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## Across Unknown South America, by

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[Illustration: The Author.]

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ACROSS UNKNOWN

SOUTH AMERICA

BY

A. HENRY SAVAGE-LANDOR

WITH 2 MAPS, 8 COLOURED PLATES, AND 260 ILLUSTRATIONS FROM PHOTOGRAPHS BY THE AUTHOR

*IN TWO VOLUMES*

VOL. I

HODDER AND STOUGHTON

LONDON NEW YORK TORONTO

*Printed in 1913*

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*by A. Henry Savage-Landor*

THIS WORK IS DEDICATED

TO

THE PEOPLE

OF THE

GREAT BRAZILIAN REPUBLIC

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PREFACE

SOUTH America is, to my mind, "the Coming Continent"--the Continent of the future. Everybody knows the wealth of the Argentine, Peru, Chile, and Bolivia; but the interior of Brazil, the largest and richest country of all, not unlike forbidden Tibet, was perhaps better known a century or two ago than now. Few people realize that Brazil is larger than the United States of North America, Germany, Portugal, and a few other countries taken together. The interior is practically a *terra incognita*--although the ancient Jesuits and, at a later date, escaped slaves and native rubber collectors have perhaps found their way inland to a considerable distance.

When I started on the transcontinental journey I did not take Europeans with me. It is not easy to find men who can stand the strain of so long a journey. I was also not surprised, although I was disappointed, not to be able to obtain suitable officers in Brazil to go part of the journey with me, so that I might be relieved of a portion of the tedious scientific work of the expedition, especially taking and computing daily astronomical observations, to which much time has to be devoted. All the work of all kinds eventually fell upon my shoulders, and after departing I found myself filling the posts of surveyor, hydrographer, cartographer, geologist, meteorologist, anthropologist, botanist, doctor, veterinary surgeon, painter, photographer, boat-builder, guide, navigator, etc. The muleteers who accompanied me--only six, all counted--were of little help to me--perhaps the reverse. So that, considering all the adventures and misfortunes we had, I am sure the reader, after perusing this book, will wonder that we got back at all, and will be indulgent enough to give me a little credit for saving, through innumerable disasters--and perhaps not altogether by mere luck--all my photographs (800 of them), all my note-books, all my scientific observations, as well as all the vocabularies I made of the various Indian languages of tribes found on my way. Also for bringing all my men out alive.

Here are, briefly, a few results of the expedition:--

(a) First of all it has proved that, far from South America's being an impenetrable continent--as was believed--it is possible for any experienced traveller to cross Brazil in any direction, if he could obtain suitable followers.

(b) It has proved that the "millions of savage Indians" supposed to be swarming all over the interior of Brazil do not exist at all. All the pure Indians of Central Brazil taken together may number a few hundreds, or including half-castes (negroes and Portuguese), a few thousands. As for the wild beasts and snakes, no one ever need fear being troubled by them. They are more afraid of you than you of them, you can take my word for it. So that the terror which has so far prevented people penetrating the interior has no reasonable ground, and this book ought to be the means of making European people some day swarm to develop that marvellous land now absolutely uninhabited.

(c) Meteorological observations were recorded daily right across Brazil.

(d) Altitude observations, forming a complete chain and including all minor undulations, were registered across the entire South American continent from the Atlantic coast at Rio de Janeiro as far as Callao on the Pacific coast. The observations were taken with a hypsometer and several excellent aneroids. These show that many of the elevations marked on the existing maps of Brazil are inaccurate, the error amounting sometimes to several hundred feet.

(e) A complete survey was made of new country between the Araguaya river and the Madeira, including a careful survey of the Arinos river and the river Arinos-Juruena, one of the most powerful tributaries of the Amazon. In the small map, reproduced from the best existing maps, at the end of the first volume, several high mountain ranges, quite as high as the Andes, may be noticed extending from north to south between the rivers Madeira, Tapajoz, Xingu, Araguaya and Tocantins. Those high ranges are merely the work of imaginative cartographers, who have drawn them to make the map look pretty. They do not exist. I have left them in order to draw the attention of the reader to them. The position of the Arinos-Juruena is from 1 to 1½ degrees farther west than it is there drawn, and should be where I have marked the red line of my route.

(f) Everything that was of interest pictorially, geologically, botanically, or anthropologically was photographed or sketched. Astronomical observations were constantly taken to determine the positions of our camps and places of importance.

Botanical and geological collections were made, but unfortunately had to be abandoned.

(g) During the journey the head waters of the following important rivers were visited: The Rio Vermelho, Rio Claro, Rio Araguaya, Rio Barreiros, Rio das Mortes, Rio S. Lourenço, the Cuyaba river, the Xingu, the Paranatinga, the Paraguay river (Paraná), the Rio Arinos, the Secundury.

(h) The entire course of the river Tapajoz was studied, and also the entire course of the Amazon from its mouth almost to its birthplace in the Andes.

(i) Useful vocabularies were drawn up of the following Indian languages: Bororo, Apiacar, Mundurucu, Campas or Antis.

(k) The expedition has furthermore shown that it is possible with poor material in the way of followers to accomplish work of unusual difficulty.

(l) That it is possible for people in a normal condition of health to go at least sixteen days without food while doing hard work.

(m) That it is possible to cross an entire continent--for one entire year--in the company of dangerous and lazy criminals without any weapon for protection--not even a penknife--and to bring forth from such poor material remarkable qualities of endurance, courage, and almost superhuman energy.

(n) Last, but not least, on that expedition I was able to collect further evidence that a theory I had long held as to the present shape of the earth was correct. I had never believed in the well-known theory that a continent, now submerged, once existed between America, Europe and Africa--in other words, where the Atlantic Ocean is now. That theory has found many followers. In support of it one is told that such islands as Madeira, the Canaries, the Azores, are the topmost peaks of a now partly submerged range of mountains which once stood upon that vanished continent. It is also a common belief that Northern Africa underwent the contrary process, and was pushed up from under the sea. That is why--it is said--the Sahara Desert, which was formerly, without doubt, an ocean bed, is now dry and above water.

One has only to look at any map of the entire world to see what really happened to the earth in days long gone by. Let me first of all tell you that there never existed a continent between Africa and South America. In fact, I

doubt whether there is as much as a square mile between those two continents more submerged to-day than it was thousands upon thousands of years ago.

Here is what really happened. The earth at one period changed its shape--when, is merely guesswork, and is of no consequence here--and the crust of the earth--not the core, mind you--split into two great gaps from Pole to Pole, with a number of other minor fissures. In other words, the earth opened just like the skin of an over-heated baked apple. The African and American continents, as well as Australasia, with New Guinea, the Celebes Islands, the Philippine Archipelago and China, which before that event formed part of one immense continent, thus became divided, leaving North and South America isolated, between the two great Oceans--the Atlantic and the Pacific--which were then, and only then, formed.

It is easy, by looking intelligently at a map, to reconstruct the former shape of the world. You will notice that the most western portion of Africa fits exactly into the gap between North and South America, while the entire African coast between Dahomey and the Cape Colony fits in perfectly in all its indentations and projections into the coast line of South America. The shores of Western Europe in those days were joined to North America, and find to-day their almost parallel and well-fitting coast line on the east coast of the United States and Canada. On the opposite side of the world, the western side of South America, the same conditions can be noticed, although the division of the two continents (America and Asia) is there much wider. Fragments were formed, leaving innumerable islands scattered in the Pacific Ocean, half-way between the actual continents of Asia, Australia and America. A mere glance is sufficient to see how well Australia fits in along the Chilian and Peruvian coast, the great island of New Guinea along part of Peru and Ecuador, and the west coast of the Central American Isthmus. The Philippine Islands lay probably in those days alongside of Guatemala, while California bordered on Japan.

Such immense rivers as the Amazon, and its portentous tributaries flowing from south to north, were also formed perhaps at that time, great fissures caused by the sudden splitting and cooling of the earth's crust becoming the river beds. So perhaps was formed the giant cañon of Colorado and the immense fissures in the earth's crust that occur in Central Asia, in Central Africa, and, as we shall see, on the central plateau of Brazil.

Undoubtedly the Antarctic continent was once joined to South America, Australia and Africa. During the last Antarctic expeditions it has been shown that the same geological formation exists in South America as in the Antarctic plateau. On perusing this book, the reader will be struck by the wonderful resemblance between the Indians of South America, the Malay races of Asia, and the tribes of Polynesia. I maintain that they not only resemble each other, but are actually the same people in different stages of development, and naturally influenced to a certain extent by climatic and other local conditions. Those people did not come there, as has been supposed, by marching up the entire Asiatic coast, crossing over the Behring Straits and then down the American coast, nor by means of any other migration. No, indeed; it is not they who have moved, but it is the country under them which has shifted and separated them, leaving members of the same race thousands of miles apart.

I was able to notice among the Indians of Central Brazil many words of Malay origin, others closely resembling words of languages current among tribes of the Philippine Islands. The anthropometric measurements which I took of South American Indians corresponded almost exactly with those of natives of the Sulu Archipelago and the island of Mindanao.

I hope some day to use the wealth of material I have collected among innumerable tribes on the Asiatic coast, on the islands of the Pacific Ocean, in South America and in Africa, in making a comparative study of those peoples. It should prove interesting enough. I have no space here to go deeply into the subject, as this is merely a book descriptive of South America. I may add that the most ardent supporter of the above theory is the celebrated explorer and scientist, Colonel Marchand, of Fashoda fame--a man who has studied and understands the mysteries of this world better than any man living.

My sincere thanks are due to the following gentlemen for much politeness shown me in connection with the expedition: To Mr. Gustave Babin, the famous writer of Paris; to Mr. Manoel Bomfin (ex-deputy of Brazil), to Senador Alcindo Guanabara, for the keen interest taken in the expedition and for proposing to Congress after my return that a grant of £4,000 should be given to me as a reward for the work done. I herewith also express my gratitude to the Brazilian Government for paying me that sum, which came in usefully to defray part of the expenses of the expedition. To H.E. Dr. Pedro de Toledo, Minister of Agriculture, for the intelligent desire shown to help as much as he could in the venture, and for kindly giving me the free use of all the telegraphs in Brazil, including the Amazon Cable, and other important privileges; to Dr. José Carlos Rodriguez for hospitality and much valuable advice; to Dr. Paolo de Frontin, *Conseilheiro Antonio Prado*, Dr. José Pereira Rebonças and Mr. Mockill and their respective Companies for the many privileges granted me upon the various railways of which they were the Presidents; to Colonel R. E. Brazil and Commandante Macedo for their kind hospitality to me while navigating the lower Tapajoz river; to Dr. A. B. Leguia, President of the Peruvian Republic; to the British Ministers at Petropolis, Lima, La Paz, and Buenos Ayres, and the British Consuls of Rio de Janeiro, Pará, Manaus, Iquitos, Antofogasta, Valparaiso; finally to the British and American Residents at all those places for much exquisite hospitality offered me.

Special thanks are due to Mr. Regis de Oliveira, ex-Brazilian Minister in London, for valuable credentials given me before my departure which paved the way to the hearty reception I received everywhere in Brazil.

A. HENRY SAVAGE-LANDOR.

SAVOY HOTEL, LONDON.

*September 1913.*

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## CHAPTER I

The Heart of Brazil--Brazil, its Size and its Immense Wealth--Rio de Janeiro--Brazilian Men of Genius--São Paulo--The *Bandeirantes*--The Paulista Railway

"MORE than three months to reach the spot?" asked the cinematograph man in amazement. "Then perhaps Monsieur is on a journey to Mars or the moon! There is no spot on earth that takes so long to reach." (Hearty laughter at his own wit.)

That exclamation, and wise words that follow, came from the assistant of one of the largest firms of cinematograph appliances in Paris, where I had called in order to purchase a moving picture apparatus and 10,000 metres of film to be used on my forthcoming journey across the South American continent.

The shop assistant had very honestly warned me that if the films were to be used in a damp, tropical climate, they must be exposed and developed within three months of their manufacture. After that time they would become so perforated and fogged as to be quite useless. I had remarked that it would take me more than three months to reach the spot where I should begin to take cinematograph pictures.

"Will Monsieur please tell where is the spot where he would be likely to use the films?" continued the assistant, still overcome with surprise.

"In the heart of Brazil."

"In the heart of Brazil ... in the very heart of Brazil?... *Oh, mon Dieu! mon Dieu!*" (More laughter and a look of compassion at me.) "*Mais nous avons une de nos maisons tout à fait près de là!*" (Why, indeed, we have one of our factories quite close to there.)

It was then my turn for hearty laughter and the look of compassion.

"Pray," I inquired, "tell me more exactly. Where is your factory close to the heart of Brazil?"

"It is quite, quite close. It is in Montreal, Canada.... You will send your films there ... two or three days' journey.... It will take us a week to develop them ... two or three days for their return journey. In a fortnight you will have them back again."

Quite close, indeed: only a distance of some 65° of latitude--or some 7170 kilometres as the crow flies--with no direct communication by land or water!

That was the Frenchman's knowledge of geography; but I find that the average Englishman, unless he is directly interested in those countries, knows little better, and perhaps even less. Time after time I have been asked in London if Brazil were not a province of Mexico, and whether it is not through Brazil that the Americans are cutting the Panama Canal! There are many who have a vague idea that Brazil is a German colony; others, more patriotic, who claim it as an English possession. Many of those who have looked at the map of the world are under the impression that Spanish is spoken in Brazil, and are surprised when you tell them that Portuguese happens to be the local language. Others, more enlightened in their geography by that great play *Charley's Aunt*, imagine it a great forest of nut trees. Others, more enlightened still, believe it to be a land where you are constantly walking in avenues adorned with wonderful orchids, with a sky overhead swarming with birds of beautiful plumage. I have been asked in all seriousness whether I found the Andes quite flat--great prairies (the person had heard of the Argentine *pampas* and got mixed up)--or whether "it" was merely a large lagoon!

I could quote dozens more of these extreme cases of ignorance, but of one thing I am certain, and that is, that there are few people in the British Isles who realize the actual size of the great Brazilian Republic.

Brazil is 8,524,778 square kilometres--with the territory of the Acre newly acquired from Bolivia, 8,715,778 sq. kil. in extent; that is to say, it covers an area larger than the United States of North America, Germany, Portugal, Greece and Montenegro taken together.

Some of the States of the Republic are larger than some of the largest countries in Europe: such as the State of the Amazonas with 1,894,724 sq. kil.; the State of Matto Grosso with 1,378,784 sq. kil.; the State of Pará with an area of 1,149,712 sq. kil.; the State of Goyaz with 747,311 sq. kil.; the State of Minas Geraes with 574,855 sq. kil.; the Acre territory, 191,000 sq. kil.

There are fewer people still who seriously appreciate the great importance of that beautiful country--with no exception the richest, the most wonderful in the world; to my mind undoubtedly the continent of the future.

Incalculable is the richness of Brazil in mineral wealth. Magnificent yellow diamonds are to be found in various regions, those of Minas Geraes and Matto Grosso being famous for their purity and extraordinary brilliancy; agates, moonstones, amethysts, emeralds, sapphires, rubies, topazes, and all kinds of beautiful rock crystals are plentiful. Gold exists in many regions on the central plateau--but particularly in Minas Geraes and Matto Grosso; and platinum in the States of São Paulo, Minas Geraes, Sta. Catharina and Espirito Santo; silver, mercury, lead, tin, salicylated and natural copper are found in many places, as well as graphite, iron, magnetic iron, oxide of copper, antimony, argentiferous galena, malachite, manganese oxide, alum, bituminous schist, anthracite, phosphate of lime, sulphate of sodium, hæmatite, monazitic sands (the latter in large quantities), nitrate of potassium, yellow, rose-coloured, and opalescent quartz, sulphate of iron, sulphate of magnesia, potash, kaolin. Coal and lignite of poor quality have been discovered in some regions, and also petroleum, but not in large quantities.

[Illustration: Rio de Janeiro, showing the beautiful Avenida Central.]

Springs of thermal and mineral waters are numerous--particularly those of which the waters are sulphurous or ferruginous; others contain arsenic and magnesia.

Most beautiful marble of various colours is to be found, and also enormous quantities of mica and amianth; porphyry and porphyroid granite, carbonated and hydroxided iron, argillaceous schist, mica schist.

Even richer than the mineral wealth is the botanical wealth, hitherto dormant, of Brazil. Valuable woods occur in many Brazilian forests--although it must not for one moment be imagined that entire forests are to be found composed of useful woods. Indeed this is not the case. Most of the woods are absolutely valueless. Still, when it is realized that the forests of Brazil extend for several millions of square kilometres, it is easy to conceive that there is plenty of room among a majority of poor trees for some good ones. Most Brazilian woods are interesting on account of their high specific gravity. Few, very few, will float on water. On the central plateau, for instance, I could not find a single wood which floated--barring, under special conditions, the burity palm (*Mauritia vinifera* M.). Along the banks of the Amazon and in the northern part of Brazil this is not quite the case. Some Brazilian woods, such as the iron-tree (pao-ferro), whose name fitly indicates its character, are of extraordinary hardness. The Brazilian forest, although not specially rich in woods for building and naval purposes, is nevertheless most abundant in lactiferous, oliferous, fibrous, medicinal, resinous, and industrial plants--such for instance as can be used for tanning purposes, etc. No country in the world is as rich as Brazil in its natural growth of rubber trees; nor have I ever seen anywhere else such beautiful and plentiful palms: the piassava (*Attalia fumifera* M.), the assahy (*Euterpe oleracea* L.), the burity (*Mauritia vinifera* M.), the carnahuberia (*Copernicia cerifera* M.), the palmito (*Euterpe edulis* M.), and many others. I shall give a more detailed description of the most important of these plants as we proceed on our journey and find them in their habitat.

Where, perhaps, Brazil's greatest richness lies is in its hundreds of thousands of square miles of wonderful pasture lands--perfectly ideal, with plenty of excellent water and a delicious climate--capable of some day fattening enough cattle to supply half the world with meat.

All these wonderful riches are absolutely dormant; more than that, absolutely wasted for lack of population, for lack of roads, trails, railways, or navigation of the rivers. The coast of Brazil is highly civilized, and so, more or less, is the immediate neighbourhood of large cities; but the moment you leave those cities, or the narrow zone along the few hundred kilometres of railways which now exist, you immediately relapse into the Middle Ages. When you get beyond the comparatively narrow belt of semi-civilization, along the coast, Brazil is almost as unknown as Mars or the moon. The people who know least the country are, curiously enough, the Brazilians themselves. Owing greatly to racial apathy, they care little for the trouble of developing their beautiful land. They watch with envy strangers taking gold, diamonds, platinum, and precious stones out of their country. They accuse foreigners of going there to rob them of their wealth; yet you seldom meet a Brazilian who will venture out of a city to go and help himself. The Brazilian Government is now beginning to wake up to the fact that it is the possessor of the most magnificent country on earth, and it is its wish to endeavour to develop it; but the existing laws, made by short-sighted politicians, are considered likely to hamper development for many years to come.

Brazil is not lacking in intelligent men. Indeed, I met in Rio de Janeiro and S. Paulo men who would be remarkable anywhere. Councillor Antonio Prado of S. Paulo, for instance, was a genius who had done wonders for his country. The great development of the State of S. Paulo compared with other States is chiefly due to that great patriot. Then the Baron de Rio Branco--the shrewd diplomatist, who has lately died--has left a monument of good work for his country. The cession of the immensely rich tract of the Acre Territory by Bolivia to Brazil is in itself a wonderful achievement. Dr. Pedro de Toledo, the present Minister of Agriculture, is a practical, well-enlightened, go-ahead gentleman, who makes superhuman efforts, and in the right direction, in order to place his country among the leading states of the two Americas. Dr. Lauro Severiano Müller, the new Minister of Foreign Affairs, is a worthy successor of Baron de Rio Branco. There are many other persons of positive genius, such as Senator Alcindo Guanabara, a man of remarkable literary ability, and one of the few men in Brazil who realize thoroughly the true wants of the Republic, a man of large views, who is anxious to see his country opened up and properly developed. Another remarkable man is Dr. José Carlos Rodriguez, the proprietor of the leading newspaper in Rio--the *Jornal do Commercio*--and the organizing genius of some of the most important Brazilian commercial ventures. Having had an American and English education, Dr. Rodriguez has been able to establish in Rio the best edited and produced daily newspaper in the world. Its complete service of telegraphic news from all over the globe--on a scale which no paper, even in England, can equal or even approach--the moderate tone and seriousness of its leading articles, its highly reliable and instructive columns on all possible kinds of subjects by a specially able staff of the cleverest writers in Brazil, and the refined style in which it is printed, do great honour to Dr. Rodriguez. Then comes another man of genius--Dr. Francisco Pereira Passos, who, with Dr. Paulo de Frontin, has been able in a few years to transform Rio de Janeiro from one of the dirtiest and ugliest cities in South America into the most beautiful. The great drive around the beautiful bay, the spacious new Avenida Central--with its parallel avenues of great width--the construction of a magnificently appointed municipal theatre, the heavenly road along the Tijuca mountains encircling and overlooking the great harbour, and a thousand other improvements of the city are due to those two men. Dr. Paulo Frontin has also been active in developing the network of railways in Brazil. Whatever he has undertaken, he has accomplished with great judgment and skill.

[Illustration: Rio de Janeiro as it was in 1903.]

It would be impossible to enumerate here all the clever men of Brazil. They are indeed too numerous. The older generation has worked at great disadvantage owing to the difficulty of obtaining proper education. Many are the illiterate or almost illiterate people one finds even among the better classes. Now, however, excellent and most up-to-date schools have been established in the principal cities, and with the great enthusiasm and natural facility in learning of the younger generations wonderful results have been obtained. On account partly

of the exhausting climate and the indolent life that Brazilians are inclined to lead, a good deal of the enthusiasm of youth dies out in later years; still Brazil has in its younger generation a great many men who are ambitious and heartily wish to render their country service. It is to be hoped that their efforts may be crowned with success. It is not talent which is lacking in Brazil, it is not patriotism; but persistence is not perhaps the chief characteristic among races of Portuguese descent. In these days of competition it is difficult to accomplish anything great without labour and trouble.

I left London on December 23rd, 1910, by the Royal Mail steamship *Amazon*, one of the most comfortable steamers I have ever been on.

We touched at Madeira, Pernambuco, and then at Bahia. Bahia seen from the sea was quite picturesque, with its two horizontal lines of buildings, one on the summit of a low hill-range, the other along the water line. A border of deep green vegetation separated the lower from the upper town. A massive red building stood prominent almost in the centre of the upper town, and also a number of church towers, the high dome of a church crowning the highest point.

I arrived in Rio de Janeiro on January 9th, 1911.

It is no use my giving a description of the city of Rio de Janeiro. Everybody knows that it is--from a pictorial point of view--quite a heavenly spot. Few seaside cities on earth can expect to have such a glorious background of fantastic mountains, and at the same time be situated on one of the most wonderful harbours known. I have personally seen a harbour which was quite as strangely interesting as the Rio harbour--but there was no city on it. It was the Malampaya Sound, on the Island of Palawan (Philippine Archipelago). But such an *ensemble* of Nature's wonderful work combined with man's cannot, to the best of my knowledge, be found anywhere else than in Rio.

It does not do to examine everything too closely in detail when you land--for while there are buildings of beautiful architectural lines, there are others which suggest the work of a pastrycook. To any one coming direct from Europe some of the statuary by local talent which adorns the principal squares gives a severe shock. Ladies in evening dress and naked cupids in bronze flying through national flags flapping in the wind, half of their bodies on one side, the other half on the other side of the flags, look somewhat grotesque as you approach the statues from behind. But Rio is not the only place where you see grotesque statuary--you have not to go far from or even out of London to receive similar and worse shocks. If Rio has some bad statues it also possesses some remarkably beautiful ones by the sculptor Bernardelli--a wonderful genius who is now at the head of the Academy of Fine Arts in Rio. This man has had a marvellous influence in the beautifying of the city, and to him are due the impressive lines of the finest buildings in Rio, such as the Academy of Fine Arts. Naturally, in a young country like Brazil--I am speaking of new Brazil, now wide awake, not of the Brazil which has been asleep for some decades--perfection cannot be reached in everything in one day. It is really marvellous how much the Brazilians have been able to accomplish during the last ten years or so in their cities, on or near the coast.

Brazilians have their own way of thinking, which is not ours, and which is to us almost incomprehensible. They are most indirect in their thoughts and deeds--a characteristic which is purely racial, and which they themselves cannot appreciate, but which often shocks Europeans. For instance, one of the most palatial buildings in the Avenida Central was built only a short time ago. In it, as became such an up-to-date building, was established a lift. But do you think that the architect, like all other architects anywhere else in the world, would make the lift start from the ground floor? No, indeed. The lift only starts from the second floor up--and, if I remember rightly, you have to walk some thirty-eight steps up a grand staircase before you reach it! Do you know why? Because the architect wished to compel all visitors to the building to admire a window of gaudy coloured glass half-way up the staircase. In this way they reason about nearly everything. They have not yet mastered the importance and due proportion of detail. Frequently what is to us a trifling detail is placed by them in the forefront as the most important point of whatever they undertake.

Thanks to the strong credentials I carried--among which were letters from H.E. Regis de Oliveira, Brazilian Minister in London--I was received in Rio de Janeiro with the utmost consideration and kindness. From the President of the Republic to the humblest citizens, all with no exception treated me with charming civility. My stay in Rio was a delightful one. The Brazilians of the principal cities were most courteous and accomplished, and it was a great pleasure to associate with them. Intense interest was shown by the Government of the country and by the people in my plan to cross the continent. Dr. Pedro de Toledo, the Minister of Agriculture, was specially interested in the scheme, and it was at first suggested that the expedition should be an Anglo-Brazilian one, and that I should be accompanied by Brazilian officers and soldiers. Colonel Rondon, a well-known and brave officer, was ordered by the Government to find suitable volunteers in the army to accompany my expedition. After a long delay, Colonel Rondon informed me that his search had been unsuccessful. Colonel Rondon said he would have gladly accompanied the expedition himself, had he not been detained in Rio by his duties as Chief of the Bureau for the Protection and Civilization of the Indians. Another officer offered his services in a private capacity, but he having become involved in a lawsuit, the negotiations were suddenly interrupted.

[Illustration: Dr. Pedro de Toledo, Minister of Agriculture, Brazil.]

I endeavoured to find suitable civilians. No one would go. The Brazilian forest, they all said, was worse, more impenetrable than any forest in the world. Brazilian rivers were broader, deeper and more dangerous than any river on earth. Wild beasts in Brazil were more numerous and wilder than the wildest animals of Africa or Asia. As for the Indians of Central Brazil, they were innumerable--millions of them--and ferocious beyond all conception. They were treacherous cannibals, and unfortunate was the person who ventured among them. They told stories galore of how the few who had gone had never come back. Then the insects, the climate, the terrible diseases of Central Brazil were worse than any insect, any climate, any terrible disease anywhere. That is more or less the talk one hears in every country when about to start on an expedition.

I had prepared my expedition carefully, at a cost of some £2,000 for outfit. Few private expeditions have ever started better equipped. I carried ample provisions for one year (tinned meats, vegetables, 1,000 boxes of sardines, fruits, jams, biscuits, chocolate, cocoa, coffee, tea, etc.), two serviceable light tents, two complete sets of instruments for astronomical and meteorological observations, and all the instruments necessary for making an accurate survey of the country traversed. Four excellent aneroids--which had been specially constructed for me--and a well-made hypsometrical apparatus with six boiling-point thermometers, duly tested at the Kew Observatory, were carried in order to determine accurately the altitudes observed. Then I possessed two prismatic and six other excellent compasses, chronometers, six photographic cameras, specially made for me, with the very best Zeiss and Goertz lenses, and some 1,400 glass photographic plates--including some for colour photography. All articles liable to be injured by heat and damp were duly packed in air- and water-tight metal cases with outer covers of wood. Then I carried all the instruments necessary for anthropometric work, and painting materials for recording views and scenes in colours when the camera could not be used, as at night or when the daylight was insufficient. I had a complete supply of spades, picks, large saws, axes, and heavy-bladed knives (two feet long) for cutting our way through the forest, making roads and constructing rafts, canoes and temporary bridges.

I carried, as usual, very little medicine--merely three gallons of castor oil, a few bottles of iodine, some formiate of quinine, strong carbolic and arsenical soaps, permanganate and other powerful disinfectants, caustic--that was about all. These medicines were mostly to be used, if necessary, upon my men and not upon myself.

I had twelve of the best repeating rifles that are made, as well as excellent automatic pistols of the most modern type, and several thousand rounds of ammunition--chiefly soft-nosed bullets. These weapons were carried in order to arm my followers. Although I had several first-class rifles for my own use--following my usual custom, I never myself carried any weapons--not even a penknife--upon my person except when actually going after game. Again on this occasion--as on previous journeys--I did not masquerade about in

fancy costumes such as are imagined to be worn by explorers, with straps and buckles and patent arrangements all over. I merely wore a sack coat with ample pockets, over long trousers such as I use in town. Nor did I wear any special boots. I always wore comfortable clothes everywhere, and made no difference in my attire between the Brazilian forest and Piccadilly, London. When it got too hot, naturally I removed the coat and remained in shirt sleeves; but that was all the difference I ever made in my wearing apparel between London and Central Brazil. I have never in my life adopted a sun helmet--the most absurd, uncomfortable and grotesque headgear that was ever invented. I find, personally, that a common straw hat provides as much protection as any healthy person requires from the equatorial sun.

If I give these details, it is merely because they might be of some use to others--not because I wish to advertise these facts; and also, if I do not give the names of the firms which supplied the various articles, it is because--unlike many other explorers--I have been in the custom of never letting my name be used in any way whatever for advertising purposes.

There are many people who are enthusiastic over a dangerous project when they first hear of it, but on thinking it over and talking with friends and relatives their enthusiasm soon wears off. That is what happened in Rio. I wasted some time in Rio--socially most enjoyably employed--in order to get followers and come to some suitable arrangement with the Government. I was deeply indebted to the Minister of Agriculture, Dr. Pedro de Toledo, for allowing me the free use of all the telegraphs in Brazil, and also for a special permission (of which I never availed myself) to use, if necessary, the flotilla of Government boats on the Amazon. Credentials were also furnished me, but owing to the way in which they were worded they were more of a danger to me than a protection. They actually proved to be so once or twice when I was compelled to present them. The expedition was considered so dangerous that the Government published broadcast statements in the official and other papers stating that "Mr. A. H. Savage Landor's expedition across Brazil was undertaken solely at his own initiative and absolutely at his own risk and responsibility." They also circulated widely the statement that I had promised not in any way to injure or hurt the native Indians, that I would not supply them with firearms of any kind, and that I would in no way ill-treat them. I had gladly promised all that. I had not even dreamt of doing any of those things to the natives, and naturally I strictly kept my promise.

In a luxurious Administration car placed at my disposal by Dr. Paulo Frontin I left Rio by the Central Railway, escorted as far as S. Paulo by Dr. Carlo da Fonseca, a railway engineer, sent to look after my comfort by the Central Brazilian Railway Company.

On approaching S. Paulo in the early morning I was much struck by the activity of the waking city as compared with Rio. Carts were dashing to and fro in the streets, the people walked along fast as if they had something to do, and numerous factory chimneys ejected clouds of smoke, puffing away in great white balls. The people stopped to chat away briskly as if they had some life in them. It seemed almost as if we had suddenly dropped into an active commercial European city. The type of people, their ways and manners were different from those of the people of Rio--but equally civil, equally charming to me from the moment I landed at the handsome railway station.

With a delicious climate--owing to its elevation--with a population of energetic people chiefly of Italian origin, instead of the apathetic mixture of Portuguese and negro, S. Paulo was indeed the most flourishing city of the Brazilian Republic. Its yearly development was enormous. Architecturally it was gradually becoming modified and improved, so that in a few years it will be a very beautiful city indeed. Already the city possessed beautiful avenues and a wonderful theatre.

[Illustration: Senador Alcindo Guanabara, a great Literary Genius and Patriot of Brazil.]

Everybody knows what an important part the enterprising people of S. Paulo have played in the expansion and colonization of the central and southern regions of Brazil. The early activity of the Paulistas--it dates back to 1531--can be traced from the River Plate on the south, to the head waters of the Madeira in Matto Grosso on



the east, and as far as Pianry on the north.

I cannot indulge here, as I should like to do, in giving a complete historical sketch of the amazing daring and enterprise of those early explorers and adventurers and of their really remarkable achievements. Their raids extended to territories of South America which are to-day almost impenetrable. It was really wonderful how they were able to locate and exploit many of the most important mines within an immense radius of their base.

The history of the famous Bandeiras, under the command of Raposo, and composed of Mamelucos (crosses of Portuguese and Indians) and Tupy Indians, the latter a hardy and bold race, which started out on slave-hunting expeditions, is thrilling beyond words and reads almost like fiction. The ways of the Bandeirantes were sinister. They managed to capture immense numbers of slaves, and must have killed as many as they were able to bring back or more. They managed, therefore, to depopulate the country almost entirely, the few tribes that contrived to escape destruction seeking refuge farther west upon the slopes of the Andes.

Although the Brazilians--even in official statistics--estimate the number of pure savage Indians in the interior at several millions, I think that the readers of this book will be convinced, as I was in my journey across the widest and wildest part of Brazil, that perhaps a few hundreds would be a more correct estimate. Counting half-castes, second, third and fourth crosses, and Indians who have entirely adopted Portuguese ways, language and clothes, they may perhaps amount to several thousand--but that is all.

The Jesuits endeavoured to save the Indians from the too-enterprising Bandeirantes, with the result that the missions were destroyed also and the missionaries driven away or killed.

Brazil occupies to-day in the world's knowledge practically the same position that forbidden Tibet occupied some fifteen or twenty years ago. It was easier to travel all over Brazil centuries ago than now.

The Bandeirantes became extraordinarily daring. In 1641 another slave-hunting Paulista expedition started out to sack the missions of Paraguay and make great hauls of converted Indians. The adventurers invaded even the impenetrable territory of the Chaco. But, history tells us, the Jesuits, who were well prepared for war, were not only able to trap the 400 Paulista Bandeirantes in an ambush and to set free their prisoners, but killed a great number of them, 120 of the adventurous Bandeirantes thus supplying a handsome dinner for the cannibal Chaco Indians. Infuriated at the reverse, the survivors of the expedition destroyed all the missions and Indian villages upon their passage, not one escaping. They came to grief, however, in the end. Few only returned home to tell the tale. That lesson practically ended the slave-hunting expeditions on a large scale of the Bandeirantes, but not the expeditions of parties in search of gold and diamonds, many of which were extraordinarily successful. Minor expeditions were undertaken in which Paulista adventurers were employed under contract in various parts of Brazil for such purposes as to fight the Indians or to break up the so-called Republic of the Palmeiras--an unpleasant congregation of negroes and Indians.

The astonishing success which the dauntless Paulistas had obtained everywhere made them thirst for gold and diamonds, which they knew existed in the interior. They set out in great numbers--men, women, and children--in search of wealth and fresh adventure. Several of the towns in distant parts of the interior of Brazil owe their origin to this great band of adventurers, especially in the section of Brazil now called Minas Geraes. The adventurers were eventually outnumbered and overpowered by swarms of Brazilians from other parts of the country, and by Portuguese who had quickly arrived in order to share in the wealth discovered by the Paulistas. They finally had to abandon the mines which they had conquered at an appalling loss of human life.

The ardour of the Paulistas was quelled but not extinguished. About the year 1718 they started afresh to the north-west in the direction of the Cuyaba River and of Goyaz, where they had learnt that gold and diamonds of great beauty were to be found. So many joined in these adventurous expeditions that S. Paulo was left almost depopulated. That is how those immense territories of Goyaz and Matto Grosso were discovered and annexed to S. Paulo, but eventually, owing to their size, these became split up into *capitaneas*, then into

states.

The Paulistas were great fighters. In 1739 they were able to drive away the Spaniards from Rio Grande do Sul and forced them to retreat into Uruguay. After many years of vicissitudes in war and exploration--after phases of prosperity, oppression, and even of almost total ruin, owing to maladministration and official greed--things began to look up again for São Paulo when the port of Santos was thrown open to the trade of the world, in 1808. The history of Brazil during the last hundred years is too well known to be repeated here.

During the last few years the State of São Paulo has attained amazing prosperity, principally from the export of coffee--perhaps the most delicious coffee in the world. Although nearly all the rivers of the State of São Paulo are absolutely useless for navigation, owing to dangerous rapids, the State is intersected by innumerable streams, large and small--of great importance for purposes of irrigation and for the generation of electric power. The most important harbour in the State is Santos. Ubatuba, São Sebastião, Iguape and Carranca are ports of less consequence. It is principally from Santos that the exportation of coffee takes place.

[Illustration: The Municipal Theatre, Rio de Janeiro.]

The State extends roughly in a parallelogram from the ocean, south-east, to the Parana River, north-west; between the Rio Grande, to the north, and the Rio Paranapanema, to the south, the latter being two tributaries of the Parana River. The State can be divided into two distinct zones, one comprising the low-lying lands of the littoral, the second the tablelands of the interior north-west of the Serra Cadias, Serra do Paranapiacaba and Serra do Mar--along or near the sea-coasts. The first zone by the sea is extremely hot and damp, with swampy and sandy soil often broken up by spurs from the neighbouring hill ranges. It is well suited for the cultivation of rice. The second zone, which covers practically all the elevated country between the coast ranges and the Parana River, is extraordinarily fertile, with a fairly mild climate and abundant rains during the summer months. During the winter the days are generally clear and dry.

It is in that second zone that immense coffee plantations are to be found, the red soil typical of that tableland being particularly suitable for the cultivation of the coffee trees.

It is hardly necessary here to go into detailed statistics, but it may be sufficient to state, on the authority of the Directoria de Estatistica Commercial of Rio de Janeiro, that during the first eleven months of the year 1912, 10,465,435 sacks of coffee were exported from Brazil--mostly from São Paulo--showing an increase of 548,854 sacks on eleven months of the previous year. That means a sum of £40,516,006 sterling, or £5,218,564 more than the previous year; the average value of the coffee being, in 1912, 58,071 milreis, or, taking the pound sterling at 15 milreis, £3 17s. 5½d. a sack--an increase in price of 4,628 reis = 6s. 2d. per sack, on the sales of 1911.

The other exports from the State of São Paulo are flour, mandioca, cassava, bran, tanned hides, horns, fruit (pineapples, bananas, cocoanuts, abacates (alligator pears), oranges, tangerines, etc.), wax, timber (chiefly jacarandã or rosewood), a yearly decreasing quantity of cotton, steel and iron, mica, goldsmith's dust, dried and preserved fish, scrap sole leather, salted and dry hides, wool, castor seed or bean, crystal, *mate*, rice, sugar, rum (*aguardente*) and other articles of minor importance.

The area of the State of São Paulo has been put down at 290,876 sq. kil.

Its population in 1908 was calculated at 3,397,000, and it had then more inhabitants to the square kilometre than any other part of Brazil. It is useless to give actual figures of the population, for none are reliable. Although this State is the most civilized in Brazil, yet a good portion of its western territory is still practically a *terra incognita*, so that even the best official figures are mere guess-work.

Owing to the wonderful foresight of that great man, Antonio Prado--to my mind the greatest man in Brazil--a

new industry has been started in the State of São Paulo which promises to be as lucrative and perhaps more so than the cultivation of coffee. It is the breeding of cattle on a gigantic scale, the magnificent prairies near Barretos, in the northern part of the State, being employed for the purpose. Slaughter-houses and refrigerating plants of the most modern type are to be established there, and with such a practical man as Antonio Prado at the head of the enterprise, the scheme is bound, I should think, to be a success. With the population of the Republic gradually increasing--it could be centupled and there would still be plenty of room for as many people again--the São Paulo State will one day supply most of the meat for the principal markets of Brazil. A good deal of the cattle which will eventually be raised on the marvellous campos of Matto Grosso and Goyaz, and destined to Southern Brazilian markets, will find its way to the coast via São Paulo. The rest will travel perhaps via Minas Geraes.

For some years cattle breeding has been carried on successfully enough, but on a comparatively small scale, in this State. Experiments have been made in crossing the best local breeds, principally the Caracù, with good foreign breeds, such as the Jersey, Durham and Dutch stocks. Pigs of the Berkshire, Yorkshire, Canasters and Tatus type are the favourites in São Paulo, and seem to flourish in that climate.

Sheep-breeding is also successful, and would be even more so if proper care were taken of the animals. Of the wool-producing kinds, those preferred are the Leicester, Merino, Oxford and Lincoln, the Oxford having already produced quite excellent results.

The Government of the State, I understand, is at present giving great attention to the matter, and is using discrimination in the selection of suitable breeds from foreign countries in order to procure the best animals of various kinds for the production of meat, butter, and hides. I also believe that an endeavour is being made to produce in the State a good breed of horses for military and other purposes.

The elevation of São Paulo city is 2,450 ft. above the sea level.

Thanks to the kindness of the President of the Paulista Railway, a special saloon carriage was placed at my disposal when I left São Paulo, and a railway inspector sent to escort me and furnish me with any information I required. I preferred travelling seated in front of the engine, where I could obtain the full view of the interesting scenery through which we were to pass.

[Illustration: Baron de Rio Branco.]

The Paulista Railway was interesting, as it was the first line in Brazil constructed entirely with Brazilian capital. The line was begun in 1870, but since that date several extensions have been successfully laid out. Up to 1909 the lines owned and worked by the Paulista Railway were the 1-60-metre-gauge trunk line from Jundiahy to Descalvado (north of S. Paulo), and the two branch lines of the same gauge from Cordeiro to Rio Claro; Laranja Azeda to S. Veridiana; the two branch lines of 0-60 m. gauge from Descalvado to Aurora and from Porto Ferreira to S. Rita do Passo Quatro. Then they possessed the one-metre trunk line from Rio Claro to Araraquara, with the following branch and extension lines: Visconde de Rio Claro to Jahu; Araraquara to Jaboticabal; Bebedouro to Barretos; Mogy Guasso Rincão to Pontal; S. Carlos to S. Euxodia and Rib. Bonita; Agudos to Dois Corregos and Piratininga; and the loop line through Brotas. Of the total charters for 1,114 kil. 261 have been granted by the Federal Government and are under their supervision, whereas 583 kil. are under charter granted by the State of São Paulo.

The following statistics taken from the last Brazilian Year Book show the wonderful development of the passenger and goods traffic on the Paulista Railway:--

Line open.	Goods carried.	Passengers including
Transport of	Baggage and	Animals.
Carried.	Coffee.	Parcels.
Kilometres.	Tons.	Tons.
1872	38	33,531

26,150 | 4,919 | -- 1890 | 250 | 348,150 | 300,857 | 5,768 | 2,613 1908 | 1,154 | 1,084,081 | 959,742 | 36,072 |  
 12,558 ----+-----+-----+-----+-----+-----

At Jundiahy the Paulista Company has extensive repairing shops for engines. Formerly they had there also shops for building carriages, but these are now constructed at the Rio Claro Station, partly from material which comes from abroad. The rolling stock of the Company is excellent in every way--quite up-to-date, and kept in good condition--almost too luxurious for the kind of passengers it has to carry.

It is principally after leaving Campinas that the scenery of the line is really beautiful--wonderful undulating country--but with no habitations, except, perhaps, a few miserable sheds miles and miles apart. At Nueva Odena the Government is experimenting with Russian and Italian labourers, for whom it has built a neat little colony. After a time each labourer becomes the owner of the land he has cultivated. I am told that the colony is a success.

**CHAPTER II**

## Coffee--The Dumont Railway

MY object in travelling by the Paulista Railway was to inspect the line on my way to the immense coffee plantations at Martinho Prado, owned by Conselheiro Antonio Prado. The estate is situated at an elevation above the sea level of 1,780 ft., upon fertile red soil. It is difficult, without seeing them, to realize the extent and beauty of those coffee groves--miles and miles of parallel lines of trees of a healthy, dark green, shining foliage. A full-grown coffee tree, as everybody knows, varies in height from 6 ft. to 14 or 15 ft. according to the variety, the climate, and quality of the soil. It possesses a slender stem, straight and polished, seldom larger than 3 to 5 in. in diameter, from which shoot out horizontal or slightly oblique branches--the larger quite close to the soil--which gradually diminish in length to its summit. The small white blossom of the coffee tree is not unlike jessamine in shape and also in odour. The fruit, green in its youth, gradually becomes of a yellowish tint and then of a bright vermilion when quite ripe--except in the Botucatú kind, which remains yellow to the end.

The fruit contains within a pericarp a pulp slightly viscous and sweet, within which, covered by a membrane, are the two hemispherical coffee beans placed face to face and each covered by a tender pellicle. It is not unusual to find a single bean in the fruit, which then takes the shape of an ellipsoid grooved in its longer axis--and this is called *moka* owing to the resemblance which it bears to the coffee of that name.

The coffee chiefly cultivated in Brazil is the *Arabica* L. and to a small extent also the *Liberica* Hiern, but other varieties have developed from those, and there are crosses of local kinds such as the Maragogyne, which takes its name from the place where it was discovered (Bahia Province). Those varieties are locally known as Creoulo, Bourbon, Java, Botucatú (or yellow bean coffee), the Maragogyne, and the Goyaz. The Creoulo, the Botucatú and the Maragogyne are wilder and show more resistance than the Java and Bourbon sorts, which are nevertheless more productive under good conditions and with careful cultivation, which the first three qualities do not exact.

The coffee tree is a most serviceable plant, every part of which can be used. Its wood is much used in cabinet making, and makes excellent fuel; its leaves, properly torrefied, and then stewed in boiling water, give a palatable kind of tea; from the sweet pulp of its fruit an agreeable liqueur can be distilled; from its beans can be made the beverage we all know, and from the shells and residue of the fruit a good fertilizer can be produced.

The chemical examination of the cinders of the coffee bean shows that it contains 65.25 per cent of potash, 12.53 per cent of phosphoric acid, 11.00 per cent of magnesia, 6.12 per cent of lime, and some traces of sulphuric and salicylic acid, oxide of iron and chlorine.

An interesting study has been made by Dr. Dafert of the weight of the various components of the coffee tree at different ages, from which it appears that the proportion of potash increases progressively in the organs as they are more and more distant from the roots. The contrary is the case with lime and phosphoric acid, which preponderate generally in the seeds.

With this knowledge a scientific cultivator can judge exactly how to treat the exigencies of the different trees at different ages. Naturally, the condition of the soil has to be taken into consideration in any case. According to experiments made by Dr. Dafert each kilo of coffee beans has extracted from the soil--potash 0.7880 gramme; phosphoric acid 0.4020 gramme; magnesia 0.3240 gramme; lime 0.1470 gramme.

These experiments apply merely to coffee grown in Brazil, and are no doubt at variance with experiments on coffee grown elsewhere. Taking all things into consideration, it has been proved by chemical analysis that the Brazilian coffee comes as near as any in its components to what the normal or perfect coffee should be.

The soil, the elevation of the land, the zone and the climate naturally have considerable influence on the quality of the coffee. The *Coffea Arabica* seems to feel happy enough in a temperate zone and at elevations from 1,500 to 2,300 ft. The States of São Paulo, Minas Geraes, Rio de Janeiro and Espirito Santo fulfil most if not all these conditions.

[Illustration: Dr. Passos.]

The coffee trees can stand cold--if not of long duration--down to freezing-point, as well as a fairly high temperature. Unlike the Liberia coffee, they fare better on undulating or broken ground than on the flat.

Two distinct seasons--the dry and the rainy--each of about six months' duration--such as are found in the above-mentioned States of Brazil, seem perfectly to suit the growth of the coffee trees. The trees are in bloom for three or four days some time during the months of September to December. If the rains are not abundant when the trees are in blossom, and during the maturing of the fruits, the latter do not develop properly, especially those at the end of the branches, where the berries become dry before their time or even do not form. If the rain comes too long before the trees are in bloom it causes the blossoms to open before their time and they are frequently spoiled by the cold which follows. The coffee beans are collected in April, during the dry weather.

The coffee trees are very sensitive to winds, cold or hot, especially when blowing continuously in the same direction, which causes the undue fall of leaves and rupture of the bark at the neck of the roots. Wind, indeed, is one of the most dangerous enemies of coffee trees, and it is to obviate this danger that in many countries--but not in Brazil--a protecting plantation in lines of other trees--generally useful fruit trees--is adopted in order to screen the coffee trees from the prevailing wind, as well as to give a further income from the fruit produced.

It has been proved that even from good trees below a certain altitude the coffee is of inferior quality, while above that height the crop becomes irregular. In zones fully exposed to the sun the quality is superior to that of regions where the sun does not reach or only reaches for a short portion of the day.

The *Coffea Arabica* is not particularly exacting in the quality of the soil, but the soil on which it flourishes best is that formed in great part by decomposed vegetable matter--as, for instance, from ancient trees mixed with volcanic earth, such as the famous red earth of the State of São Paulo. Volcanic cinders also are said to be wonderful fertilizers for the soil, and well adapted for the welfare of coffee trees.

One thing is undoubted, and that is that the State of São Paulo possesses the ideal soil for coffee plantations. Analysis has shown that, curiously enough, the soil of São Paulo is not in itself very rich. It has an insufficient quantity of fertilizing substances, particularly of lime; but it should not be forgotten that locality and climatic conditions must be taken into serious consideration, and that we must not be misled by the difference between the apparent and the real fertility of the soil. What would be a poor soil in Europe may prove to be an excellent one in a tropical country. So the famous "red earth" of São Paulo, which in a drier climate would be sterile and unproductive, is there excellent because of its extremely permeable, porous and powdery qualities.

The special terms used for naming the different kinds of earth suitable for the cultivation of coffee are: *terra roxa* (red earth), *massapé*, *salmorão*, *catanduva*, *terra de areia* (sand earth), *picarra* (stony earth), and *pedreguelho* (stony earth).

The *terra roxa* is an argillaceous, ferruginous earth of diabasic origin, occasionally mixed with sand. It contains salicylic acid, oxide of iron, alumina, phosphoric acid, oxide of manganese, lime, magnesia, potash and soda.

The *massapé*, originally decomposed gneiss-granitic rock mixed with clay, contains oxide of iron. Its

occasional blackness is due to the decomposed vegetable matter it embodies.

The *salmorão* includes in its formation small stones indicating the incomplete decomposition of the rock from which it originates.

The *catanduva*--which is of inferior quality--is composed of much disintegrated vegetable matter and fine dust.

The names of the other kinds of earth well denote their quality.

One reason why coffee cultivation is so popular in Brazil is because of the general belief that no trouble is required to look after the trees--a very mistaken notion indeed. There is a marked difference between plantations carefully looked after and those that are not. More than usual care must be taken to select the seed for new plantations. The young plants must get strong in a nursery and then be transplanted into proper soil, the prudent distance between trees being generally from 9 to 12 ft. For the convenience of collecting the beans and keeping the soil clean, a perfect alignment in all directions is necessary. The most suitable month for planting coffee in Brazil, according to the authority of Dr. Dafert, is the month of July.

Great care must be taken of the trees themselves and of the soil around the trees, which must be kept clean and absolutely free from grass. The capillary roots of the trees extending horizontally near the surface of the soil are much affected by the presence of any other vegetation, and by the collection of insects which this produces and harbours. Frost, rain, and the heat of the sun naturally affect the trees more when the soil is dirty than when kept clean. Many of the coffee estates suffer considerably from insufficient labour. The effects of this are quickly visible on the trees. Artificial fertilization is useful, even necessary after a number of years, and so is careful pruning in order to keep the trees healthy, strong and clean.

[Illustration: A Beautiful Waterfall at Theresopolis.]

[Illustration: Antonio Prado's Coffee Estate.]

Coffee trees have many natural enemies--chiefly vegetable and animal parasites--which mostly attack the leaves. The *Ramularia Goeldiana*, a parasite not unlike the *Cercospora Coffeicola*, is one of the worst, and undoubtedly the chief offender in Brazil, although great is the number of insects prejudicial to the trees. The most terrible of all, perhaps, are the ants and termites, such as the *Termes opacus*, which attack and destroy the roots of young trees. The *cupim* (*Termes album*) or white ant, and the *carregador* or *Sauba*, a giant ant with which we shall get fully acquainted later on our journey, are implacable enemies of all plants. Also the *quen-quen*, another kind of ant. These ants are so numerous that it is almost an impossibility to extirpate them. Various ways are suggested for their destruction, but none are really effective. Certain larvæ, flies and cochinilla, owing to their sucking habits, deposit on the leaves and branches a viscous sugary substance, which, on account of the heat, causes fermentation known locally as *fumagina*. This produces great damage. Birds pick and destroy the berries when ripe; and caterpillars are responsible for the absolute devastation of many coffee districts in the Rio de Janeiro and São Paulo States. Other pests of the *Heteroptera* type attack the roots to such an extent as to cause the death of the trees.

Among the diseases of the trees are the *Aphelencus Coffea* and the *Loranthus brasiliensis*--the latter a terrible parasite which quickly envelops the stem and branches of the tree and ends by killing it.

The collection of the berries is the busiest process in the fazendas, and has to be performed with considerable care, for some of the berries are already ripe and dried when others hidden under the branches have not yet reached the required degree of maturity. An experienced hand can collect from 400 to 450 litres of coffee berries per day. It takes an average of 100 litres of coffee berries to produce 15 kilos of prepared coffee beans ready to be shipped. The crop is not the same every year. After one plentiful crop there generally succeeds one

year, sometimes two or three, of poor--almost insignificant--collections, varying according to the care that is taken of the trees and the soil.

When once the coffee has been collected and transported to the fazenda in baskets, blankets and sheets, it is necessary to remove the skin and viscous pulpy matter which envelop the beans. This is done partly by maceration in water tanks, and afterwards by drying upon extensive flat terraces, tiled or cemented, and locally called *terreiro*. The process of drying by machinery has not been adopted in Brazil; principally because of its high cost. The coffee is first placed for some days in mounds on the terraces, until fermentation of the outer skin begins, which afterwards hastens desiccation when coffee is spread flat in a thin layer on the terraces. When once the coffee berries have been freed from their pulpy envelope and skin, the desiccation--if the weather is propitious--takes place in a few days. Care must be taken to move the berries constantly, so that they dry evenly on all sides, as perfect desiccation is necessary in order to preserve the coffee in good condition after it is packed for shipment.

There are two ways of preparing coffee for export--the humid and the dry. In the humid process the berries are placed in a special machine called *despolpadora*, which leaves the beans merely covered and held together in couples by the membrane immediately enclosing them after the skin and viscous sugary coating have been removed. Those coffees are called in commerce, *lavados*, or washed.

The dry process consists, after the berries have been skinned and dried, in removing part of the pulp and membrane in a special machine and a series of ventilators. They are then quite ready for export.

The preparation of coffee from the drying terraces is slightly more complicated. The coffee passes through a first ventilator, which frees it from impurities such as earth, stems, stones, filaments, etc.; from this it is conveyed by means of an elevator into the *descascador*, where the membrane is removed. Subsequently it passes through a series of other ventilators, which eliminate whatever impurities have remained and convey the coffee into a polishing machine (*brunidor*). There the coffee is subjected to violent friction, which not only removes the last atoms of impurity but gives the beans a finishing polish. The coffee is then ready for the market.

I spent a most instructive day inspecting the fazenda of Conselheiro Antonio Prado and having things clearly explained by his intelligent overseer, Mr. Henrique P. Ribeiro.

From that place I drove across country, through endless groves of coffee trees--for miles and miles--as far as the next great coffee estate, belonging to the Dumont Company, an English concern, with an authorized capital of £800,000, the estates being valued at £1,200,000. It is not often one sees an estate so beautifully managed and looked after in a country like Brazil. The buildings, the machinery, the "drying terraces," everything was in capital order. To indicate on what scale the Company does business, it will be sufficient to state that in 1911 the coffee crop amounted to 109,368 cwts., which realized on a gross average 56s. 10½d. per cwt. This crop was not as plentiful as in the previous year, when 110,558 cwts. were harvested. The gross profit for the year up to June 21st, 1911, was £123,811 2s. 5d., which, less London charges, still showed the substantial sum of £119,387 11s. 8d. There had been a considerable rise in the rate at which coffee was sold in 1911--viz., 56s. 10½d. per cwt. as compared with 41s. 8½d. the previous year; but notwithstanding the high price, the high rate of exchange, and the cost of laying the coffee down in London--which had risen on the estate by 1s. 11½d. and by 1s. 3½d. in respect of charges between the estate and London, the Company had been able to earn a profit of 20s. 4¾d. per cwt.

I was taken round the estate by Mr. J. A. Davy, the general manager, whose good and sensible work was noticeable at every turn. The trees seemed in excellent condition and likely to have a long life on the specially suitable rich red soil, and with sufficient breathing space allowed to maintain them in good health. The soil was of such unusual richness in that particular spot that no artificial stimulation was required in order to keep the trees healthy and vigorous. One could walk for miles and miles along the beautiful groves of coffee trees,



clean-looking with their rich deep green foliage.

They seemed to have no great difficulty on the Dumont estate in obtaining sufficient labour--greatly, I think, owing to the fair way in which labourers were treated. Mr. Davy told me that over an area of 13,261 acres a crop had been maintained which averaged  $8\frac{1}{4}$  cwts. per acre.

Experiments have also been made on the Dumont Estate (at an elevation of 2,100 ft. above the sea level)--chiefly, I believe, to satisfy the wish of shareholders in London--in the cultivation of rubber, but it did not prove a success--as was, after all, to be expected. It is not easy to make the majority of people understand that coffee grows lustily in that particular part of the State of São Paulo mainly because of the eminently suitable quality of the soil; but it does not at all follow that soil or climatic conditions which are good for coffee are suitable for rubber trees, or vice versa. In the case of the Dumont Estates, although the best possible land was chosen and three different varieties of rubber--the Pará, Ceará and the Castilloa were experimented with, it was soon discovered that only one kind--the Ceará--attained any growth at all, and this gave very little latex--owing undoubtedly to the nature of the soil and the climate. The cost of extracting the latex was prohibitive. With wages at four shillings a day a man could collect about one-third of a pound of latex a day. Rubber trees could, in that region, not be expected to produce more than one-fifth of a pound of rubber a year, so that the cost of collecting and shipping rubber from ten-year-old trees would amount to 3s. 3d. per lb., without counting the cost of planting and upkeep.

By a special train on the Dumont Railway line I travelled across beautiful country--all coffee plantations--the property of the Dumont Company and of Colonel Schmidt, the "Coffee King," whose magnificent estate lies along the Dumont Railway line. I regretted that I could not visit this great estate also, but I was most anxious to get on with my journey and get away as soon as possible from civilization. It was pleasant to see that no rivalry existed between the various larger estates, and I learnt that the Dumont Railway actually carried--for a consideration, naturally--all the coffee from the Schmidt Estate to the Riberão Preto station on the Mogyana Railway.

**CHAPTER III**

## On the Mogyana Railway

I ARRIVED at Riberão Preto at 3.45 p.m. on March 29th. Riberão Preto--421 kil. N.N.W. of São Paulo and 500 kil. from Santos--is without doubt the most important commercial centre in the northern part of the State of São Paulo, and is a handsome active city, neat and clean-looking, with an Italian, Spanish and Portuguese population of some 25,000 souls. Its elevation above the sea level is 1,950 ft. The people of Riberão Preto subsist chiefly on the coffee industry. There are one or two theatres in the city, the principal being a provincial one. There are several hotels of various degrees of cleanliness and several industrial establishments. Unlike other cities of the interior, Riberão Preto boasts of a good supply of *agua potavel* (drinking water), and the town is lighted by the electric light.

The value of land in the vicinity of Riberão Preto varies from 300 milreis to 1,500 milreis for the *alqueire*, a price far superior to that of other localities on the same line, where cultivated land can be purchased at 300 milreis an *alqueire* and pasture land at 100 milreis.

At Riberão Preto I was to leave the Dumont Railway. Special arrangements had been made for me to meet at that station a special Administration car which was to be attached to the ordinary express train on the Mogyana Railway line.

I had been warned at the Dumont Estate that a brass band had been sent to the Riberão Preto station, where some notabilities were awaiting my arrival in order to greet me with the usual speeches of welcome. As I particularly dislike public speaking and publicity, I managed to mix unseen among the crowd--they expecting to see an explorer fully armed and in khaki clothes of special cut as represented in illustrated papers. It was with some relief that I saw them departing, with disappointed faces, and with their brass instruments, big drums and all, after they had entered the luxurious special car placed at my disposal by the Mogyana Railway and found it empty--I humbly watching the proceedings some distance away from the platform.

Thanks to the splendid arrangements which had been made for me by Dr. José Pereira Rebonças, the President of the Mogyana, I was able to take a most instructive journey on that line, the Traffic Superintendent, Mr. Vicente Bittencourt, having been instructed to accompany me and furnish all possible information.

A few words of praise are justly due to the Mogyana line for the excellence of the service and the perfection of the rolling stock. I inspected the entire train and was amazed to find such beautiful and comfortable carriages, provided with the latest improvements for passengers of all classes. It is seldom I have seen in any country a train look so "smart" as the one in which I travelled from Riberão Preto to the terminus of the line. The appointments of every kind were perfect, the train ran in excellent time, and very smoothly over well-laid rails. The special car in which I travelled was "palatial and replete with every comfort," if I may use the stock words invariably applied to railway travelling.

Here are a few interesting points regarding the Mogyana Railway.

By a provincial law (São Paulo) of March 21st, 1872, a guaranteed interest of 7 per cent on a capital of 3,000,000 milreis was granted for ninety years for the construction of a railway of 1 metre gauge from Campinas to Mogymirim, and of a branch line to Amparo, to the north-east of Campinas and due east of Inguary. By a similar law of March 20th, 1875, a guaranteed interest was granted for thirty years as to the capital of 2,500,000 milreis for a prolongation of the line to Casa Blanca.

By a provincial law (Minas Geraes) of October 1st, 1881, another guarantee was granted of 7 per cent for thirty years, upon a maximum capital of 5,000,000 milreis, for a continuation of the railway through the provincial territory from the right bank of the Rio Grande to the left bank of the Parahyba River. Finally, by

a provincial contract of Minas Geraes of October, 1884, a further guarantee was granted of 7 per cent for thirty years, on a maximum capital of 5,000,000 milreis, for the construction of the prolongation of the railway from its terminal point at the Rio Grande as far as the Paranahyba via the city of Uberaba.

In view of other important concessions obtained, one may consider that the Mogyana Company is perhaps the most important railway concern in Brazil, up to the present time. It does great credit to Brazilians that the railway was constructed almost entirely by capital raised on bonds in Brazil itself, the only foreign loan issued in London being a sum raised amounting merely to £341,000 at an interest of 5 per cent. Between the years 1879 and 1886 the Company returned to the Government of São Paulo the interests received, thus liquidating its debt. A decree of October 18th, 1890, fixed the capital spent on the Rio Grande line and a branch to Caldas at 4,300,000 milreis gold and 1,853,857.750 milreis paper as guarantee of the interest of 6 per cent conceded by the National Treasury.

In the year 1900 the value of interests received amounted to 3,190,520.418 milreis in paper, and 1,963,787.300 milreis in gold, out of which 544,787.300 milreis were in debenture bonds. On the same date the value of interests repaid to the National Treasury amounted to 1,606,578.581 milreis in paper currency.

The federalized lines of the Company were: from Riberão Preto to Rio Grande (concession of 1883); from Rio Grande to Araguary (concession of 1890); with a total extension of 472 kil., and a branch line from Cascavel to Poço de Caldas, 77 kil., the last 17 kil. of which were in the Province of Minas Geraes. The extension from Rio Grande to Araguary, 282 kil., was also situated in the Province of Minas Geraes.

Having dodged the expectant crowd at the station unnoticed, I did not go with the Traffic Superintendent, Mr. Vicente Bittencourt, into the luxurious special car as the train was steaming out of the Riberão Preto station, but preferred to travel in front of the engine so as to get a full view of the beautiful scenery along the line. We went at a good speed over gentle curves rounding hill-sides, the grass of which bent under a light breeze. Here and there stood a minute white cottage--almost toy-like--where coffee gatherers lived. On the left we had a grandiose undulating region--what the Americans would call "rolling country"--combed into thousands of parallel lines of coffee trees, interrupted at intervals by extensive stretches of light green grazing land. Only now and then, as the engine puffed and throbbed under me, did I notice a rectangle of dried brownish yellow, where the farmers had grown their Indian corn. These patches were a great contrast to the interminable mass of rich dark green of the coffee trees and the light green of the prairies.

Near these patches--prominently noticeable in the landscape because so scarce--one invariably saw groups of low whitewashed or red-painted houses, mere humble sheds. Where the land was not yet under cultivation--quite a lot of it--low scrub and stunted trees far apart dotted the landscape.

On nearing villages, as the express dashed through, goats stampeded in all directions: sleepy women and men looked at the train half dazed as it went by, and children, with quite a characteristic gesture, screened their eyes with their elbows to protect them from the dust and wind the train produced. I was astonished to notice how many fair-haired children one saw--curious indeed in a population of Latin races and negroes. That golden hair, however, seemed gradually to grow darker, and became almost black in the older people.

Hideous barbed-wire fences gave a certain air of civilization to those parts, but the landscape was nevertheless getting desolate as we proceeded farther north. Except in the immediate vicinity of habitations, one felt the absolute lack of animal life. Only rarely did we see a black bird of extraordinary elongated form dash frightened across the railway line, much too fast for me to identify to which family it belonged.

One could not help being impressed by the immensity of the landscape, endless sweeping undulation after undulation spreading before us, but not a real mountain in sight. It was like a solid ocean of magnified proportions. Just above the horizon-line a large accumulation of globular clouds of immaculate white intensified the interesting colour-scheme of greens and yellows on the earth's surface to its full value by

contrast.

The large proportion of cultivated land which had impressed me so much in the vicinity of Riberão Preto gradually diminished; and at sunset, by the time we had reached Batataes, only 48 kil. farther on, hardly any more coffee plantations were visible. Only fields of short grass spread before us on all sides. An occasional bunch of trees hiding a humble farmhouse could be perceived here and there, but no other sign of life upon the immense, silent, green undulations of symmetric curves, not unlike enormous waves of the sea.

Farther north upon the Mogyana line, land seemed to diminish in price considerably. Its quality was not so good, especially for coffee plantations. At Batataes, for instance, 548 kil. by rail from the coast, prices were cheaper. Good land for cultivation could be obtained at 200 milreis, and campos at 25 milreis an alqueire.

Such low prices were general north of Riberão Preto, although naturally they were likely to increase as the country got slowly opened up with new roads and railroads. Away from the railway the price of land was much lower.

One thing that particularly struck the traveller straying in those parts was the poverty of all the minor towns and villages. The industrial development of the larger settlements consisted merely of a distillery of "fire-water" (*aguardente*), or, if the city were modern and up-to-date, of a brewery, the only two profitable industries in those regions.

Batataes--according to Brazilian statistics--was stated to "*deve ter*"--"it should have perhaps" some 5,000 inhabitants. The zone around it was said to be suitable for coffee growing; in fact, the municipality possessed much machinery for the preparation of coffee.

At 7.50 p.m. punctually--as she was due--the engine steamed into the Franca station, where the train was to halt for the night. The passenger traffic was not yet sufficiently extensive on that line to allow trains to travel continuously during the twenty-four hours. Passenger trains ran only in the daytime.

I was treated with the greatest consideration while travelling on the Mogyana. Not only was the Administration saloon car, containing a comfortable bedroom, placed at my disposal, but telegrams had been sent all along the line with orders to supply me with anything I required. At Franca, much to my surprise, I found an imposing dinner of sixteen courses waiting for me in the station hotel--with repeated apologies that they were distressed they could not produce more, as the telegram announcing my arrival had been received late. On no account whatever was I allowed--as I wished--to pay for anything. I was rather interested to watch in the station restaurant the wonderful mixture of people who had assembled: priests, monks, railway porters, commercial travellers--some black, some white, some a combination of the two--all sitting together in a jovial manner sipping coffee or devouring a meal.

The city of Franca itself, 2 kil. away from the station, 617 kil. from the sea at Santos, 528 kil. from São Paulo, was in the most remote northerly corner of the State of São Paulo, and had a population of 9,000 people or thereabout. The electric light had been installed in the town, and there was a theatre. Much difficulty was experienced in obtaining sufficient water for the needs of the population. In the municipality there existed a number of machines for use in the rice and the coffee culture, as well as two steam saws, a butter, and a sugar factory.

There were several trails--so-called roads--branching off from this town and leading to Borda de Matta, Garimpo das Canoas, Potrocinio do Sapucahy, S. José da Bella Vista, etc.

The climate was healthy and delightful. While I was there the Fahrenheit thermometer registered 76° at an elevation of 3,450 feet. With a fairly good soil, the municipality could produce cereals in plenty under proper cultivation. Land was cheap enough in that region--150 milreis per alqueire for good land for cultivation, and

25 to 30 milreis per alqueire for campos.

We proceeded on our journey north the next morning, passing through Indaya, 3,450 ft. above the sea level--a settlement boasting of two houses upon the highest point of the railway line in the State of São Paulo. We were nearing the Rio Grande, or Great River, which, flowing in a westerly direction, formed in that region the northern boundary of the State of São Paulo with the State of Minas Geraes. As we got near the river a greater lack of cultivation was noticeable, with more extensive zones of wooded country, especially in the depressions of the land. The undulations of the landscape were more accentuated as we approached the Minas Geraes province. Clouds hung low in the valleys, and we occasionally went through banks of mist not unlike those of Scotland. At Chapadão the ground was more "*accidenté*"--to use an appropriate French expression--with deep depressions and indentations in the surface soil caused by erosion.

The high land on which we had been travelling between Franca and Igaçaba, the station after Chapadão, gave birth on the west to several important tributaries of the Rio Grande, enumerated below, from south to north; the Rio Salgado, the Rio do Carmo, Riberão Ponte Nova, Rib. Bandeira, Rio da Soledade, Rib. S. Pedro; on the east was the Rib. S. Jesus, also a tributary of the Rio Grande.

As the train sped down the incline towards the Rio Grande we were now treated to magnificent scenery on our right. An isolated hill stood at the bottom of the valley with higher mountains on either side of it, and, beyond, a high flat-topped plateau. The railway line skirted snake-like along the hill-side. The hill-tops were getting more rounded and fairly thickly wooded. As we got to a lower elevation the isolated hill assumed the appearance of an elephant's back. A grassy valley several miles wide opened up before us.

At Rifaina Station we had reached the level of the banks of the Rio Grande, that is to say, 1,950 ft. above the sea level. The valley of the river was formed, in this case also, by erosion which had left isolated hills in terraces, one with as many as six distinct terraces, others with rounded backs, but all plainly showing in their stratification, which was identical with that of the surrounding elevations, that in former days there stood, where the valley was now, a plateau which had subsequently been gradually eroded by the action of water and wind.

Having crossed the river, we arrived at Jaguara--we were now travelling in the Minas Geraes Province--where a breakfast awaited us of rice, pork, dried beef, as hard as leather, omelette with shrimps (a much cherished dish in those parts), beans, mandioca, and coffee. Black railway porters, firemen and engine drivers all sat round the table and ate heartily, the meal costing 2 milreis, or about 2s. 8d.

The railway ran almost parallel with the river on the north side round the immense curve which the Rio Grande describes in that particular section. We passed Sacramento (elev. 1,850 ft.), and, in numerous curves, the railway rose by a gradient of  $3\frac{1}{2}$  per cent among hills seemingly worn out by torrential rains into rounded shapes with huge gaps between. We left the Rio Grande, there about 100 yards wide with thickly wooded banks and islands. At Conquista we had already again reached an elevation of 2,350 ft., but we still continued to rise by a gradient of  $2\frac{1}{2}$  to 3 per cent, until a pass was reached from which two exquisite panoramas were obtained. One, particularly interesting, looked over Conquista with its whitewashed houses--some 250 of them--and red-tiled roofs against the background formed by the rugged sides of the natural cauldron worn in the tableland by erosion.

At 538 kil., 2,700 ft. above the sea level, a view was obtained of a small coffee plantation, but most of the country around was scantily wooded, grassy in places, barren in others.

The railway, having descended to 2,500 ft., rose again to 2,900 ft. near Paneiras Station. Then, through beautiful grazing country, gently undulating, we descended and mounted and went round sweeping curves, which formed in places regular loops not unlike a horseshoe. Two pits producing a considerable quantity of lime existed some 2 kil. from Paneiras. Weak attempts were noticeable here and there at growing coffee. We

were now in an eminently wonderful pasture land--getting more and more beautiful as we neared Uberaba, where we found ourselves on almost flat country at an elevation of 2,900 ft., with hardly any trees at all and with a delicious climate. The town of Uberaba, with some 12,000 people, was situated at a slightly lower elevation--only 2,700 ft.

[Illustration: The Station and Shed of the Goyaz Railway, Araguary.

Mr. Luiz Schnoor and his two engineers.]

[Illustration: Typical Trees of the Brazilian Forest, Goyaz.

The stem devoid of branches and foliage up to a great height.]

Uberaba was perhaps the most important distributing centre in the western part of Minas Geraes, for many trails branched from that place to various distant points in the farther interior. The most important trail was the one to Sta. Rita do Paranahyba, thence to the capital of Goyaz Province via Marrinhos and Allemão; whence a second trail went to Fructal via Conceição das Alagoas; a third, to Sant' Anna do Paranahyba, going on the whole almost due west, but with great deviations, went almost across South America as far as Pulacayo, in Bolivia, crossing first the State of Matto Grosso in its southern and narrower point via Coxim and Corumba, then all Bolivia, eventually joining the La Paz-Antofagasta Railway line at Uyum (Pulacayo is connected by rail to Uyum), and ending at the Pacific Ocean. Another trail led to Monte Alegre; yet another to Uberabinha--although the railway had already connected that town with Uberaba. This last trail continued, making great detours, to Bagagem, then to Patrocino, from which place it deviated due north to Paracatú, where three ramifications occurred: one to Sta. Lucia, Pyrinopolis, and Goyaz (capital); the second to Jamarria, Jocaré (on the San Francisco River), and Carrinhan (on the Carinhaha River, a tributary of the San Francisco), and eventually by water to the Atlantic Ocean; the third trail proceeded due east--across the S. Francisco River to Montes Claros and Grão Mogol; a fourth in a south-easterly direction led to Curvelho and Sta. Lucia, where it met the railway to Rio de Janeiro. Another route proceeded south to Sta. Rita do Paraiso.

The price of land--which was excellent in the valley of the river--in the vicinity of Uberaba was from 30 to 150 milreis per alqueire--each alqueire being reckoned at 10,000 square braças, and a braça being about 6½ ft., or a little over two metres.

After leaving Uberaba the scenery was magnificent, especially when a storm approached as we were steaming over the Serra de Caracol. Dense black clouds collected and capped the dark green forest of the Serra, while down, down below on our right the endless gently undulating plain of fresh green grass was brilliantly illuminated by a warm dazzling sun. Most beautiful grazing land--practically going to waste now--we crossed on reaching the highest point of the Serra; grass, grass, as far as the eye could see--quite flat land--but not a head of cattle in sight; in fact, no sign of animal life, and a stillness of death except for the puffing of the railway engine on which I sat. Water, however, did not seem to abound--only a small stream, near which curious-looking patches, or *bosquets* of trees lay in dark spots on that light green expanse. We were then at an elevation of 3,400 ft., amid delightfully cool and crisp air.

At Burity passed the great route of the cattle dealers from Goyaz and Matto Grosso for Sta. Rita, Passos, and Tres Corações do Rio Verde. At Palestina (845 kil. from the sea) we were on what seemed an interminable flat plateau with ideally green grass, and here and there patches of stunted vegetation. Land could be purchased there as low as 10 milreis an alqueire, although the best land cost from 50 to 300 milreis.

All was absolutely flat until we reached Sicupira (elev. 3,100 ft. above the sea level), where we began to descend to the Rio Uberabinha, its delightfully clear crystalline water winding its way through scrub.

At Uberabinha we again came across the wonderful red earth of the Riberão Preto district. Situated at an

elevation of 3,050 ft. stood the little town of some 4,000 inhabitants, about 500 yards from the comfortable and pretty station. Although the land was beautiful, cultivation could not be said to be prevalent. Merely some rice, beans, and Indian corn were grown in small quantities.

From Uberabinha the railway line descended all the time through thinly wooded country of shrubs and stunted trees; the verdant prairies, so refreshing to the eyes, were left behind, and the country became more broken, but the land was still excellent for agricultural purposes. After crossing a well-constructed iron bridge resting on two masonry pillars and spanning the picturesque rapids of the Rio das Velhas--the river, with its turbid, muddy, nasty-looking water, being there some 80 yards wide, at an elevation of 2,050 ft. above the sea level--we again began a steep ascent by a gradient of over 3 per cent, following most of the time the river course. The thickly wooded banks obstructed a good deal of the view except here and there, where a charming glimpse of the water could be obtained.

Seven hundred and eighty-nine kilometres from Campinas--or 982 kil. from the Atlantic Ocean at Santos--we arrived at the terminal station of the Mogyana Railway at a place called Araguay, 3,150 ft. above the sea level--one of the dirtiest and most unpleasant spots on the face of the earth. The termini of railway lines in newly developed countries seem to act like filters. Whatever is good passes through; only the impurities or dregs remain.

**CHAPTER IV**

The Terminus of the Railway--An Unpleasant Incident--The Purchase of Animals--On the March with the Caravan

A GREAT crowd had assembled at the station. The train had hardly stopped when my car was invaded by boisterous people, who embraced me and patted me on the back in the most approved Brazilian style. Before I could inquire who they were, one fellow, more boisterous than the others, informed me that he had purchased a great many mules for me, that he had engaged men for me, and also procured riding and pack-saddles, harness, implements, clothing and bedding for the men he had engaged, and I do not know what else. Everything was paid for. I could return the sum paid out the next day. Another man said he had already prepared a sumptuous apartment for me in the best hotel in the town.

When asked who had instructed them to make such arrangements, they were vague, and on being pressed for an answer gave names of people of whose existence I was perfectly ignorant. Before I could realize what all this meant I discovered--much to my annoyance--that all my baggage had been taken out of the train and had been conveyed to the hotel. I was therefore compelled to proceed there myself, in the company of my new "friends," who shouted everything they had to say at the top of their voices, so that I should not fail to understand. It was already night, and the streets of the town were in such a terrible condition that the overladen carriage--there were people on all the seats, on the box and standing on the steps--nearly turned over on going round corners. The wheels sank up to their axles in mud.

We pulled up at the hotel door, where another crowd of loafers had assembled. I was literally dragged into the hotel--for I had become somewhat reluctant, first on seeing the appearance of the place, then on being met by waves of a nauseating odour which suggested the non-existence of sanitary arrangements and worse.

"Come in, come in!... wait here!" shouted they in a most excited manner, when I expressed a wish to inspect the palatial quarters which they had been good enough to reserve for me.

"Wait a moment!" shouted the landlord, a slumbering, disjointed, murderous-looking creature, whose violent gestures and waving of hands in front of my face were somewhat irritating. He dashed into a room on the ground floor--and we outside could hear an altercation between the loud-voiced proprietor and the plaintive moans of a half-dying man.

A moment later the half-dying man, skeleton-like, with livid eyes, a complexion the colour of a lemon gone bad, and quivering bare legs, was literally dragged out of the bed and roughly thrown out of the door.

"Here is your room!" cried the landlord triumphantly to me, as he flung out of that apartment some cheap canvas bags, clothes--which from birth had been innocent of washing and pressing--and the socks, shoes, and day shirt of the guest who had been ejected.

The odour alone, as I peeped into the room, was enough to stifle any one with the sense of scent even less delicate than my own. As for the vacant bed--any pariah dog of any other country would have been offended to be offered such filthy accommodation.

In Brazil--as elsewhere--it does not do to lose one's calm. I also wished to avoid an unpleasant quarrel, as I have a belief that quarrels are bad for one's health. I spoke gently and kindly to the hotel-keeper, and said that, although I had ordered nothing, still, as he had kindly reserved that charming apartment for me, I should be very pleased to pay for it, which I would do at once. If he would excuse me, I preferred to go back to sleep in my private car. Upon hearing these words a nasty tragi-comic scene occurred, which, had I not remained cool and collected, might have ended badly.



"Do you know, sir," shouted the landlord, with livid features and eyes shooting out of their orbits, so enraged was he--"do you know that I am the Chief of Police here, and that everybody is afraid of me? I have only to give orders and every one will kill any one I like." Here he discontinued shaking his somewhat grimy hands under my nose and, drawing himself up, stood upon the doorstep of the hotel in order to harangue the great crowd which had collected.

"We are all millionaires in Brazil," shouted the landlord, with an effort which seriously impaired the safety of his fully-congested jugular vein. "We are all atheists and anarchists in Brazil. Down with the infamous oppression and slavery of Europe! Down with kings and emperors! Down with Europe, the land of oppression and cruelty!" And again: "We in Brazil are the richest people on earth. We are all millionaires in Brazil. We do not need foreign charity!"

"Down with foreigners!" answered the chorus of assembled natives.

The railway inspector who had been sent by the Company to accompany me became scared at the turn matters were taking, and told me, against the instructions he had received, that I could not now return to the car. Upon hearing this, my new friends, believing they had me in their power, renewed their vocal attack.

I remained some time endeavouring to collect my baggage, pretending to pay no attention whatever to the absurd oratory. To this day I cannot yet grasp what the oppression of Europe had to do with my wanting to pay for something I had never had. I then repeated my offer, which was again refused. With the protection of his strong rear-guard, the Chief of Police advanced bravely towards me, holding in a suggestive manner with his right hand the pommel of his revolver in the back pocket of his trousers. In a tragic manner he exclaimed:

"We will settle this matter, to-morrow."

"We will settle it at once," I placidly replied.

"No, to-morrow," he repeated, with a vicious look.

"Very good: at what time and where?"

"At ten o'clock," he eventually grunted, after I had repeated the above question four times.

I also politely invited all the others present to come forward if they had any claims to square. I was quite ready to settle anybody at any time and anywhere. Perhaps they might get more than they wished.

I departed with my baggage laden on two carriages and a cart, and eventually found accommodation at an equally filthy hotel near the station--only the latter place was kept by a humble and honest, decrepit old woman. I do not know that I have ever spent a more miserable evening anywhere. I do not mind roughing it in the roughest way possible, but I have always detested pretentious efforts at civilization of an inferior kind. Thus I sat having a meal--eggs, beans, rice--all soaked in *toucinho* (pork fat) which I detest and loathe. I watched black railway workmen and porters stuffing themselves with food in a most unappetizing way, and making disgusting noises of all kinds.

Fortunately I remembered that a friend of mine--a railway contractor, Mr. Louis Schnoor--must be at that time in Araguay, looking after the construction of the new railway line which will eventually join Araguay to the capital of Goyaz. I went in search of him, stumbling along the terrible roads with deep holes and pools of water and mud. As luck would have it, I was able to purchase from him, that very same evening, a number of excellent mules, which he very generously had offered to place at my disposal without payment. Also he promised to supply me with two reliable men--a job not at all easy in that particular part of Brazil.

[Illustration: Author departing from Morro da Meza,

Showing costume worn during the expedition.]

[Illustration: Alcides. Filippe the Negro.]

Mr. Louis Schnoor--a Brazilian of German extraction--was a godsend to me. Thanks to him, I returned that night quite happy to the miserable hotel. Happy, because in less than half an hour I had arranged to leave that pestilential hole the following day. Mr. Schnoor had kindly undertaken that he would send me, at eleven o'clock the next morning, in a special train to the end of the line in construction, some 45 kil. farther north. In a town of gentle folks like Araguary the luxury of sleeping with one's window open could not be indulged in--especially as nearly all the houses were one storey high. So the night was rendered particularly oppressive and long, tormented as you were in your bed by its innumerable inhabitants, which stung you all over. I had taken the precaution to spread a waterproof sheet under my own blankets on the bed, but that, too, proved ineffective. Mosquitoes were numerous.

No sanitary arrangements to speak of existed in Araguary, so that everything was flung out of the windows into the streets, which made walking about the town most objectionable. The odour everywhere was revolting, as can well be imagined. The city was nevertheless considered by the natives as all that is most perfect in the way of civilization, for not only did it possess a few anæmic electric lights--so far apart as to be a nuisance instead of a help in seeing one's way about--but also, behold! it actually boasted of a spasmodic cinematograph. There were some 500 houses, all counted, at Araguary, all more or less miserable-looking, and a population of some 2,500 souls--"lost souls," I should think.

Slowly, very slowly came the next morning, March 31st. At ten o'clock sharp I called on the Chief of Police at his hotel, and found that he had departed early in the morning and was not to be expected back for some hours! A charming way of keeping an appointment which he was so anxious to bring about.

In the company of Mr. Louis Schnoor I also called on the persons who said they had made arrangements for my expedition, as I did not wish to have any misunderstanding in the matter. Far from having purchased mules, horses, saddles and harness, they could produce nothing on demand, and finally asked me to remain in Araguary for one month--fancy one month in Araguary!--so that they could produce their purchases.

As I was driving in Mr. Schnoor's carriage we met, a long way from his home and hotel, the Chief of Police and hotel proprietor. I immediately dismounted and informed that gentleman of my visit at the appointed time. I also demanded that whatever he wished me to settle must be settled at once.

"Nothing at all," said he, shaking me warmly by the hand. "You owe me nothing. It was all a mistake. It was all a mistake. Please do not think of it any more. You owe me nothing, nothing, nothing. If I can be of use to you, pray order me! I am your humble servant." And his delightful politeness was such that I could hardly realize it was the same vicious man of the previous evening. In my surprise I had to turn to Mr. Schnoor to inquire whether I had got hold of the wrong man.

Yes, indeed. Some of those fellows of Central Brazil were a remarkable mixture of villainy and charm--in chemical language one might describe them as sublimates of rascality and delightful manners.

However, good manners or not, I had taken such a dislike to the place that I was glad when eleven o'clock came and Mr. Schnoor conveyed me to the special train--an engine and one car. I inspected the new station of the Goyaz railway, which was already finished--a useful, well-constructed building, quite sufficient for its needs. In the company of Mr. Schnoor, his chief engineer, Mr. Schirmer and Mr. Bertoux, we left Araguary--oh, what a relief!--for the end of the line, 45 kil. away. I had decided to go and wait there in the open country the few hours which would be necessary to collect the men who were to accompany me, and the

mules.

The work on that portion of the Goyaz line which was already laid was well and quickly done. Mr. Schnoor assured me that in four or five months more they expected to run trains to Catalão. An iron bridge will eventually be built across the Paranahyba River, within a short distance of which the line had already been laid when I was there. Some delay had been experienced in making a deep cut on the south side of Paranahyba Hills, where the strata had been found much harder than expected.

I camped for a day and a half at Morro da Meza, a lovely spot at an elevation of 2,850 ft., from whence an immense panorama could be enjoyed. What a relief this heavenly place was after Araguary, and how everlastingly grateful I shall be to my friend Mr. Schnoor for having deposited me there!

I took the opportunity of the solitude to rearrange my baggage. On April 1st my good friend Schnoor reappeared to see that all arrangements were satisfactory for my departure.

Morro da Meza will ever remain present in my mind, for it was my jumping-off place into the wilds. It was from there that the actual marching on horseback and on foot began, and it was there I last saw a railway train for the best part of a year.

On April 1st, at 4 p.m., I left Morro da Meza, went through the new railway cut in preparation, crossed the Paranahyba River (at an elevation of 1,970 ft. above the sea level), and made my camp on the opposite side of the stream at Anhanguera (elev. 2,100 ft. above sea level) in the railway engineers' camp, 800 yards away from the water. The engineers, an Italian, Mr. Schnoor's father-in-law, and a Russian--a Mr. Martens--showed me every possible civility. A curious incident occurred while we were having dinner. The day was a holiday, and the workmen on the line were resting. We were sipping our coffee, when a man entered our hut and said a companion of his had been shot. We rushed to see him, and we found that the poor wretch had had his skin perforated in eight different places by the same bullet. What was more remarkable was that each perforation was close to dangerous places in the man's anatomy, and yet not a single wound was mortal. This is how it happened. The man was lying down in his suspended hammock, resting his left hand on his left knee. A friend came along to show him a new automatic pistol he had purchased. In the usual silly fashion he had pointed it at his friend. The pistol went off, and the bullet passed just under the skin at the knee, at the side of the knee-cap, and having come out again, went right through the soft part of the hand between the thumb and index finger. It then perforated the arm at the biceps, and further entering the chest, shaved the heart and came out at the shoulder-blade, continuing its flight beyond to somewhere where no one could find it again. That spoke highly for the penetrating power of bullets from automatic pistols, and also for the little harm those little bullets may inflict. The man, after we had carefully dressed his wounds, looked, perhaps, a little miserable, but he was able to depart on horseback carrying with his good arm a bottle of medicine.

The Goyaz railway was making rapid progress. The rails were soon to be laid on the north side of the river as far as Catalão. The bed of the railway was fast being made ready.

It was not until April 3rd that I was able actually to make a start with my caravan. My good friend, Mr. Louis Schnoor, had promised me two men--Alcides Ferreiro dos Santos and Filippe da Costa de Britto; the first a German Brazilian of a violent revolutionary temper but of extraordinary bravery; the other a pure negro of a boisterous, simple nature, also of indisputable bravery in moments of great danger. These two men--both natives of Araguary--proved themselves to be on that fateful expedition the two best men I possessed. Thus, if nothing else can be said in praise of Araguary, it must be said in justice that it can produce some men of great courage and faithfulness--a boast which cannot well be applied to many places in Brazil.

On April 3rd, at 9 a.m., after a touching farewell, I left the engineers' camp mounted on a magnificent mule that Mr. Schnoor had insisted on lending me as far as Goyaz, with the pack animals which I had purchased. I did not follow the principal road, which went by a somewhat circuitous route from Araguary to the capital of

Goyaz via the towns of Catalão and Bomfin, but preferred to travel across country by a short cut which took you there in an almost direct line in a north-westerly direction. On getting over the Serrinha (elev. 2,250 ft.), a hill range, one obtained a gorgeous view of the valley of the Paranaíba River--a river which, already of good width there, became eventually the great Parana. It is on the right bank of the river, near its mouth, some thousands of miles from where we were, that Buenos Aires is situated.

Going through a beautiful forest in undulating country, we reached the summit of a flat-topped tableland, 2,500 ft. above the sea level, with a gentle slope towards the north, where the edge of its summit was some 50 ft. lower than on the south. The vegetation was somewhat stunted, but interesting, for many were the trees I noticed which could be put to some use or other. The Barbatimão (*Stryphnodendron bar.* M.) was plentiful, and could be used advantageously in tanning leather; the Pao ferro (*Cæsalpinia ferria* M.) and the Paneira, were present in quantities.

Through the forest we descended in three hours to the Rio Virissimo, which, swollen by the sub-tributaries Barrocas, Indaica, Pirahitinga and Perobas on the east and Vae Vem on the west, throws itself into the Paranatinga between Morro Alto and Porto do Barreiro. That stream had been bridged over. We had descended to 2,000 ft. During the entire distance--we had travelled some 23 kil. from the Paranaíba River--we had passed only two miserable sheds and we had not met a single soul, barring a glimpse at a shaggy female who happened to be opening the door of her hut as we were passing, and with a yell of terror banged it again, and bolted it as she perceived us riding by.

A peculiar kind of wild fig-tree was to be seen, ball-like in appearance, with branches inclined down instead of skyward like most trees. On our right as we proceeded down to the farms of S. Jeronymo and Sta. Barbara (elev. 2,400 ft.) stood a mountain with beautiful grazing land upon its slopes. Healthy fat cattle, in most wonderful condition--testifying to the excellence of the grazing in that region--were bred by the farmers. To the north, north-east and north-west behind this place were to be seen delightful green round-topped hills, also with excellent grazing. A few cows and imported zebus were to be seen, it is true, but the country could support a million times that number and more.

It was that evening that I noticed for the first time in Brazil a peculiar and most wonderful effect of light at sunset--not unlike an aurora borealis. White, well-defined radiations shot skyward from the west, where the sun had set, and stood out luminously against the dark blue sky, like the spokes of a gigantic wheel. This effect, as we shall see, was repeated frequently at sunset, and sometimes was even more beautiful than on the occasion of that first acquaintance with it.

We marched 39½ kil. that day--with my nine pack-mules, Formosa (which in Portuguese means "beautiful"), the splendid white mule I rode, and three other mules ridden by my men. It was a real pleasure to see the appetite of the animals when we made camp. How joyfully they ground with their powerful jaws the Indian corn which each had received in a nose-bag soon after we had halted, removed the loads and saddles from their backs, and properly groomed them!

When we started the next morning we went through most beautiful grazing land for some 20 kil., and through marvellous grassy slopes on the mountains beyond. Streamlets of clear abundant water were passed. From 2,050 ft., the elevation of the stream, we rose to 2,650 ft., then descended gradually to the village of Corumbahyba, with its brand-new red-tiled roofs and whitewashed houses--very tiny, and, with one exception, all one-storied. The windows and doors were gaily decorated with bright blue paint. There was a church, of course, on one side of the large square smothered in high grass, and by the church two wooden pillars supported a beam from which hung a bronze bell. Then in the centre of the square stood, most prominent of all in the village, a huge wooden cross in a dilapidated condition. What little life seemed to exist in the place was to be found in the local store, where an inquisitive crowd had collected when I arrived.

[Illustration: Goyaz Railway in Construction.]

The cut leading to the Paranahyba River.]

[Illustration: Author's Caravan crossing a Stream.]

My mules were let loose to graze in the square, joining a number of cows that were there already. As I sat in the shop, closely examined by the inhabitants, I returned the compliment by analysing them. What a strange, dried-up, worn-out appearance young and old presented! What narrow, chicken-like chests, what long, unstable legs and short arms. And, dear me! what shaggy, rebellious hair, which stood out bristle-like in all directions upon their scalps! Yet those people came from ancestors who must have been, centuries ago, magnificent types of humanity to be able to accomplish what they did in the way of colonization. With the habit we possess of looking for finer, healthier specimens of humanity in the country than in the cities, this condition of affairs came somewhat as a surprise to me, since that rule generally applied to most nations I have visited except Brazil. Those people, partly by constant intermarriage among themselves, partly by the mixture of black blood with the white, and greatly owing to the effects of the most terrible complaint of the blood in existence--universal in Brazil--partly, too, by the dull, uninteresting, wasted lives they led and the poverty of their nourishment, were reduced to a state of semi-idiotcy. The men hardly seemed to have the strength and energy to walk or even stand up--although I must confess, to my regret, that they had not yet lost the power of talking.

Their features were unattractive. Eyes wide apart and widely expanded, so that the entire circle of the iris was exposed, although the eyeball itself was not *à fleur de tête*, but rather sunk into excessively spacious orbital cavities in the skull. The part of the eyeball which is usually white was yellow with them, softened somewhat by luxuriant eyelashes of abnormal length. In fact, the only thing that seemed plentiful and vigorous with them was the hair, which grew abundantly and luxuriantly everywhere, just as bad grass and weeds do on uncultivated or abandoned lands. There was a lot of hair everywhere--on the scalp, on the eyebrows, on the men's unshaven cheeks, on the chest, the arms, hands, and the legs. It is, I believe, a well-known fact that hair is generally more luxuriant, the weaker and more anæmic the subject is--up to a certain point.

Deep grooves and hollow cheeks--the latter due to absence of teeth--marked the faces of even young men. Then one of the most noticeable peculiarities was the extraordinary development, prominence and angularity of the apple of the throat. The ears--which to my mind show the real character and condition of health of a person more than any other visible part of his or her anatomy--were large and prominent, occasionally well-formed, but lacking colour and the delightful, well-chiselled, vigorous curves of healthy, normal, intelligent people. The hands and feet were generally small and well-shaped, in wonderful condition--though not necessarily clean--owing to the inborn reluctance which all the people of Brazil have towards manual labour.

It has always been my experience that, generally speaking, malformed people possess distorted brains--which does not mean at all that the brain of a malformed person may not perhaps develop in a marvellous manner in one particular direction. What I maintain is that, with few possible exceptions, the brains of malformed people are seldom perfectly balanced. In those particular subjects it did not take a deep student of human nature to set down the entire crowd of them as visionaries, most fantastically inclined--in which direction, having no restraint whatever, they ran absolutely amuck.

Yet there was something very charming about the people of the interior of Brazil, after they had overcome their first suspicion of strangers and their own shyness. They seemed imbued with the idea that everybody went there specially to do them harm. They lived in a constant state of fear and trembling, even of their own relations and friends. They all went about armed to the teeth, and would not dream of going a yard outside their homes without a revolver, a rifle and a dagger. Even to walk about the village the men were all armed.

When not in a rage or sulky--which seemed to be their almost constant condition--they were the most good-hearted people I have ever met; gentle, affectionate--in fact, so sentimental that it became a positive

nuisance. If one learnt how to deal with them--which was not always easy--they were really delightful people in their enviable simplicity.

A reflection of the people's mentality was to be discovered at a glance in examining the articles that were for sale in the only shop in the village. There, remember, you were in a country which, from an agricultural point of view, could be made of immense value. Now, did you notice any implements in the shop which suggested agricultural pursuits of any kind whatever? No; what you found were patent leather dress shoes, elaborately embroidered top-boots, fancy neckties, gaudy gilt and silver spurs of immense size, bottles of powerful perfumes, fancy soaps, mirrors, combs, and highly-coloured calicoes, beer, fire-water, and other such articles of luxury.

[Illustration: Characteristic Types of Brazilians of the Interior.

(Notice degenerate faces and development of goitre.)]

[Illustration: A Typical Village of the Province of Goyaz.]

The Corumbahyba village stood at an elevation of 2,250 ft. in a hollow surrounded by low hills. The water was delicious at that place.

As I was getting through my lunch--which I enjoyed thoroughly after my morning march of 23 kil.--I saw crossing the square two murderers laden with iron chains, led along with a rope by two mounted men. The natives present laughed as they saw the poor devils struggle along. Not a sign of pity or care was shown by anybody present.

After leaving Corumbahyba we witnessed a panorama of magnificent mountain scenery from a height of 2,550 ft., to which we had ascended. Then came a steep and rugged descent through a forest down to a streamlet (2,250 ft.); then up another ascent to 2,350 ft. and down again to 2,050 ft. at the great Corumbá River, there 300 yards wide. We crossed this beautiful stream--animals and all--on three canoes joined together, upon which a platform had been built.

**CHAPTER V**

Travelling across Country--A Musical Genius--Valuable Woods--Thermal Springs

AT the river were several picturesque two-wheeled carts waiting to be ferried across. Drawn by ten, twenty, and even as many as thirty oxen, these heavy hooded vehicles travelled across country in a most wonderful manner. Naturally they had to be of solid construction to stand the wear and tear demanded of them. Their wheels were heavy solid discs of hard wood encircled by powerful tyres of iron. A primitive system of brake--a mere bar of wood held in position by ropes--retarded the speed of the vehicle down extra-steep declivities. When going up or down hill the friction of the wheels upon their axles produced a continuous shrill whistle, which, when heard from a distance, sounded not unlike the whistle of a locomotive. In the deathly stillness of the Goyaz landscape those whistles could be heard a long way off. The expectant farmers--expectant, because those trading carts conveyed to them a good deal of the food-stuff, salt, and other necessaries of life, as well as the luxuries they could afford--were clever at recognizing the whistles of the various carts, and they identified one special cart or another by what they poetically called the "voice of the wheel" or the "song of Goyaz."

There were some picturesque rapids just above the spot where we crossed the Corumbá River, which flowed in a tortuous channel with a general direction of W.S.W.

To the east of our track, as we proceeded northward, stood a glorious range of hills with magnificent grazing land extending for many miles. In front of us to the north and N.N.E. towered a high plateau, the Serra de Callos, also called, I believe, Serra do Cusuzeiro.

Still travelling up and down and across several streamlets, we reached at sunset the Rio Boccagna (2,230 ft. above the sea level), which, soon after passing the place where we crossed it, entered the large river Bagri, winding its way through a gorgeous forest. We had passed during the day really wonderful grazing land on either side of the track, but principally to the east, between the north bank of the Corumbá River and Camp Mazagan. There were plenty of small streams in the hilly and sometimes slightly wooded valleys.

At seven o'clock, having ridden that day 76 kil., we halted after dark at the *moradoria*, or farm, of Mazagan (elev. 2,375 ft. above the sea level). We were politely asked to enter the house, and immediately preparations were made to clear out the best room for me. The illumination was not grand: an ancient metal arrangement--not unlike a Pompeian lamp--with a wick soaked in oil profusely smoking. In the dim light I could just distinguish in the background, reclining against the wall, a youth with a guitar, from which two chords--always the same two chords--were strummed. The boy seemed in a trance over this musical composition, and even our appearance had not disturbed his efforts. He had taken no notice whatever of us. Dinner was prepared--it took a long time--the musician all the time delighting his admiring family with the two monotonous chords.

"It is a pity," said his delighted mother to me, "that we cannot send him to school. He is a genius; he would astonish the world."

"Yes," I hastily agreed, "it *is* a pity you cannot send him ... somewhere!"

"Can you not take him with you?"

I explained to the poor woman that it required very civilized people to appreciate her son's music. Among the wild Indians I expected to find, later on in my journey, I was sure that with music like that, we should all be killed; they were such savages!

After two solid hours--and the two chords still continuing, with no signs whatever of relenting--I asked the musical genius if he could treat me to a different tune. Alas! he knew no other, but as he saw that I was so fond of music he would again, with the greatest pleasure, go on playing the same air--he called it an air.

"*Muito obrigado!* (Thank you very much!)" I moaned, with a sickly smile on my lips and a violent internal wish to smash guitar and guitarist.

"*No hai de que!* (Do not mention it!)" and here recommenced the repetition of the two chords.

"I should like to go to sleep now; thank you very much again for the lovely music," I next plaintively added, in my most approved Brazilian politeness.

"Oh, not at all: I shall go on playing while you are sleeping. It will give you pleasant dreams!"

It was too pathetic. Nothing short of murder could have stopped his enthusiasm. Being a traveller of years' experience, I was not to be outwitted. As he would not stop the music, I stopped hearing it by stuffing my ears tight with cotton-wool. So I slept soundly enough, notwithstanding the orchestral entertainment. At sunrise, when I opened my eyes again, the boy was still at it. I removed the cotton from my ears ... yes, indeed, the identical two chords!

The boy and the guitar will perhaps never know what a narrow escape they both had! In despair I gave orders to get the mules ready at once in order to depart immediately.

Those halts in farmhouses were dreary beyond words. The Brazilians of the interior--quite unlike those of the big towns in or near the coast--were sullen people, with no conversation--or else too much--no interest in anything, no art, no imagination. They were timid and vain to an incredible degree, suspicious, avaricious, and easily offended, so that the greatest tact had to be used with them. They were ignorant of everything even in their own immediate neighbourhood. Yet, mind you, with all that, extraordinarily kind and ultra-polite of speech. They all seemed turned out of the same mould. When you had seen one you had seen them all. There were, of course, a few exceptions--Brazilians of recent German, French, Italian or Spanish origin--but these exceptions were indeed very rare in the interior.

Ill-fed, his blood corrupted and impoverished to the utmost degree--his health, therefore, never in a normal condition--his finances at the lowest ebb, the Brazilian of the interior had little indeed to make him happy. His home at best was as miserable and dirty as possible. The room generally given to an honoured guest--the best in the house--was the granary. More than once was my camp-bed perched on a mound of Indian corn. And the furniture? A wooden bench of the roughest description--really an instrument of torture rather than an article of comfort; a few wooden pegs in the wall for hanging rifles or other things; an occasional wooden bedstead; seldom, very seldom, a stool or a chair--in any case, never a comfortable one such as you invariably find with peasants and old-established colonists of most other countries. They cared not for comfort. Their beds, a mass of rags, were shared by masters and hens and dogs. Everything was in an abandoned state, everything had fallen to rack and ruin. All looked as if they were tired of life, too indolent to move. They seldom saluted when you met them on the trail, nor when you entered their houses; if they did, they rapidly touched their dilapidated hats as if afraid to spoil them. Never did you perceive a smile upon their long-drawn countenances. When they greeted one another they laid their bodies close together as if about to dance the *tango*, and patted each other repeatedly on the shoulder-blades, turning their heads away as if to avoid their reciprocal evil odour. It is not the fashion in any part of Brazil to shake hands. Some say it is because of the unpleasant feeling of touching sweating hands; others suggest that it is to prevent the contagion of the many skin complaints from which people suffer. When they do shake hands--with a stranger, for instance--one might as well be grasping the very dead hand of a very dead man; it is done in so heartless a manner.

For a consideration they reluctantly gave a stranger what little they possessed, but they had not the remotest



idea of the value of things. In one farmhouse you were charged the equivalent of a few pence for an egg or a chicken; in the next farm a small fortune was demanded for similar articles of convenience. Men, women, children, dogs, pigs and fowls, all lived--not happily, but most unhappily--together.

No sooner were we able to saddle the animals and pack the baggage and pay our hostess, than we tried to make our escape from that musical farm. But luck was hard on me that day. One mule was lost, a second received a terrible gash in his hind quarters from a powerful kick from another mule.

We went on among low, fairly grassy hills to the west, W.N.W. and to the east of us. We still had before us the Serra de Callos--a flat-topped tableland some 12 kil. in diameter on the summit, where it was almost circular. Its deeply grooved sides showed clearly the great work of erosion which had occurred and was still taking place in those regions. With the exception of two spurs, which projected on the west and east sides of the plateau, its sky-line was quite clean and flat.

After rising to an elevation of 2,600 ft., then descending to 2,450 ft., we crossed two streamlets which afterwards joined a fairly important torrent. One was called the Rio Boa Vista. We gradually then rose to 2,750 ft. on another flat tableland to the east of the Serra de Callos, with its sides eroded in two distinct terraces, the higher one being almost a straight wall from two-thirds up the side of the range. In the lower portion a number of rounded mounds were to be observed, which, with a stretch of the imagination and for the sake of comparison, resembled, perhaps, elephants' heads.

North-east of the Serra stood a thickly-wooded, detached mound, while to the north as we went along there was displayed before us a magnificent view of the flat valley into which we were about to descend.

Where the country was wooded many trees and plants were to be found, useful for their tanning, medicinal, oliferous or lactiferous qualities: such as the Dedal, a yellowish-leafed shrub from which a yellow dye can be obtained; the tall thin Arariba Amarelho, or Amarelhino (*Centrolobium robustum*), a great number of Lobelia trees, with their elongated light green leaves and clean barked stems, which eject, from incisions, a caustic and poisonous juice. The tallest of all the trees in that region was perhaps the Jacaranda, with its tiny leaves.... There were four kinds of Jacaranda--the Jacaranda *cabiuna*, *rosa*, *tan* and *violeta*, technically known as *Dalbergia nigra*, *Machærium incorruptibile*, *Machærium cencopterum*, *Machærium Alemanni*, Benth. The three latter have a specific gravity higher than that of most woods in Brazil, except the Pao de ferro (*Cæsalpina ferrea*), the very plentiful Barbatimao (*Stryphnodendron barbatimao*), a mimosa-like tree, and the Vinhatico amarello (*Echyrosperum Balthazarii*), the last of which has the highest specific gravity of all.

Then we found plenty of Sambaiba, an excellent wood, and Imuliana, a wood of great resistance, much used in certain parts of Brazil for constructing fences.

A peculiar tree with concave leaves shaped like a cup was locally called Ariticun or Articun. It produced a large fruit, quite good to eat.

Much botanical variety was indeed everywhere around us.... There was the *terra da folha miuta*, which, as its name tells, possessed minute shiny leaves; then the tall Faveiro (*Pterodon pubescens*), producing a bean, and having dark leaves not unlike those of mimosas. Then, many were the kinds of acacias we noticed as we went along.

[Illustration: Picturesque Ox-carts of Goyaz.]

Still descending, we arrived at the little town of Caldas de Goyaz--so called because there were three hot springs of water of different temperatures. I visited the three springs. The water tasted slightly of iron, was beautifully clear and quite good to drink. Two springs were found in a depression some 150 ft. lower than the village--viz., at an elevation of 2,450 ft., whereas the village itself was at 2,600 ft. These two springs were

only 20 ft. away from a stream of cold water. A short distance from the cold stream was another stream of hot water emerging from the rocks.

Small rectangular tanks had been made at the two higher springs, which were said to possess wonderful curing qualities for eczema and other cutaneous troubles; also for rheumatism and blood complaints of all kinds. Whether those waters were really beneficial or not, it was not possible to ascertain on a passing visit. I drank some of the water and it did me no harm, so if it does no good neither is it injurious.

The village of Caldas showed signs of having seen better days. It was clean-looking, but like all other villages of Goyaz it was dreary in the extreme. There were only a few houses in the place, and each had a shop; all the shops sold similar articles--nickel-plated revolvers, spurs and daggers, calicoes, gaudy wearing-apparel, perfumery, and so on.

For any one interested in the study of the effects of erosion on a gigantic scale, no more suitable country could be found than Central Brazil. Here again to the E.N.E. of Caldas stood the Serra do Sappé. In this case it was not a tableland, like the Serra de Caldas, but purely a hill range. The plateau of Serra de Caldas, I was told, measured on its summit 12 kil. by 18 kil.

Again, after leaving Caldas, we went through most wonderful grazing ground to the north-east and east of our route at the foot of the Serra do Sappé. We had descended to the Rio Lagiadi, 2,480 ft. above the sea level, which flowed into the Pirapitinga River (a tributary of the Corumbá). Once more did we admire that evening the remarkable effect of solar radiation, this time a double radiation with one centre--the sun--to the west, and a second centre, at a point diametrically opposite, to the east. Those radiations, with a gradually expanded width, rose to the highest point of the celestial vault, where they met. The effect was gorgeous indeed, and gave the observer the impression of being enclosed in the immeasurable interior of an amazingly beautiful sea-shell turned inside out.

We arrived in the evening at the farm of Laza (elev. 2,450 ft.), where we had to abandon the wounded mule, and also another which, on coming down a steep incline, had badly injured its fore leg.

The pack-saddles used in the interior of Brazil (Minas Geraes, Goyaz and Matto Grosso) were the most impracticable, torturing arrangements I have ever had to use on my travels. The natives swore by them--it was sufficient for anything to be absurdly unpractical for them to do so. It only led, as it did with me at first, to continuous unpleasantness, wearying discussions and eventual failure if one tried to diverge from the local habits, or attempted to eradicate deeply-rooted ideas.

Let me describe a typical Brazilian pack-saddle. It weighed, with its inseparable protecting hide, well over 90 lbs. It was bulky and cumbersome, most difficult to lift and set right on the animal's back. It consisted of two great parallel, clumsily-carved, heavy U-shaped pieces of wood supported upright on two enormous pads, at least double the size and thickness necessary. The breast and tail pieces were of extra thick leather of great width, which had the double disadvantage of being heavy and of producing bad sores by their constant friction and hard, saw-like, cutting edges. Then the saddle allowed the loads to hang much too low on the sides of the animal's body. This naturally saved trouble and effort to the men who packed the animals. Two of them simply lifted the loads simultaneously on the two sides and hooked them to the saddle by means of adjusted loops of leather or rope. Then came the difficulty of keeping the loads in position, so that they would not shift back and forth. This was done by passing a leather thong over all and under the animal's belly, which was then squeezed beyond all measure. Result of this: continuous trouble to pack rebellious animals, who knew what was coming; painful marching for the animals, who thus had difficulty in breathing, and therefore extra long marches, almost an impossibility without much injury to them. We will not speak of sore backs, sore sides, sore chests, and sore tail root--which was a matter of course after a pack animal had borne for a few hours one of those torturing arrangements on its back.

I had tried to adopt lighter saddles of a more practical design, such as I had used on other expeditions; but as this involved a different method altogether of packing the animals, it led to much derision, unpleasantness, and refusal to do the work except in their own stupid way, so that in order to save time, expense and trouble I had to conform, much against my will, to the Brazilian method. It was an impossibility to induce a Brazilian of the interior to agree that any other way of doing anything was better or even as good as his own.

A painful phase of human existence, as the country became more and more sparsely inhabited, was the number, relative to the population, of cases of sexual insanity, due naturally to the great difficulty of intercourse. We will not refer to sexual vices--extremely common--which reduced the few inhabitants to a state of absolute idiocy. Thus at Laza farm there were only three women and no men. They were all of a certain age, and for many many years had been there alone, and had not seen a man. They had become absolutely insane, and it required no little tact to prevent a catastrophe. One--a repulsive, toothless black woman, formerly a slave--was in such an excited state of mind that I was really glad when I saw my troop of animals started on the march early the next morning.

On April 6th we were still on the north side of the Serra de Caldas, at the northernmost point of which flowed a *ribeirão*, or great river (elev. 2,450 ft.). Most beautiful grazing land spread to the north of us, enormous stretches of undulating country verdant with delicious grass. The Sappé Mountains were still visible in the distance.

Marching through enchanting country--almost level, or merely rising or descending a few feet--with a magnificent view of distant mountains to our right and of low flat plains and far-away tablelands to our left, we arrived, after a morning's march of 36 kil., at the fazenda of Pouso Alto (elev. 2,600 ft.).

[Illustration: A Home in Central Brazil.]

[Illustration: A Clever Automatic Pounding Machine.]

Outwardly Pouso Alto was by far the neatest-looking fazenda we had yet seen since leaving Araguary, but on entering the house the floor was a mass of dirt. Fowls were running to and fro all over the rooms. A rough table of Portuguese origin, a couple of benches so dirty that one did not dare to sit on them, some roughly made bedsteads, miserable and filthy--but no washstands or basins, no articles of necessity were anywhere to be observed or found. The mattresses--if one can elevate them to the dignity of such a name: they were mere bags filled with anything that had been found handy, such as the leaves and stalks of Indian-corn, wool and dried grass--were rolled up in the daytime. Only one bed was still made up. On it a cackling hen was busy laying an egg. That egg--a very good egg--was triumphantly served to me for breakfast.

The walls of nearly all the farmhouses in the southern part of the Province of Goyaz were made of wooden lattice work, the square cavities formed by the cross sticks being filled in and the whole plastered over with mud, which eventually became hard when dry. Near the foundations the walls were strengthened with mud bricks half baked.

Evidently, as was the case with this particular old house, in former days, when Goyaz was more prosperous than it is now, in the time of the Emperor, most of the houses were whitewashed--a luxury which in these days of misery the farmers can no longer indulge in. The doors and windows were rambling, though the frames of them were generally solidly made, but one never saw a pane of glass in any window anywhere in the country. At night the people barricaded themselves tight into their rooms and let no air in. It was partly due to fear of attack. Whenever a building was whitewashed one invariably saw on it the impression of its owner's spread hand in outline, or else his signature in blue paint. The favourite colours in house decoration--where any were noticeable--were blue and a dirty cinnabar red.

Dogs were numerous everywhere, and, like their masters, were indolent and sleepy.

In the afternoon of that same day we travelled some 13 kil. more, on practically level ground intersected by a couple of streamlets. Marching through thinly wooded country, grassy here and there, one began to notice a variation in the scenery, which was gradually becoming more tropical in appearance. Palm trees, especially burity (*Mauritia vinifera* M.), in single specimens, or in groups, could be seen in the great stretches of good grazing country which appeared on both sides of our course.

We spent the night at the fazenda of Ritiro Alegre (elev. 2,450 ft.), which words translated mean "the merry rest"--a most undeserved name, I can assure you, for neither merriment nor rest was to be obtained there. An evening in a Brazilian farm was, nevertheless, occasionally not devoid of interest or of comic scenes.

These folks evidently valued little the life of their children. As I was sitting on the doorstep waiting for my dinner to be cooked, down came, galloping at a breakneck speed and riding bareback, a little child of eight, carrying slung under his arm a smaller child of one, the latter squealing terribly. They both landed safely at the door. Then there appeared one of the picturesque carts drawn by twelve oxen, anxiously awaited by the family. Twenty snarling, snorting, ill-natured pigs provided enough noise seriously to impair the drums of one's ears; and when you added to this the monotonous bellowing of cows and oxen, the frantic neighing of horses and mules waiting to be fed, the crowing of cocks and the cackling of hens, the unmusical shrieks of a beautiful *arara* (or macaw, of gorgeous green, blue, and yellow plumage), and of two green parrots--to which total add, please, the piercing yells of the children--it was really enough to drive one insane.

They were superior farmers, those of the "Merry Rest"--no one could doubt it when the lady of the house and her pretty daughter arrived from an errand and found strangers in the house. Dear me, what style, what enchanting affectation, the pretty maid and her mamma put on when they perceived us!... With an air of solemnity that was really delightful, they each offered us the tip of one finger for us to shake, and spoke with such affectation that their words stumbled one against the other. Their vocabulary was evidently restricted, and in order to make the conversation elegant they interpolated high-sounding words which did not exactly belong, but sounded grand in their ears. It was a trial to have to remain serious.

Dinner was served--always the same fare wherever you went. Boiled rice (very badly boiled), beans, stewed chicken chopped up, *pimienta* (peppers), fried eggs and Indian corn flour, which one mixed up together on one's plate and rendered into a paste. The coffee was always plentiful and good, but so strong that it was quite bitter.

By the light of a wick burning and smoking terribly from the neck of an ex-medicine bottle filled with oil, we enjoyed our meal, watched intently by the entire family, silent and flattened in semi-obscurity against the walls. The primitive lamp gave so little light--although it gave abundant smell--that the many figures were almost indistinguishable against the dirty background, and all one perceived on raising one's eyes from the dinner-plate was a row of expanded eyes, following the movements of our hands, and just under that row a row of white teeth.

When seen in a stronger light it was curious to notice criminal characteristics on nearly every face one saw; in the servants at those farmhouses one frequently observed murderous-looking creatures whom one would not care to meet alone in the dark. They were a special breed of stranded outcasts who had drifted there--the outcome of a complex mixture of Portuguese, former black slaves, and Indians. When you realized that the people who had drifted into the interior were the worst Portuguese, the worst blacks, and the Indians who intermarried with these gentry the worst Indians, you can well imagine what fine results could be expected from such a breed.

One trait predominant among these people was the unreasonable jealousy of the men over their women. Had they been so many Venuses of Milo the men could not have guarded them with more ferocity. I am sure it would take a brave man indeed, and, above all, a totally blind man, to fall in love with the farmers' wives, daughters, or servants of the Province of Goyaz.

I must say this in favour of my Brazilian men, that, whatever other faults they may have had, they always, behaved in a most chivalrous, dignified way with the women-folk we met. Never once did I have to reprimand them.

In the morning, as the cows were driven into the yard to be milked, and the calves were being suckled by their mothers, and the children, rubbing their sleepy eyes with the backs of their hands, scrambled out of the house upon their drowsy legs, the girls of the family brought the last cups of coffee to us departing strangers. We packed our animals, paid the bill, and were off again.

On April 7th we crossed the Piracanjuga River, another tributary of the Corumbá, 50 yards wide, flowing from north-east to south-west, at an elevation of 2,300 ft. One league (6 kil. 600 m.) farther on we crossed another stream flowing east, in its turn a tributary of the Piracanjuga.

One of the most beautiful trees in that region was the *caneleira*, of the family of the *Laurineas*. Beautiful, too, were the *oleo pardo* and *vermelho* (*Myrocarpus frondosus* and *Myrospermum erythrozylon*).

We were next treated to a view of an extensive, deliciously green valley, most excellent for grazing purposes, extending from north to south to the west of our route. In the central depression of this valley were *burity* palms in abundance. They say that wherever you find a burity you are sure to find water. It is perfectly true, as the burity only flourishes where there is a good deal of moisture in the soil.

Having crossed a low pass, we found ourselves in another valley--this one sparsely wooded (2,500 ft. above the sea level), very beautiful, with undulations some 200 ft. high, and with streamlets at the bottom of most of the undulations. The summit of the highest elevation on that undulating land was 2,750 ft., the level of the principal streamlet 2,600 ft. above the sea.

**CHAPTER VI**

Inquisitiveness--Snakes--A Wonderful Cure--Butterflies--A Striking Scene

TWENTY-NINE kilometres from the "Merry Rest" we arrived at the little town of Pouso Alto--duly translated "high camp"--situated 2,750 ft. above the sea level on an elevation between the two rivers Piracanjuba, and the Furniga (which afterwards became the Rio Meio Ponte), throwing itself into the Paranahyba River.

Pouso Alto was like all the other *villas* or settlements of Goyaz, only perhaps a little larger. The same whitewashed houses with doors and windows decorated with blue, the same abandoned, deserted look of the principal square and streets; in fact, another "city of the dead." Only two men--drinking in the local store--were visible in the whole village.

The usual impertinent questions had to be answered.

"Who are you? Why do you come here? Is your country as beautiful as ours? Have you any cities as large as ours in your country? How much money have you? Are you married? You are English; then you come here to steal our gold and diamonds."

"Have you any gold and diamonds here?"

"No!"

"No, you cannot travel for pleasure. The English only travel to take away all the riches from other countries! Those instruments you carry" (a compass and two aneroids) "are those that tell you where to dig for gold!"

I could not help remarking to this gentleman that so far the country I had traversed seemed merely to be rich in misery, that was all.

Nothing could be imagined more funereal than those little towns. My men intended remaining there for the night, but I insisted on pushing on for a few more kilometres--especially as in these places my men were led to drink and became unmanageable. On we went for 9 kil. to the farm of Bellianti (elev. 2,500 ft. above the sea level).

On April 8th we made an early start and travelled through a luxuriant forest, which was daily getting more and more tropical as we went farther north. We were, of course, do not forget, south of the equator.

Thirteen kilometres from camp we crossed the Rio Furniga (or Meio Ponte) about 100 yards wide, flowing there in a direction from east to west at an elevation of 2,000 ft. Most gorgeous, richly verdant vegetation overhung and festooned the banks of the stream.

As we went farther toward the interior the vegetation grew more beautiful, the people more repulsive. The majority of the people suffered from *goître* in more or less advanced stages. Many were the persons affected by leprosy.

We were in a region where oranges (imported, of course) of most excellent juicy quality were obtainable--for instance at the farm of Felicidade (elev. 2,350 ft.). All those farms--very old--showed signs of having seen better days--no doubt when slavery existed in a legal form in Brazil and it was possible to work those estates profitably. With the prohibitive price of labour--and in fact the impossibility of obtaining labour at any price in the interior--farming cannot indeed flourish to-day. The comparatively few immigrants who landed at the various ports in Brazil were at once absorbed near the coast, and seldom left the port of landing, where labour

was anxiously required.

For the first time, that day did I see two snakes, which were concealed in the deep grooves left by a cart wheel. One wound itself around the front leg of my mule, and for a moment I was anxious lest the animal had been bitten; but fortunately the snake, which had been trodden upon, did no damage. Only rarely did we see a bird anywhere, except in villages, where an occasional crow, with its dried-up neck and jerky motions, could be seen. How like the inhabitants those birds were!

[Illustration: Brazilian Pack-saddles.]

[Illustration: A Typical Village.

(The higher building is the church.)]

Twenty-seven kilometres farther we reached Santo Antonio, a village situated in quite a heavenly spot, 2,800 ft. above the sea level, but in itself one of the most miserable villages I have ever seen. There were altogether some forty houses scattered about, eight of which were along the sides of the principal square--an abandoned field. The church had the appearance of a disused barn. A large wooden cross stood in front of it, upon which birds had built their nests. Four thin, anæmic-looking palms stood at different angles by the side of the cross. We had the misfortune to stay there for the night. By seven o'clock everybody had barricaded their houses and had retired to sleep. There was, of course, no such thing as a post-office or a telegraph in the place. The nearest place where a letter could be posted was some 72 kil. away on the high road between Goyaz and Catalão. Goats tied in pairs, with a log of wood between in order to keep them apart, seemed to have the run of the place, and were the only things there which appeared to have any life in them.

But if the place was miserable, if the natives were repulsive and dull, there was plenty to be thankful for in admiration of the really glorious country around, and the superb sunsets to which we were treated every evening. Again that evening, when everybody in the place was slumbering, the sunset was more wonderful than words can describe. The usual radiations, which again reached the highest point of the sky's vault, were that night white on the west, with corresponding ones of brilliant cobalt blue to the east.

A drizzling rain rendered the night cold and damp, although the Fahrenheit thermometer registered a minimum temperature of 70°.

On leaving S. Antonio the trail ascended to a height of 3,100 ft. (4½ kil. from the village), and we were then in a rich forest region, where the *acaju*--of the *Terebinthaceæ* family--was plentiful, with its huge leaves and contorted branches. The *acaju* produced a refreshing fruit, either of a bright red or else of a yellow colour, not unlike a large pepper, outside of which was strongly attached a seed possessing highly caustic qualities. Many *gordinha* trees were also to be seen. It was interesting to see how those zones of forest were suddenly succeeded by beautiful and vast areas of grazing land, such as we found that day. We crossed three streams at the respective elevations of 2,550 ft., 2,650 ft., and 2,750 ft., after which we reached an elevation of 3,000 ft., the highest we had so far attained on our route from the coast, where we found ourselves on a grassy tableland of considerable beauty. Looking back to the S.S.E., we perceived the two hill ranges, one behind the other, which we had crossed. Between them and us were marvellous slopes covered with green grass, but not in the lower portion, where bordering the stream was luxuriant forest. This was noticeable also on a hill to the west, forming a minor tableland with rounded sides.

To the N.N.E. was a perfectly flat plateau. The distance rendered it of a deep blue, and its level sky-line gave the appearance of the horizon upon the ocean, except that there rose two small peaks which stood up slightly above the elevation of the plateau. On all that beautiful land only two small miserable farms were to be seen. Yet it seemed to be a paradise on earth--delightful climate, excellent soil, useful woods in the forest, plenty of delicious water.

Three more streamlets flowing from west to east were encountered at elevations of 2,700 ft., 2,750 ft. and 2,800 ft., with undulating grassy land between of wonderful beauty.

Having deviated somewhat from our route, we at last descended into a grassy valley--absolutely flat--the best of all we had seen. It had been fenced all round. Upon inquiry, I learned that it had been acquired by the Redemptionist Friars. There is one thing friars certainly know. It is how to select the best land anywhere to settle upon.

We had travelled 46 kil. 200 m. that day when we arrived at Campinas (elev. 2,550 ft. above the sea level)--the usual kind of filthy village with tiny, one-storied houses, more like toys than real liveable habitations. This time the doors and windows were bordered with grey instead of blue. On nearing those villages in Central Brazil one frequently found an abundance of rough wooden crosses scattered upon the landscape. They marked the spots where individuals had been killed.

In the room where I put up in the village, in the *hospedagem*, or rest-house, the floor was besmeared with blood, the result of a recent murder. The shops grew more and more uninteresting as we got farther into the interior. The difficulties of transport were naturally greater, the prices rose by leaps and bounds, as we got farther; the population got poorer and poorer for lack of enterprise. The articles of luxury and vanity, so frequently seen in shops before, were now altogether absent, and only bottles of inferior liquor and beer were sold, matches and candles--that was all. No trade, no industry, no money, existed in those places. If one happened to pay with a five- or a ten-milreis note (6s. 8d. or 13s. 4d.), one could never obtain change. Frequently, unless you wished to leave the change behind, you were obliged to carry away the balance in cheap stearine or beer. I took the stearine. A short distance from the town was a seminary, with four German friars, very fat, very jolly, very industrious.

Alcides, one of my men, was by way of being a veterinary surgeon. Here is how he cured a wounded mule, which, having received a powerful kick from another animal, displayed a gash 3 in. long in her back, and so deep that the entire hand could be inserted and actually disappear into the wound. Francisco, another of my men, having duly and firmly tied the animal's legs--a sensible precaution--proceeded with his naked arm to search for *bishus*: anything living is a *bishu* in Brazil, from an elephant to a flea; but in this particular case it was applied to insects, such as *carrapatos*, maggots, or parasites, which might have entered the wound. Having done this at considerable length and care, he proceeded to tear off with his nails the sore edges of the laceration, after which he inserted into the gash a pad of cotton-wool soaked in creoline. That was the treatment for the first day. The second day, the wound proceeding satisfactorily, he inserted into it, together with his hand, a whole lemon in which he had made a cut, and squeezed its juice within the raw flesh. The amazing part of it all was that the animal, with an additional bath or two of salt and water, absolutely recovered from the wound and got perfectly well.

The Redemptionist monks had a fine vineyard adjoining their monastery--the only one of any size and importance we had seen since leaving the railway--and also some lovely orange groves in a walled enclosure. They had built a mill on the bank of the stream. Most of that beautiful valley for miles and miles belonged to them. The town of Campinas--not to be confounded with Campinas of São Paulo Province--had a population of 600 souls.

When we left that place the next morning, again we went across beautiful flat stretches of grassy land--several miles long and broad--regular tablelands, at an elevation of 2,700 ft.--most wonderful pasture lands now going absolutely to waste. Plentiful streamlets intersected those lovely meadows at a slightly lower elevation--merely a few feet--where the water had eroded itself a channel. Those streams were generally bordered by a thick growth of trees and entangled vegetation. We stopped for lunch at the farm of *Boa Vista* (Belvedere or Fine View), so called--according to the usual Brazilian way of reasoning--because it was situated in a deep hollow from which you could see nothing at all! Another more rational name which this place also possessed was *Bocca do Matto* (Mouth of the Forest), because it truly was at the entrance of a thick



forest extending to the north.

We went, in fact, from that point through densely wooded country, although the trees were of no great height or size. The ground was swampy and sloppy, most unpleasant for marching, for some nineteen kilometres, until we arrived at Goyabeira (elev. 2,700 ft.), having covered 56 kil. 100 m. that day--not at all bad marching considering that we could not change animals and we conveyed all our baggage along with us.

I saw that day another snake, called by the natives *duas cabecas* (and Tu Nou), or double-headed snake, because its marking gives that impression at first sight.

After leaving Goyabeira the thick growth continued over several ridges, the highest of which was 2,950 ft., with streams between at elevations respectively of 2,630 and 2,700 ft. I noticed in the forest some beautiful paneira trees, with their trunks enlarged near the base--a regular swelling all round. One of the peculiarities of this tree was that it produced a kind of vegetable wool contained within fairly hard capsules.

That was indeed a day of surprises for us. As we were proceeding over another hill range between two streams (elev. 2,850 ft.), we saw at last some butterflies of a gorgeous lemon yellow, some of a rich orange, others of red and black, great numbers of pure white, and some huge ones of an indescribably beautiful metallic blue colour. There were swarms of them near the water. So unaccustomed were they to see human beings that many settled on my white coat and on my straw hat and came along undisturbed for long distances upon my person. They were so beautiful that I had not the desire to kill them, even for the sake of bringing back a valuable collection. It would have been easy to capture them, as you could touch them several times with your fingers before they would fly away. One butterfly particularly took a great fancy to my left hand, in which I held the reins of my mule, and on which it sat during our marches for several days--much to my inconvenience, for I was afraid of injuring it. It would occasionally fly away and then return. At night while we were camping I transferred it to my straw hat, on which it quietly remained until the next morning. The moment I had mounted my mule, the butterfly would at once fly again to my hand. This great affection was due chiefly, I believe, not to any magnetic attraction, but merely to the delicately scented soap which I used in my morning bath, and which greatly attracted the butterfly.

On many occasions on that expedition I had similar experiences with butterflies.

For the first time, too, I perceived that day a few *colibris*--tiny humming-birds of wonderful plumage.

Twenty-three kilometres from Goyabeira--after many ups and downs along a deep-channelled, slushy trail, and having crossed over several swampy, troublesome streamlets--we suddenly emerged into a marvellous undulating open plain with lovely grass and numerous fat cattle grazing upon it. In the distance upon the hill-side four or five farm-sheds could be perceived. We had stopped at one farm on the way in hopes of getting food, but they could only sell us some *feijão*--beans soaked in lard--so that it was with some haste that we directed our mules to the more imposing building in expectation of finding there at least some rice and eggs. We hurriedly crossed the plain and then the stream, and halted at the Cachoeira Grande (Grand Rapid) farm, 2,950 ft. above the sea level. A pure negro was in charge of the place, whose wife was also as black as the ace of spades. Curiously enough, they possessed a child much discoloured and with golden hair and blue eyes. Such things will happen in the best regulated countries. The black man swore it was his own child, and we took--or, rather, did not take--his word for it.

We went on thirteen more kilometres that afternoon, when we were overtaken by a hurricane and torrential rain which drenched us to the marrow of our bones. We halted for the night at the farm of *Lagoa formosa* (Beautiful Lagoon), 3,000 ft. above the sea level.

It was on April 12th that we proceeded to climb the dividing range between the waters flowing south into the Paranyhya (afterward called the Parana) River, and those flowing north eventually into the Amazon. This

range of mountains was by some called Serra de Sta. Rita, by others Serra Dourada. It was not possible to ascertain the real name from the local people, who could tell me the names of no place, or mountain, or stream, and hardly knew the names of their own homes.

On a flat expanse some 13 kil. from Lagoa Formosa we came upon a small lake. We travelled mostly across campos (or prairies), with waters from that point flowing northward. Seventeen kilometres farther we entered the neat-looking village of Curralhino (elev. 2,600 ft.), with two squares and streets actually with names to them. We were from this point on the main route between São Paulo and the capital of Goyaz, and also met there the telegraph line between Goyaz and São Paulo.

We were getting near the capital of the province. A little more life was noticeable in this settlement than in those we had met before. Caravans of mules and horses occasionally passed through, and bullock-carts, with eighteen and twenty oxen, slowly and squeakily crept along. We were going through a region that was more than hilly--almost mountainous--the first of the kind we had encountered since leaving the railway.

[Illustration: Author's Caravan about to cross the River Corumba.]

[Illustration: Burity Palms.]

At Camp Maria Alves we were at an elevation of 3,000 ft. Beautiful crystals were to be found at and near this place. Many were enclosed in hard envelopes of yellow lava, which contained besides semi-crystallized matter easily crushed--to be strictly accurate, the imprisoned infinitesimal crystals were easily separated, under gentle pressure. Some spherical balls and pellets of lava I picked up, when split contained red baked earth which had evidently been subjected to intense heat. In the centre of these pellets one or more crystals of great clearness were invariably to be found. These pellets must have been expelled with terrific force from a volcanic vent, and must have travelled great distances, for the depression where I found them had a surface of alluvial formation.

On April 13th we again rose over a range where we encountered a good deal of igneous rock and quantities of beautiful crystals. We had a range to the west of us and one higher and more important to the north-east, the latter more broken up than any we had so far seen in the three last provinces crossed. We somehow missed now the lovely pasture lands of the day before, so refreshing to the eye, and the landscape had suddenly become more rugged and barren, except near water. Some 9 kil. from the farm Maria Alves the Uru or Uruba River (elev. 2,550 ft.) flowed north--there merely a picturesque torrent among rocks and overhanging vegetation on both banks.

The wonderful effect of erosion was noticeable on the mountain sides to the north of us, where it had left a top terrace with deep corrugations in the lower sides of the mountain. A miserable-looking farmhouse could be seen here and there--quite as miserable as the country in itself was rich. Some shaggy policemen, in rags and barefooted, passed us, guarding an ox-cart dragging treasure to the capital. Only the oxen and some cows which were about looked at us with interest, and sniffed us--it is wonderful how quick animals are at detecting the presence of strangers--but the people took no notice of us. Here and there a tumbled-down tree blocked the way. There were tracts of pasture land. My men were considerably excited on seeing a poisonous snake crawl swiftly towards our mules. It was perhaps an absent-minded or a short-sighted snake, for no sooner did it realize our presence than it quickly veered round to escape. My men killed it.

At an elevation of 2,550 ft. we met a limpid stream of most delicious water. At that particular spot it flowed south.

We were now confronted with a range of actual mountains. The trail took us over wonderful rugged scenery, masses of pillar-like grey rock of granitic formation. On the summit of the pass we were over strata of half-solidified tufa in sheets--or foliated--easily crumbled and finely powdered between one's fingers. The

strata were at an angle of 45°, showing that they had undergone some disturbance. They had been subjected to great heat, for in some places they had been hard baked, which rendered them of a yellowish brown colour. On the left of us--to the west--a great vertical pillar of rock plainly showed the stratification, the continuation of which could be followed on the opposite side of the pass, both in the horizontal strata and those which had been forced up at an angle. Looking back from the pass, we obtained a heavenly panorama of wooded hills to the south-east, far, far beyond in the background, and of glorious campos between them and us. With the winter coming on--of course you know that south of the equator they have their winter when we have our summer--beautiful yellowish, reddish and brown tints of the foliage added picturesqueness to the landscape.

The pass itself was 2,850 ft. above the sea level. There was not much in the way of vegetation, barring a few stunted *sucupira* trees. The air was exquisitely pure and the water of two streamlets at 2,550 ft. delicious and cool. We were marching over quantities of marble fragments and beautiful crystals, which shone like diamonds in the sun. Having gone over the pass, we came upon a most extraordinary geological surprise. There seemed to have been in ages long gone by a great subsidence of the region north of us. We were then on the steep edge of what remained of the plateau, and down, down in the depth below was an immense valley in which Goyaz city lay.

To the west of us--as I stood impressed by that awe-striking scene--we had the irregularly-cut continuation of the edge of the plateau on which we stood, supported as it were on a pillar-like granitic wall of immense height and quite vertical, resting on a gently sloping base down to the bottom of the vast basin below.

This great natural wall of gneiss, which contained myriads of crystals and mica schists, shone like silver in the spots where the sun struck it, and with the lovely pure cobalt blue of the distant hills, the deep green of the valley below, and the rich brown and yellow and red tints of the near foreground, made one of the most exquisitely beautiful sights I have ever witnessed. The nearest approach to it in my experience was, perhaps, the eastern escarpment of the Abyssinian plateau in Africa, where a similar panorama on a much smaller scale could be seen, but not the same geological formation.

[Illustration: The President of Goyaz and his Family.]

[Illustration: Giant cactus in the background.]

No sooner had I recovered from the strangeness and marvellous beauty of Nature's work around me, than I felt a great shock at seeing what men had done in that region. We were at this point on the high road between São Paulo, Uberaba and Goyaz capital. As my animals stumbled down the steep escarpment traces could be seen of what must have been formerly a beautiful paved road, well-drained on both sides with channels, and held up in terraces by stone works where the gradient was steepest. Here and there bits still remained, demonstrating how well the road had been made. But, uncared for and abandoned, most of it had been washed away by the heavy rains, which had turned that road into a foaming torrent in wet weather. Near habitations, the well-cut slabs with which the road was paved had come convenient to the natives for building purposes. During the time of the Emperor Pedro II., I was told, that was a magnificent road, kept in excellent repair.

Goyaz city lay before us down, down below, in the hollow of the huge depression. Its single row of low whitewashed houses of humble architectural pretensions became less and less impressive and less picturesque as one got nearer. I had by that time grown quite accustomed to this optical disillusion, for it was frequently the case with the work of man in Brazil. It always needed distance--the greater distance the better--to lend enchantment to it.

With a feeling of intense oppression--perhaps due to the stifling air and the lower elevation (1,950 ft.) at which Goyaz city lay--we entered the capital of Goyaz. At the sound of our mules upon the pavement, timid men, timid women and children cautiously peeped from each window through the half-closed Venetian blinds. We only had to turn round to peep at them, and with terrified squeals the hidden creatures banged and bolted

the windows. The sight of a stranger in Goyaz was apparently an event. Whether we were expected or not, I do not know, but the whole population seemed to be hiding behind the tiny windows to look at us. The few who were caught in the street seemed as if they wanted to bow but had not the courage to do it. Indeed, their timidity was intensely amusing. Some, more courageous, gave a ghastly grin, displaying rows of irregular teeth in a terrible condition of decay.

#### DISTANCES BETWEEN ARAGUARY AND GOYAZ

Araguary to Parahyba 59 kil. 400 m. = 9 leagues. Parahyba to Corumbahyba 59 " 400 " 9 " Corumbahyba to Caldas 59 " 400 " 9 " Caldas to Pouso Alto 79 " 200 " 12 " Pouso Alto to S. Antonio 59 " 400 " 9 " S. Antonio to Campinas 46 " 200 " 7 " Campinas to Goyabeira 56 " 100 " 8½ " Goyabeira to Curralhino 66 " " 10 " Curralhino to Goyaz 46 " 200 " 7 " ----- Total 531 " 300 " 80½ "

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**CHAPTER VII**

## In the City of Goyaz

THERE was no such thing as an hotel in Goyaz capital. The nearest approach to it was a filthy rest-house for muleteers, which was, furthermore, already full. Against my usual custom--as I never, unless absolutely necessary, make use of the credentials I carry for my private needs--I had, therefore, to apply to the Presidente or Governor of the Province to find some sort of accommodation in the town for my animals, men, and myself.

"Take off your spurs before you enter!" roughly shouted a sentry at the Governor's palace--a huge barn-like structure--just as I was stooping to do that before being asked.

"Do not stand on the pavement," said the sentry again, anxious to display his authority.

Being a law-abiding person I shifted to one side.

"Do not stop under the Presidente's window!" cried the policeman angrily once more, digging me in the ribs with his bayonet.

I was beginning to be sorry I had not brought an aeroplane with me in order to complete my toilet in the air before entering so sacred a precinct, but patience being one of my chief virtues I transferred myself to the remotest point across the square, where, stork-like, upon one foot at a time I was able--this time undisturbed--to remove both spurs.

"Take off your hat before entering," again shouted the policeman, as I was still some fifteen yards from the door.

I really began to feel rather nervous, with all those orders grunted at me. I wondered at the strange people who must visit the palace to have to be instructed to such an extent before entering. I also stopped for a moment to ponder whether I had taken off all that was necessary to enter a palace where so much etiquette was required.

The moment I entered things were different. I was ushered into an ante-room, where I had to go through a short cross-examination by some police officers. Then, when they had made sure of my identity, they immediately led me before the Presidente.

The Presidente greeted me with effusion. He was a most polished and charming gentleman from Rio de Janeiro, had travelled extensively in Europe, and could speak French and English. He roared heartily when I told him of my experience outside his palace.

"They are all savages here," he told me; "you must not mind. The sentry has orders to keep everybody away from the palace, as people come in the afternoon and squat under my windows to jabber, and I cannot sleep. Those orders, I assure you, were not meant for you. You will be my guest all the time you are in the city, and I can accept no excuse."

The Presidente placed a small house near the palace at my disposal, and insisted on my having all meals with his family--most refined, handsome, exquisitely polite wife and daughters.

I presented the credentials I possessed from the Minister of Agriculture in Rio and the Brazilian Ambassador in London, requesting the Presidente to do all in his power to further the success of the expedition--I, of course, paying all expenses. The Presidente, like most other Brazilians of a certain age, was *blasé* beyond words. Nothing interested him except his family, and life was not worth living. He believed in nothing. He

was an atheist because he had not been as successful as he wished in the world, and attributed the fault to God. He cared little about the future of his country. If his country and all his countrymen went to a warmer place than Heaven, he would be glad to see them go that way! As for going exploring, mapping unknown regions, studying the country and the people, building roads, railways and telegraphs, it little mattered to him, but it seemed all nonsense.

"Instead of coming to these wild, deadly regions, why do you not go and spend your money enjoying yourself in Paris or Vienna?" was his advice to me.

"Perhaps I need a change occasionally, and I enjoy things all the more by contrast when I return to Europe."

The Presidente was evidently not in good health and spirits. He was a Senator of the Republic, and a man formerly of great ambitions, which were more or less shattered when he was elected Governor of Goyaz Province, with its population of corpses, and at a salary of £40 a month--very little more than I paid my head muleteer--so that little could be expected from the Governor of such a Province.

It was thus that the State of Goyaz, one of the naturally richest in Brazil--it contained pasture lands unique for their beauty, forests with valuable woods, plenty of water and great navigable rivers draining it both north and south, of which it was sufficient to mention the magnificent Araguaya River, the Rio Tocantins and the Parana (or Parana)--was instead one of the poorest. In the very heart of Brazil, Goyaz was geographically and politically the centre of the Republic. With an area of 747,311 sq. kil. (288,532 sq. miles), the Province had an estimated population of some 280,000 souls, or less than one to every square mile.

The region forming the present State of Goyaz was first explored in 1647 by Manoel Correa, a native of São Paulo, and in 1682 by another Paulista, Bartholomeu Bueno de Silva, who both were prospecting for gold. The latter was successful in locating gold mines and in making friends with the local Indians of the Goyaz tribe, from whom the Province then took its name. Some forty-three years later de Silva returned to São Paulo with 918 ounces of gold. The news of these goldfields quickly attracted a great number of adventurers to Goyaz. The country then saw its most prosperous days, especially in and near Villa Boa, the present city of Goyaz, where gold was said to have been plentiful in those days.

The enterprising Bartholomeu Bueno de Silva returned to Goyaz in 1731 as a Capitão Mor, or Grand Captain, with the right to dispose of land. In 1822 Goyaz was recognized as a Province of the Empire, and subsequently in 1869 it became one of the States of the Union, with autonomy as regards local affairs under its own Constitution approved by the Federal Constituent Assembly in 1891.

Cattle, horse and mule breeding on a small scale was the chief source of income of that magnificent State--an income which in less indolent hands might be increased ten-thousand-fold or more. Its horses and mules found a ready market in the adjacent State of Matto Grosso and from there went into Bolivia, while the States of Minas Geraes and São Paulo were the chief buyers of pigs, *toucinho* (dried pork fat), dried beef, hides raw and cured, cheese, lard, etc.

Goyaz prided itself greatly on its horses, which enjoyed a certain fame all over Brazil. Perhaps they were in a way as good as any produced in the Republic. With a little study and care in the breeding they might be greatly improved and rendered as sturdy and good-looking as some horses of Asia and Northern Africa. So far they were far inferior in appearance and endurance to the horses of Arabia, Turkestan, Europe and Abyssinia.

The most interesting type of the Goyaz horse was what is called the *curraleiro* or "stable horse," bred in the north of the State, especially in the valley of Parana, bordering upon Minas and Bahia. The *curraleiro* was also known as *cavallo sertanejo* or "horse of the jungle"--two most inappropriate names, for it was, accurately speaking, neither one nor the other.

The Goyaz horse was a typical Brazilian horse. It shared many of the characteristics of the people of the Province. Timidity, laziness, lack of affection and judgment, sulkiness and great stubbornness under training of any kind were its qualities. This was due chiefly, I think, to its inferior intelligence when compared with thoroughbred horses of other nations. The Goyaz horse was small, fairly agile, and when well cared for had a handsome shiny coat with luxuriant mane and tail. It was capable of short, noteworthy efforts, but did not possess abnormal endurance.

The present curraleiro is a mere degeneration of what must have formerly been an excellent horse. Considering the absolute lack of care taken in its breeding, it was certainly remarkable that it proved to be as good a horse as it actually was. Judiciously crossed with Hungarian, Turkestan, Arab or Abyssinian horses, I think that quite excellent results might be obtained. It must be taken into consideration that great hardships and work of the roughest character were demanded of animals in Central Brazil.

A praiseworthy movement was started some years ago by Marechal Hermes da Fonseca, now President of the Republic, to mount the entire Brazilian Cavalry on national horses. That will perhaps lead some day to a great improvement in the breeding of animals all over the country, and especially in Goyaz, which provided the most suitable land for that purpose. The same remarks could, perhaps, in a slightly lesser degree, be applied to the breeding of donkeys and mules. No care whatever was exercised by the breeders in order to improve the breeds. Everything was left to luck and chance. The result was that a degenerate type of animal was produced--wonderful indeed, considering the way it was bred, but which might be improved to an immense extent and made into a remarkable animal, in such a propitious climate and with such marvellous pasture lands.

With cattle also, it is safe to assert that, since the colonial time, very little fresh foreign blood of any importance has been introduced in breeding--except, perhaps, some inferior types of the Indian humped zebu. Most of the stock I saw in Southern Goyaz was intermixed with zebu. The formerly existing bovine races, such as the Mocha, Coraçu and Crioula have now almost altogether disappeared.

Unlike most other States of Brazil, Goyaz had no Provincial Customs duties. With its immense frontier, bordering upon seven different other States, it would be impossible to enforce the collection of payments. No reliable statistics were obtainable as to the amount of exports or imports of the State. Even approximately it would be impossible to make a guess as to the actual amount of the resources of the State.

Sugar-cane and tobacco could be profitably grown in the State. The small quantity of tobacco grown there was of excellent quality.

[Illustration: The Main Square of Goyaz City,

Showing Prison and Public Library.]

[Illustration: Some of the Baggage and Scientific Instruments used by the Author on his Expedition.]

The Government of Goyaz Province consisted of three Powers: the Executive, represented by the President, elected for three years by universal suffrage; the Legislature--a Chamber of Deputies equally elected for three years by suffrage; and a Judicial power constituted by the High Court of Justice, *Juges de droit*--law judges--and District Judges. To be elected President of Goyaz State all that was necessary was to be a Brazilian citizen, over thirty years of age, and able to read and write. The same applied to the election of Deputies--for whom a residence of only two years in the State was sufficient.

The capital of Goyaz--situated on the Rio Vermelho, a tributary of the great Araguaya River--had, according to the census of 1900, a population of some 13,475 people, but I rather doubt whether it possessed as many as 8 to 10,000 souls when I visited it. One could notice indications that Goyaz had been in days gone by a

flourishing place. There were a number of fine churches, and a large cathedral in course of construction--but since abandoned. Some of the buildings, too--the finest was the prison--must have been quite handsome, but were now in a dilapidated condition. It was really heart-breaking to see such a magnificent country go to rack and ruin--a State naturally the richest perhaps in Brazil, yet rendered the poorest, deeply steeped in debt, and with the heavy weight of absurdly contracted loans from which it had no hope whatever of recovering under present conditions. They had in the province the most beautiful land in Brazil, but it was a land of the dead. People, industries, trade, commerce, everything was dead. Formerly, in the time of the Emperor and of that great patriot General Couto de Magalhães, Goyaz city could be reached--within a few kilometres--by steam on the beautiful river Araguaya, which formed the western boundary of the province, an ideal waterway navigable for 1,200 kil.--in Goyaz province alone. In the time of the Emperor, when Brazil was a wild country, steam navigation actually existed up the Araguaya River from Conceição as far as Leopoldina (the port for Goyaz city). The river was free from obstacles of any kind, even in the rainy season. There were then three beautiful English-built launches on that service. A fine repairing shop had been erected at Leopoldina.

But in these days of civilization, order and progress, the steamers have been purposely run aground and left to rot. There was actually a tree growing through the hull of one of those launches when I last heard of them; the machine shop was robbed of all its tools, and the machinery destroyed and abandoned. The Presidente told me that the Provincial Government had eventually bought the wrecks of the launches and the machine shops for £20--and as it cost too much to leave a man in charge everything had since been abandoned.

When I visited Goyaz there was no sign and no hope of re-establishing steam navigation on that marvellous waterway.

The Tocantins River, which intersected the Province from Goyaz city to its most northern point, was also another serviceable stream--but no one used it, except, perhaps, some rare private canoe taking up goods to settlements on its banks.

The navigation of the Tocantins, when I was in Goyaz, extended merely to the Port of Alcobaca, 350 kil. from Para, from which point rapids existed which made steam navigation impossible as far as Praia da Rainha. The distance of 180 kil. between those two places was eventually to be traversed by a railway, a concession for which had been granted to the Estrada de Ferro Norte do Brazil. In the High Tocantins I believe two steam launches were temporarily running as far as Porto Nacional or perhaps a little higher.

Undoubtedly the State of Goyaz will some day, notwithstanding its apathetic inhabitants, see great changes for the better. The new epoch will begin when the several railways which were in course of construction from various directions enter the Province. Not one of them had penetrated the Province at the time of my visit, although the work of preparing the road had just been begun on Goyaz territory, as we have seen, for a few kilometres north of the Parahyba River, on the extension of the Mogyana line from São Paulo. A second railway line in course of construction was a branch of the Western Minas Railway; and there was a third up the Araguaya from Para. Those railways will certainly revolutionize the country. The inhabitants of Goyaz, ultra-conservative in their ideas, were not at all anxious to see a railway reach their capital. In their curious way of reasoning they seemed to think that the railway would make life dearer in the city, that strangers would be coming in great numbers to reap the benefit of their country, and that the younger people who were satisfied to live there--because they could not get away--would all fly to the coast as soon as the railway was established, to enjoy the luxuries of Rio and São Paulo, of which they had heard, but could so far only dream of. They did not stop to think that the railways will certainly make Goyaz the richest country in the world.

The financial condition of that beautiful State can perhaps best be shown by quoting the words of the Presidente himself in his message to the Legislative Congress of Goyaz on May 13th, 1910, on assuming the Presidency of the Province.

"On my assuming the Government of the Province, I ordered the Secretary of Finance to give an account of



the balance existing in the State Treasury; and it was verified that up to April 30th last there existed a sum of Rs. 87,000,000 (£5,800 sterling), which became reduced to Rs. 50,000,000 (£3,334 sterling) after the payments made on the 1st, 3rd, and 4th of the present month (May, 1910). It must be understood that the above-mentioned sum does not represent a balance existing in the Treasury, because it includes deposits and guarantees, as well as the deposits of the Orphan Asylum and of the Monte Pio.

"Leaving out the sums left in the Treasury on deposit, and which represent in fact a debt of the State, we come to the conclusion that there is no money whatever in the Treasury, and that the State '*ainda fica a dever*' (is instead deep in debt). The expenses were vastly higher than the income of the Province and whereas the expenses of administration increased daily, the receipts remained stationary."

There was a certain humour in the Presidente's remarks on crime, when he referred to the difficulties experienced by the Chief of Police, who received no remuneration.

[Illustration: The Author's Six Followers.]

"It is easy," he said, "to understand the drawbacks resulting for the maintenance of order and the repression of crime, which is daily becoming more common--owing, no doubt, to the facility of entrance, through our unguarded boundaries, of persecuted people or fugitives from our neighbouring States, and of the impunity of criminals due to the benevolence of our juries. The diminution of our police force in so large a State with such difficult communications has had the result that the police force, moved incessantly from one end of the State to the other, never arrives in time to prevent crime!"

"Many criminals have been prosecuted and are now safely guarded in prisons, but unhappily the greater number of criminals are loose all over the State without fear of being prosecuted, and terrorizing the population. Bands of gipsies were followed by officers and soldiers, and their attacks on property and individuals were prevented.... In the town of Catalão the two armed parties were successfully prevented from violence and '*viessem ás mãos*' (coming to blows). At Morrinhos armed citizens in a menacing attitude were dispersed by the police ... in other localities other riots or attempts (*sic*) at disorder were immediately repressed, and we can now say that the State enjoys perfect peace, save the municipality of Douro, which is threatened by bandits from Bahia. They are constantly springing upon the terrified population of the municipality and especially of the town.

"... The bandits continue their incursions; murders follow one another in the entire zone between Formosa and Barreiros, including Santa Rita and Campo Largo, the inhabitants of which zone are paralyzed with terror.... Our commerce with Bahia, as well as relations between private individuals, is thus interrupted."

In his message the Presidente wisely and frankly disclosed the difficulty of administering justice under existing laws, when juries would absolve proved and confessed murderers wholesale. He endeavoured to stimulate some sense of honour in the officials in charge of the various municipalities, where "*as rendas em geral mal applicadas*" (the revenue generally misapplied) found its way into channels through which it was not intended to pass.

A fervent appeal the Presidente made to prevent the spread of smallpox. The vaccine which the Government sent to various points of the State was not used.

Curious, indeed, but perfectly true, were his statements regarding the police force.

"The officers are zealous and understand their duty. The policemen, notwithstanding all their defects, are being instructed and disciplined. The policemen are in general '*criminals*' (*morigerados*). *Ha falta de armamento, e o existente não é o melhor.* (There is lack of armament and the existing one is not the best.) The pay is small ... and the body needs reorganization."

The Academy of Law (*Academia de direito*) was not satisfactory and did not answer the purpose for which it was established.

The Lyceum, with its 105 pupils, gave fair results, barring the tolerance in examinations, which, however, did not reach a criminal point (*sic*). It possessed no building of its own, and was badly housed in a private dwelling.

Public instruction was admittedly defective all over the province. The teachers were almost as ignorant and illiterate as the people who went to learn--and perhaps more so; while the Escola Normal (Normal School) for women was almost altogether unattended. The public works were uncared for--there was not a single new work of art begun in the State. Nor could the State boast of a single road or trail or bridge in fair condition.

The laws on the possession of land would one day lead to immense difficulties and confusion. The greater part of the land now occupied was in the hands of people who had no legal right whatever to it.

The existing laws on mining were equally unsatisfactory, and the Presidente rightly remarked that "without facilities and guarantees, capitalists will never venture upon so risky and problematic an enterprise as mining in a State so distant and so difficult of access." He also exhorted the people to re-establish steam navigation on the Araguaya River, such as existed in the days of the Empire.

I was told that a launch had actually been purchased in the United States, but was either waiting at Pará for want of an engineer or else had again been sold owing to the impossibility--due to lack of money--of its being transported in sections over the rapids above Conceição.

The question of boundaries with neighbouring States was an amusing one. According to some rule for which no one can account, the Government of Goyaz claimed from the State of Matto Grosso enormous stretches of land on the opposite side of its natural, indisputable geographical western boundary, the main stream Araguaya, as well as the isolated settlement of Conceição, on the opposite side of the Araguaya River, which was undoubtedly in the State of Pará. One only had to glance at a map--bad as maps were--to see that in both cases the claim was an absurd one. In the case of Conceição it was perfectly ridiculous. The Pará Government held the place with a military force and occupied the territory with complete jurisdiction. In a more peaceful manner the State of Matto Grosso was in possession of the entire territory west of the Rio Grande do Araguaya, which the people of Goyaz said belonged to them. On the west the Araguaya formed a perfect geographical boundary from the Southern Goyaz boundary--where the Araguaya had its birth--as far as the most northern point of the State; whereas, were one to accept the supposed Goyaz boundary formed by the Rio das Mortes--a tributary of lesser volume than the main stream--it would involve an imaginary compound boundary line up the Paredão stream, then up the Rio Barreiros, then an imaginary straight line from north to south across mountainous country, winding its way east until it met the Serra dos Bahus, then again north-east over undetermined country, then along the Rio Aporé and eventually joining the Paranahyba River.

Curiously enough, nearly all the Brazilian Government maps--and all the foreign ones copied, of course, from the Brazilian, all remarkable for their inaccuracies--gave the wrong boundary as the correct one! In any case, both the States of Matto Grosso and Pará were in actual occupation of the respective disputed territories, and Goyaz was much too poor to afford fighting for them, so that I fear her most unreasonable claims will ever remain unsatisfied.

The final blow to the financial status of the Province was the loan raised on the Banco do Brazil of Rs. 300,000,000 (£20,000 sterling) at an interest of 7 per cent per annum. The Presidente counted on the receipts from the exports as well as on economy in administration in order to pay the interest on this sum--a dream which soon became impossible to realize.

It was then attempted to float an internal loan of Rs. 200,000,000 (about £13,334 sterling) at an interest of 6

per cent; but, as the Presidente pathetically ended his message to the State Congress, "not a single person presented himself to subscribe to the loan."

The receipts from the export of cattle from Goyaz State amounted in 1910 to only Rs. 171,901,000 (or £11,460 1s. 4*d.* sterling). After all expenses were deducted the State of Goyaz then showed a deficit of Rs. 325,510,743 (£21,700 14s. 4*d.* sterling).

**CHAPTER VIII**

## Fourteen Long and Weary Days--Disappointment--Criminals as Followers

IT was in the town of Goyaz that I had entertained hopes of finding suitable followers to accompany my expedition. The officials in Rio de Janeiro had given me glowing accounts of the bravery of the people of Goyaz. According to them those settlers of the interior were all daredevils, courageous beyond words, and I should have no difficulty whatever in finding plenty of men who, for a consideration, would join the expedition.

"They will one and all come with you," a well-known Colonel had exclaimed enthusiastically to me in Rio--"and they will fight like tigers."

I carried the strongest possible--although somewhat curiously worded--credentials from the Federal Government to the Presidente and other officials of Goyaz, the letters, which had been handed to me open, stating that the Presidente was earnestly requested to do all in his power to help to make the expedition a success. When I presented these documents, I explained clearly to the Presidente that all I wished was that he should help me to collect thirty plucky men, whom I would naturally pay, and pay well, out of my own pocket, feed and clothe, during the entire time the expedition lasted, as well as pay all their expenses back and wages up to the day of reaching their original point of departure.

"I cannot help you; you will get nobody. Besides, I have received an official but confidential message from Rio requesting me to do all I can to prevent your going on."

Such treachery seemed inconceivable to me, and I took no notice of it. I again requested the Presidente to endeavour to find me men and animals, as nothing would deter me from going on. If no Brazilians came, I said that I would go alone, but that the value of the expedition would naturally suffer, as I should thus have to leave behind all the instruments, cameras, and other impedimenta, which, single-handed, I could not possibly carry.

It was my intention to travel north-west from Goyaz city as far as the River Araguaya. There I wanted to descend the Araguaya as far as the Tapirapez River--a small tributary on the west side of the Araguaya, shown on some of the very incorrect existing maps approximately in Lat. 11° S., and on others in Lat. 9° and some minutes S. Proceeding westward from that point again, I proposed crossing over to the Xingu River, then to the Tapajoz, and farther to the Madeira River. It was necessary for me to hire or purchase a canoe in order to descend the Araguaya River as far as the Tapirapez.

Believing that perhaps I might be able to find men without the assistance of the Governor, I tried every possible channel in Goyaz. I sent men all round the town offering high pay. I applied to the commanding officer of the Federal troops. I applied to the Dominican monks, who have more power in Goyaz State than all the officials taken together.

The Father Superior of the Dominicans shook his head at once and told me that, much as he wished to oblige me, I was asking for something impossible. He was right. The people were so scared of the Indians, and of the horrors of camping in the jungle, that no money in the world would ever induce them to move out of their town.

"Are there no young fellows in the town who will come along for the love of adventure as well as the money they will get?" I asked.

"For love! ... love!" said the friar, bursting with laughter. "I do not believe that such a thing exists in Brazil."

Having removed "love or money" from the programme of temptation, there remained little else except patience. In the meantime I endeavoured to hire a canoe. The Presidente kindly undertook to do this for me with the help of a well-known Colonel, one of the most revered men in the city.

"There is only one boat on the Araguaya," said the Presidente to me. "You cannot build a raft, as all the woods in these regions are too heavy and not one will float. You must hire that boat or nothing."

[Illustration: View of Goyaz City from Sta. Barbara.]

[Illustration: Author's Men packing Animals.]

The honoured Colonel his friend also impressed that point well upon me. "Only that boat or nothing." They also added that they had arranged for me to hire that boat for four days, and it would only cost me £500 sterling. My distinguished friends had taken ten days to arrange that bargain. It took me ten seconds to disarrange it all. All the more as I had heard that a German traveller, Dr. Krause, had the previous year gone down the Araguaya River, where he had done excellent research work, and had also travelled up the tributary Tapirapez, crossing over nearly as far as the Xingu River. He had found in that region no Indians and the country of little interest. Furthermore, on my arrival in Goyaz capital I learnt that a Brazilian Government expedition, under the leadership of Dr. Pimentel, had already been in Goyaz some six months trying to start on a journey down the Araguaya, and, if possible, also to go up the Tapirapez and other tributaries of that great stream. Moreover, the Araguaya was perhaps, after the Madeira, one of the best known southern tributaries of the Amazon. As we have already seen, during the time of Dom Pedro, the Emperor, there was even steam navigation almost all along the course of the upper Araguaya as far as Leopoldina, the port for Goyaz capital. Several Englishmen and Germans and very many Brazilians had travelled on that river, where even military posts had at one time been established at intervals on its banks.

So that, rather than be imposed upon and travel for hundreds of kilometres in so well-known a region, I decided slightly to alter my route in order to cover ground that was newer and infinitely more interesting and important.

The Presidente's friend, the highly revered Colonel, had also undertaken to purchase a number of horses and mules for me. "The people of Goyaz," said he, "are terrible thieves; they will swindle you if you buy them yourself. I will purchase them for you and you will then pay me back the money. By to-morrow morning," he had stated, "I shall have all the horses and mules you require."

This was on the day of my arrival in Goyaz. Twelve days after that date he appeared with a famished, skeleton-like horse--only one--for which he made me pay nearly double what I had myself paid for other excellent animals.

I took care after that experience to beware of the "revered and honest men of Goyaz." Those who behaved honestly were generally those who were described as thieves. Everything is reversed in Brazil, and I should have known better.

Let us have a look around the city. Mules and horses were grazing in the principal square on a severe slope; the streets were paved in a fashion calculated to dislocate your feet or possibly break them if you happened to be walking out after dark. There was not the slightest semblance of drainage in any part of the town. The people flung out into the streets all that could be flung out, and also a good deal that should not be flung. The dirt was excessive all over the place when the rain did not come to the rescue and wash it all off.

The boast of the town was its brilliant illumination--one hundred petroleum lights all told, lighted up until ten p.m. when there was no moon. When there was, or should have been, a moon, as on stormy nights, the municipality economized on the paraffin and the lamps were not lighted. I do not know anything more

torturing than returning home every night after my dinner at the palace, walking on the slippery, worn slabs of stone of the pavements, at all angles--some were even vertical--in the middle of the road. You stumbled, slipped, twisted your feet, jamming them in the wide interstices between the slabs. I never could understand why the municipality troubled to have lights at all. They gave no light when they were lighted--not enough to see by them--and they were absolutely of no use to the natives themselves. By eight o'clock p.m. all the people were asleep and barricaded within their homes.

Yet--can you believe it?--in this mediæval city you would be talked about considerably and would give much offence if you went out of your house in clothes such as you would wear in England in the country. On Sundays and during all Easter week--when I was there--all the men went out in their frock-coats, top hats of grotesquely antiquated shapes, extra high starched collars, and, above all, patent leather shoes--with the sun scorching overhead. The women were amusing enough in their finery--which had been perhaps the fashion elsewhere fifty or sixty or more years ago. But they believed they were as well-dressed and quite as up-to-date as the smartest women of Paris or London. They never let an opportunity pass of telling you so.

The most striking building in the principal square of Goyaz was the prison. I visited it in the company of the Chief of Police. The place had been specially cleaned on the occasion of my visit, and that particular day it looked quite neat. I was shown very good food which--at least that day--had been prepared for the prisoners. Nearly all the prisoners were murderers. "But the biggest criminals of all," said the Chief of Police to me, "are not inside this prison; they are outside!" The poor devils inside were mere wretches who had not been able to bribe the judges.

Curiously enough, petty theft was considered a shame in the Province of Goyaz, and was occasionally severely punished; whereas murderers were usually set free. I saw a poor negro there who had stolen a handful of beans and had been sent to five years' penal servitude, while others who had killed were merely sentenced to a few months' punishment. In any case, no one in Brazil can be sentenced to more than thirty years' detention, no matter how terrible the crime he has committed.

The display of police guarding the prison was somewhat excessive. There were fifty policemen to guard fifty prisoners: policemen standing at each door, policemen at each corner of the building, while a swarm of them occupied the front hall. The various common cells were entered by trap doors in the ceiling, of great height, and by a ladder which was let down. Thus escape was rendered improbable, the iron bars of the elevated windows being sounded every morning and night for further safety.

The sanitary arrangements were of the most primitive kind, a mere bucket in a corner serving the needs of eight or ten men in each chamber.

As there was no lunatic asylum in Goyaz, insane people were sent to prison and were kept and treated like criminals.

I noticed several interesting cases of insanity: it generally took either a religious or a criminal form in Brazil. One man, with a ghastly degenerate face, and his neck encircled by a heavy iron collar, was chained to the strong bars of a window. His hands and feet were also chained. The chain at his neck was so short that he could only move a few inches away from the iron bars. He sat crouched like a vicious dog on the window-ledge, howling and spitting at us as we passed. His clothes were torn to shreds; his eyes were sunken and staring, his long, thin, sinewy arms, with hands which hung as if dead, occasionally and unconsciously touching this or that near them. I tried to get close, to talk and examine him; but his fury was so great against the policeman who accompanied me that it was impossible to get near. He was trying to bite like a mad dog, and injured himself in his efforts to get at us. Another lunatic, too--loose in a chamber with other prisoners--gave a wonderful exhibition of fury--that time against me, as he was under the impression that I had come there to kill him! He was ready to spring at me when two policemen seized him and drove him back.

There was a theatre in Goyaz--a rambling shed of no artistic pretensions. The heat inside that building was stifling. When I inquired why there were no windows to ventilate the place I was told that a leading Goyaz gentleman, having once travelled to St. Petersburg in Russia in winter-time, and having seen there a theatre with no windows, eventually returned to his native city, and immediately had all the windows of the theatre walled up, regardless of the fact that what is suitable in a semi-arctic climate is hardly fit for a stifling tropical country.

One thing that struck me most in Goyaz was the incongruity of the people. With the little literature which found its way so far in the interior, most of the men professed advanced social and religious ideas, the majority making pretence of atheism in a very acute form. "Down with faith: down with religion: down with the priests!" was their cry.

Yet, much to my amazement--I was there in Easter week--one evening there was a religious procession through the town. What did I see? All those fierce atheists, with bare, penitent heads stooping low, carrying lighted candles and wooden images of our crucified Saviour and the Virgin! The procession was extremely picturesque, the entire population, dressed up for the occasion, being out in the streets that night, while all the men, including the policemen and federal soldiers--all bareheaded--walked meekly along in the procession, each carrying a candle. When the procession arrived at the church, the Presidente himself--another atheist--respectfully attended the service; then the priest came out and delivered a spirited sermon to the assembled crowds in the square. Then you saw those atheists--old and young, civil and military--again kneeling on the hard and irregular paving-stones--some had taken the precaution to spread their handkerchiefs so as not to soil their trousers--and beating their chests and murmuring prayers, and shaking their heads in sign of repentance.

Such is the world! The prettiest part of the procession was that formed by the young girls, all garbed in immaculate white, and with jet-black hair--masses of it--hanging loose upon their shoulders. The chanting was musical and the whole affair most impressive.

I had received somewhat of a shock in the morning on passing the principal church--there were five or six in Goyaz. Spread out upon the pavement was the life-size wooden figure of our Saviour--which had evidently long been stored in a damp cellar--much mildewed and left there in the sun in preparation for the evening performance. The red wig of real hair, with its crown of thorns, had been removed and was drying upon a convenient neighbouring shrub! Really, those people of Goyaz were an amusing mixture of simplicity and superstition.

One great redeeming point of the people of Goyaz was that they were extremely charitable. They had erected a huge building as a workhouse. It was entirely supported by charity. A small library had also been established.

As I have elsewhere stated, I needed for my expedition no less than thirty men, so that they could, if necessary, carry all my instruments, cameras, provisions, ammunition, etc., where animals could not get through.

Fourteen long and tedious days elapsed in Goyaz. No one could be induced to come. In despair I sent a despatch to the Minister of Agriculture, asking for the loan of at least four soldiers--whom I should naturally have paid out of my own pocket, as I had duly explained to the Presidente, who backed my request. To my regret I received a reply from the Minister of War saying that at that moment the Government could not possibly spare four soldiers. It must be said that, although the men of Goyaz did not shine for their bravery, it was not so with the ladies, several of whom offered, if necessary, to accompany the expedition and do, of course, the work of the men. I believe that they meant it.

I have, indeed, the greatest respect and admiration for the noble self-sacrifice of the women of Goyaz.

Devoted mothers and wives, to men who deserved no devotion at all--nearly all the men had concubines--gentle, humble, thoughtful, simple and hard-working, they did all the work in the house. They were a great contrast to the lazy, conceited, vain male portion of the population. Certainly, in a population of 10,000 people, I met two or three men who deserved respect, but they were the exception.

If the men were so timid, it was not altogether their fault; they could not help it. It was enough to look at them to see that no great feats of bravery could be expected of them. They were under-developed, exhausted, eaten up by the most terrible complaint of the blood. The lives in which they merely vegetated were without any mental stimulus. Many suffered from goître, others had chests that were pitiful to look at, so under-developed were they; all continually complained, every time you spoke to them, of headache, toothache, backache, or some other ache. They were always dissatisfied with life and with the world at large, and had no energy whatever to try and improve their condition. They were extremely polite; they had a conventional code of good manners, to which, they adhered faithfully--but that was all.

[Illustration: Some of Author's Pack Animals.]

At the end of the fourteen days in Goyaz I had been able to purchase a good number of mules and horses--at a very high price, as the people would not otherwise part with their quadrupeds. Also I had collected all the riding and pack saddles and harness necessary, a sufficient quantity of spare shoes for the animals, a number of large saws, axes, picks and spades, large knives for cutting our way through the forest, and every possible implement necessary on a journey of the kind I was about to undertake. Everything was ready--except the men!

Alcides Ferreiro do Santos and Filippe da Costa de Britto--the two men lent me by Mr. Louis Schnoor in Araguay--upon seeing my plight were at last induced to accompany the expedition at a salary of close upon a pound sterling a day each.

At the last moment the Presidente came to my rescue. He supplied me with six men.

"They are criminals," he said to me, "and they will give you no end of trouble"--a fact fully demonstrated three hours later that same evening, when one of them--an ex-policeman--disappeared for ever with a few pounds sterling I had advanced him in order to purchase clothes. Another fellow vanished later, carrying away some 40 lb. of coffee, sugar, knives, and other sundries. So then I had two criminals less.

I packed my animals, and was about to depart with the four remaining rascals and the two Araguay men--six all told--when a policeman, sent in haste, called me to the Palace. The truly good-hearted Presidente and his charming family were in a great state of mind. They told me that my men had gone about the town the previous night drinking, and had confided to friends that they were merely coming with me in order to murder and rob me of all I possessed as soon as they had an opportunity. It was an open secret that I carried a very large sum of money upon my person, as after leaving São Paulo city it was impossible to obtain money by cashing cheques on letters of credit or other such civilized means, and it was imperative for me to carry several thousand pounds sterling in cash in order to be able to purchase horses, mules, boats, food, and pay the men, as long as the journey should last.

When you stop to consider that I had before me the prospect of not replenishing my exchequer for at least one year, or perhaps two years or more, it will be easily understood that if one wants to travel, and travel quickly as I do, there is no other possible way than to carry the money with one in hard cash. The risk was certainly enormous, although no one except myself ever really knew the amount that I actually carried. A large portion of that sum was in Brazilian notes, a good deal in English bank-notes, and some four hundred pounds sterling in English gold. As I could trust nobody, that sum, except what I gradually spent, and barring the few moments when I took my daily morning bath, never left my person, even for a few minutes, for the entire period of one year. Most of the notes were contained in two bulky leather bags and the gold in a third,



attached firmly to a strong belt which day and night--much to my discomfort--encircled my waist. The larger bank-notes, letters of credit, etc., were divided into my various coat, shirt, and trousers pockets. The gold was so heavy that it caused with its friction a large sore on my right hip--a sore which remained there more or less for an entire year.

"You cannot start under such conditions," said the Presidente appealingly. "I cannot furnish other men. No one will go, notwithstanding the high pay you give them."

I thanked the Presidente for his exquisite kindness, and for the very generous and thoughtful hospitality he and his delightful family had offered me in Goyaz, and which left in my mind the only pleasant moments spent in that dull city.

## CHAPTER IX

### The Departure--Devoured by Insects

A FEW minutes later I had again joined my caravan, watched intently, at a respectful distance, by a few astonished natives of Goyaz. As soon as all my mules and horses had been packed--they were very heavily laden--I took my departure in a direction north-west by west. The six men mounted on mules came along. I had armed all my followers with the best repeating carbines that are made, as well as with excellent automatic pistols, and the long daggers locally used; but personally I carried no weapons of any kind.

Having been unsuccessful in obtaining sufficient men from the officials of Goyaz, there yet remained for me one last faint hope. It was to try and get a few followers from the Indian colony of the Salesian friars, a few days' journey west of the Araguaya River.

On April 26th, from the height of Santa Barbara (elev. 2,150 ft. above the sea level), a picturesque chapel and graveyard to the west of the city, I bade good-bye for good to Goyaz capital (elev. 1,950 ft.). One obtained from this point a fine view of the entire city spreading from north to south, at the bottom of the imposing frame of mountains on the south with their extraordinary columnar formation. Each natural column, with its mineral composition and crystallization, shone like silver in the bright light. The *ensemble* from our point of vantage resembled the set of pipes of an immense church organ. High hills stood to the east. In the distance to the south-west the lower country was open with the exception of mountains in the far background.

We marched rapidly enough across wooded country until we crossed the Rio Vermelho (elev. 1,750 ft.). My men became very excited and began firing their carbines recklessly. I had handed to them fifty cartridges each, with strict instructions not to fire without my orders. I was some distance off. When I heard the fusillade I immediately galloped to the spot. The men had blazed away nearly all their ammunition, nor would they cease firing when I ordered them until they had exhausted their supply of 300 cartridges in all. Why were they firing? Because, said they, they had crossed the first water on their journey.

My heart absolutely sank into my boots when I realized that it was my fate to travel with such contemptible imbeciles for perhaps a year longer or more, and that was only the first day! Oh, what a prospect! We had our first quarrel when the men demanded to have their belts replenished with cartridges for their protection against attack. As I refused to let them have them there was a mutiny, the men declining to go on another yard unless the cartridges were handed to them. We had not been gone more than three hours, and a mutiny already! With a great deal of patience I induced them to go on, which they eventually did with oaths and language somewhat unpleasant. Still I held firm.

After several ascents and descents and a great many mishaps with our mules, unaccustomed yet to the work, we made camp, having marched 18 kil., on the bank of the Rio Agapa (elev. 1,650 ft.), near which the grazing was fair.

Two mules escaped during the night, and we could only make a late start the next morning. Alcides traced them all the way back to Goyaz, where he recovered them. Up and down we went, from 1,760 ft. to 1,550 ft., at which elevation we crossed the Rio Indio with a beautiful rocky bed the banks of which showed strata of red and grey clay and delicious crystalline water. No fossils of any kind were to be seen anywhere, although I looked hard in search of them all the time. The country was undulating and fairly thickly wooded near streams, otherwise it consisted mostly of campos, at the highest point of which another beautiful panoramic view of the escarpment in the plateau we had left behind could be obtained. The elevation was constantly changing between 1,750 ft. and 2,050 ft. above the sea level. Burity and other palms were plentiful. We crossed that day three streams, the last one the Rio Uva.

In a distance of 38 kil. we saw only a miserable shed, although we passed a site where a ruined house and paddock showed that once there must have been quite an ancient and important farm. Yes, indeed, Goyaz State had seen better days in the time of the Emperor and when slavery was legal. With the present lack of population and the prohibitive prices of labour it was impossible to carry on farming profitably.

The landscape was everywhere beautiful, but one never saw a bird, never perceived a butterfly, nor any other animal life of any kind. I was just remarking this fact to Alcides when a snake, eight or nine feet long, crossed at a great speed in front of my mule. The mules and horses were rather frightened at first of snakes, and it was amusing to watch how high they stepped when they saw them and tried to escape from them. We were in great luck. A flock of six beautiful red *araras* (macaws) passed above our heads. They looked perfectly gorgeous as they flapped their wings heavily and shrieked loudly as they sped along.

The formation of the soil in that region was interesting enough. Under a greyish white surface layer there were thin sedimentary strata of pebbles, deposited evidently by water, then under these a thick stratum--30 ft. or more--of warm-coloured red earth. The streams which had cut their way through this geological formation were invariably limpid in the extreme.

We were beginning to find beautiful flowers and butterflies again, the latter in great swarms near the water.

My caravan of grey and white pack-animals--some fourteen--was quite a picturesque sight as it wound its way down steep hill-sides, the mounted men urging the mules with shouts and lashes from their whips. We experienced difficulty in finding a good camp that night, the grazing being poor and the water scarce when sunset came. It seemed a pity that the most suitable camping places were not always to be found when you wished to halt!

We were now at an elevation of 1,550 ft. When we proceeded the next morning we found nothing of interest. Fairly wooded country alternated with campos, at first rather undulating, then almost flat, until we arrived at the Tapirapuana River (elev. 1,350 ft.), 8 yards wide and 3 ft. deep, which we crossed without much trouble, in the afternoon, at a spot some 28 kil. distant from our last camp. Luxuriant foliage hung over the banks right down into the water, which flowed so slowly--only at the rate of 1,080 metres an hour--that it looked almost stagnant, and of a muddy, dirty, greenish colour.

We were much troubled by mosquitoes, flies and *carrapatinhos*, the latter a kind of tiny little clinging parasite which swarmed absolutely all over us every time we put our feet on the ground on dismounting from our animals. The irritation was such that you actually drove your nails into your skin in scratching yourself. They could only be driven away by smearing oneself all over with tobacco juice, the local remedy, or with strong carbolic soap, which I generally used, and which worked even more satisfactorily.

A tubercular leper came to spend the evening in our camp. He was most repulsive, with his enlarged features, especially the nose, of a ghastly, shiny, unwholesome, greenish white, and pitifully swollen feet and hands.

The heat was not unbearable in that region--89° Fahrenheit in the shade, 105° in the sun. There was a breeze blowing that day from the north-east, with a velocity of 200 metres a minute by anemometer.

A good portion of the following day was wasted trying to recover four animals that had escaped. In order that they might graze properly it was necessary to let them loose. They sometimes strayed away long distances. Occasionally they hid in the shade of the *matto* (forest and shrub), and it was easy to miss them while looking for them. Luckily, two of my men--Alcides and a man called Antonio--were excellent trackers, and sooner or later they were generally able to bring back the animals, which was not at all difficult, as one only had to follow the marks of their hoofs to find where they had gone.

We departed late in the afternoon through thick shrub, over marked undulations--in some spots quite steep.

From the highest point that day (elev. 1,900 ft.) we obtained an extensive view of flat tablelands in the distance to the east, with a low hill-range standing in front of them. It was scenery quite typical of Central Brazil, with no irregular, striking mountains; but everywhere we had plenty to study in the effects of erosion on that great continent.

I tried to make up for time lost by marching at night--a most trying experience, as my men, unaccustomed to the work and frightened at every shadow, let the mules stray in all directions. I unfortunately had to hand over to my followers a few cartridges each, or else they would not come on. Every now and then that night they fired recklessly in the dark--much to the danger of beasts and men alike--thinking they had seen an Indian, or a leopard, or some other wild animal. I was glad when we arrived in camp and ascertained that no one had been wounded.

That night-march demoralized animals and men alike. Most of the animals strayed away during the night, as the grazing was bad where we halted. I was compelled to halt for two days in that miserable spot, simply devoured by flies and mosquitoes and *carrapatos*, in order to recover them.

If you do not know what a *carrapato* is, let me tell you. It is an insect of the order of Diptera and the genus *Mosca pupiparas*, and is technically known as *Melophagus ovinus*. Its flattened, almost circular body varies in size from the head of an ordinary nail to the section of a good-sized pencil. Like the *carrapatinho*--its miniature reproduction--it possesses wonderful clinging powers, its legs with hook attachment actually entering under the skin. Its chief delight consists in inserting its head right under your cutaneous tissues, wherefrom it can suck your blood with convenient ease. It is wonderfully adept at this, and while I was asleep, occasionally as many as eight or ten of these brutes were able to settle down comfortably to their work without my noticing them; and some--and it speaks highly for their ability--were even able to enter my skin (in covered parts of the body) in the day-time when I was fully awake, without my detecting them. I believe that previous to inserting the head they must inject some poison which deadens the sensitiveness of the skin. It is only after they have been at work some hours that a slight itching causes their detection. Then comes the difficulty of extracting them. If in a rash moment you seize the carrapato by the body and pull, its head becomes separated from its body and remains under your skin, poisoning it badly and eventually causing unpleasant sores. Having been taught the proper process of extraction, I, like all my men, carried on my person a large pin. When the carrapato was duly located--it is quite easy to see it, as the large body remains outside--the pin was duly pushed right through its body. The carrapato, thus surprised, at once let go with its clinging legs, which struggled pitifully in the air. Then with strong tobacco juice or liquefied carbolic soap, or iodine, you smeared all round the place where the head was still inserted. The unpleasantness of these various beverages immediately persuaded the brute to withdraw its head at once. You could then triumphantly wave the pin and struggling carrapato in the air. You were liberated from the unpleasant visitor. It was not uncommon while you were extracting one--the operation took some little time--for two or three others to find their way into your legs or body. I fortunately possess blood which does not easily get poisoned, and felt no ill effects from the hundreds of these brutes which fed on me during the entire journey; but many people suffer considerably. My men, for instance, had nasty-looking sores produced by the bites of the carrapato. The mules and horses were simply swarming with these insects, which gave them no end of trouble, especially as they selected the tenderest parts of the skin in various localities of the body to settle upon. Where an animal had a sore it would soon be swarming with carrapatos near its edge. It would then putrefy, and maggots in hundreds would be produced inside the wound almost within a few hours.

There was, near by, an old *moradoria*, a large patch of *muricy* trees (*Byrsonima*), of which various species exist. These were not unlike small olive trees and produced a small sweet fruit quite good to eat.

We went for 22 kil. through a forest with beautiful fan palms over 30 ft. high. There was no animal life. We crossed three streamlets, the country between being undulating. Between the last two streams we came across rock showing through the alluvial deposits. It was an interesting conglomerate of minute crystals cemented together by hardened clay, the whole forming large blocks.

More trouble was in store for us. One of my mules was seriously injured. Its spine was so badly strained that it was quite disabled for further work. My cook, who had a slight attack of indigestion, wished to be left there to die, and declined to proceed any farther. With true Brazilian reasoning he wished, nevertheless, to be paid off before dying. With true English reasoning I explained to him that money would be of little use to him in the next world. If he really intended to die I would certainly not pay him, but his wages would naturally go on while he was alive, continued the journey, and did the cooking. He quickly returned to life, and to his senses.

Really, in the entire experiences of my travels I have never come across more pitiable specimens of manhood than those fellows. They absolutely gave me a sickly feeling that I never lost while they were with me, for many many months to come. The animals, too, were almost as bad as the men. They had little endurance, they had no courage, everything seemed to affect them. The worst Abyssinian mule, for instance, was, for equal work, vastly superior to the best Goyaz mule. It was a useless task to try and train those animals. On my many previous expeditions I had been able to win the affection of my animals, and was able to train them in a few days so that they obeyed with the perfection of soldiers, but in Brazil, the last day I had them--after several months that they had been with me--they were just as disobedient and stupid as on the first day. In fact, they never even seemed to recognize us again. They had learnt absolutely nothing, except bad habits. Everything seemed to frighten them. One mule, for instance, was afraid of crossing small streams. Its legs invariably began to quiver on entering the water, and down would go mule and baggage rolling into the water. All the thrashing in the world could not make it get up. We had to drag the brute bodily across the stream, when it would jump up on its legs again. It was quite futile to try and prevent that animal collapsing every time it had to go across water. So that, on approaching any streamlet, we had to unload it in order at least to prevent the baggage getting soaked.

The interior of Brazil--even comparatively near a city, as we were still to Goyaz--did not compare in civilization with the lowest and poorest countries of Central Asia or Africa. Humble countries like Persia and Beluchistan or Abyssinia some ten or fifteen years ago were more advanced than Brazil to-day. They had good trails on which a regular postal service was established, there were regular rest-houses on those trails, and horses or camels could easily be hired and exchanged at the different stations, so that one could travel comparatively quickly. It was not so in Brazil. Even if you wished to take a short journey of a few days from a city, you had to purchase your horses or your mules, and have the riding and pack saddles made for you at a high cost.

As we have seen, even in the city of Goyaz itself, there did not exist a single hotel, nor did we find a proper rest-house in the 531 kil. between the railway terminus and Goyaz capital. Nor is there one of these conveniences west between Goyaz and Cuyaba, the capital of Matto Grosso. Of course there were no hotels because nobody travelled, but it can also be said that many people do not care to travel where there are no hotels. In so humble and poor a country as Persia you always could indulge in a delicious bath in every caravanserai, which you found in the remotest spots all over the country. In Brazil you have to resort to the streams, where the moment you remove your clothes you are absolutely devoured by mosquitoes, flies and insects of all kinds--a perfect torture, I can assure you. Once you were in the water, immersed up to the mouth, it took a brave man to come out again, as millions of mosquitoes and flies and gnats circled angrily and greedily above your head ready for the attack the moment you came out.

We were travelling all the time at elevations varying from 1,450 ft. at our last camp to 1,400 ft. at our present camp, the highest elevation between these two places being on a rocky hillock about 100 ft. higher than those altitudes.

Our camp was on a streamlet flowing from south to north, of milky water containing lime, which made our tongues and gums smart when we drank it.

Again on May 3rd we went through forest all the time, with wonderful palms and many medicinal plants. Alcides had an extensive knowledge of the curative qualities of the various plants. Various species of the

*Caroba* (*Bignoniaceæ*), very beneficial, they say, as a blood purifier, especially in the worst of terrible complaints, were plentiful there. Giant nettles, the *Ortiga* or *Cassausan*, as it is locally called, were also frequently noticeable, especially when we passed too near and were stung all over by them.

We had risen to 1,200 ft. on the summit of a range called O Fogo. From it we had another exquisite view of the mountain range called Bucainha, which we had left behind to the east. It had a marked erosion on its north side.

On the west side of the pass we found curious small domes as well as pillars and other rocks of columnar formation. We had met during the day many *Aricori* palms, which, I was told, produced a sweet fruit excellent to eat when ripe, in the month of November.

After a steep rocky descent we made our camp. We halted earlier than usual. I was sitting outside my tent while my dinner was being cooked. I could not help smiling at the warlike array which had been necessary in order to make a start from Goyaz. The camp was a regular armoury. Beautiful magazine rifles, now rusty and dirty owing to the carelessness of the men, were lying about on the ground; revolvers and automatic pistols stuck half out of their slings on the men's belts as they walked about the camp; large knives and daggers had been thrown about, and so had the huge, heavy, nickel-plated spurs of the men, with their gigantic spiked wheels. These wheels were as much as two inches in diameter and even more. It was the habit of Brazilians to wear the spurs upside down, so that when they got off their mounts they had to remove them or it would have been impossible for them to walk. Naturally, worn like that, they were much more effective, and were intended to torment the animals with greater success.

I reprimanded the men for keeping their weapons so dirty. One man thereupon sat himself three feet away from me and proceeded to clean his rifle, keeping the muzzle pointed constantly at me. On my suggesting that he might point the weapon in another direction he roughly replied the usual thing: "There is nothing to be afraid of, it is not loaded"--and he proceeded to pull the trigger, the gun pointed straight at me, when I leapt up and snatched it out of his hands. There was a cartridge in the barrel and several cartridges in the magazine.

[Illustration: Author's Caravan across the Immense Prairies of Matto Grosso.]

During the night the fusillade was constant. It was enough for the men to hear a leaf fall. Immediately there was an alarm and the rifles were fired. Once or twice the bullets came so unpleasantly near me that I suspected they were intended for me. I thanked my stars that my men were bad shots. To make sure of this fact, I one day had a shooting competition. After that I became quite assured that it was sufficient to be at the spot where they aimed to consider myself in absolute safety. It was not so, of course, when they aimed somewhere else. I did not care to take away the cartridges from them altogether, as they would have then imagined that I was afraid of them--an impression which it would have been fatal to let them entertain even for a moment. Each man was allowed to replenish his belt each day to the extent of ten cartridges.

I have elsewhere referred to the absurd pack-saddles used in Brazil, so heavy and unsteady when going over rough country, with the underpads so difficult to adjust that the animals were soon a mass of sores on the back, the sides of the body, on the chest and tail. I had other lighter and more sensible saddles, but I had to discard them as the Brazilians would not hear of using them, and I gave up in despair of teaching them how to pack them. I eventually left those saddles behind.

The riding-saddles, too, were almost as absurd as the pack-saddles, constructed as they were of innumerable and useless pieces of wood, iron and leather. The stirrups were gaudy, and consisted of a regular shoe of silver or other metal, into which you inserted the greater part of your foot, or else of a much ornamented circular ring. The head-piece and bit were also extremely heavy, clumsy, and highly decorated, for everything must be made for show if it had to be used in Brazil.

It was not possible to associate in any way or be friendly with my men. They were unpleasant beyond all conception. One could not say a word--no matter how kind--without the prospect of a long argument or a row. It was quite beyond them to be civil, and, like all ignorant people, they always imagined that they could teach others everything--including good manners! They were ridiculously courteous to one another--a muleteer talking to another always addressing him as "Sir," and referring to his comrades as his "colleagues."

We travelled that day nearly altogether over finely powdered reddish earth of volcanic origin. I had so far not met with a single fossil, not a shell, not a petrified bone of any animal, nor, indeed, impressions on rock of leaves, twigs or other parts of plants. The farther one went on, the more one had proof that that portion at least of the American continent had never been submerged in its entirety.

Some rocks displayed on the surface peculiar perforations such as would be produced by incessant water dripping over them, but these were caused, I think, merely by water falling over them while they were in a molten state; other rocks were thoroughly polished on the surface, as if sand or other gritty substance had flowed with great force over them, mixed with water--perhaps during a period of volcanic activity and torrential rains.

Geological research was somewhat difficult for a passing traveller in that region, for everything was smothered in vegetation. Only here and there in the cuts of rivers was I able to judge a little better of the actual formation of the land.

We camped on the stream Agua Limpa, which duly deserved its name of "clear water" (elev. 1,470 ft.). It flowed south. On May 4th, going through forest again over a hill (elev. 1,650 ft.), we obtained a glorious view of the immense expanse to the west and to the south-west--a great stretch of greenish, long sweeping lines with a plateau in the background. A somewhat taller hill rose at one end of it. We then descended to another deliciously clear river, which deserved as well as the previous one the name of Agua Limpa (elev. 1,450 ft.), but this one flowed north into the Rio Claro. The land was fine, sparsely wooded all the time, absolutely flat, but getting slightly undulating beyond that stream. It seemed wonderful land for agricultural purposes.

After passing the Indain River, the Bom Sucesso, and another stream, all three flowing south, we swerved more to the north-west, rising up on an elevated spot, from which we obtained another glorious panorama, a high Serra to the west, another in the distance to the east, the two extending almost parallel towards the south, where the gap in the horizon line between these ranges was filled by a very distant range showing a conical peak, and to the west of this another in the shape of a dome. It was the grandeur of these panoramas that impressed one most, rather than their monotonous beauty.

All the outlines of the scenery of Central Brazil had, so to speak, been worn smooth by the erosive action of water and wind, so that no fantastically shaped mountains had yet been encountered, no landscape which some great commotion had rendered strangely picturesque. There, only the steady work of uncountable ages showed itself in a most impressive way to those who understood. From a striking pictorial point of view very little remained in one's mind of those wonderful scenes after one had turned one's head away, except, perhaps, their immensity and the deep green tones--the two salient points of the scenery.

When we had descended from the pass (elev. 1,650 ft.) we came to the Rio Tres de Majo, where a hamlet of three sheds was found. Twenty-eight kilometres from our last camp we arrived at the Rio Rancheria, where stood a miserable farm. Both those streams, at an elevation of 1,300 ft., flowed into the Rio Claro to the north.

We had the misfortune of halting near the farmhouse, and suffered tortures from the millions of mosquitoes, gnats, carrapatos and carrapatinhos which made that night almost unbearable. I invariably found that carrapatos and carrapatinhos were more plentiful where living people or animals were to be found. Near those dirty farmhouses we were simply swarming all over with them. My poor animals, owing to the long marches we had been making, and the terrible pack-saddles, had sore backs and loins, sore chests. Yet we could not

stop, and the poor things must stand the pain and strain.



**CHAPTER X**

## Fishing--Termites--The Great Araguaya River

AN amusing incident happened. A cow chewed up the coat of one of my men, which was lying on the ground. In his fury the owner of the coat, on discovering the misdeed, seized his carbine and fired four shots at the cow and four at the farmhouse. None of us could tell where the bullets went. The cow, startled by the shots, gave a few jumps and kicks, then, absolutely uninjured, peacefully continued grazing. The house too remained untouched. Amazing shots my men were!

Across almost flat country we reached the Rio Claro--"the Limpid River" (elev. 1,250 ft. above the sea level), 200 metres wide, and flowing along a winding course in a general direction of south-west to north-east. Wide beaches of sand and fine gravel were to be seen on the convex or inner curves of its channel. Along the banks there was luxuriant vegetation, which hung down and dipped into the water.

Diamonds were to be found in that river. At low water curious eruptive, highly ferruginous rocks showed in the river bed, some in the shape of spherical balls riddled with perforations, as if they had been in a state of ebullition, others as little pellets of yellow lava, such as I had before encountered between Araguaya and Goyaz, and which suggested the spluttering of molten rock suddenly cooled by contact with cold air or water.

We encamped some three kilometres from the Rio Claro, on the streamlet Arejado, where again we were devoured by mosquitoes. Although we all had thick mosquito nets, and although we slept wrapped--head and all--in our respective blankets, the brutes managed to find their way in and stung us with incredible vigour. We were fresh blood for them. The irritation caused by their bites was a torment.

We were now getting closer to the country where we were to meet the terrible wild Indians, the most ferocious and cruel cannibals on earth, according to the accounts heard in Goyaz. My men were already beginning to lose heart. With the sleepless night due to the mosquitoes, and the heavy atmosphere caused by a fast-approaching thunderstorm, they were morose in the morning. With the exception of Alcides and the negro Philippe, the others came insolently forward and refused to go any farther. They shoved the muzzles of their rifles under my nose; they wished to be paid up instantly and go back. With a little patience it was easy to get out of difficulties of that sort, if you possessed the gift of keeping calm.

Faithful Alcides, who had a fiery temper, seized his rifle and was about to fire at them, when I took the weapon from him.

"Do not shoot them, Alcides: these men have been good (*sic*) until now because they were in good health. They are bad now because they are ill. I will cure them."

And so saying I felt the pulse and forehead of the astonished rioters.

"Yes, indeed, these men are very, very ill. They need medicine. Alcides, get the castor oil--the large tin."

I had two kinds of castor oil: one tasteless--*pour façon de parler*--for my own use and cases of serious illness; another in large tins, of the commonest kind, with an odour that would kill an ox, which I used occasionally for punishment on my men when they were disobedient.

Alcides, who quickly entered into the spirit of that little joke, immediately produced the deadly tin, collecting upon the ground the four cups belonging to the strikers. Taking my instructions, he poured some four ounces of the sickening oil into each cup--and perhaps a little more. I handed a cup to each man and saw that he drank it. They all eventually did so, with comic grimaces and oaths. The men, I must tell you, had great faith in my powers as a medicine man. Once or twice before I had already cured them of insignificant ailments, and

whenever I told them seriously that they were ill they believed, in their ignorance, that they were really ill.

This done, and to put them again in a good temper, I patted them on the back and, handing each of them a fish-hook and a line, sent them all to fish in the river, saying that as they were so ill I would delay my departure until the afternoon.

"That pool, over there," some three hundred yards distant, I suggested would be an excellent place for them to fish in. In that direction, as meek as lambs, like so many naughty children they all went, carrying the lines away and some *toucinho* (lard) for bait. Alcides, who was an enthusiastic fisherman, also went off with a line, and had good sport. He reported that the other men lay flat upon their backs most of the time, groaning and moaning, upon the rocks, basking in the sun instead of fishing. The castor oil in any case had the desired effect that the men did not mutiny again for some time.

We did not leave camp until 2 p.m. The country was teeming with plants of great medicinal value, such as the *sucupira*, which gave a bean much used in Goyaz to relieve stomach troubles; the *algudanzinho*, with its lovely cadmium-yellow cup-shaped flower--a plant which was most plentiful in that region, and the root of which was said to be very beneficial for the worst of venereal complaints; and also the *acaraiba*. Many were the handsome wild flowers we came across, principally red and yellow; but to my mind they could bear no comparison with even the ugliest European wild flowers. They were coarse in shape and crude in colour, and in their beauty there was the same difference as there would be between the lovely refined face of an aristocratic woman and that of a handsome massive peasant girl.

Water was certainly not lacking in that country. We crossed the Rio Striminho, then the Rio Stacco flowing from south-west to north-east into a lagoon formed by the Rio Claro. We camped on the bank of the Rio Stacco. The water was delicious.

[Illustration: The Araguaya River (looking North).]

[Illustration: The Araguaya (looking South).]

The negro Filippe killed a wild boar. My men had a great time preparing a huge dinner. They absolutely gorged themselves. Personally I never touch pig in any shape or form, as I cannot get over the idea that its meat is poisonous for any thoroughly healthy person. It may, of course, not be so to people who are not absolutely healthy. The very sight and odour of it make me quite ill, and I fully share the idea of Mahommedans that the meat--certainly of tame pigs--is most unclean.

As we went on we had good sport, my men taking the greatest delight in fishing in the rivers on the banks of which we halted. The travelling was easy over flat country. We made short marches for some days, in order to let the animals recover their lost strength. In the river Las Almas (elev. 1,250 ft.), 20 metres wide and 3 ft. deep, flowing north-west, we caught a beautiful *pintado* fish--so called because of its spotted appearance. That fish possessed a huge flat head, with long feelers, two on the nose--at the side of the nostrils, to be accurate--two under its lower mandible. The mouth was enormous in comparison with the total length of the fish, and could be opened at an extraordinarily wide angle. Inside were most peculiar teeth in sets of twos, while the mouth was lined with thousands of hard, tiny sharp points. The eyes were far back upon the skull. The bony dome of the palate was divided in the centre, and a similar separation was to be observed in the centre of the lower jaw, giving thus a great flexibility to the interior of the mouth. When measured, the length of the head was exactly one-third of the length of the entire fish.

Other fish, too, were caught that day, called *mandibé* or *fidalgo*.

The aspect of the country was gradually changing. During that day's march we had gone over beautiful open stretches of grassy land with only a few stunted trees upon them. *Bosquets* or tufts of small palms or other

trees were to be seen, raised on small mounds, showing how the country was gradually wearing itself down. Nearly each tree was raised on a mound of grey clay. Some fine specimens of *Lexia* trees, with their peculiarly distorted branches, were to be observed.

Those great scavengers of Brazil, the *Urubu*, of which two varieties were to be found--the *Urubu commun* (*Cathartes atratus*) and the *Urubu rei* (*Cathartes Papa*)--a cross between a vulture and a crow, were fairly plentiful now that game was more abundant in the country. They often pierced our ears with their unmusical shrieks. The *urubu* belonged to the vulture family and was found in all tropical South America. It had black plumage, somewhat shaggy, with reddish legs and feet, and bluish, almost naked, head and neck. Like all rapacious birds of its kind, it lived entirely on dead animals and what refuse it could find about the country. Near farms these birds were generally to be seen in great numbers.

We had a delicious breakfast of fish--really excellent eating--which set everybody in a good humour, and then we proceeded over slight undulations (elev. 1,250 to 1,300 ft.) through forest until we got to the Ponte Alto (High Bridge) River, so called because..., there is no bridge whatever there! The Brazilians are really too delightful in their reasoning; and, mind you, it is not done with a mischievous sense of the ludicrous--indeed no; it is done seriously. The Ponte Alto stream was, like most of the other watercourses of that region, wonderfully limpid.

From that point we were in charming open country, where we could freely breathe the delicious air. Occasionally we saw some *angelin* trees (the *Angelino amargoso* and *Angelino pedra*), technically known as *Andira vermifuga* M. and *Andira spectabilis* Sald.

Nearly all the woods we found had a high specific gravity: the two latter, for instance, 0.984 and 1.052 respectively, and a resistance to crushing of kilos 0.684 and kilos. 0.648.

*Cacti* of great size were numerous. We were now in a region where termite-hills (ant-hills) were to be seen in great numbers. They stood from 2 to 3 ft. above ground, although occasionally some could be seen nearly double that height. Some of the ant-heaps were extraordinary in their architecture, and resembled miniature castles with towers and terraced platforms. Whether they had been built so by the ants or worn down to that shape by the pouring rain and wind, was not so easy to tell.

The more one saw of the termites, the more one disliked them, for they were the most insidious, destructive little brutes of that region. They were ugly in appearance, with their fat white bodies of a dirty greenish-white colour. Nevertheless one could not help having great admiration for those little rascals, which in one night were able to devour the bottom of stout wooden boxes, and in a few hours damaged saddles, clothes, shoes, or any article which happened to be left resting for a little while on the ground. They were even able to make an entire house tumble down in a comparatively short time if the material used in the construction were wood.

Yes, one hated them; yet, when one knew all about them, one had to spend hours watching their doings with a microscope, it was so interesting. They seemed to have two social classes among them--the labouring class and the warriors. To the labourers was given the heavy task of digging underground channels, the surplus earth of which was thrown up with great force through apertures in the soil until the earth so displaced and amassed formed a high heap, riddled in its interior by hundreds of channels and miniature chambers and apartments. To the warriors--really more like a kind of perfect police service--was entrusted the safety of the colony and principally the protection of the young. White ants have many enemies, especially among the larger ants, which carry on regular wars against them; for although ants and termites--commonly called white ants--have many points in common, yet they belong to totally different orders of insects, as can be easily noticed in their structure and development. The peculiar structure of the enlarged heads of the warrior termites was particularly noticeable. Some had a formidable head provided with tentacles and powerful rodent clippers--as well as the peculiar whitish cuirasses in sections of the body. The workers had more normal shapes, the head being better proportioned with the body.

It was enough to split one of the heaps and watch the termites at work to learn a lesson of what devotion and duty mean. In the many passages overcrowded with ants--there was never confusion--you saw hundreds of them, either conveying food or building materials to the various quarters. Some carried leaves, others carried pieces of wood, seeds, or dead insects. If one was not strong enough to convey its load, others came to its assistance--although they generally seemed to resent the intrusion of others in doing their work. I always noticed that when one was in difficulty and others ran to the rescue there generally ensued what seemed to be a row, and the new arrivals hurriedly left--either disgusted or angry, I could not tell which by their minute expression.

Then there were extraordinarily fat lady ants, lying flat upon their backs, and with many attendants around them doing massage and general nursing with the greatest possible gentleness and care. If one wanted to see a great commotion one only had to introduce into one of the chambers a larger ant of a different kind. What struck me was that the moment the fray was over the termites at once--if perhaps a little more excitedly--resumed their work.

What astonished me more than anything was that they would go on working at all--as if nothing had happened--when I split open one of their dwellings and many of the channels, which must have been normally in the dark--were now exposed to the light. This made me suspect that their vision was either missing altogether or was very defective.

Nature is a wonderful organizer. The majority of termites--including warriors and workers--were sexless; that was perhaps why they were such good workers, as they had nothing to distract them. The males and females whose duty was merely to propagate and improve the race were provided temporarily with wings, so that they could fly away from the colony and disseminate their love among other winged termites of other colonies. The relation between different colonies was friendly. When their task was accomplished and flight was no more necessary for them, they conveniently and voluntarily shed their wings, leaving merely a small section of the wing root attached to the thorax.

The local name for all kinds of termites was *cupim*, but technically they are known in the Order of *Neoptera* as *Termes album*. Another variety of insect, the *Psocus domesticus*, was also as destructive as the *Termes album*.

We frequently met with plants of *caju*, or *acaju* or *acajueiro* (*Anacardium Occidentale* L.) on our course. They belonged to the *Terebinthaceæ* group. In a preceding chapter I have already described the red or yellow delicious fruit of this tree. Then we found other interesting trees, such as the *oleo*, the tall and handsome *poinna*, and numerous specimens of the small but good-looking palm *pindova*.

There were not many flowers in that particular spot, barring perhaps an occasional cluster of white flowers, principally *bocca de carneiro*, said to have properties refreshing for the blood.

Near a small stream I noticed some lovely, slender, tall *jeguitiba vermelho* trees (*Couratari estrellensis* Raddi), from 75 to 80 ft. high, with branches and clusters of deep green healthy leaves at the summit only.

There was a little less monotony in the scenery before us that day, for to the west stood, over a long, slightly undulating line, one peculiar conical hill heavily wooded. In pools of stagnant water were lovely water flowers, and in the neighbourhood of that moisture many handsome *burity* palms were prominent in the landscape.

We had been mounting gently all the time from our last camp. Early in the afternoon we reached that magnificent river, the Araguaya, over 200 yards wide, although something like between 2,500 and 3,000 kil., or perhaps more, from its mouth. Its lovely placid waters, reflecting with the faithfulness of a mirror the vegetation on the high steep banks as well as the clouds in the sky, made an effective picture. The dead

silence, disturbed only by the shouts of my men urging the mules to the water-side, was most impressive, the water flowing so slowly that it almost looked stagnant.

Not a mountain, not a hill could be perceived, except one low humble range of hills to the south. It was on those hills that the great Araguaya had its birth.

We crossed the great stream--mules, baggage and all, on three canoes upon which a platform had been erected. Once landed on its western bank, we were, notwithstanding local boundary quarrels, in the immense State of Matto Grosso, the wildest of Brazil.

**CHAPTER XI**

The *Tucano*--Fish of the Araguaya River--A Bad Shot--A Strange Sight

I SEEMED to have no luck on that journey. Everything went wrong all the time. Everything seemed to stand in my way to prevent my progress. My men were demoralized, my mules and horses in a pitiable condition. I called a halt of two or three days in order that we might shoe the animals again and rearrange the pack-saddles. We had, of course, a good supply of new shoes, but the work of shoeing so many animals was hard, especially as I had to do most of it myself with Alcides and Filippe, the other men being absolutely useless. Add to this a stifling temperature of 90° Fahrenheit.

[Illustration: Caraja Indian of the Upper Araguaya River.]

To make things worse there came a downpour, such as I have seldom seen, and which lasted for two entire days. That was the dry season too! The house in which we had put up--and through the roof of which we could admire the stars at our ease while in bed--was turned into a regular swimming-tank when the rain came. We had a good deal of trouble to keep our things dry, propping them up on improvised stands of stones which we removed from the crumbling walls of the building. Fortunately, most of my pack-saddle cases were air- and water-tight, so that the contents could not be injured. The wind blew with great fury--at the rate of 460 metres a minute, to be strictly accurate.

There was a humble hamlet at Rio Grande or Porto do Castanho, on the Matto Grosso side, where we had crossed the Araguaya River. It was the gloomiest of gloomy places even in glorious weather. Imagine it on a wet, windy day. The few tiny one-storied cabins--they could hardly be called houses--had got soaked with the storm, and looked miserable. The inhabitants were busy baling water from inside their dwellings. Many tiles of the roofs had been blown away, and those that remained had grown extra dark with the moisture, with merely a bluish tinge from the reflected light of the grey sky upon their shiny surfaces. The solitary palm tree at the end of the oblong square looked pitiful, with its long bladed leaves split and broken by the wind, while the dense foliage along the river banks was now several tones darker and richer than we had seen it before.

Under usual circumstances the *plaza*--or square--was so high above the river that one could not see the water at all until one went to the edge of the stream, but during flood the river rose as much as 20 ft. and occasionally overflowed the greater portion of the square.

The grass of the square--a mere field--alone seemed happy in the damp. Half dried and anæmic from the hot sun, it seemed to be quickly coming back to life and vigour in those few hours which had rendered us all miserable. My poor horses and mules, worn and sore, stood dripping and wretched, with quivering knees, in the middle of the square--too miserable to feed, only now and then slashing their long wet tails to right or left to drive away impertinent flies.

With the storm the temperature had suddenly descended to 75°, and everybody was shivering with cold after the oppressive heat before the storm.

Upon the half-rotted wooden cross which stood in front of the church was perched a vulture--so thin and shaggy and soaked and motionless that you might easily have mistaken it for a stuffed bird. It was the very picture of misery. But everybody was miserable--one could not help it. I was, too--who am not much given to being depressed.

While marching or camping in the midst of unspoilt nature, I never felt depressed, no matter what happened, and was absolutely regardless of climatic conditions; but in those miserable settlements--feeble attempts at civilization--I must confess that I used to get low-spirited too, and often thought what an idiot I had been to leave my happy homes in Florence and in London, in order to come to these wretched places.

After the attempts at baling out the water had proved futile--as there was more coming in than it was possible to fling out--the people in resignation barricaded their doors and windows. Not a soul was to be seen or heard anywhere. The place was absolutely dead. Even after the storm was over no sign of life could be noticed. The people were all still hiding and trembling in their houses, the comparatively slight but sudden change in the temperature bringing upon most of them attacks of strong malarial fever, which was there prevalent.

At last, splashing her little naked feet along the footpath in the grass--now changed into a streamlet--there approached a little girl with a face as black as coal. She looked terrified as she approached the window out of which I was looking. But she overcame her fright and, prettily stretching out her tiny hand, called out "*Boa tarde!*" (Good afternoon). Her father and mother were ill; would I give her some medicine for them? Soon after, when the sky had cleared, other patients came along asking for quinine or any medicine I could give them. Others wished to have their teeth pulled out. The Brazilians of the interior had great trouble with their teeth, which were usually in a state of decay.

My own men had wrapped themselves up in their blankets in order to keep warm. They had slept most of the time. They were too cold and lazy even to get up to cook and eat their food. None of the houses possessed a chimney, cooking being done outside; nor, of course, any sanitary arrangements. Those of my men who had toothache cried and moaned the whole night, as might be expected of children aged six of any other country. I have seldom seen men more sensitive and frightened at pain or illness.

The main structure at Porto do Castanho (Port of the Chestnut Tree, because there should be a chestnut tree there) was the church, a mere barn, which elsewhere but in central Brazil would not be considered good enough for storing hay, still less for the worship of the Almighty. Not that it was used much for the latter purpose, as there was no priest within several hundred kilometres. The walls of the church were all scraped and dirty, the corners chipped off by passing animals. All the passers-by went and wiped their dirty hands on the walls of the church--perhaps attracted by the whitewash, which none of the other buildings possessed.

The shops--there were two--had nothing for sale, except some locally grown tobacco. In one shop I found some small iron nails, which were sold at the equivalent of 6*d.* each!

May 11th. The drenching rain continued the entire night, the minimum temperature being 73° Fahrenheit. My poor animals were in a terrible condition the next morning through the damp, the sores having become badly infected. They were in a purulent condition, and a mass of maggots--the terrible *bishus*, which were the pest of Brazil. So we had the great job of cleaning them all with a powerful disinfectant as well as washing them with a decoction of warm *barbatimão* (*Stryphnodendron barbatimão* M.), a wood with a great resistance to crushing (K. 1-015) and a specific gravity of 1.275. The decoction, which was really very beneficial for wounds and sores of animals, was made with the bark of that tree warmed in water over a fire. Another decoction we frequently used was of salt and *carrapicho* herb, but this was not quite so effective as the former.

My men killed a magnificent *tucano*--a large bird with climbing, inquisitive habits. It possessed an enormous yellow bill of singularly light structure, the point of which was black. The lower part of the bill was of a brilliant red, and of a similar red was the rib of the upper part of the bill. The plumage was of a handsome velvety black on the body and tail--quite shiny--while the chest was of a pure white, and the under part of the tail of bright vermilion feathers. White feathers showed at the base of the tail above.

The *tucano* (*Ramphastos*) is too well known for me to describe it fully again. It is found all over tropical Brazil. There are many different varieties, such as the *Ramphastos vitellinus*, *Ramphastos ariel*, the *Ramphastos Cuvieri*, the *Pteroglossus Beauharnaisii*, or curl-crested tucano, etc., extremely common, especially farther north, near the borders of the Amazon.

I was sorry when my men killed this beautiful bird. I had watched it for some time, with its inquisitive habits,

hopping from branch to branch, peeping its bill into cavities and examining everything that happened below by bending its head attentively, now on one side then on the other. It evidently took intelligent interest in our doings. My men had gone out to do their cooking. The bird watched them with the greatest attention--with jerky movements not unlike those of a magpie.

The tucanos have, I believe, been described as being stupid; but on the contrary I think they are extremely clever--quite as clever as many parrots or macaws. I observed how shrewd that particular bird was. It would come quite close to us, and examine with really amazing attention what we were doing as long as we were not taking any notice of it, but the moment a man happened to touch a stone or try to point a rifle at it, it would fly a long distance off, with shrill yelps, and would not return until it was quite sure that we were not noticing its presence.

The uses of the enormous bill of the tucano have often been discussed by ornithologists, many of whom believe that the bill is of no use to that bird and Nature made in this case a mistake and has not yet had time to rectify it. Scientists frequently allege that Nature makes mistakes, because many of them have never really understood Nature. How could they? They have never been near enough to Nature unspoiled. Many of them also believe that tucano birds are great fishers, following the notion that many water birds have red or yellow bills of large size. That, too, is another great mistake, for the tucano is eminently a fruit and nut eater, and of course a feeder on worms and insects contained in fruit.

The huge bill, attaining the length of six or seven inches, is toothed at the sides in order to be able to saw the stems of fruit. The shape and size of the bill, far from being a mistake of nature, are made so in order to enable that bird to dig holes into the bark of trees and to enable it to crush and chew the many curiously shaped fruits found in certain parts of the Brazilian forest. Moreover, the bill is also a great protection to the head in going through the dense foliage, where thorns are innumerable and alive with dangerous insects of great size, which can, owing to the length of its beak, be destroyed at a distance from the bird's most vital organs.

These birds have received the name *tucano* from the noise they make, which resembles "*tok-kan*" very sharply pronounced and with a snap at the end of each syllable.

The tucanos are good climbers, but not good fliers. In fact, their flight is somewhat clumsy and heavy. They seldom fly long distances. They spend all their time on the higher branches of trees. They are generally to be seen alone or in couples, or perhaps occasionally in flocks of three or four.

What spare moments I had in Castanho--after the storm was over--I spent on the banks of the river looking at the magnificent stream.

Looking south, a low hill range could be seen in the distance with a conical summit rising slightly above the range--the Serra do Cayapo. It was there, as I have said, that the great Araguaya had its birth. It was interesting to note that the head waters of the Araguaya--flowing north, of course--had their birth within an infinitesimal distance of those of two such immense rivers as the Inducassu and the Sucuru, flowing into the Parana, and also near the somewhat unknown Taquary River flowing into the Paraguay.

It would be possible--although perhaps expensive--by means of raised artificial lakes and locks actually to join at least one of these southern great rivers to the great Araguaya, and thus--barring some troublesome rapids--form a continuous waterway from south to north across South America, from Buenos Ayres, roughly in Lat. 34° 5' south, to Pará in Lat. 1° 27' 6" South. Imagine a distance by river extending for 33° 37' 54" (or 3,737 kil.) in a straight line--as the crow flies--and not less than double that distance if we include the constant turns and deviations in the various connected rivers.

Easier still and less expensive would be to connect by rail the last two navigable points of those two streams. That will certainly be done some day, when those abandoned regions are eventually populated and properly



developed.

There were some rocky falls just below Porto Castanho which prevented navigation as far as the place where we crossed the Araguaya--otherwise the river was navigable from those falls as far as Conceição.

The formation of the clouds over the great Araguaya River was peculiar. Great clusters of globular clouds generally collected in three distinct strata upon a whitish sky as far as high up upon the sky vault.

Facing north, the country appeared absolutely flat, and nothing could be seen above the trees as far as the eye or even a telescope could perceive. In that direction the stream, 200 yards wide, flowed through a perfectly straight channel for about one mile.

The fishing in the river was excellent. One night we caught a lot of fish. One, a huge *pirarara* weighing 40 lb., then some *pirahiba* and a *pintado*, the latter 24 lb. in weight. The *pirarara* was an extraordinary-looking fish. It had a long head covered entirely with a hard, bony, granular substance, which could only be cracked by a severe blow with an axe. The eyes were prominent and placed quite close to abnormally long antennæ or feelers. The back of the *pirarara* was bluish black, the centre of the body longitudinally was yellowish, whereas the under part was white. The tail was of a bright vermilion, and the black fins had red edges, which made the huge *pirarara* a really beautiful fish to look at.

[Illustration: Typical Flat-topped Plateau of Central Brazil.]

[Illustration: One Night's Fishing on the Araguaya.]

The *pirahiba* had a grey back with stripes so faint that they were hardly visible. Its head was flat and anchor-shaped. The eyes--very small--were curiously situated on the top of the head instead of at the sides--owing to the fact that the head was really so flat that it had no sides: it was merely a gentle convex curve from one side of the mouth to the other over the skull. The *pirahiba* too, like most fish of those rivers, possessed long tentacles. Its mouth and fins were slightly tinted red. It displayed powerful teeth similarly arranged to those of the *pintado* fish previously described.

Then we got some *tubarao* (or *Squalus carcharias*)--a small fish with a long, pointed head like a bird's beak, of the *plagiostomos* order, and several *mand[~i]*--a small yellow fish with enormous eyes. The *mand[~i]* had remarkable vitality. Seven hours after it had been caught--I had no idea the poor thing was still alive--it gave several leaps in the air, and when I put it in a bucket of water it shortly began to swim as if nothing had happened.

There were only two or three very small dug-outs on the Araguaya, none of which were capable of carrying more than one or two people. There was no boat there large enough to carry all my men and baggage, had I even at that moment decided to descend that river instead of proceeding west. I took observations for latitude and longitude at Porto Castanho, as well as boiling-point observations with the hypso-metrical apparatus, the latter in order to get the exact elevation, and also to keep a check on my several aneroids which I used on the journey merely for differential observations.

May 9th, 1910. Boiling point, 210° 3 F. Temperature of the air, 83° F. = 1182 ft. above the sea level. By Aneroid, 1190 ft.

My mules having had a good rest, I was making ready to start on May 12th, when one of my men refused to come any farther. He wished to be paid off and go. So he received his pay and went. He would probably end his existence in that filthy little hamlet. He would never have the energy to return to Goyaz alone. I was rather glad he had gone, as, a few nights previously, he had fired at me while I was asleep. The bullet had actually made a hole through the canvas of my camp bed. I had fortunately taken the precaution to alter the position of

my bed--under my tent--a precaution I took every night, after my men had gone to sleep in their hammocks, some distance outside. The man had evidently aimed where he thought my head was resting. I having turned the bed around, the bullet, fired from the man standing, went just over my ankles, perforating the canvas quite close to them. I naturally came out of my tent to see what was the matter, and saw the man with the rifle in his hand.

"Why did you shoot?" I inquired, as the man, evidently surprised to see me standing before him, ejaculated disconnected words.

"I saw a huge *onça*" (a jaguar) ... "it was there ... I saw its two eyes shining like fire...."

"Did you kill the *onça*?"

"No, it leapt away."

I advised the man, patting him paternally on the back, not to startle everybody again. If he should see another *onça* he had better come to me. I seldom missed when I fired at all--as I had been able to show them a few days before. I did not wish my men to behave like so many timid young girls, as I wished to be able to tell people in Europe that Brazilians were brave and noble.

"Firing in such a fashion indiscriminately," I explained to him, "you might have even killed one of your companions! Now go to sleep like a good fellow, and do not fire again!"

I spoke to the rascal in the gentlest of ways, never for one moment letting him suspect that I knew he had intended that bullet to go through my head. Nor did I ever take any of the other men into my confidence. When they asked what the commotion was about, I told them that their companion had fired at a jaguar and the jaguar had leapt away. There is only one effective weapon you can use with scoundrels. It is the greatest calm and kindness.

The man, hiding his face in his hands, threw himself upon his hammock and began to sob. He sobbed and sobbed and sobbed until the morning--much to the inconvenience of everybody in camp. At sunrise he had been seized with a severe attack of rheumatism which had contracted a leg badly. It was pitiful to see him walking--but when he was not aware of being looked at he walked as well as anybody else.

From that day that fellow never dared look me straight in the face. He avoided riding near me on the march, and in camp was sulky and unpleasant, retiring to a distance and declining to work. He was relieved of the functions of cook. The last time he had produced a meal nearly brought massacre upon him at the hands of the other men.

He received his full pay up to date, without uttering a word of thanks. He duly signed a receipt with his thumb-mark, as he was unable to write. When the troop of horses and mules and his companions left, he never spoke a word of farewell to his companions or animals, nor to me. He sat silent and motionless, with his eyes riveted to the ground as if in a trance. Some days later we discovered that he had stolen from our store some 40 lbs. of coffee and a large quantity of sugar, as well as a number of other articles which had been useful to us.

The sky when we left was overcast, and huge globular clouds, white and grey, hung in great masses, especially half way up the vault of the sky. The country, after crossing the Araguaya, was remarkably beautiful, from an agricultural point of view--enormous campos or prairies--over rich alluvial deposits, with scanty stunted trees upon them. Plenty of *burity* palms grew in the lower depressions.

My men suffered intensely from the cold at night--the minimum being 60° Fahr., maximum 92°, in the

afternoon of the 13th. The temperature had been much lower since we had crossed the great river. The elevation was only 1,250 ft.

Rising slowly over an undulation in the country to 1,300 ft., we began to find igneous rock showing through the surface soil, especially on the higher points.

*Lixia* (*Nephelium Litchi* Carab), *caraiba* and the *laranjeira do campo* (*Citrus vulgaris*), were trees to be seen in that region.

We had wonderfully clear sky in the morning. At noon it became slightly clouded, while in the afternoon one-third of the sky was covered. A light breeze blew from the west.

Some 28 kil. from the Araguaya we came to a small miserable farmhouse. After a great deal of bargaining I was able to purchase some extra horses. The people had no idea whatever of the value of money, and named sums at first which would have easily purchased the finest horses on the English turf. They descended in time to more reasonable figures.

Our life was rendered miserable all day by the millions of *pium* or gnats that swarmed around us and stung us with incredible fierceness and viciousness. Those little brutes left on our skins black marks fully as large as themselves wherever they stung us. The itching was most trying. Those marks remained for several weeks, and only disappeared when we perforated them with a needle to let the blood out, or waited long enough for them to become desiccated and the skin re-formed.

*Pium* is a word of the Tupi and Tupinamba Indians' language. Those tiny insects entered your eyes, leaving behind an odoriferous acid which caused great irritation of the lids. We removed dozens every day from our eyes. Fortunately they were easily extracted. They also dashed into your ears, up your nose, and, whenever you opened it, inside your mouth.

It was well worth going to Matto Grosso to enjoy the lovely moonlight nights, only comparable in their luminous splendour to nights of Central Africa in the middle of the Sahara desert, and to those on the high Tibetan plateau in Asia. The light of the moon was so vivid that one could see almost as well as in the daytime.

Personally, the crisp cool air (min. 59° Fahr.) made me feel in most excellent health and spirits, but my men, who had putrid constitutions, were a mass of aches and pains. Some cried like children the entire night with toothache, moaning and shrieking like lunatics when the pain became acute; others got internal aches, another had cramp in the legs. I must say that Alcides, with all his faults, was the only one who always did his work--not always with common sense, but he did it--and, when ill, never gave exhibitions of pitiful weakness like the others.

Filippe, the negro, who eventually showed himself to be the bravest Brazilian on that expedition, also stood the pain more calmly and with manliness. As I had judged from the first moment I had laid eyes upon them, those were really the only two men who were any good at all. "*Il bon dì si vede dal mattino*" (A fine day is seen in the morning), says an ancient and very true Italian proverb; truer, perhaps, in its philosophy with individuals than with the weather.

Many of my men's complaints vanished with the warmth of the sun--108° Fahr. at 1 p.m., with a maximum temperature during the day of 85° in the shade.

With the beautiful clear sky and a gentle breeze blowing, it was a real delight to march. Only a slight whitish mist--always in horizontal streaks--was to be noticed near the earth. The sky, although limpid, was never of a deep blue, but merely of a pale cobalt. The dew was heavy during the night and soaked everything, making

the baggage, the tents particularly, heavy for the animals to carry. We still kept at an elevation of 1,250 ft., noticing, as we marched on, an isolated range of hills extending from north-east to south-west and showing considerable erosion at its south-westerly terminus. Two conical hills--one a broken cone--stood on the summit of a flat plateau, the entire range, as well as the summit of hills, showing eroded slopes with vertical wall-like superior portions.

After leaving the stream at the foot of a range 1,450 ft. above the sea level, on rising over a low pass I could observe to the north-east of that range great blocks of eruptive rock much perforated, in which were embedded pellets of yellow lava and of red and black baked igneous rock. On examining the north-eastern end of the main part of the range it was apparent that what remained standing before us was merely one half of a circular crater, the other half of which had collapsed or had been blown up by volcanic action. The bottom of the crater was subsequently filled with alluvial deposits. There was there a grassy plain with a few *burity* palms. In the valley before us was ideal pasture land, which will some day be of great value.

We crossed two cols (elev. 1,550 ft.) with a beautiful plain between. Then we descended into a third lovely valley on the north side of the outer wall of the crater. The grazing was perfect for the animals. Clusters of vigorous, healthy *burity* palms stood in great numbers in the centre and at the sides of the valley. This great valley was bounded by two ridges extending in a northerly direction--two spurs, as it were. The rounded, channelled outer sides of the crater to the north would tend to strengthen the theory that those slopes were formerly a gradual continuation of the present inclined valley. On those slopes of the mountain hardly any vegetation could be noticed, perhaps owing to the fact that hard volcanic rock existed under the thin surface padding of yellowish earth.

The valley was buried in red and grey lapilli and ashes, finely broken up marble cubes, and fragments of other forms of crystallized rock.

As we proceeded from camp Fogasso, the northern slopes of the crater became divided into huge furrows, the vertical upper part of the crater displaying vividly rich red tones. The crater was castellated at the summit, like the walls of a fortress.

The geological formation of that portion of the Matto Grosso plateau interested me greatly. Each individual spur, taken separately, showed slopes sometimes abrupt, sometimes well rounded, separated from the next spur of hills by a V-shaped or angular, or else a concave hollow. At the bottom of those hollows one did not find the slopes continuing the line of the crater, but the valley was there absolutely flat and cut the line of the slope sharply. It would almost appear as if a subsidence of the soil had taken place in that particular locality, or else one might speculate whether those abrupt hills had not been the walls of what was once a subterranean volcanic cauldron--the flat valley, in which we were, having been the bottom of that cauldron. What little rock one found in the river bed in this valley showed signs of having been exposed to intense and prolonged heat, and so did the brilliant red summit of the hill range, which was also of the deep red typical of hard-baked rock.

[Illustration: The Paredãozinho.]

[Illustration: Typical Scenery of Matto Grosso.]

The scene which I had before me there in Matto Grosso greatly reminded me of a similar basin I had seen when the great Bandaisan mountain in Japan was blown up by a volcanic explosion and left merely the bottom part of its gigantic internal cauldron with vertical red walls around it. With the exception of scanty and anæmic grass and a few stunted trees, there was hardly any vegetation noticeable. The Fogasso stream, on the bank of which we camped, flowed in an easterly direction into the Araguaya.

The temperature on the plateau was ideal--min. 63° Fahr. during the night; max. 75°. We were at an elevation

of 1,450 ft.

On May 15th we were travelling along a valley over which must have once risen the continuation of a range which stood to the north of us. There were deep grooves and corrugations in the valley in a direction from south to north between the two sections of the now interrupted range. There we found soil of red, brown and yellow tints, or else great stretches of grey volcanic ashes and earth mixed, as well as sharply angular fragments of igneous rock, which showed that they had not travelled there by rolling on the ground or propelled by water.

After this we passed close to another curious spur of mountains on the east--quite isolated and of a red vertical columnar formation. Its summit was broken up--much more so than that of the plateau-like range to the south of us which we were following in a parallel line. The highest point of that range, to the south, was wooded, and so were the two conical-topped hills which towered over it. The strata where exposed showed a slight dip to the north. We crossed the range by two low cols at elevations of 1,550 ft. and 1,560 ft. respectively. On the summit and even lower upon the sides of those cols we found huge boulders of eruptive rock, highly ferruginous. Globular lumps, big and small, of spattered smooth-surfaced yellow lava were to be found in myriads; also many spherical pellets of ferruginous, highly-baked rock with innumerable holes produced while in a state of ebullition. Some of the ferruginous rocks had pellets of yellow lava firmly imbedded in them, which had evidently penetrated while liquid into the hollows of the ferruginous rock which was already in a semi-solid, or perhaps solidified, condition. At any rate, when it happened the ferruginous rock was already harder than the lava.

While I was studying attentively the geological conditions of that region, the sky suddenly became as black as ink to the south, and a heavy shower, which lasted half an hour, drenched us all to the marrow of our bones. Then it cleared up, and the sun, supplemented by our natural heat, dried our clothes upon us again as we went on.

**CHAPTER XII**

## Geological Speculation--Beautiful Pasture-land

THE stars were of extraordinary brilliancy at night; so much so that one could see quite well enough by their light to get about. The atmosphere being extremely clear, they appeared of immense size, the planets shining with dazzling, changing colours which would have filled even the most profane with reverence for their splendour.

I drew the attention of my men to the wonderful sight.

"They are stars!" they replied contemptuously; "Have you never seen stars before?"

It was indeed difficult to enter into conversation on any subject with them without having an ardent desire to strangle the lot, they were so ignorantly offensive. I was thankful I had the sense always to go about unarmed, or I am certain some of them would have paid somewhat dearly for their impertinence. I was glad, too, that I never felt the weight of loneliness, as days and days would go by without my saying a word to them, barring perhaps a shout in camp to bring my breakfast, lunch, or dinner.

What was even worse than entering into conversation with them was to listen--one could not help it, they shouted so loudly all the time--to the conversation among themselves. We will not refer to the choice language they used, so inexplicably sacrilegious and indecorous that it would have set on edge the teeth of the coarsest specimens of humanity; but the subject--I say subject in the singular, mark you, for alas! there was only one subject--discussed in all its phases perhaps, but only one single subject--assassination. The accounts of different murders, in some of which the men boasted they had taken part, were nightly repeated in their minutest details to the assembled crowd--myself excluded--sitting around the fire, while the *feijão*--beans, so loved by them--were being stewed for hours and hours in a cauldron.

There was the story of one murder of which one of the men was particularly proud, in which he reproduced the facial expression as well as the smothered shrieks of the horrified victim. He gave a vivid description of how the blood squirted out like a fountain from the jugular vein of the throat as it was being severed. That story--most graphically narrated, I admit--had taken the fancy of that cruel crowd. Almost every evening, during the entire time those men were with me, many long months, I heard that story repeated amid roars of laughter from the company. Murder--when applied to others--was evidently for them a great joke!

Inconsiderate to a degree, they would get up and sing at the top of their voices in the middle of the night and keep everybody awake while the *feijão* was stewing. It took hours and hours before those awful black beans had boiled sufficiently to be edible, and the man who acted as cook had to sit up the whole night to stir them up and watch them. Yes, the position of cook for the camp was not an enviable one, for it meant marching all day and sitting up all night to prepare the *feijão* for the following day. Yet the love they had for their *feijão*--I never ate the beastly stuff myself--was so great that those lazy devils, who could not be induced on any account to do other work, did not mind at all having sleepless nights to watch over the stewing cauldron. With the *feijão* were placed in the pot large pieces of *toucinho* (lard). We carried quantities of *feijão*, for without *feijão* you cannot induce a Brazilian to do anything or go anywhere. Of the two he would rather sacrifice his life than lose his daily *feijão*.

It requires great ability, I believe, to cook *feijão* properly. I noticed that all my men in a body were ever superintending its preparation. When the cook in the early hours of the morning happened to let the fire go down, or in his drowsiness was not stirring it properly, there were angry shouts from the other men, who, every time they opened one eye in their sleep, invariably gazed towards the beloved cooking-pot.

We came to a second range parallel with the one described before and extending from north-east to south-west. Again a vertical natural wall was noticeable to the east. This range was subdivided into many sections, almost all of the same size and shape. The end section to the north-east--which made an exception--was about three and a half times the length of any of the others. I observed some deep vertical vents such as are frequently to be seen in the sections of volcanoes that have partly been blown up. These vents were particularly numerous in the north-easterly block, where broad corrugations and some narrow ones--ten in all--were also to be seen.

Two alternatives could explain the present configuration of that region. There had been either a great volcanic explosion or else a sudden subsidence. Personally I was inclined to favour the first hypothesis. I shall explain why. First because the great fissures between the various huge blocks and the grooves carved in those rocks would then at once explain themselves--caused naturally by the violent shock. They had apparently been enlarged in the course of time by erosion of water and wind, and possibly by the friction of the débris of the masses of rock settling down when the stratum was severed. The quantity of débris of shattered rock minutely broken into cubes and other angular forms would suggest that some great shock had occurred. Then the usual yellow pellets of polished lava, either globular or pear-shaped, or like an elongated oval ending in a point and well rounded at the other end, would also indicate that these missiles had been flying great distances through the air in a molten state before they had actually dropped. In fact, the flight was so long as absolutely to cool and solidify them before they fell--unless they had fallen in cold water--for they had retained their original form, instead of getting flattened at the heavier end, as could be expected had the lava reached the ground in a half-soft state. Large blocks of lava--which naturally took a longer time to cool and a shorter time to reach the earth after their flight through the atmosphere--had, in fact, become flattened on the lower side where they struck the ground. Others of a composite globular form had invariably been flattened into a slight curve on the side where they had come in contact with the soil.

Ovoid rocks as large as a loaf of bread and composed of compressed cinders were to be seen about, which, when easily split open, showed a band of slightly ferruginous matter, very brittle, in a crystallized condition. In the centre of these rocks were invariably found beautiful crystals of great limpidity, easily separated from one another by a slight pressure of the fingers.

Erosion had evidently since played great part in the present appearance of the country, but to my mind--directly above what is now a valley--there existed at one time a high range of mountains, which was in those days the great dividing line of the waters flowing south and north.

One might, of course, also argue that what are the mountains now have been pushed up from underneath above the ground into their present position, but local conditions do not tend to encourage this theory.

The strata of red baked rock in the existing mountain side were almost absolutely horizontal, with merely a slight dip to the north. In the northern end of the range the rock showing through the vegetation was white, as if it had been subjected to baking. The western aspect of the first range showed also a vertical summit of red rock with a sloping spur extending to the west.

We camped that night on the river Prata, which flowed south. Elevation, 1,300 ft. Maximum temperature 85° F., minimum 63½° F.

The formation of the clouds was always interesting. The long horizontal streaks across the sky, which were daily noticeable, took a form that day not unlike the vertebræ of an immense snake, whereas the higher clouds of transparent mist in filaments looked exactly like a huge spider's web.

We established our camp under a tall, handsome, slender *Xinghi*-tree, the triangular fruit of which, with a light brown, hard skin, was deadly poisonous if eaten. Alcides told me that in Minas Geraes it was much used in the manufacture of soap. This tree was extremely neat-looking, with its clean sinuous branches and its pretty,

light green, healthy leaves, of an elongated oval shape.

[Illustration: Volcanic Scenery of Matto Grosso.

Chapada in foreground.]

[Illustration: Peculiar Formation of Central Plateau.]

My men had insisted on bringing dogs away with us for safety in case of attack by Indians. They had in fact procured three--I would not care to say how--before our departure from the Goyaz Province. Those dogs were just as faithless and lazy and worthless as the people. They followed us because they got plenty of food, otherwise they had no affection for anybody; and, far from giving an alarm when any person or any animal approached the camp, they were quite unmoved by anything that happened around them during the day or night, except at meal-times. A handsome *onça* (jaguar) leapt close to camp, and on perceiving us bounded gracefully away--the dogs remaining fast asleep with their noses resting on their respective extended fore-paws. Another day during the march a *veado* (*Cervus elaphus*), a deer, sprang in his flight clean over one of the dogs without the dog even noticing him! Game was plentiful in that part of the country, and the animals were so unaccustomed to see people, that one could get quite near them.

My men went after game in the morning and we did not make an early start, in fact not until 10.30 a.m. It was amazing to see the amount of good water that was to be found on the plateau. We crossed a streamlet flowing south (elev. 1,300 ft.), and shortly afterwards, upon gently inclined land, we crossed another stream, also flowing south.

We were travelling due west along the foot of a curious range which stood to our north and of another of similar characteristics to the south. It seemed quite possible, in fact, even probable, that the two ranges were formerly only one, which had then split, and that we were travelling inside the partially-filled-up fissure between the two divided ranges. The sky-line of the two ranges matched exactly on both sides--first a long hump, then two smaller humps, after that a more even and continuous line.

On reaching an elevation of 1,500 ft. we were confronted with a splendid view of a flat plateau to the west. By a steep descent we went down 300 ft. to a river (elev. 1,200 ft. above the sea level) in a hollow, reached by going through dense tall grass and thick vegetation. A humble wooden cross by the stream marked the spot where a Brazilian had been murdered by Indians.

Interesting flows and domes of lava were to be seen near the stream, after which our marching that day was mostly up and down campos with magnificent grazing, the general slope of which was from north to south. At an elevation of 1,400 ft., on turning our heads back, we had a general view of the two ranges which had become separated.

On one side of the range, a sloping back was noticeable, whereas on the opposite side were almost vertical sides, much grooved, with a terrace about two-thirds up the total elevation, except at the western end, where the terrace was instead exactly half way up, with a minor terrace near the summit.

We met and crossed another streamlet, and then rose on our route to 1,550 ft., from where another beautiful view of the plateau to the south-west could be obtained, a low hill range with a higher peak in front of it, and the immense green campos at a slanting angle. Another fine panoramic view of the two divided ranges was also before us, although from that particular point of vantage it was slightly more difficult to reconstruct their former appearance in one's imagination than from the centre of the valley we had crossed, although even from that point the fact was apparent with a little study.

On proceeding down to the river we met some flows of red lava and, upon the top of nearly every undulation,



boulders of black eruptive rock showed through, highly ferruginous, as well as much lava in pellets. Débris of baked red and black rock were to be found in quantities down the slopes and at the bottom of those undulations, carried there evidently by water. In one or two places, such as near the river at Ponte Keimada, I smashed some of the larger boulders of yellow lava. Here is what I found inside: Under an outer coating of lava an inch thick there was a layer of solidified cinders. Under that lay a thin layer of lava, then again yet another layer of grey ashes, then lava again. This would indicate that those boulders had gradually reached their present shape partly in revolutions through the air thick with cinders, partly by rolling down or along intermittent stretches of molten lava and cinders during a great eruption, or perhaps during several successive eruptions. Personally, I think that it was during various periods of one eruption before the lava had cooled, so that in its sticky state it would easily collect the ashes round it, which it would certainly not do in its polished, solidified state.

When we had passed beyond the western end of the two parallel ranges a great change was noticeable in the appearance of the country we were crossing. We missed the long, sweeping, uninterrupted lines of the scenery, and had before our eyes a confused surface of bosses, mounds and short undulations, with thick luxuriant vegetation upon them which prevented my studying carefully their geological formation. The soil, of a rich red colour, showed every indication of being extremely fertile in that particular climate.

From the point where we stood, one could well judge the effects of the great volcanic explosion on the back of the range--the one to our left--where a long line of buttresses had formed, as if on that side a subsidence on a large scale had also taken place. It was in any case curious to notice that at the two termini east and west of the two parallel ranges white rock in columnar form was exposed in both ranges in corresponding sites.

The slope noticeable on the north side of the southern range could be explained by the tilting of the strata where the separation took place. The angle of the strata clearly demonstrated this fact.

Millions of mosquitoes and *piums*, *carrapatinhos* and *carrapatos* made life unbearable both during the day and night. We never had a moment's respite. The gnats, too, in thick swarms around us were a constant worry--we were all day busy removing them from our eyes and ears. They stung us all over most mercilessly. I was making a botanical collection, which not only contained specimens of the leaves of all the trees we met with, but also of minor plants and various kinds of grass. This involved getting off my mule many times a day. Whenever I put my feet on the ground or touched a blade of grass I well knew what was in store for me. At once I became literally covered with *carrapatinhos*, and set to scratch myself so violently that nothing short of digging my nails into my skin seemed to relieve the irritation--and that, mind you, only momentarily. One had to bear it, and wait until one got to camp in the evening before one could disinfect oneself all over. In this world one never gets credit for anything, but I do think that few men under those circumstances would have gone on, as I did, collecting botanical specimens for no reward whatever except my own pleasure, if pleasure it can be called.

Again we noticed that day wonderful effects of clouds in filaments, one group stretching along the sky in an arc from north to east like the dorsal bone and ribs of an immense fish.

We camped on the bank of a stream (elev. 1,050 ft.) flowing north-east, which was, I think, the same stream we had met in the morning, and which had described a big turn.

My men amused me with their fears. Even when in camp they never left their rifles for a moment. When they went only a few yards away, either to fetch water or bring back a mule, they invariably took all their weapons with them--carbines, automatic pistols, and daggers.

In order to collect specimens and examine the country, I sometimes strayed away alone for long distances from camp--sometimes for two or three hours at a time--always absolutely unarmed. My men began to be thoroughly frightened of the immunity I possessed from attacks of wild beasts and Indians. Although I told

them that wild beasts never attacked human beings unless attacked first, and that there were no Indians about, my men would not believe me. They maintained that I must have some special secret of my own which brought me back alive, and that I must be even bullet-proof. They could never be induced to go alone--even when armed--for more than a few metres from camp.

We were having cool nights. Minimum 59° Fahr., maximum 80° Fahr.--on May 17th. A mackerel sky of the prettiest design was overhead, like a lovely mosaic of white and blue porcelain, while a band of clear blue encircled us all around above the horizon line.

Across a forest we continued our journey, rising some 300 ft. to 1,350 ft. above the sea level, where we again found campos and forest alternately upon deep masses of fine red sand or else great expanses of grey and black volcanic cinders intermixed in patches. On reaching the highest elevation we actually went over 6 kil. of volcanic sand and ashes, and in one place traversed a patch of shattered *débris* with cutting edges of eruptive rock, and brilliant red or deep black pebbles. Then again we saw masses of the usual ferruginous, much-perforated rocks--many so absolutely spherical as to resemble cannon-balls.

To the west we could see before us lovely green undulations--campos--with, in the centre, a curious hump that looked as though due to subterranean pressure. In the distance was visible another of those long flat-topped plateaus typical of Brazil, with a headland which, owing, it seemed, chiefly to erosion, had become separated from the main range. It resembled and was parallel with the second range of the split mountains we had just left. Some nine kilometres from our last camp we encountered the river Das Corgo, flowing south (elev. 1,150 ft.) over a bed formed by an impressive great flow of solidified red lava covered in some places by deposits of bright red earth. Beyond the river we found ourselves again upon yellow sand and ashes.

Beneath a cirro-cumulus--or mackerel sky--again that day, wonderfully beautiful because of its perfection of design, we were gradually rising over the domed elevation we had previously observed, upon which we found masses of tiny pebbles--what are known to geologists by the Italian name of "puzzolana" or *scoriæ* reduced to a granular condition. Farther on, travelling over other undulations, we sank into thick deposits of grey and yellow volcanic scoriæ, such as fine sand, cinders, and lapilli. At the highest point (elev. 1,270 ft.) we travelled over deep sediments of sand and ashes mixed together. All those undulations, as a matter of fact, were above great buried flows of red lava, which were invariably exposed to sight in the depressions, particularly in the beds of rivers.

Being a great lover of good water--to my mind the elixir of life, the great secret of health and strength--I was always enraptured by the deliciousness of the water in the streams we met. It was so crystalline and limpid that one could not resist the temptation of drinking it, even when not thirsty. I always carried slung to my saddle an enamelled tin cup attached to a string so as to be able to procure myself a drink at all the streams without getting off my mount.

Twelve kilometres from our last camp we came to a watercourse flowing into a big stream at the bottom of the valley. Its bed was in overlapping terraces of polished red lava.

The green country before us, in great sweeping undulations, reminded one much, in its regularity, of the great waves of the ocean--what sailors call "long seas." Where the stream had cut through and left the underlying dome of lava exposed one could easily judge of the thick deposits of sand, ashes and pulverized rock which formed the strata above it.

We travelled over more red volcanic sand for some four kilometres, rising to 1,400 ft., on which elevation was thick *matto*, or stunted, much entangled forest. Then we emerged once more into glorious open country, marching over a stratum 8 ft. thick of whitish tufa and ashes, this stratum lying immediately above one of red volcanic earth. The strata were easily measurable where rivulets had cut deep grooves in the softer superficial strata and had reached the foundation layer of lava.

The campos seemed to get more and more beautiful as we went west. What magnificent grazing land! One could imagine on it millions and millions of happy, fat cattle; but no, not one was to be seen anywhere. What a pity to see such wonderful country go to waste! There was everything there, barring, perhaps, easy transport, to make the happiness and fortune of thousands upon thousands of farmers--excellent grazing, fertile soil, good healthy climate and delicious and plentiful water--but the country was absolutely deserted.

For miles the beautiful prairies extended, especially to the south-west, where in the distant background loomed a high, flat-topped tableland, interrupted by two deep cuts in its extensive monotonous sky-line. Those cuts were near its southern end. To the south stood a long range of wooded hills--also with an absolutely flat sky-line. We ourselves were not higher than 1,400 ft. above the sea level. My animals stumbled along over a region of much-broken-up débris; then again travelling was easier, although heavy, over tufa, sand and ashes. On descending to a stream, 1,200 ft. above sea level, we slipped terribly on the steep argillaceous slope, and the animals had great difficulty in climbing up on the opposite side, where we made our camp.

[Illustration: Curious Domes of Lava with Upper Stratum of Earth, Sand and Ashes.]

[Illustration: Great Undulating Campos of Matto Grosso.]

The streamlet flowed east into a larger stream, which we also crossed, and which flowed south-west.

It seemed to be getting colder at night as we went westward (May 18th, min. 57° Fahr.), whereas during the day the temperature was hot--max. 97° F. As early as 9 a.m. the thermometer already registered 85° in the shade, and not a breath of wind. The elevation was 1,150 ft. The sky was in streaky horizontal clouds to the east, and thin misty clouds to the south--cirro-stratus.

One of my horses having strayed away a long distance, we only left that camp in the afternoon after the animal had been recovered. We rose quickly over the usual red volcanic sand held down in its place by the vegetation--rather anæmic at that particular spot. Higher up we again sank in the white and yellow ashes, with occasional zones covered by small, angular, black-baked débris.

Ants seemed to flourish happily in that region, for the ant-heaps were innumerable and of great size, several with towers about 6 ft. in height, resembling miniature mediæval castles.

Having risen--all the time over grey and white ashes--to 1,420 ft., we found ourselves again upon open campos with a splendid view of the flat-topped range we had already seen to the north and of another to the south. At the angle where the northern range changed its direction slightly there stood a high prominence of peculiar appearance. The range extended west, where it ended, into a broken cone--as I have already stated quite separated by erosion from the main range. All along the range in the section between the prominence at the angle and the terminal cone could be noticed three distinct level terraces and several intermediate ones--not yet well defined nor continuous along the whole face of the range. About half-way along its length, a semi-cylindrical vertical cut was a striking feature, and appeared from a distance to be the remains of an extinct crater. It may be noted that where that crater was, the range was higher than elsewhere. Its summit, with an undulating sky-line, lay to the west of it, no doubt formed by erupted matter. Other great vertical furrows were noticeable not far from the crater and to the west of it.

The scenery was getting stranger and stranger every day. We began to notice solitary domes and cones in the landscape. That day, in fact, beyond the great campos we had before us a curious little well-rounded dome, standing up by itself upon an absolutely flat surface, at a considerable distance from the flat tableland which stood on one side, and of which formerly it evidently made part. Higher mountains, somewhat nearer to us, were on the south-west.

We had reached the River Corgo Fundo (elev. 1,250 ft.), along the banks of which the laminæ of red-baked rock could be observed with thin white layers between. Above was a lovely green pasture with a tuft of deep green trees, which looked exactly like a bit of a well-kept English park. We mounted up again to 1,430 ft., then went down another descent into a large plain with campos, upon which grew merely a few stunted trees. We were still travelling over deep deposits of sand.

The range to the north of us extended, to be accurate, from north-east to south-west, and at its south-westerly end possessed a dome not dissimilar to the one already described on our previous day's march. This one was perhaps more rounded and not quite so tall. It rose above the plateau in two well-defined terraces, especially on the north-east side, but was slightly worn and smoothed to the south-west. On the terminal mound--clearly separated from the range by erosion--seven distinct terraces could be counted, with some less defined intermediate ones.

In the bed of another stream flowing south--it was impossible to ascertain the names of these streamlets, for there was no one to tell, and none were marked on existing maps--another great flow of red lava was visible. This stream flowed into the Rio das Garças or Barreiros, only 500 metres away--an important watercourse, throwing itself eastward into the Rio das Mortes, one of the great tributaries of the upper Araguaya River.

## CHAPTER XIII

### The River Barreiros--A Country of Tablelands

THE Rio Barreiros was about 100 metres wide. It was reached through a thick belt, 100 metres in width, of trees and bamboos of large diameter, which lined both its banks. The river flowed swiftly where we crossed it, over a bed of lava and baked rock, red and black, with huge treacherous pits and holes which rendered the job of crossing the stream dangerous for our animals. There were rapids lower down in the terraced mass of rock forming the river bottom. The rock, worn smooth by the water, was extremely slippery. It was only after we had all undressed and taken the baggage safely across on our heads--the river being too deep for the loads to remain on the saddles--that we successfully drove the animals over to the opposite bank.

On the banks I collected some specimens of the laminated red rock, which had no great crushing resistance when dry. It could be easily powdered under comparatively light pressure, and scratched with no difficulty with one's nails. It was of various densities of red tones, according to the amount of baking it had undergone. The superposed red strata had a dip northward in some localities. The rock was much fissured, and had either gone through excessive contraction in cooling or else perhaps had been shattered by some earthly commotion--such as must have occurred often in that region in ages gone by, for, if not, how could one account for finding scattered blocks of this red rock resting upon the surface of great stretches--sometimes for 20 or 30 kil.--of uninterrupted sand or ashes which covered such great expanses of that country?

In the valleys, near water, *burity* palms were numerous.

Overhead the sky was always interesting. The days nearly invariably began with a clear, speckless sky, but, mind you, never of quite so deep a blue as the sky of Italy or Egypt. The sky of Central Brazil was always of a whitish cobalt blue. That morning--an exception to prove the rule--we had awakened to a thick mist around us, which enveloped and damped everything. No sooner did the sun rise than the mist was quickly dispelled. In the late morning, about 10 o'clock, clouds began to form high in the sky--not along the horizon, as is generally the case in most countries--and grew in intensity and size during the afternoon. Nearly every day at about sunset a peculiar flimsy, almost transparent, streak of mist stretched right across the sky from east to west, either in the shape of a curved line, or, as we had observed as recently as the day before, resembling with its side filaments a gigantic feather or the skeleton of a fish.

In the State of Goyaz, it may be remembered, we had a more beautiful and complete effect at sunset of many radiating lines, starting from the east and joining again to the west, but here we merely had one single streak dividing the sky in two. When the sun had long disappeared under the horizon, that streak high up in the sky was still lighted by its rays--becoming first golden, then red. The effect was quite weird.

My men went during the night on another fishing expedition, but with no luck--partly due to the infamy of our dogs. They used as bait for their large hooks *toucinho*, or pork fat, of which they had started out provided with a huge piece. They walked off a good distance from camp to find a suitable spot. Unfortunately, while they were there the dogs ate up all the *toucinho* and the result was that the men had to return disappointed. There was plenty of game, especially wild pig and *veado* (deer).

Alcides had a smattering of botany, which was a great danger to the company. He knew, he thought, the uses, medicinal or otherwise, of all plants, herbs and fruit, wild or not wild. This, in addition to the greediness of the men--who, although actually gorged with food, were always willing to devour anything else they found--led once or twice, as we shall see, to the poisoning of himself and his companions so dangerously as not only to cause terrible internal pains, but to bring them all actually to death's door.

I never got poisoned myself, as I generally took good care to watch the effects of those experiments upon my men first. Then also in my many years of exploration I had learnt only too well to beware of even the most

seductive tropical plants and fruit. Notwithstanding all this, Alcides was really wonderful at turning out pleasant-tasting beverages from the stewed bark or leaves of various trees, and of these decoctions--in which additional quantities of sugar played an important part--my men and myself drank gallons upon gallons. Many of those drinks had powerful astringent qualities and had severe effects upon the bladder, but some were indeed quite good and innocuous.

During the night I observed a most perfect lunar halo, the circle, close to the moon, displaying a curious yellowish red outer fringe.

Since leaving the Araguaya we had been bothered a good deal nightly by the heavy dew, which absolutely soaked everything, made all our rifles and axes and iron implements rusty, and the tents and saddles and baggage considerably heavier for the animals to carry, owing to the moisture they had absorbed. In the early morning we began to get thick cold mist, and it was about that time that the minimum temperature was usually registered--58° Fahr. that particular night, May 19th. We were at quite a low elevation, merely 1,100 ft. When we started in the morning we found more sand and volcanic débris over ridges some 100 ft. or so above the level of the river. A torrent, 15 metres wide, flowing swiftly W.S.W. on a red lava bed, was crossed, the mules slipping terribly on the polished rock. More ashes and sand were found as we ascended to an elevation of 1,200 ft., from which height we discerned a much-terraced headland to the east and two streams meeting and flowing south where we eventually crossed them. One of those watercourses descended in cascades over laminated successive flows of lava, between which thin layers of white crystallization could be seen.

Slightly higher, at 1,250 ft., we sank again in yellow and grey ashes.

Across campos we reached another foaming torrent, flowing as usual over a lava bed, but this time in a north-westerly instead of in a southerly direction. That day we met with many watercourses. Having risen to 1,450 ft., we soon after found another streamlet (elev. 1,230 ft.). Again a red lava-flow was exposed in its bed and showed heavy upper deposits of grey ashes, with above them a thick layer of yellow-ochre sand (1,300 ft.).

The distances on the journey were measured by a watch, the speed of the animals at the time being naturally taken into consideration. It was not possible to use the usual bicycle wheel with a meter attached, which is used with so much success in the Arctic regions or in countries where travelling more or less in a straight line and on a level surface is possible.

Another limpid stream flowing south-west (elev. 1,200 ft.) was reached, then more deep sand and ashes. After that we came to a thick growth of bamboos and brush on reaching the banks of a streamlet winding its way north.

Travelling up and down, all day and day after day, over those undulations became tedious work--red sand, whitish sand, grey ashes, all the time.

[Illustration: Typical Brazilian Plateau, showing Work of Erosion.]

[Illustration: On the Plateau of Matto Grosso.

(Alcides in foreground.)]

On the west side, on descending the last prominence we at last came to a slight variation in the geological composition of the country. After more white sand and ashes had been passed, we came upon great stretches of greenish grey granite exposed in huge domes and much striated, with parallel grooves on its surface so deep that they almost looked as if they had been incised by a sharp tool. These grooves were, nevertheless,

naturally caused by the sharp friction of sand and water, I think, and also by sand blown over those rocks with terrific force by winds of inconceivable vigour. All the way down our descent we travelled over that striated rock. It had become exposed to the air, but must have once been buried under sand and ashes like all the rest of that region. Curious vertical cracks were to be noticed in several places, with ramifications from a common centre--evidently caused by the concussion of some huge weight which had fallen from above, perhaps a huge boulder shot out by volcanic action, which had then rolled farther down the incline.

The terminal side of the curious range we had on our right appeared not unlike a fortress with its vertical walls standing upon a slanting bastion.

At the bottom (elev. 1,200 ft.) of the great dome of granite we had travelled upon we crossed a stream flowing south-west, the water of which was quite warm. The high temperature was due, I think, to the heat absorbed by the rock exposed to the sun and communicated to the water flowing over it, rather than to a thermal origin.

Continuing our journey, we had to the south a great hollow basin in the south-western end of the range, with two hillocks between the range itself and the flat boundary plateau to the south.

The highest point of the hill on which we travelled was 1,450 ft. above the sea level. Every metre we travelled westward became more strangely interesting. We were now upon a conglomerate of bespattered lava-drops encased in a coating of solidified ashes. When we reached the stream we had to go through a dark tunnel of dense vegetation, great ferns, giant palms, creepers with their abundant foliage, and tall trees festooned with liane. Having crossed this dark vegetable passage, we emerged once more into lovely open campos.

Great lumpy globular woolly clouds faced us in the sky to the west. Horizontal intermittent white layers were close to the horizon to the east, then three parallel lines of feathery mist to the north-west. In quantity of clouds the sky that day would meteorologically be described as C 4--which means that four-tenths of the sky vault was covered.

One could not help being struck in Central Brazil by the almost absolute immobility of the clouds. One seldom experienced a strong wind; contrary to what must have taken place there in ages gone by, when that country must have been the very home of terrific air-currents and disturbances on a scale beyond all conception. It was only occasionally that a light breeze--merely in gusts of a few seconds--would refresh one's ears and eyes as one marched on. What was more remarkable still was the sudden change of direction of those spasmodic gusts of wind when they did come.

From a river (elev. 1,250 ft.) we proceeded over undulations to 1,550 ft. There we were treated to an extensive and beautiful view to the west, south-west and north-west. The elevated sky-line formed by the plateau and mountains was quite straight, barring three much eroded mountains standing quite isolated and at a great distance from one another.

One of these solitary elevations was to the south-west, another--the castle-like mountain of great height we had already observed--stood due west. Then came the long flat line of the plateau but for a gentle convexity at each end. The plateau, dressed in thick forest, stood in the middle distance to the west-south-west. Campos of great beauty were prominent on its slopes and in the two hollows in the immediate vicinity.

As we wound our way forward we found masses of ferruginous black rock, black débris, and beautiful crystals.

The silence of that wonderful landscape was impressive. The tinkling of my mules' neck-bells was the only cheering sound breaking that monotonous solitude--except perhaps the occasional harsh voices of my men urging on the animals with some unrepeatable oath or other.

Filippe, the negro--to be distinguished from the other Filippi in my employ, a mulatto--was mounted on one of my best mules. He carried a regular armoury on his back and round his waist, for not only did he carry his own rifle but also mine, besides a pistol and two large knives. He rode along, slashing with a long whip now at one mule then at another. Occasionally he treated us to some of his improvised melodies--not at all bad and quite harmonious, although one got rather tired of the incessant repetitions. Filippo was a pure negro, born in Brazil from ex-slaves. He had never been in Africa. His songs interested me, for although much influenced naturally by modern Brazilian and foreign airs he had heard at Araguay, still, when he forgot himself and his surroundings, he would relapse unconsciously into the ululations and plaintive notes and rhythm typical of his ancestral land in Central Africa--that of the Banda tribe, which I happened to have visited some years before. I identified him easily by his features, as well as by his music and other characteristics.

Filippe did not remember his father and mother, nor had he known any other relatives. He had no idea to what tribe he had belonged, he did not know any African language, and he had never to his remembrance knowingly heard African music. It was remarkable under those circumstances that the Central African characteristics should recur unconsciously in Filippo's music. It showed me that one is born with or without certain racial musical proclivities, dictated by the heart and brain. They cannot be eradicated for many generations, no matter what the place of birth may be or the different surroundings in which the individual may find himself, or the influences which may affect him even early in life.

Brazil was certainly a great country for tablelands. As we came out again into the open, another great plateau, ending with a spur not unlike the ram of a battleship, loomed in the foreground to the south. Yet another plateau of a beautiful pure cobalt, also with another gigantic ram, appeared behind the first, in continuation of the two separated plateaux we have already examined. It was separated from these by a deep cut--a regular cañon--several miles wide, and with sides so sharply defined that it looked like the artificial work of an immense canal.

Great campos lay before us in the near foreground, from our high point of vantage (elev. 1,550 ft.). We were still travelling on a surface of volcanic débris, yellow ashes and sand--forming a mere cap over all those hills, the foundation of which was simply a succession of giant domes of lava.

North-west we still had the almost flat sky-line of a plateau rising slightly in two well-defined steps or terraces to a greater height in its northern part. What most attracted me that day was the delightful view of the Barreiros valley spreading before us--a view of truly extraordinary grandeur.

We rapidly descended, leaving to our left the Indian colony of Aracy. Great granitic and lava slabs, much striated, were seen on our way down to the river (elev. 1,200 ft.). The stream was 50 metres wide, and flowed south where we crossed it. There was a handsome white sand beach on the left bank of the river. On the western, or right bank, stood great volcanic cliffs of boiled and broiled rock, interesting for the violent contortions they had undergone during the processes of ebullition, which showed plainly in their present solidified form.

The river bed itself was one of the usual lava-flows with huge globular lumps and knots--but all in a solid, uninterrupted mass.

We waded chest-deep across the stream, conveyed our baggage and mules to the opposite side, and then we all enjoyed a lovely bath with plenty of lathering soap in the deliciously refreshing waters of the Rio Barreiros.

The river Barreiros, which had its birth in the Serra Furnas Corros, to the south-west, entered the Rio das Garças--there 100 metres wide--a short distance from where we crossed it. The latter river, by far the larger of the two and of a very circuitous course, flowed in a south-easterly direction into the Araguaya. The Rio das Garças, which also had its origin in the Furnas Corros Mountains, had almost a parallel course with the upper



Barreiros from south-west to north-east, but on meeting the Barreiros suddenly swung round at a sharp angle towards the south-east, which direction it more or less followed until it entered the Araguaya.

We made our camp on the right bank of the Barreiros River. My men were in a great state of mind when I told them that perhaps on this river we might find some Indians. The cautious way in which they remained as quiet as lambs in camp amused me. I noticed the care with which they cleaned their rifles and replenished their magazines with cartridges. I assured them that there was no danger--in fact, that quite close to this place we should find one of the Salesian colonies.

**CHAPTER XIV**

## The Bororo Indians

WHILE I was reassuring my men an Indian appeared, bow and arrows in hand. He stood motionless, looking at us. My men, who had not noticed his coming, were terrified when they turned round and saw him.

The Indian was a strikingly picturesque figure, with straight, sinewy arms and legs of wonderfully perfect anatomical modelling, well-shaped feet--but not small--and hands. He was not burdened with clothing; in fact, he wore nothing at all, barring a small belt round his waist and a fibre amulet on each arm.

The Indian deposited his bow and arrows against a tree when some other Indians arrived. He stood there as straight and as still as a bronze statue, his head slightly inclined forward in order to screen his searching eagle eyes from the light by the shade of his protruding brow. He folded his arms in a peculiar manner. His left hand was inserted flat under the right arm, the right hand fully spread flat upon his abdomen.

The first thing I did was to take a snapshot of him before he moved. Then I proceeded to the interesting study of his features. They were indeed a great revelation to me. One single glance at him and his comrades persuaded me that a theory I had long cherished about the aboriginal population of the South American continent was correct, although in contradiction to theories held by other people on the subject. I had always believed--for reasons which I shall fully explain later--that South America must be peopled by tribes of an Australoid or Papuan type--people who had got there directly from the west or south-west, not by people who had gradually drifted there from the north.

Some scientists--with no experience of travel--have been greatly misled by the fact that the North American Indians are decidedly a Mongolian race. Therefore they assumed--basing their assumption on incorrect data--that the unknown Indians of South America must also be Mongolian. This was a mistake, although undoubtedly migrations on a comparatively small scale of Indians from North to South America must have taken place, chiefly along the western American coast. Those tribes, however, unaccustomed to high mountains, never crossed the Andes. Whatever types of Indians with Mongolian characteristics were found settled in South America were to be found to the west of the Andes and not to the east. This does not of course mean that in recent years, when roads and railways and steamships have been established, and communication made comparatively easy, individuals or families may not have been conveyed from one coast to the other of the South American continent. But I wish my reader to keep in mind for a moment a clear distinction between the Indians of the western coast and the Indians of the interior.

[Illustration: A Fine Bororo Type on a Visit to Author's Camp.]

To return to our man: I was greatly impressed by the strongly Australoid or Papuan nose he possessed--in other words, broad, with the lower part forming a flattened, depressed, somewhat enlarged hook with heavy nostrils. In profile his face was markedly convex, not concave as in Mongolian faces. Then the glabella or central boss in the supra-orbital region, the nose, the chin, were prominent, the latter broad and well-rounded. The cheek-bones with him and other types of his tribe were prominent forwards, but not unduly broad laterally, so that the face in front view was, roughly speaking, of a long oval, but inclined to be more angular--almost shield-shaped. The lips were medium-sized and firmly closed, such as in more civilized people would denote great determination. His ears were covered up by long jet-black hair, perfectly straight and somewhat coarse in texture, healthy-looking and uniformly scattered upon the scalp. The hair was cut straight horizontally high upon the forehead, which thus showed a considerable slant backward from the brow to the base of the hair. A small pigtail hung behind the head. The hair at the sides was left to grow down so as fully to cover the lobes of the ears, where again it was cut horizontally at the sides and back of the head. The top of the head was of great height, quite unlike a Mongolian cranium.

The eyes--close to the nose, and of a shiny dark brown--had their long axis nearly in one horizontal plane. They were set rather far back, were well cut, with thick upper eyelids, and placed somewhat high up against the brow ridges so as to leave little room for exposure of the upper lid when open.

None of the other Indians, who had gradually assembled, wore a particle of clothing, barring a tight conical collar of orange-coloured fibre encircling their genital organs--so tight that it almost cut into the skin. Without this solitary article of clothing no Indian man will allow himself to be seen by another, less still by a stranger. But with so modest an attire he feels as well-dressed as anybody. I think that this elegant article of fashion must have originated as a sanitary precaution, in order to prevent insects of all kinds, and particularly *carrapatos*, penetrating within--or else I was really at a loss to understand of what other use it could be. They themselves would not say, and only replied that all Bororo Indian men wore it. The Indians who had assembled all belonged to the Bororo tribe.

On that, as well as on later occasions, I noticed two distinct types among the Bororos: one purely Papuan or Polynesian; the other strongly Malay. The characteristics of those two different types showed themselves markedly in every instance. The majority were perhaps of the Malay type. I was intensely interested at the astounding resemblance of these people to the piratical tribes of the Sulu Archipelago in the Celebes Sea, where, too, one met a considerable amount of mixture of those two types as well as specimens of pure types of the two races.

Among the Bororos many were the individuals--of the Malay type--who had the typical Malay eye *à fleur de tête*, prominent, almond-shaped, and slightly slanting at the outer angle. The nose--unlike that of Papuan types--was flattened in its upper region between the eyes, and somewhat button-like and turned up at the lower part--just the reverse of the Papuan types, who had prominent aquiline noses with a high bridge and globular point turned down instead of up.

The lips were in no case unduly prominent, nor thick. They were almost invariably kept tightly closed.

The form of the palate was highly curious from an anthropological point of view. It was almost rectangular, the angles of the front part being slightly wider than a right angle.

The front teeth were of great beauty, and were not set, as in most jaws, on a more or less marked curve, but were almost on a straight line--the incisors being almost absolutely vertical and meeting the side teeth at an angle of about 60°. The upper teeth overlapped the lower ones.

The chin was well developed--square and flattened in the Papuan types, but receding, flat and small in the Malay types.

Both types were absolutely hairless on the face and body, which was partly natural and partly due to the tribal custom of pulling out carefully, one by one, each hair they possessed on the upper lip and upon the body--a most painful process. The women--as we shall see--in sign of deep mourning, also plucked out each hair of the scalp.

A striking characteristic of the head--in Papuan types--was the great breadth of the maximum transverse of the head, and the undue prominence of the supra-orbital ridges. Also, the great height of the forehead and its great width in its upper part were typical of the race. The maximum antero-posterior diameter of the skull was equal, in many cases, to the vertical length of the head, taken from the angle of the jaw to the apex of the skull.

The ears nearly invariably showed mean, under-developed lobes, but, strangely enough, were otherwise well shaped, with gracefully defined and chiselled curves. They were not unduly large, with a wonderfully well-formed concha, which fact explained why the acoustic properties of their oral organs were perfect. They

made full use of this in long-distance signalling by means of acute whistles, of which the Bororos had a regular code.

The favourite form of earring adopted by the Bororos was a brass ring with a metal or shell crescent, not unlike the Turkish moon, but I do not think that this ornament was of Bororo origin. Very likely it was suggested by the cheap jewellery imported into Brazil by Turkish and Syrian traders.

They displayed powerful chests, with ribs well covered with flesh and muscle. With their dark yellow skins they were not unlike beautiful bronze torsi. The abdominal region was never unduly enlarged, perhaps owing to the fact that their digestion was good, and also because they took a considerable amount of daily exercise. In standing they kept their shoulders well back, the abdominal region being slightly in front of the chest. The head was usually slightly inclined downwards.

The feet of the Bororos of the Malay type were generally stumpy, but this was not so with the higher Papuan types, who, on the contrary, had abnormally long toes and elongated feet, rather flattened. The Bororos used their toes almost as much as their fingers, and showed great dexterity in picking up things, or in spinning twine, when their toes did quite as much work as their fingers.

The colour of the iris of the Bororo eye was brown, with considerable discoloration around its outer periphery, and especially in the upper part, where it was covered by the lid. The eyes were generally kept half closed.

The anatomical detail of the body was perfectly balanced. The arms were powerful, but with fine, well-formed wrists--exquisitely chiselled, as were all the attachments of their limbs. They had quite graceful hands, long-fingered--in more ways than one--and wonderfully well-shaped, elongated, convex-faced nails, which would arouse the envy of many a lady of Western countries. The webbing between the fingers was infinitesimal, as with most Malay races. Great refinement of race was also to be noticed in the shape of their legs--marvellously modelled, without an ounce of extra flesh, and with small ankles.

The Bororos divided themselves into two separate families--the Bororo Cerados and the Bororo Tugareghi. The first descended from Baccoron; the second claimed descent from Ittibori. Baccoron lived where the sun set, in the west; Ittibari dwelt in the east.

I heard a strange legend in connection with their origin, in which they seemed proud of their descent from the jaguar--which to them represented the type of virility. A male jaguar, they said, had married a Bororo woman.

A sensible custom existed among the Bororos, as among the Tuaregs of the Sahara desert in Africa. The children took the name of the mother and not of the father. The Bororos, like the Tuaregs, rightly claimed that there could be no mistake as to who the mother of a child was, but that certainty did not always apply to the father. This was decidedly a sensible law among the Bororos, who were most inconstant in their affections. They were seldom faithful to their wives--at least, for any length of time.

The Bororos were not prolific. They frequently indulged in criminal practices in order to dispose of their young--either by strangulation at birth or soon after, or by drugging their women before the birth of the child. The young, when allowed to live, took milk from their mothers until the ages of five or six years. The parents were extremely kind to their children; indeed, they were extraordinarily good-natured and considerate. Eight days after birth they perforated the lower lip of male children and inserted a pendant, taking that opportunity to give a name to the child. The lobes of the ears were only perforated at the age of ten or twelve.

It was only at the age of about twenty that men were allowed to marry.

I found among the Bororos an interesting custom which I had seen but once before--in Central Asia, on the slopes of the Himalaya Mountains, among the Shoka tribesmen. I am referring to the "clubs"--called by the

Bororos *Wai manna ghetgiao*. There the young men and girls went not only with the object of selecting a wife or husband, but also to get thoroughly acquainted and see if the mate selected were suitable or not. The men sat on one side of the club-house--a mere hut--the women on the other. In a way, these clubs prevented hasty marriages, for the men were given plenty of time to study their prospective brides and the girls their future husbands. Curiously enough, in the Bororo country it was generally the woman who proposed to the man. When the official engagement was made the man proceeded to the hut of his sweetheart and brought a gift of food for her and her mother. If the gifts were accepted there was no other formality to be gone through, and the matrimonial ceremony was indeed of the simplest kind. The man took away the girl to his hut and they were man and wife.

The *cuisine* of the Bororos was not attractive to European palate, ears or eyes. One of the favourite dishes of the Bororos, served on grand occasions, was the *mingao*, or Indian corn chewed up into a paste inside their mouths by women and then displayed before the guests in earthen pots filled with fresh water, in which it was then cooked.

The Bororos maintained that the sun, *Cervado*, and the moon, *Itary*, were two brothers, both being males.

They believed in a superior Being--the essence of goodness and kindness--a Being who will never give pain or hurt anybody; therefore the Bororo, who was really at heart a great philosopher, never offered prayers to that superior Being. Why pray and worry one who will never injure us? they argued.

Then they believed in a wicked and revengeful devil, the *Boppé*, to whom constant attention was paid because by him was caused all the trouble that humans can have. Malady, accidents, disaster in love, in hunting or fishing expeditions--for all these the devil *Boppé* was responsible.

Then they had also another evil spirit--the *Aroe Taurari*--who, they said, often assumed the appearance of their ancestors in order to come and watch the games of the Bororos, such as wrestling and archery. Wrestling--in the catch-as-catch-can style--was one of their favourite games. They were very agile at it. Their favourite trick was to seize each other across the shoulders, each endeavouring to trip his opponent by a twisted leg round his knee. Children in the *aldejas* were playing at this game all the time. In the Bororo wrestling-matches it was sufficient to be thrown down to be the loser, and it was not essential to touch the ground with both shoulder-blades.

The only other game I saw among the Bororos was the test of strength. It was carried out with a most striking article--a great wheel made of sections, each one foot long, of the trunk of the *burity* palm tied together by double strings of fibre. The ribbon thus formed by them was rolled so as to make a solid wheel of heavy wood 6 ft. in diameter. The whole was retained in a circular form by a strong belt of vegetable fibre. This great wheel was used by the Bororos in their sports, at festivals, for testing the strength of the most powerful men. It was so heavy that few men could lift it at all, the great test being actually to place it on one's head and keep it there for a length of time.

[Illustration: Bororo Men, showing Lip Ornament.]

[Illustration: Bororo Men.]

The Indians of South America, like the Indians of North America, revelled in decorating themselves with the feathers of brightly-coloured birds. The red, yellow and blue giant macaws, fairly common in that region, paid dearly for this fashion of the Indians. Many of those poor birds were kept in captivity and plucked yearly of all their feathers in order to make hair ornaments of beautiful blue and green plumage for the leading musician, who rattled the *bacco* (a gourd full of pebbles which can make a terrible noise), or else armlets, earrings or necklaces. Some of the designs woven with the tiniest feathers of those birds were quite clever, and required delicate handling in their manufacture. Ducks, too, supplied many of the feathers for the

ornaments of the Bororos.

Their cooking utensils were simple enough--merely a few large earthen bowls, badly baked and unglazed, the largest of which was seldom more than 2 ft. in diameter. They broke easily, being made extremely thin.

The Bororos made basket-work by plaiting dried palm-leaves, but their most interesting work of all consisted in the really beautifully made fishing nets. Nearly all the Indians of South America showed remarkable talent and patience at this work. The strings were twisted of a vegetable fibre, extremely resisting, and eminently suitable by its softness and regularity of diameter.

Whether owing to excitement, indigestion or other causes, the Bororos had visions, which they attributed to the *Aroe Taurari*. In a certain way they were believers in the transmigration of the soul--not generally, but in specific cases.

There were certain Bororos who, by magic songs, professed to fascinate animals in the forest and were able to catch them. The *barih* or medicine-man generally, assisted in those incantations.

The Bororos were remarkable walkers. They were extremely light on their feet and had a springy gait, most graceful to watch. A striking characteristic of these people was that, when standing--unlike nearly every other tribe of savages I have seen--they spread their toes outward instead of keeping both feet parallel. To a lesser extent the feet were held in that position also when walking. The suppleness of their bodies gave them a great advantage in penetrating with ease anywhere in the forest without having to cut their way through.

Both men and women were passionately fond of dancing, although their dancing had not reached any degree of perfection. With a strip of *burity* palm upon their shoulders they hopped around, monotonously chanting, with a rhythmic occasional jump, the women following the men.

The women possessed considerable endurance. They could carry heavy weights for long distances by means of a fibre headband resting on the forehead. Under those circumstances the body was kept slightly inclined forward. Children were also carried in a similar fashion in a sling, only--less practically than among many Asiatic and African tribes--the Bororo children were left to dangle their legs, thereby increasing the difficulty of carrying them, instead of sitting with legs astride across the mother's haunches. I was amazed to see until what age Bororo mothers and sisters would carry the young upon their shoulders--certainly children of five or six years of age were being carried about in this fashion, while such hard duties as pounding Indian corn, thrashing beans, and hut-building, were attended to.

Neither in women nor in men was the power of resistance in any way to be compared with that of the tribes of Central Africa or Asia. The Indian tribes of Brazil impressed one as being strong, because one compared them with their neighbours and masters, the Brazilians, who were physically one of the weakest, least-resisting races I have ever seen. When you compared them with some of the healthy savage races elsewhere, the Indians did not approach them in endurance and quickness of intellect. Do not forget that endurance is greatly due to brain power and self-control. The Indian races I saw in Brazil seemed to me almost exhausted physically, owing perhaps to constant intermarriage among themselves. The eyesight of the Bororos, for instance, was extremely bad. There were many in every *aldeja* who were almost or absolutely blind. The others were nearly all short-sighted.

The Bororos removed--pulled out, in fact--their eyelashes one by one, as they believed it improved their sight, especially for seeing at long distances. They all suffered more or less from complaints of the eyes. Indeed, I have seldom found races whose members had eyes in such poor condition. Conjunctivitis was the most prevalent form of eye disease. Ophthalmia was frequently met with. They seemed to have no efficacious method of curing those complaints, and the result was that one found an appalling number of blind or half-blind persons among them--quite out of proportion to the small population. The Bororos did not, of

course, know of spectacles or any other way of protecting the eyes. Even when their eyes were in a normal condition, they nearly all had some defect of vision. Squinting was frequently to be noticed among them, and nearly invariably unevenness of the eyes. Cataract was common at a comparatively early age, and they knew no remedy for it. An abnormally marked discoloration of the upper part of the iris was constantly to be noticed even in young people. Among the healthiest I never saw one man or woman with extraordinary powers of vision such as are most common among savage tribes of Asia and Africa. The diseased condition of their blood was also perhaps to a certain extent responsible for this.

Their hearing was good, but not much more acute than with the average European--and infinitely inferior to that of the natives of Asia and Africa. They suffered considerably from the most terrible of blood complaints, general among them, also from leprosy and various skin troubles.

The Bororos made considerable use of the *urucu* plant (*Bixa orellana* L.) which they called *nonoku*, from the fruit of which they obtained a brilliant red colouring matter for tinting their bows and arrows. The shell of the fruit contained a number of shiny seeds, which, when squashed, exuded a vivid red juice. It adhered easily to the skin of the forehead and cheeks, for which purpose the Indians also extensively used it.

The black paint which the Indians used for smearing themselves across the forehead, cheeks, and upon the shoulders, from side to side, was made to stick to the skin and shine by mixing it with a resin.

The Bororos of the Rio Barreiros district carried five arrows each with them, but each family of Bororos used a special colour and also a different number of arrows, so that no particular rule could be laid down for the entire tribe. The red-tinted arm-band which most men wore was called the *aguasso*.

Before starting on a hunting expedition of importance the Bororos usually indulged in a feast.

I took a great number of thumb-marks among them, some of which were remarkable for the precision of the spiral lines from the central point, all over the thumb point. Others in the longer thumbs showed a peculiar deviation in the curve at the end, near the point of the thumb. Where the lines began to deviate, the triangle formed was filled in by other lines joining those of the spiral at sharp angles.

The experiments with the dynamometer in order to measure their strength, the anthropometric measurements with a calliper, and the printing of the thumb-marks, caused the Bororos first of all great anxiety, then boisterous amusement. They looked upon it all as utter nonsense--in a way I did not blame them--and repeatedly asked why I did it. I told them that I did it to find out where they came from.

"We are not monkeys," said they; "we do not walk on our hands. If that is your object you should look at our foot-marks on the ground, not at the marks of our hands!"

With these words, from a tracker's point of view, the local wit set the entire company in shrieks of laughter at his quick repartee.

"Oh, yes!" said I; "but with the thumb-marks I may perhaps trace, not only where you come from, but also where your great-grandfather, who is now dead, came from."

That was too much for them. All had been anxious to make a smudge with smoke-black upon my note-book. Now they all refused to do any more thumb-marking, and walked away; but I had fortunately already finished the work I needed from them.

The Bororos--in fact, most Indian tribes of Central Brazil--knew nothing whatever of navigation. This was chiefly due to the fact that all the woods of Central Brazil had so high a specific gravity that not one of them would float. Hence the impossibility of making rafts, and the greatly increased difficulty in making boats. As

for making dug-outs, the Indians had neither the patience nor the skill nor the tools to cut them out of solid trees. Moreover, there was really no reason why the Indians should take up navigation at all when they could do very well without it. They could easily get across the smaller streams without boats, and they were too timid to go and attack inimical tribes on the opposite banks of unfordable rivers. Besides, the Indians were so few and the territory at their entire disposal so great, that there was no temptation for them to take up exploring, particularly by water.

They were all good swimmers. When the river was too deep to ford they merely swam across; or else, if the river were too broad and swift, they improvised a kind of temporary raft with fascines or bundles of dried *burity* leaves, to which they clung, and which they propelled with their feet. These fascines were quite sufficient to keep them afloat for a short time, enabling them also to convey a certain amount of goods across the water.

In other countries, such as in Central Africa among the Shilucks and the Nuers of the Sobat River (Sudan), and the natives on Lake Tchad, I have seen a similar method adopted in a far more perfected fashion. The Shilucks, for instance, cleverly built big boats of fascines--large enough to carry a great number of warriors. Such was not the case with the bundles of *burity* of the Indians--which merely served for one or at the most two people at a time, and then only until the bundle became soaked, when it went to the bottom.



**CHAPTER XV**

Bororo Superstitions--The Bororo Language--Bororo Music

[Illustration: Bororo Indians.]

THE Bororos were superstitious to a degree. They believed in evil spirits. Some of these, they said, inhabited the earth; others were invisible and lived "all over the air," to use their expression. The aerial ones were not so bad as those on earth. It was to the latter that their invocations were made--not directly, but through a special individual called the *barih*, a kind of medicine man, who, shouting at the top of his voice while gazing skyward, offered gifts of food, meat, fish and grain to the *boppé* or spirits invoked. There were two kinds of *barih*: a superior one with abnormal powers, and an inferior one. The *barih* eventually pretended that the spirit had entered his body. He then began to devour the food himself, in order to appease the hunger of his internal guest and become on friendly terms with him. The wife of the *barih*, who on those occasions stood by his side, was generally asked to partake of the meal, but only after the *barih* had half chewed the various viands, when he gracefully took them with his fingers from his own mouth and placed them between the expectant lips of his better half. She sometimes accepted them--sometimes not. All according to her appetite, I suppose, and perhaps to the temporary terms on which she was that day with her husband.

The Bororos, curiously enough, spoke constantly of the hippopotamus--*ajie*, as they called it--and even imitated to perfection the sounds made by that amphibious animal. This was indeed strange, because the hippopotamus did not exist in South America, nor has it ever been known to exist there. The women of the Bororos were in perfect terror of the *ajie*, which was supposed to appear sometimes breaking through the earth. Personally, I believed that the *ajie* was a clever ruse of the Bororo men, in order to keep their women at home when they went on hunting expeditions. Boys were trained to whirl round from the end of a long pole a rectangular, flat piece of wood attached to a long fibre or a string. Its violent rotation round the pole, with the revolutions of the tablet around itself at different speeds, reproduced to perfection the sounds of blowing and snorting of the hippopotamus. The whizzing of this device could be heard at astonishing distances. The credulous women were rendered absolutely miserable when they heard the unwelcome sounds of the *ajie*, and, truly believing in its approach, retired quickly to their huts, where, shivering with fright, they cried and implored to have their lives spared.

The boy who whirled the magic tablet was, of course, bound to keep the secret of the *ajie* from the women. Let me tell you that one of the chief virtues of the Bororo men, old and young, was the fidelity with which they could keep secrets. The youngest children were amazing at keeping secrets even from their own mothers. There were things that Bororo women were not allowed to know. Boys attended the tribal meetings of men, and had never been known to reveal the secrets there discussed either to their sisters or mothers.

When I said it was a virtue, I should have added that that virtue was a mere development of an inborn racial instinct. Young and old among the Bororo were extremely timid and secretive by nature. They feared everybody--they were afraid of each other. It was sufficient to watch their eyes--ever roaming, ever quickly attracted and pointing sharply at anything moving anywhere around--to be satisfied of the intense suspiciousness of these people.

The Bororos were restless nomads and could never settle anywhere. They were always on the move--hunting, fishing, and formerly on warlike expeditions with other tribes. They showed great skill with their arrows, which they threw with wonderful accuracy even under conditions of unusual difficulty. When fishing, for instance, they showed remarkable calculating powers when the line of vision became deviated by the surface of the water and made it difficult to judge the exact position of the fish at different depths, quite removed from where the eye saw it. Their long arrows had a double-barbed bone head, which was poisoned when fighting men.

The Bororos were not quarrelsome by nature; on the contrary, they were dignified and gentle. They always avoided fighting. It was only when driven to it, or when hunted down and attacked, that they naturally endeavoured to defend themselves. This has brought upon them the reputation of being barbarous and cruel savages. Even among themselves they seldom quarrelled; they never offended one another with words. They had great respect for their elders.

At night the men collected in the village. One of them spoke aloud to the crowd, delivering a regular lecture on the events of the day, their hunting or fishing adventures, or tribal affairs. The greatest attention was paid to the orator, and only after his speech was over a warm but orderly discussion followed.

When a Bororo man was angry with another he would not descend to vulgar language, but he generally armed himself with a bony spike of that deadly fish, the *raja* (*Rhinobates batis*) or *mehro*, as it was called in the Bororo language, which he fastened to a wristlet. With it he proceeded in search of his enemy, and on finding him, inflicted a deep scratch upon his arm. This was considered by the Bororos the greatest insult a man could offer.

Women, as in most other countries, quarrelled more than men. Not unlike their Western sisters, they always--under such circumstances--yelled at the top of their voices, and then resorted to the effective and universal scratching process with their long sharp nails.

It will be judged from this that it will not quite do to put down the Bororos as being as tame as lambs. Indeed, it was sufficient to look at their faces to be at once struck by the cruel expression upon them. They prided themselves greatly on having killed members of rival tribes, and more still upon doing away with Brazilians. In the latter case it was pardonable, because until quite recently the Brazilians have slaughtered the poor Indians of the near interior regions in a merciless way. Now, on the contrary, the Brazilian Government goes perhaps too far the other way in its endeavour to protect the few Indians who still remain within the Republic.

The more accessible tribes, such as the insignificant ones on the Araguaya, were having a good time--valuable presents of clothes they did not want, phonographs, sewing machines, fashionable hats, patent leather shoes, automatic pistols and rifles being showered upon them by expensive expeditions specially sent out to them. It no doubt pleased an enthusiastic section of the Brazilian public to see a photograph of cannibal Indians before they met the expedition, without a stitch of clothing upon their backs--or fronts to be accurate--and by its side another photograph taken half an hour later and labelled "Indians civilized and honoured citizens of the Republic," in which you saw the same Indians, five or six, all dressed up and, it may be added, looking perfectly miserable, in clothes of the latest fashion. It would have been interesting to have taken a third photograph an hour after the second picture had been taken, in order to show how soon civilization--if donning a pair of trousers and shoes and a collar and tie can be called being civilized--can be discarded.

[Illustration: Bororo Men.

(The aprons are not actually worn.)]

The news had spread by word of mouth down the Araguaya many months ahead that a Brazilian expedition would be sent out with gifts, in order to befriend the Indians--supposed to be innumerable: only a few dozens, all counted, in reality. Seeing no expedition arrive, the Indians--five or six--proceeded to travel some hundreds of miles to go and find it. The expedition for lack of money had remained stuck in a certain town. It was in that town that the valuable photographs were taken. No sooner had they said good-bye to their generous donors than the Indians left the city, quickly removed their clothes, which they exchanged for a few drinks of *aguardente* (fire-water), and, as naked as before, returned to the shores of their beloved river.

Nevertheless the movement of the Brazilian Government was extremely praiseworthy and did it great credit. Like all movements of that kind it was bound to go to excesses in the beginning, especially in Brazil, where

people were very generous when they were generous at all. So that so far the fault has been on the right side. It will undoubtedly prevent in the future much severe, even cruel treatment which has been bestowed on the Indians.

It was only a great pity--a very great pity--that this movement for the protection of the Indians had been started when there were few pure Indians--almost none--left to protect. According to Brazilian statements, the wild Indians of Central Brazil amounted to some fifteen or twenty millions or thereabouts! A few--very few--thousands, perhaps only hundreds, would be nearer the truth. There were no great tribes left in their absolutely wild state anywhere in Brazil. There were a few small tribes or families scattered here and there, but it was seldom that these tribes numbered more than twenty or thirty members. If the tribe numbered fifty individuals it was already a large tribe. Most of them contained merely six or eight members. So that really, in the population of Brazil, these tribes, instead of being the chief factor, were in fact a negligible quantity. It would be rash to make a statement as to the exact number of wild Indians in Brazil, for in a country so big--larger, as I have already stated, than the United States of America, Germany, Portugal, and a few other states taken together--and most of which was little known or absolutely unknown--it was not easy to produce an exact census.

During my journey, which crossed that immense country in a zigzag from one end to the other in its broader width, and covered all the most important regions of the Republic, I became assured that few indeed were the pure Indians to be found in Central Brazil. One went hundreds and hundreds of miles without meeting signs of them; and that in localities where they were supposed to be swarming. The Bororos--a few dozens of them, all counted, in two or three different subdivisions--were perhaps the strongest wild tribe in all the immense State of Matto Grosso.

As I have said, I was greatly impressed, from my first contact with the Bororos, by the strongly Polynesian appearance of some of them. The more specimens I saw of them the more I became convinced that they were of the same race. In fact, more: I began to speculate whether the people of Australia and Polynesia had migrated here or whether it was just the other way--which theory might also be plausibly upheld--viz. that the people of Central South America had migrated to the west, into Polynesia and Australia. Many theories have been expounded of how races always follow certain rules in their migrations, but in my own experience I do not invariably find that those theories are always correct. Again, it does not do to rely too much on the resemblance of words in establishing a relationship between two or more races. Nor, indeed, can one trust absolutely to the resemblance in the rudimentary ornamentation of articles of use. If you happen to be a student of languages, and have studied dozens of them, you will soon discover how far words will travel across entire continents. They can often be traced back to their origin by the knowledge of intermediate languages through which, with distortions, those words have passed. In Central Africa I actually heard words of Mongolian origin, and not only that, but even traced Mongolian characteristics in the type of the ruling classes of natives, as well as in the construction of their language.

It is easy to be occasionally misled. I remember on my journey across Africa how amazed I was at first at hearing some Tonkinese expressions used by the native cannibals. I really could not get over my amazement until I learnt that some years previously a number of Tonkinese convicts had been sent up the Congo and Ubanghi rivers by the French. Several of them had lived in that particular village of cannibals for some years. Hence the adoption of certain words which had remained in frequent use, whereas the Tonkinese individuals had disappeared.

I took special care in Brazil, when making a vocabulary of the Bororo and other Indian languages, to select words which I ascertained were purely Indian and had not been contaminated either by imported Portuguese words or words from any other language. I was much struck by the extraordinary resemblance of many words in the language of the Indians of Central Brazil to the Malay language and to languages of Malay origin which I had learnt in the Philippine Islands and the Sulu Archipelago.

For instance: the Sun, which is called in Malay *mata-ari*, usually abbreviated into *'ari*, was in the Bororo language *metiri*, and in the language of the Apiacar Indians of the Arinos-Juruena river, *ahra*, which indeed closely resembles the Malay word. Moreover, the word *ahri* in the Bororo language indicated the *moon*--a most remarkable coincidence. It became slightly distorted into *zahir* in the Apiacar language.

Water, which is *poba* in Bororo and *üha* in Apiacar, was curiously enough *ühaig* in the Bagobo language (Mindanao Island), *po-heh* or *bo-heh* in the Bajao language (Mindanao Island), *ayer* in Malay, and *uhayeg* in Tiruray (west coast of Mindanao Island, Philippine Archipelago).

Father was *bapa* in Malay, and *pao* in Bororo. Many were the words which bore a slight resemblance, as if they had been derived from the same root. *Langan*, arm, in Malay, was *ankan-na* or *akkan-na*. Ear, in the Ilocano language (Philippine Archipelago) was *cabayag*; *aviyag* in Bororo. Hair in Ilocano, *b[()o][()o]k*, in Manguianes *bohoc*, and in Sulu (Sulu Archipelago) *buhuc*; in Bororo it was *akkaio*, which might easily be a corruption of the two former words.

[Illustration: Bororo Warriors.]

[Illustration: Bororo Warriors.]

I was greatly interested, even surprised, to find that although those Indians lived thousands of miles on every side from the sea, and had never seen it, yet they talked of the *pobbo mae re u*--the immense water; (*pobbo*, water; *mae*, great; *re*, the; *u*, an expression of magnification such as our *oh*).

It was also interesting to note that they had specific words for water of streams--words which we do not possess in the English language, complete as our language is--such as down-stream, and up- or against-stream--like the French *en aval* and *en amont*. The Bororo used *tche begki*, down-stream, and *tcheo bugkii*, up-stream.

The Bororo language was rudimentary in a way, yet most complete--extremely laconic, with innumerable contractions. The construction of sentences and the position of the verb were not unlike those of Latin languages.

The chief wealth of the Bororo language consisted in its nouns. Like all savage languages, it was wonderfully rich in botanical and zoological terms. The gender was formed by a suffix, the masculine differing from the feminine.

There were in the Bororo language three genders, masculine, feminine and neuter. The masculine was formed by adding the words *chireu*, *curi*, or *curireu*, to the noun; the feminine by the suffixes *chireuda* and *curireuda*. There were many words which were used unaltered for either gender. In the case of animals, the additional words *medo*, male, or *aredo*, female, clearly defined the sex in specific cases where the names would otherwise be ambiguous. Inanimate objects had no sex, and were therefore neuter.

Most nouns had a plural as well as a singular, but there were exceptions to this rule, such as names of certain plants and animals, the sky, the wind, etc.; not to count things which were generally taken collectively, such as flies--*ruque*; macaw or macaws, *nabure*, etc.

The plural was made by the suffixes *doghe* or *maghe*--the *maghe* being used principally in possessive cases, such as *tori-doghe*, stones; *padje-maghe*, our mothers. Exceptions to this rule were the words ending in *bo*, *co*, *go*, or *mo*, to which the suffix *e* was sufficient to form the plural; whereas in those terminating in *do* or *no*, *ro*, or other consonants, the *o* was suppressed and an *e* placed in its stead. Example: *jomo*, otter, *jomoe*, otters; *cuno*, parrot, *cune*, parrots; *apodo*, or tucan (a bird), *apode*, tucans, etc.

There were a number of irregular exceptions, such as *aredo*, wife; *areme*, wives; *medo*, man, *ime*, men. Perhaps the most curious of plurals was *ore*, sons, the singular of which was *anareghedo* (son).

The words ending in *go* generally formed the plural with an interchangeable *ghe*.

The pronouns were:

*imi* = I *aki* = thou *ema* = he or she *sheghi* or *paghi* = we *taghi* = you *emaghi* = they

When immediately before a verb these were abbreviated into *I* or *it*, *a* or *ac*, *e* or *ei*, *pa* or *pag*, *ta* or *tag*, *e* or *et*--I, thou, he or she, we, you, they, according to their preceding a vowel or a consonant. With words beginning with a consonant only the first syllable of the pronoun was used.

The verb itself did not vary in the various persons, but it did vary in its tenses by suffixes, sometimes after the pronoun, sometimes after the verb. In the present tense the Bororos generally used for the purpose the word *nure*, usually between the pronoun and the verb, with the pronoun occasionally repeated after the *nure*; but in general conversation, which was laconic, the pronoun was frequently suppressed altogether--similarly to the frequent omission of the pronoun in the English telegraphic language.

There were various other forms of pronouns, but I could not quite define their absolute use--such as the *tched* or *tcheghi*, which seemed to include everybody, corresponding to the English *we* in orations which includes the entire audience, or the whole nation, or even the entire human race.

The Bororo language was complete enough, the conjugation of verbs being clearly defined into past, present, imperative and future.

The past was formed by interpolating between the pronoun and verb the words *re gurai*, generally abbreviated into *re*. The imperative was made chiefly by the accentuation of the words, and was susceptible of inflexion in the second person singular and plural. The future was formed by adding, sometimes after the pronoun, sometimes after the verb, the words *modde*, *uo*, or *ua*.

At the end of the second volume, in the Appendix, will be found a vocabulary of useful words needed in daily conversation which I collected during my visit to the Bororos. I had made a much more complete dictionary of their language, in a book which I kept for the purpose, but unfortunately the book was lost with a great many other things in an accident I had some months later on the Arinos River.

\* \* \* \* \*

It was not possible to say that the Bororos shone in intelligence. It was seldom one found an individual who could count beyond two. Everything in the Bororo country was reckoned in couples--with the aid of fingers, thumbs, and toes. The learned could thus reach up to twenty, or ten pair--but beyond twenty no Bororo dared venture in his calculations. They had no written language, no sculptures or paintings, no carved idols. Their artistic talent seemed limited to occasionally incising rudimentary representations of horns, footprints, and line figures on rocks.

They showed great skill in the manufacture of their arrows, which were indeed constructed on most scientific lines, and were turned out with wonderful workmanship. The arrows were from 4 to 5 ft. long, and were chiefly remarkable for the intelligent and highly scientific disposition of the two balancing parrot feathers, gently bent into a well-studied spiral curve, so as to produce a rotary movement, united with perfect balance, in the travelling weapon. The arrows were manufactured out of hard, beautifully polished black or white wood, and were provided with a point of bamboo one-third the length of the entire arrow. That bamboo point was tightly fastened to the rod by means of a careful and very precisely made contrivance of split cane fibre.

[Illustration: Bororo Children.

(The horrors of photography.)]

The Bororos used various-shaped arrow-heads, some triangular, others flattened on one side with a raised rib on the opposite side, others triangular in section with hollowed longitudinal grooves in each face of the triangle in the pyramid, making the wound inflicted a deadly one. Others, more uncommon, possessed a quadruple barbed point of bone.

The favourite style of arrows, however, seldom had a point broader in diameter than the stick of the arrow.

The music of the Bororos--purely vocal--had three different rhythms: one not unlike a slow waltz, most plaintive and melancholy; the second was rather of a loud warlike character, vivacious, with ululations and modulations. The third and most common was a sad melody, not too quick nor too slow, with temporary accelerations to suit words of a more slippery character in their pronunciation, or when sung in a *pianissimo* tone.

The songs of the Bororos could be divided into: hunting songs, war songs, love songs, and descriptive songs and recitatives.

They were fond of music in itself, and possessed fairly musical ears. They were able to retain and repeat melodies quite foreign to them. Their hearing was acute enough to discern, with a little practice, even small intervals, and they could fairly accurately hit a note which was sung to them. They had flexible voices, quite soft and musical, even in conversation.

In males, as far as I was able to judge, baritone voices were the most prevalent; in female voices, soprano. Their typical songs were chiefly performed in a chorus by men only, although once or twice I heard solos--which, nevertheless, always had a refrain for the chorus. The Bororos sang in fair harmony more than in unison, keeping regular time, and with occasional bass notes and noises by way of accompaniment. They possessed no musical instruments of any importance--a most primitive flute, and one or several gourds filled with seeds or pebbles, being, as far as I could trace, the only two musical instruments among them.

Their songs contained progressions in chromatic intervals. Those progressions were not only frequently repeated in the same melody, but some of the favourite ones recurred in several of their melodies. They frequently broke from one key into another, not gradually or with modulations, but very abruptly. There were constant and sudden changes in the *tempo* of their melodies, accelerations being frequently caused by excitement in the performers, by incidents occurring, by anger or other passions being aroused. They had no set rules--nor, of course, any written music. The melodies were sung according to the temporary feelings of the performers, who occasionally adorned their performances with variations. Practically they improvised, if led by a musical talent, as they went along. Still, mind you, even when they improvised, the character of the songs was the same, although they may have added so many variations and embellishments to the theme as to make it impossible to identify them. Furthermore, no two choruses ever sang the same songs alike, nor did the same chorus sing the same song twice alike. There were in their melodies great changes in the degree of loudness. Those changes were generally gradual, although often extremely rapid.

[Illustration: Bororo Chief.

Rattling gourds filled with pebbles, in order to call members of his tribe.]

The Bororos seemed to be greatly carried away by music, which had upon them quite an intoxicating effect. There were certain high notes and chords in a minor key which had a great attraction for them, and which constantly recurred in their melodies and their lengthy ululations. Some of the notes had undoubtedly been

suggested by the song of local birds and by sounds of wild animals. The Bororos were good imitators of sounds, which they could often reproduce to perfection. They were observant with their ears--much more so than with their eyes. Even in conversation the Bororos would often repeat, accurately enough, noises they heard around them, such as the crashing of falling trees, of rushing water, of distant thunder, or foreign words which caught their fancy. I was amazed at their excellent memory in that direction.

There were no professional musicians in the Bororo country in the strict sense of the word, the *barih* being the only person who might, at a stretch, be put down as one. Nor was anybody taught music. They were one and all musicians without knowing it--or at least thought they were--a belief not monopolized by the Bororos only. They all sang. They learned to sing gradually by hearing and imitating their elders.

I think that with the Bororos the steps of their dances had been suggested by the rhythm of the music, and not the other way round. They preferred music to dancing, for which latter exercise they showed little aptitude. Although their melodies would appear appallingly melancholy to European ears, it did not follow that they were so to them. On the contrary, some which had a most depressing effect on me--and I felt like throwing at them anything handy but heavy to interrupt the melody--seemed to send the performers into a state of absolute beatitude. They kept up those melodies interminably, repeating constantly the same short theme dozens of times--hundreds, in fact, if nothing happened to stop them. When once they had started on one of those songs it was difficult to switch them on to another. They loved to hear it again and again.

The time of their music was "common" time, slightly modified according to the wording of the song. It generally altered into a triple time when the words were of a liquid kind in their pronunciation, and a dual time when sung low and slowly.

When singing, especially during ululations, the Bororos swung their bodies forward and backward--not unlike the howling dervishes of Egypt--uttering occasional high and strident notes. This was generally done before starting *en masse* on a hunt, when a feast also took place.

The women never joined in the songs, but the boys did. Even if their voices were not powerful enough to produce lengthy ululations, they spiritedly took part in the violent undulations of the body.

The Bororos were great lovers of minute detail. So it was that, in their music, strange, weird effects were attempted, wonderfully complicated in detail.

Bororo singing occasionally took the form of a recitative, with the chorus joining in the refrain--this principally when chanting the merits of a deceased person, or during some calamity in the *aldeja*, or village.

[Illustration: Bororo Child showing strong Malay Characteristics.]

The only musical instruments I was able to find in the various settlements of Bororos I visited consisted chiefly of single, double, or treble gourds, the latter with perforations at the two ends, used as wind instruments and producing deep bass notes. The single gourd had a cane attachment intended to emit shrill high notes. Then there were other dried gourds filled with pebbles which rattled as they were shaken at the end of a long handle to which the gourds were fastened.

The cane flutes were slightly more elaborate, with ornaments of rings of black feathers. There was only one rectangular slit in the centre of the flute, so that only one note could be produced--as was the case with most of their rudimentary musical instruments.

## CHAPTER XVI

### Bororo Legends--The Religion of the Bororos--Funeral Rites

THE Bororos believed in spirits of the mountains and the forest, which haunted special places in order to do harm to living beings. Those spirits came out at night. They stole, ill-treated, and killed. In rocks, said the Bororos, dwelt their ancestors in the shape of parrots. The Bororos were greatly affected by dreams and nightmares, which they regarded as events that had actually happened and which generally brought bad luck. They were often the communications of evil spirits, or of the souls of ancestors. The Bororos had many superstitions regarding animals, which they individualized in their legends, giving them human intelligence--especially the *colibri* (humming-bird), the macaw, the monkey, the deer, and the leopard.

The stars, according to these savages, were all Bororo boys. Let me give you a strange legend concerning them.

"The women of the *aldeia* had gone to pick Indian corn. The men were out hunting. Only the old women had remained in the *aldeia* with the children. With an old woman was her nephew, playing with a bow and arrow. The arrows had perforated sticks, which the boy filled with Indian corn. When the boy had arrived home he had asked his grandmother to make a kind of *polenta* with Indian corn. He had invited all the other boys of the *aldeia* to come and eat. While grandmother was cooking the children played, and among them decided to go to heaven. In the *aldeia* there lived an old woman and a red macaw. Both could speak. The boys, having eaten the *polenta*, cut off the woman's arms, cut out her tongue and eyes, and tore out the tongue of the speaking bird. Having done this, they went into the forest, where they found a liana twisted into innumerable steps (in the Bororo language, *ippare*, young; *kugure*, multitude; *groiya*, step). They could not speak for fear of drawing attention, nor ask any one for help. They had taken the precaution of setting free all the captive birds in the *aldeia*, and they had flown away, except the *pio duddu* (the *colibri*), which they took with them into the forest. The boys gave a long liana, like a rope, to the *colibri*, requesting him to fasten it to the top of the highest tree, and another long liana which he must tie to the sky where they all wished to ascend. The *colibri* tied the vegetable ropes as requested, and all the boys climbed up.

"The mothers, missing their children, went to the old woman and the speaking macaw.

"Where are our children?" said they in a chorus.

"No answer. They were horrified when they perceived the mutilated woman and bird. They rushed out of the hut and saw the children--up--up--high, like tiny spots, climbing up the liana to heaven. The women went to the forest, to the spot where the boys had proceeded on their aerial trip, and showing the breasts that had milked them, entreated them to come down again. The appeal was in vain. The mothers, in despair, then proceeded to follow their children skyward up the liana.

"The youthful chieftain of the plot had gone up last. When he perceived the mothers gaining on them, he cut the liana. With a sonorous bump, the mothers dropped in a heap to the ground. That was why the Bororo women were resigned to see their sons in heaven, forming the stars, while they--the women themselves--remained the transmigrated souls of their mothers upon earth."

The Bororos also said that the stars were the houses of deceased children.

The Bororos believed that the sky vault, or heaven, formed part of the earth, and was inhabited. They proved this by saying that the vulture could be seen flying higher and higher until it disappeared. It went to perch and rest upon trees in heaven. The Milky Way in the sky--the *kuyedje è 'redduddo* (literally translated "stars they cinders")--consisted for them merely of the flying cinders from the burning stars.



The sun, they stated, was made up entirely of dead *barih*, or medicine-men, who rose daily with red-hot irons before their faces. The *barihs* prowled about the earth at night, and went to the east in the morning on their return to the sun. The hot irons held by the *barihs* were merely held in order to warm the people on earth. At sunset the orb of day "came down to the water" beyond the horizon, and from there marched back to the east. The Bororos maintained that the heavy and regular footsteps of the sun walking across the earth at night could be heard plainly.

[Illustration: Bororo Girls.]

[Illustration: Bororo Girls (side view).]

The moon, which was masculine to the Bororos, was the brother of the sun, and was similarly the home of *barihs* of minor importance.

The legends of the Bororos were generally long and somewhat confused. They were the outcome of extremely imaginative and extraordinarily retentive minds. Their imagination frequently ran away with them, so that it was not always easy to transcribe the legends so as to render them intelligible to the average reader, unaccustomed to the peculiar way of thinking and reasoning of savages. Yet there was generally a certain amount of humorous *vraisemblance* in their most impossible stories. Their morals, it should be remembered, were not quite the same as ours. There were frequently interminable descriptive details which one could on no account reproduce in print, and without them much of the point of the legends would be lost. So that, with the confusion and disorder of ideas of the Bororos, their peculiar ways of expression, and the mutilation necessary so as not to shock the public, the legends were hardly worth reproducing. Still, I shall give here one or two of the more interesting legends, which can be reproduced almost in their entirety.

"The sun and moon (two brothers, according to the Bororos) while hunting together began to play with arrows with blunt heads, such as those used by Bororos for catching birds alive. They hit each other in fun, but at last the sun shot one arrow with too much force and the moon died from the effects of the wound. The sun, unconcerned, left his dying brother and continued hunting; but afterwards returned with medicinal leaves which he placed on the wound of the moon. According to Bororo fashion, he even covered the dying brother entirely with leaves, when he saw his approaching end. When he discovered that the moon was dead he became frightened and left. That is why the moon, which when alive was once as bright as the sun, is now of less splendour. It is because it is dead, and the sun is still alive."

The Bororos firmly believed that formerly the world was peopled by monkeys. This was rather an interesting legend, as it would point out that the Bororos, in any case, were aware that the world was once inhabited by a hairy race, which they called monkeys. It is quite remarkable that a similar legend was found among many of the tribes of the Philippine Islands and Sulu Archipelago, and along the coast of the Eastern Asiatic continent. The Bororos stated that they learnt from monkeys how to make a fire. Monkeys were their ancestors. The whole world was peopled by monkeys in those days. Monkeys made canoes, too.

"One day a monkey and a hare went fishing together in a canoe in which they had taken a good supply of Indian corn. While the monkey was paddling the hare was eating up all the corn. When the corn had been entirely disposed of, in its irresistible desire to use its incisors, the hare began to gnaw the sides of the canoe. The monkey reprimanded the hare, and warned it that the canoe would sink, and as the hare was not a good swimmer it would probably get drowned, or be eaten by fish which swarmed in the stream. The hare would not listen to the advice, and continued in its work of destruction. A hole was bored in the side of the canoe, which promptly sank. The hare being a slow swimmer--according to Bororo notions--was immediately surrounded by swarms of *doviado* (gold fish) and speedily devoured. The monkey--an excellent swimmer--not only was able to save its life, but, seizing a big fish, dragged it on shore.

"A jaguar came along and, licking its paws, asked whether the monkey had killed the fish for its (the jaguar's)

dinner.

"Yes," said the monkey.

"Where is the fire for cooking it?" replied the jaguar.

"The sun was just setting. The monkey suggested that the jaguar should go and collect some dried wood in order to make the fire. The sun was peeping through the branches and foliage of the forest. The jaguar went, and returned with nothing; but in the meantime the monkey, with two pieces of soft wood, had lighted a fire and eaten the fish, leaving a heap of bones. When the jaguar arrived the monkey leapt in a few jumps to the top of a tree.

"Come down!" said the jaguar.

"Certainly not!" said the monkey. Upon which the jaguar requested its friend the Wind to shake the tree with all its fury. The Wind did, and the monkey dropped into the jaguar's mouth, from which it immediately passed into the digestive organs. The monkey little by little moved its arms in the close quarters in which it found itself, and was able to seize the knife which it carried--in the most approved Bororo fashion--slung across its back. Armed with it, it split the jaguar's belly and resumed its daily occupation of jumping from tree to tree."

I was able to record yet another strange legend on the preservation of fire.

"An otter," said the legend, "in days long gone by, had with great difficulty lighted a fire on the bank of a river. The sun first came to warm itself by the fire, and while the otter had gone on one of its aquatic expeditions, the moon arrived too. The sun and moon together, feeling in a mischievous mood, put out the fire with water not extra clean. Then they ran for all they were worth. The otter, feeling cold, came out of the water and, to its amazement, found the fire had been extinguished.

"Who did it?" cried the furious otter, wishing to kill whoever had put the fire out. While its anger was at its highest the otter perceived a toad, which was accused of extinguishing the fire because its legs were as red as fire.

"Do not kill me!" appealed the toad. 'Put your feet on my belly.' The request was at once granted. The toad opened its mouth wide, and with the pressure of the otter's paws upon its body a burning coal was ejected from its interior anatomy. The otter spared the toad's life in recognition of its services in preserving the fire. That is why the otter and the toad have been friends ever since."

It was not easy to collect legends from the Bororos, as only few of them were inclined to speak. The same legend I found had many variations, according to the more or less imaginative mind of the narrator.

Here is an extraordinary explanation of the origin of lightning.

[Illustration: Bororo Women, showing Method of carrying Children.]

[Illustration: Bororos showing Formation of Hands.]

"A boy had violated his own mother. His father, discovering the misdeed and wishing to punish him severely--in fact, get rid of the boy altogether--sent him to several dangerous places to collect various things for him, such as wild fruit, etc. The son, fearing disaster, went to his grandmother for advice. She in turn called first one bird and then another for their advice. The father had sent his son to fetch some small gourds (*bappo rogo*), which grew floating on or suspended above the water of a lagoon. But the lagoon was filled with the souls of deceased Bororos and evil spirits. In the first instance the grandmother begged for the help of

the *pio duddo* (or *colibri*). This obliging bird accompanied the boy to the lagoon and, flying over the water, with its beak cut the twigs of the small gourds, and one by one brought them to the boy, who had wisely remained on dry land in order not to be seized by the evil spirits which lay concealed in the water. When the bird was about to bring the dried gourds back, the seeds which were inside rattled and aroused the evil spirits of the lagoon. Up they all sprang--but the *colibri* was too swift for them, and the gourds were safely delivered to the boy. The boy brought them to his father, who, amazed at seeing his son still alive, sent him next to fetch some large gourds--such as those used by the *barih* at funerals and in high ceremonies.

"The boy went once more to his grandmother, and she this time recommended him to a dove (*metugo*). When the dove and the boy arrived at the lake the dove cut some large gourds, but, unfortunately, in so doing made a noise. The souls and evil spirits of the lake leapt out and dispatched numerous arrows to kill the dove, but, as luck would have it, dove and *bappo* (gourds) escaped unhurt. The boy handed the large gourds to his astounded father, who could not imagine how the boy had escaped death a second time.

"The Bororos used in their dances the nails of wild pigs, which they attached to their feet in order to produce a noise something like castanets. That ornament was called a *buttori*.

"The father next ordered his son to go and bring back a complete set to form a *buttori*. For some reason or other--according to the legend--the *buttori* was also found suspended over the lagoon swarming with souls and evil spirits. The grandmother on this occasion advised the son to accept the services of a large, beautifully coloured locust--called by the Bororos *mannori*. The *mannori*, however, made so much noise while on its errand that it became riddled with arrows from the angry spirits of the lake. To this day, say the Bororos, you can see a lot of white spots all over the body of the *mannori*. Each marks the spot of a former wound. But the *mannori*, too, faithfully delivered the foot ornaments to the youth. The youth brought them to his father, who, in amazement and vicious anger, ordered his son to go with him on the mountain to seize the nest of the *cibae* (vulture). According to the notions of the Bororos, the souls of their dead trans-migrate into the bodies of birds and other animals.

"The young fellow again paid a visit to his wise grandmother, who was this time greatly upset. She handed him a stick and requested him to insert it at once into the vulture's nest, when they had arrived in the hollow in the rock where the nest was. The boy departed with his father up the precipitous mountain side. When they had nearly reached the nest the father placed a long stick across a precipice and ordered his son to climb on it and seize the nest. The son duly climbed--carrying with him his grandmother's stick. When he had reached the top the father did all he could to shake the son down into the chasm, and even removed the long stick on which he had climbed. But the lucky boy had already inserted his grandmother's stick into the crevasse and remained suspended, while the father--really believing that he had at last succeeded in disposing of his son--gaily returned to the *aldeia* (village). The son, taking advantage of a liana festooned along the rock, was able to climb to the very summit of the mountain. There, tired and hungry, he improvised a bow and arrow with what materials he could find, and killed some lizards. He ate many, and hung the others to his belt. He went fast asleep. With the heat, the fast decomposing lizards began to smell. The odour attracted several vultures, which began to peck at him, especially in the softer parts behind (for he was sleeping lying on his chest and face, as Bororos generally do). The boy was too tired and worn to be awakened. The vultures then seized him by his belt and arms, and, taking to flight, soared down and deposited him at the foot of the mountain. There the boy woke up, famished. His supply of lizards had been eaten by the vultures. He searched for fruit and ate some, but he could not retain his food owing to injuries caused him by the vultures. (Here a good portion of the legend has to be suppressed.)

"As best he could, the boy went to look for the *aldeia*, but it had vanished. He walked for several days, unable to find traces of his tribe. At last he found the footmarks which they had left upon their passage. He followed them, and came to a fire freshly made, left by the Indians. He went on until he identified the footmarks showing where his grandmother had gone. He made sure they were hers by the extra mark of her stick on the ground. With the assistance of a lizard, then of a big bird, then of a rat, then of a butterfly, he discovered the

whereabouts of the old lady. He was by then an old man. Upon perceiving his grandmother he again became a boy, and hurried on--making a noise so that she might know him again. She asked another nephew--'Look and see who is behind!'--The nephew turned round and recognized his eldest brother--who was also his father. The grandmother embraced him tenderly.

"The eldest fellow persuaded his grandmother and brother not to return to the *aldeia* where he had suffered so much from the hands of his father.

"They have made me suffer,' he said, 'and I shall take my revenge. Come with me, and we shall all be happy together.'

"They went to a beautiful spot. He climbed a mountain, and from there proceeded to produce lightning, thunder and wind, which exterminated the rest of the tribe in the *aldeia*. That is why, when the Bororos see lightning, they say that it is someone's vengeance coming upon them."

[Illustration: Bororo Women.]

[Illustration: Bororo Women.]

In the Bororo language, lightning was called *boeru goddo* or "angry people"; thunder was *bai gabe* when near, and *boya ruru*--or deaf sound--when distant.

The Bororos related an interesting legend of a great flood or deluge.

"One night a Bororo went with his bow and arrows to the river in order to fish, at a spot where a cane snare or trap had been made in the stream. He killed a sacred fish. No sooner had he done this than the water immediately began to rise. He was scarcely able to get out of the water and run up the mountain side, lighting his way with the torch of resinous wood he had used in order to attract the fish while fishing. The water kept almost overtaking him, it rose so rapidly. He called out to the Bororos of his tribe to make their escape, as the water would soon drown them, but they did not believe him and consequently all except himself perished. When he reached the summit of the mountain he managed to light a big fire just before the rising water was wetting the soles of his feet. He was still shouting in vain to all the Bororos to run for their lives. The water was touching his feet, when he thought of a novel expedient. He began to remove the red-hot stones which had lain under the fire and threw them right and left into the water. By rapid evaporation at the contact of the hot missiles, it is to be presumed, as the legend does not say, the water ceased to rise. In fact, the water gradually retired, and the Bororo eventually returned to the spot where he had left the tribesmen. All were dead. He went one day into the forest and he found a doe--which had in some mysterious way escaped death--and he took her for his wife. From this strange union were born children who were hornless and quite human, except that they were very hairy. After a few generations the hair entirely disappeared. That was how the Bororo race was preserved."

That extraordinary legend was, to my mind, a very interesting one--not in itself, but from several facts which in its ignorant language it contained. First of all, the knowledge of the Bororos concerning a former hairy race--a hairy race referred to in legends found all over the Eastern Asiatic coast and on many of the islands in the Pacific from the Kuriles as far as Borneo. Then it would clearly suggest a great deluge and flood which most certainly took place in South America in days long gone by, and was indeed quelled by burning stones--not, of course, thrown by the hands of a Bororo, from the summit of a mountain, but by a great volcanic eruption spitting fire and molten rocks.

As I have stated elsewhere, there was every possible indication in Central Brazil that torrential rains on an inconceivable scale--naturally followed by unparalleled floods--had taken place, in the company of or followed by volcanic activity on a scale beyond all imagination. One had only to turn one's head round and

gaze at the scenery almost anywhere in Central Brazil, but in Matto Grosso particularly, to notice to what extent erosion and volcanic activity had done their work.

Another curious belief of the Bororos was worth remembering. They claimed that men and women did not come from monkeys, but that once upon a time monkeys were human and could speak. They lived in huts and slept in hammocks.

The Bororos possessed no geographical knowledge. Beyond their immediate neighbourhood they knew of no other place, and did not in any way realize the shape or size of the earth.

They called themselves *Orari nogu doghe*--or people who lived where the *pintado* fish (*orari* in Bororo) was to be found. The Bororos spoke of only three other tribes: the *Kaiamo doghe* (the Chavantes Indians), their bitter enemies; the *Ra rai doghe*--the long-legged people--ancient cave-dwellers, once the neighbours of the Bororos, but now extinct; and the *Baru gi raguddu doghe*--a name better left untranslated--applied to a tribe living in grottoes.

In the way of religion the Bororos admitted of five different heavens, in the last of which dwelt a Superior Being--a deity called the *Marebba*. Marebba's origin was unknown to the Bororos. All they knew was that he had a mother and a powerful son. Marebba only looked after the men--but he was so occupied that when the *barihs*--through whose mediation it was possible to communicate with him--wished to be heard, they had to shout at the top of their voices in order to attract his attention. Only the higher *barihs* could communicate with him, the lower *barihs* being merely permitted to communicate with his son.

They also believed in the existence of a bad god--an evil spirit called *Boppe*. Boppe inhabited the mountains, the tree-tops and the "red heaven." There were many *boppe*, male and female, and to them were due all the misfortunes which had afflicted the Bororos. Some of the *barihs* maintained that they had actually seen both Marebba and some of the *boppes*. They gave wonderful descriptions of them, comparing them in their appearance to human beings. The Bororos believed that in any food it was possible to find a *boppe*--there established in order to do evil. Therefore, before partaking of meals, especially at festivals, they first presented the *barih* with fruit, grain, meat and fish in order to appease the anger of the evil spirits.

The Bororos believed in the transmigration of the soul into animals. They never ate deer, nor jaguar, nor vultures, because they thought that those animals contained the souls of their ancestors. The jaguar, as a rule, contained the soul of women. When a widower wished to marry a second time he must first kill a jaguar in order to free the soul of his first wife from suffering.

They also seemed to have an idea that the *arué*, or souls of the dead, might reappear in the world and could be seen by relatives. Men and women all became of one sex on leaving this world--all souls being feminine, according to the Bororos.

[Illustration: Bororos Thrashing Indian Corn.]

[Illustration: A Bororo Blind Woman.]

The apparition of the souls before their relatives was, of course, merely a clumsily arranged trick of the *barihs*. This is how it was done. They made a circle of branches of trees--in order to keep the audience at a distance--and then erected a large wooden gate, so arranged that when the souls appeared it fell down in order to give them free passage. The souls--generally not more than two together--upon being called by the *barih*, entered the ring with their faces covered and hopping with a special step of their own. They did not respond to prayers or tears, and kept on twirling about within the ring. The body was that of a woman, wearing from the waist down a gown of palm leaves. The face was covered by a mask of vegetable fibre which allowed its owner to see and not be seen. Upon the head was worn a cap of wax in which were stuck a great number of

arrows, so that it looked just like the back of a disturbed porcupine.

Naturally those "souls" were merely special girls dressed up for the occasion. But credulous Bororo women believed they were actually seeing the souls of their dead relatives. They worked themselves into a great state of excitement.

The same implement which was employed by the Bororos to reproduce the sound of the *aigi* or *ajie* (hippopotamus)--a board some ten inches long and three inches wide attached to a string and revolved from a long pole--was also used by them to announce the departure of souls from this world to the next. The women were ordered to cover their faces or hide altogether inside their huts when these noises were produced. Should one be curious enough to inquire into their origin and look, she was generally condemned to death--frequently by starvation. The Bacururu--or the Coroado Indians--believed that, after such an indiscretion, nothing could save the life of a woman.

Before starting on a hunting or fishing expedition prayers were offered to the souls of the departed, so that they might not interfere with the success of the expedition, and if possible help instead.

The funeral rites of the Bororos were singular. On the death of a man, a chorus of moans began and tears were shed in profusion, while some one sang for several days the praises of the defunct in a melancholy monotone. The body was covered for two entire days, during which all articles that belonged to the deceased, such as bow and arrows, pots, and musical instruments, were smashed or destroyed. The débris was stored behind a screen in the hut, where subsequently was also kept the hearse in which the body was conveyed to the burial spot. The body, wrapped in a palm-leaf mat, was then interred in a shallow oval grave just outside his hut. A wooden beam was placed directly over the body, and then the hollow was covered over with some six or eight inches of earth. A few branches of trees and some thorns were thrown over it to indicate the spot.

For twenty days in the evening and night moans resounded through the air. More tears were shed by the relatives and by the *barih*, who frequently proceeded to the grave to pour water on it. On the twentieth day, while some one set at play the awe-inspiring revolving board, others proceeded to exhume the body--by then in a state of absolute decomposition. The remains were taken to the stream and the bones cleaned with great care. The skull was placed within two inverted hemispherical baskets, whereas all the other bones of the body were heaped into a third concave basket of a larger size.

It was on their return--with moans and chanting--to the *bayto*, or meeting-place in the *aldeia*, that the most touching scene ensued. The skull was decorated with a design of coloured feathers, while those present inflicted wounds upon their own bodies, shedding blood upon the basket of remains. The women, moreover, tore one by one each hair from their heads and bodies in sign of mourning.

After this the skull and bones were placed within another basket, and were either cremated or thrown to the bottom of a river. The property of the deceased was then set ablaze.

I noticed in a hut a skirt made of long palm leaves. It was donned at funerals. There were also several long rudimentary flutes, formed by a cane cylinder with a rounded mouthpiece inserted into another. These flutes, too, were used only on such mournful occasions.

The *barih* received a present from relatives at the death of individuals in the tribe. The family remained in mourning from five to six months. The widow, at the death of her husband, was expected to tear each hair off her scalp, one by one, until her head remained as bald as a billiard-ball. She generally did it.

The corpses of women were treated slightly differently. When a woman died she was buried *pro tem*. A feast was given to the tribe. The process of denudation having been given ample time to leave her skeleton clean, her bones were collected, and placed in a special basket and then cremated. The ashes were scattered to the

winds, and so were all her clothes, ornaments, chattels, smashed to atoms, and articles of food. Even fowls, if she possessed any, were destroyed. Usually they were eaten by her friends.

The Bororos did not possess a sense of honour resembling ours. Theft was not considered dishonourable, and was not looked down upon nor condemned by them. If a Bororo liked anything belonging to any one else, they could see no reason why he should not appropriate it. That was their simple way of reasoning, and as no police existed among them such theories were easily followed.

Taking something belonging to a stranger was, in fact, rather encouraged, and in our experience we had to keep a sharp watch when Indians came to our camp, as things disappeared quickly. They seldom took the trouble to ask for anything; they just took it and ran away.

The measurements of Bororo heads in the table on page 261, taken, as an average, from several of the most characteristic types, will be found of interest, especially when compared with some from Papuan and Malay tribes of the Philippine and Sulu Archipelagoes with whom they have many points in common.

Due allowance must be made for the artificial deformation of the cranium in the case of the Bororos.

I had no end of trouble in obtaining these measurements, as the Bororos would not hear of being measured. They were frightened of the nickel-plated calliper I used for the purpose. It was quite beyond them to understand why any one should want to know the length of their noses. In fact, although many, after a lot of coaxing, submitted to have other measurements taken, few of them would let me measure the nose. None at all would permit me to measure the length of their eyes, as they feared I should intentionally blind them.

[Illustration: Bororo Children.]

[Illustration: Bororo Women.]

I met other tribes of Bororos as I went along, and I was able to add to the curious information already collected and given in previous chapters. It appeared that at the birth of a child the head, while the skull was still soft, was intentionally compressed and bandaged, especially at the forehead and back, so as to flatten it and produce an abnormal shape of the skull. In many cases only the back of the head was flattened by the application of artificial pressure. The elongation was both upwards and sideways. This deformation was particularly confined to male children.

|Bororos. |Bilan, Island of Mindanao Philippine Archipelago. ||Manobo. |||Mahommedans West coast of Mindanao I. ||||Guiangas. |||||Samal. |||||Bagobos. |||||Ilocanos. |||||Mandayas (Gandia). |||||Tirurays. |||||Mansakas (of Panter). |||||Yacanes.

	Bororos	Bilan	Manobo	Mahommedans	Ilocanos	Mandayas (Gandia)	Tirurays	Mansakas (of Panter)	Yacanes
Vertical maximum length of head	0.264	0.215	0.222	0.212	0.236	0.222	0.234	0.229	0.233
Bizygomatic breadth	0.240	0.221	0.220	0.1415	0.130	0.131	0.137	0.138	0.130
Maximum breadth of forehead	0.129	0.130	0.123	0.131	0.145	0.131	0.131	0.126	0.126
Minimum breadth of forehead at lower part of temples	0.126	0.136	0.131	0.127	0.128	0.130	0.131	0.126	0.126
Maximum length of cranium (from forehead to back of head)	0.199	0.215	0.193	0.181	0.183	0.173	0.183	0.199	0.192
Breadth of skull one inch above ear	0.185	0.199	0.192	0.184	0.185	0.199	0.192	0.184	0.185
Maximum breadth of lower jaw	0.1945	0.132	0.132	0.123	0.117	0.121	0.124	0.116	0.109
Length of nose	0.117	0.110	0.125	0.064	0.060	0.050	0.052	0.058	0.052
Breadth of nose at nostrils	0.055	0.057	0.062	0.0375	0.043	0.037	0.041	0.035	0.045
Distance between eyes	0.037	0.037	0.037	0.033	0.032	0.034	0.028	0.033	0.035
Length of nose	0.031	0.031	0.031	0.033	0.032	0.034	0.028	0.033	0.035





## CHAPTER XVII

### The River Das Garças--Majestic Scenery

I WENT to call on the Salesian Fathers. Between my camp and the river Das Garças, on the right bank of which the colony stood, there was a great dome of red volcanic rock with many loose boulders such as we had seen for the last three days of our journey. The river was swift and deep. The colony was on the opposite side of the water. We shouted until an Indian appeared and took us across in a rickety canoe belonging to the friars, which he paddled with the stalk of a palm-leaf.

The Salesians were remarkable people, and should be an example to many other missionaries. Wherever they went they did not trouble much about making converts. They taught the natives instead how to work the soil and how to make all kinds of articles which might or might not be useful to them as they became more civilized. The chief effort of the monks was to teach the natives agriculture, from which--charity always begins at home--the friars themselves were naturally the first to reap the benefit. At the same time the natives learned, and earned, and were made happy. They improved their mode of living and were, with great softness and patience, not only drawn nearer to Catholicism but towards white people altogether. The Salesians had established on the Rio das Garças--an enchanting spot--a beautiful farm on which they grew quantities of Indian corn, sugar-cane, wheat, and all kinds of vegetables.

Although I am not a Roman Catholic, the Salesians received me very politely and took the greatest delight in showing me all over the Mission. It was interesting to note that everybody was working hard. The Father Superior himself was busy shaping a big table from a huge plank of hard wood, and nothing could induce him to leave his sweating work--not even to go and have his meals. Father Colli Agostino was detailed to go round and explain everything to me.

The Salesians had no trouble with the Indians, whom they found quite gentle and docile. But they could never be relied upon. One day the entire tribe would come and help to work the soil with great vigour; the next day they would all disappear from the neighbourhood and no one knew where they had gone--sometimes for weeks. They invariably came back, sooner or later, and, what was more, they were always welcomed back.

Converting them to Christianity was a different matter. The Salesians had made little headway in that direction.

"We are patient people," said Father Colli; "it will come in time. Already the Bororos are beginning to join us in the church, where many enjoy singing with us. They are intelligent and soon learn to sing."

I purchased, at almost prohibitive prices, many things from the Salesians, principally food for my animals and men. Of course, in buying one had to realize where we were, which made all the difference in the price. I was glad to pay them the money and obtain the commodities.

The Salesians told me that while digging to make the foundations for one of their buildings they had found--only 3 ft. under ground--in the sandy soil several earthen pots of great antiquity, in excellent preservation, as well as a fireplace with ashes and charcoal. The sand had evidently accumulated in the valley below there owing to wind and not to water. The frail pottery, imperfectly baked, would have crumbled away quickly in moisture.

On May 20th (min. 58° Fahr., max. 85°) we were again off toward the west, travelling over great domes of red lava, the higher portions of which were covered by layers of ashes and red sand. We were at an elevation of 1,480 ft. in the deep basin of the Rio Barreiros and Rio das Garças, but we soon went over three consecutive ridges, 1,550 ft. above the sea level, with delicious campos and a *bosquet* of trees here and there. In the arc of a circle extending from north-west to south-west we had in front of us a beautiful view. Previous to reaching

the third ridge, that day, we also had behind us a wonderful panorama of the great plateau described in a previous chapter.

On travelling over a fourth elevation we found ourselves upon another immense dome of red volcanic rock, blackened on the surface, as if by fire, and with the peculiar striations we had noticed once or twice before. In this case there were cross striations as well, the direction of one set of parallel marks being from north-west to south-east, of the other set north-east to south-west, thus forming lozenges, each about 60 cm. across. All those lozenges were so regularly cut that the *ensemble* gave the appearance of a well-made pavement. Then I noticed some peculiar great cavities in the rock, like those formed by glacial action. In fact, on a superficial examination, it seemed almost as if that region had first gone through a period of great revolution while in a state of semi-liquefaction owing to intense heat from fire, after which a sudden and intense cooling had taken place and covered the country perhaps even with ice. Whether the immense deposits of ashes and sand had been formed before or after the glacial period--if any such period ever existed in that particular region--could be merely a matter of speculation. In many places the sand, ashes, and red earth had almost consolidated into easily friable rock.

Where the actual rock was not exposed we had campos, campos, campos, stretching as far as the eye could see. Far from being monotonous, one had--or at least I had--a delightful sensation in riding across those interminable prairies of beautiful green. One could breathe the pure air with fully expanded lungs, and in that silent, reposeful solitude one felt almost as if the whole world belonged to one. We were not much worried by insects on those great open places; it was only on getting near patches of vegetation and near streams that we suffered from the attacks of those pests.

We saw few trees--all stunted and weak--as the padding of earth over the rocky under-strata did not permit their roots to go deep down, and therefore they grew up with difficulty and anæmic.

Twelve kilometres from the Rio Barreiros we came to a stream (elev. 1,400 ft.). On our left, rising above the inclined campos, was a triple undulation much higher than its neighbours. To the west stood two twin, well-rounded mounds, that my men named at once "the woman's breasts," which they much resembled.

We were still marching on deep deposits of ashes, and, higher, upon semi-hardened sandstone. On the northern side the twin hills had a different shape. They ended in a sharply pointed spur.

After going over an ochre-coloured sandy region (elev. 1,530 ft. above the sea level) we were again on magnificent undulating campos, dotted here and there with dark green shrubs and *bosquets* to the north, north-west, and north-east.

Beyond, to the north-east, loomed again in the far distance our mysterious plateau, of a pure cobalt blue where in shadow. As one ran one's eye along its sky-line it was almost flat for more than half its length, then came a slight dip, followed by a terraced dome. Then again a straight line followed by a slightly higher and more undulating sky-line with three steps in it, and a conical end at its eastern terminus. The most easterly point of all--the highest--resembled a castle with vertical sides. But of this we have already spoken, at the terminal point of the great divided range we had passed some days previously. The vertical cliffs of the plateau, where lighted by the sun, were of a brilliant red colour.

[Illustration: Isolated Conical Hills with Tower-like Rocky Formation on Summit.]

[Illustration: The Endless Campos of Matto Grosso.]

As we approached the twin hills they appeared to be the remains of an ancient crater. They formed, in fact, a crescent with a broken rocky lower section--completing the circle of the crater. I had no time to go and examine carefully, as it would have meant a deviation from my route, but that is how it appeared to me. There

were, in fact, extra deep deposits of volcanic ashes at the foot of the descent before we arrived at the river Agua Emeindada, where we made our camp that night, 15 kil. from the Rio Barreiros.

My men went after game that night. Alcides killed a *veado* (deer), and we all enjoyed the fresh meat for dinner.

The clouds (cirro-stratus) were, during the entire day, in horizontal lines and slight globular accumulations, the latter in a row and, taken *en masse*, giving also the impression of lines just above the horizon to the west. At sunset we once more saw the glorious effect of the radiation from the west, only instead of being straight lines there were, that time, feathery filaments which rose in graceful curves overhead, like so many immense ostrich feathers. They joined again in a common centre to the east.

My men were complaining all the time of the intense cold at night, and made me feel almost as if I had been responsible for it. They grumbled perpetually. During the early hours of the morning their moans were incessant. They never ceased crying, as hysterical young girls might do, but as one would not expect of men. Some of them had toothache--and no wonder, when one looked at their terrible teeth and the way they ate. They devoured pounds of sugar every day--our supply, which should have lasted a year or more, having already almost been exhausted. It was impossible for me alone, with all the astronomical, geological, botanical, geographical, meteorological, photographic, anthropometric, and artistic work--not to mention the writing-up of my copious daily notes--also to keep a constant watch on the supplies. I had handed over that responsibility to Alcides. Unfortunately, he was the greediest of the lot. Every time I warned him not to be so wasteful, as we should find ourselves dying of starvation, he and the others made me feel that I was meanness itself, and that I was only doing it to save money.

I never objected to their eating as much as they could--as I have always made it a point on all my expeditions to feed my men on the best food procurable, and give them as much as they could possibly devour. But it pained me to see quantities of good food thrown away daily, as I knew what it would mean to us later on.

"We are Brazilians," said they, "and like plenty to eat. When there is no more we will go without food. You do not know Brazilians, but Brazilians can go thirty or forty days without anything to eat!"

"All right," said I--"we shall see."

Forty minutes--and perhaps not so long--had been, so far, the longest time I had seen them cease munching something or other. Not satisfied with the lavish food they were supplied with--heaps of it were always thrown to the dogs, after they had positively gorged themselves--yet they would pick up anything on the way: a wild fruit, a scented leaf of a tree, a nut of some kind or other, a *palmito*, a chunk of tobacco--all was inserted in the mouth. It was fortunate that we took enough exercise, or surely they would have all perished of indigestion. In my entire experience I have never seen men eat larger quantities of food and more recklessly than my Brazilian followers did. In the morning they were almost paralyzed with rheumatism and internal pains all over the body. Frequently those pains inside were accentuated by the experiments they made in eating all kinds of fruit, some of which was poisonous. Many a time on our march did we have to halt because one man or another was suddenly taken violently ill. My remedy on those occasions was to shove down their throats the end of a leather strap, which caused immediate vomiting; then when we were in camp I gave them a powerful dose of castor oil. After a few hours they recovered enough to go on.

On May 21st the minimum temperature of the atmosphere was 55° Fahr., the maximum 79°, the elevation 1,250 ft. at the stream Agua Emeindada. My men declared again they were half-frozen during the night and would not go on with me, as it was getting colder all the time and they would certainly die. When I told them that it was not cold at all--on the contrary, I considered that temperature quite high--they would not believe me.

With the temperature in the sun during the day at 98°, most of the aches of the men disappeared, and I had little trouble with them until after sunset, when there was generally a considerable drop in the temperature.

We went on. We had a volcanic mountain to the left of us--half the crater of a volcano formed of red lava and friable red-baked rock. In the northern and central part of the mountain were masses of lava which had been shot out of the mouth of the volcano and had solidified into all kinds of fantastic forms, some sharply pointed, some red, others black. On the east side of the crater was a dome covered with earth with an underlying flow of lava. Then could be observed a circular group of huge rocks, pear-shaped, with sharp points upward. While the volcano was active these rocks had evidently stood on the rim of the then cylindrical crater. The mountain behind those rocks was formed by high accumulations of red volcanic sand, which in time had gradually, by the action of rain and sun, consolidated into soft rock.

The plateau extending northward, which was disclosed in all its entirety before me from the elevation of 1,600 ft. which we had reached, also seemed to possess an extinct crater shaped like a crescent with steep slopes and two rounded promontories on its side.

The sky that day was partly covered by transparent feathery clouds and by dense mist near the horizon line to the east, but was quite clear to the west. As usual, that evening we were again treated to fairly handsome radiating white lines from the sun reaching half way up the sky vault, but this time they were flimsy and not to be compared to the magnificent displays we had observed before.

Our animals still sank in ochre-coloured sand, or stumbled on conglomerate rocks of spattered lava pellets embedded in sandstone. Capping the higher undulations we again found deposits of ashes.

[Illustration: Geometrical Pattern on the Surface of a flow of Lava.

(Caused by sudden contraction in cooling.)]

We travelled for long distances on a ridge at an elevation of 1,650 ft. over a thick layer of sand and ashes mixed. Then campos spread before us, and upon them here and there grew stunted vegetation, the trees seldom reaching a greater height than 15 ft.

From our last high point of vantage the crater with fantastic rocks and its continuation we had observed appeared to form a great basin. A subsidiary vent was also noticeable. Farther on our march we found other immense deposits of grey ashes and sand alternately--one great stretch particularly, at an elevation of 1,600 ft. Water at that spot filtered through from underneath and rendered the slope a grassy meadow of the most refreshing green. We were rising all the time, first going north-west, then due north. At noon we had reached the highest point.

From the high point on which we were (1,920 ft.) we obtained a strange view to the west. Above the straight line of the plateau before us rose in the distance a pyramidal, steep-sided, sharply-pointed peak, standing in solitary grandeur upon that elevated plain. Why did it stand there alone? was the question one asked oneself--a question one had to ask oneself frequently as we proceeded farther and farther on our journey. We often came upon mountains standing alone, either on the top of table-lands or in the middle of extensive plains. Their presence seemed at first unaccountable.

Again as we journeyed onward the mules' hoofs were injured by treading over large expanses of lava pellets and sharp-edged, cutting, baked fragments of black rock, myriads of which also lay embedded in reddish half-formed rock or buried in layers of yellowish-red earth.

To the north was a majestic panorama of the most delicate tones of blue and green, with almost over-powering sweeping lines hardly interrupted by a slight indentation or a prominence rising above the sky-line. Only to

the north-west in the middle distance was there the gentle undulating line of magnificent campos--most regular in its curves, which spread in a crescent toward the west. The line was interrupted somewhat abruptly by a higher and irregular three-terraced mass, but soon resumed its sweeping and regularly curved undulations beyond. This great crescent almost described a semicircle around the smaller undulations over which we were travelling.

We descended to 1,750 ft. On facing west we had curious scenery on our left (south). A huge basin had sunk in--evidently by a sudden subsidence which had left on its northern side high vertical cliffs supporting the hill-range that remained standing. The undulating centre and sides of the immense depression formed beautiful campos with an occasional *bosquet* of forest on the top of hills, and also on the lowest points of the undulations. Those *bosquets* were few and far apart, only to be found where moisture was plentiful. The remains of a high, flat plateau, which had escaped while the rest of the country had subsided, loomed alone in the distance.

One of the central hills was crowned by great black volcanic boulders of the same rock which was visible at the southern edge of this great basin, bounded by vertical cliffs--all of the same composition.

Directly south-west the evenness of the sky-line was again interrupted by two mountains--flat-topped, one not unlike the gabled roof of a house, the other like a cylindrical tower on the top of a high conical hill. We again rose to an elevation of 1,950 ft., still travelling on the summit of the plateau bordering the deep depression. We were compelled to describe a curve in our route, and had reached a height of 2,000 ft. We perceived to the north-east and east a long, uninterrupted--almost flat--sky-line. We had described a sweeping curve right round the irregular edge of the undulating plateau. We could now look back upon the southern aspect of the vertical black and brown rocky cliff, on the summit of which we had been travelling. The rocky cliffs were particularly precipitous and picturesque in the western portion. Interminable campos were still before us.

I occasionally picked up interesting plants and flowers for my botanical collection. Innumerable in this region were the plants with medicinal properties. The *sentori* (*centaurea*) for instance--plentiful there, with its sweetly pretty mauve flower--when boiled in water gave a bitter decoction good for fever.

We came upon a patch of *landir* or *landirana* trees, with luxuriant dark green foliage. They grew near the water, and were by far the tallest and handsomest, cleanest-looking trees I had so far seen in Matto Grosso. They attained a great height, with extraordinarily dense foliage, especially at the summit, but also lower down at the sides. Then *burity* palms were fairly abundant wherever one met *landir* trees in groups or tufts. We were now travelling at an elevation of 2,050 ft., then soon after at 2,100 ft. above the sea level. There was merely stunted vegetation growing upon the red earth and sand.

On descending from that high point we came upon extraordinary scenery. To our right (north) was another concave depression with a further subsidence in its central part. Due west and north-west, from the spot where we first observed the scene, appeared four curious hemispherical domes forming a quadrangle with three less important ones beyond. In the south-easterly portion of the depression was a great rocky mass, while due north another, and higher, conical mount, much higher than all the others, could be observed.

In the eastern part of the depression a wide circle of big volcanic boulders--undoubtedly an extinct crater--was to be seen, with huge masses of spattered yellow lava in large blocks as well as ferruginous rock. That great depression--taken in its entirety--was subdivided into three distinct terraces, counting as third the summit of the plateau. A mighty, deep, impressive chasm, smothered in vegetation, could be observed within the central crater--in the north-east side of the circle.

The summit of the plateau, varying in elevation from 2,000 ft. to 2,100 ft., on which we were travelling was entirely covered by sand and grey ashes.

The valley in the depression extended in lovely campos from south-west to north-east--in fact, as far as the giant table-land which stood majestic in the distance.

The scene, as we stood on the edge of the plateau, was impressive in its grandeur, in its silence. In the morning the sky was almost entirely covered with transparent clouds in scales like a fish. In the afternoon the sky above changed into horizontal layers of globular clouds, which stood as still as death. Leaden black globular accumulations covered one-third of the sky vault, great unshapen masses overhead rendering the air heavy.

We marched all that day on a deep layer of ashes. On descending from the plateau we had on our left great clean campos and plentiful *burity* palms in a slight depression where moisture filtered through. As the caravan was moving along gaily, a *veado* (deer) gracefully leapt in front and, turning its head back two or three times to look at us, ran before us. Filippe, the negro, in his excitement, gave wild yells which set the mules stampeding, while green parrots in couples, scared at the sudden disturbance, flew overhead, adding piercing shrieks to the rapid tinkling of the mules' bells, the rattling of the baggage on the pack-saddles, and the shouts of the men trying to stop the excited mules. All those sudden noises mingled together were quite a change for us, accustomed to a constant deathly silence.

Before us on the W.N.W.--as we still sank in grey ashes--were two conical hillocks. In the distance, to the west, two small flat-topped plateaux rose above the sky-line, and also two hills shaped not unlike the backs of two whales. On our left we had an immense crack or fissure extending from north-east to south-west between the hill-range on which we travelled and another on the south--both showing huge domes of eruptive rock, apparently extensive flows of red lava subsequently blackened on the surface by weathering. On the opposite side to ours the rock was exposed all along the fissure for a great height, except the surface padding on the summit, where beautiful fresh green grass was in contrast to the deep tones of the rock. On our side we were still struggling in ashes and sand, with striated and much indented boulders of lava showing through.

We found many *sicupira* nuts, of a small, flat and fat oval shape, and a yellow-ochre colour. The shell contained many tiny cells or chambers--just like the section of a beehive. Each chamber was full of a bitter oil, said to cure almost any complaint known.

On May 22nd I took observations with the hypsometrical apparatus in order to obtain the correct elevation, and also as a check to the several aneroids I was using for differential altitudes. Water boiled at a temperature of 210° with a temperature of the atmosphere of 70° Fahr. This would make the elevation at that spot 1,490 ft. above the sea level. The aneroids registered 1,480 ft.

We came upon two strange rocks, one resembling the head and neck of a much-eroded Sphinx--of natural formation--blackened, knobby, and with deep grooves; the other not unlike a giant mushroom. The sphinx-like rock stood upon a pedestal also of rock in several strata. The head was resting on a stratum 1 ft. thick, of a brilliant red, and at a slight dip. Under it was a white stratum much cracked, after which came a stratum of white and red blending into each other. This stratum, 2 ft. thick, showed the white more diffused in the upper part than the lower. The lowest stratum of all exposed was of a deep red.

Near this stood erect another columnar rock of a similar shape, the head and base entirely of red rock. It was eroded on the north-west side to such an extent that it was almost concave in the lower part. This rock, too, showed great cracks and a slight dip north-west in the strata. Vertical fissures were noticeable, and seemed caused by concussion.

A third rock--flat, with a convex bottom--stood as if on a pivot on the angular point of a pyramidal larger rock, this larger rock in its turn resting over a huge base. There was no mistake as to how those two rocks had got there. They had fallen from above, one on the top of the other. A proof of this lay in the fact that they had arrived with such force that the base had split at the point of contact. As there was no hill above or near those

rocks, there was little doubt that they had been flung there by volcanic action.

We were in a region of extraordinary interest and surprises. In the plain which extended before us there stood two conical hills in the far north-west, and three other hills, dome-like, each isolated, but in a most perfect alignment with the others, towards the east. Close to us were giant domes of rock, the surface of which formed marvellous geometrical designs of such regularity that had they been on a smaller scale one might have suspected them of being the work of human beings; but they were not, as we shall see presently.

## CHAPTER XVIII

### The Salesian Fathers--A Volcanic Zone

WE arrived at the chief colony of the Salesians, Sagrado Coração de Jesus (Tachos). There, thanks to the great kindness and hospitality of the Fathers, and also owing to the amount of interesting matter I found from a geological and anthropological point of view, I decided to halt for a day or two.

The Salesians had come to that spot, not by the way I had gone, but by an easier way via Buenos Aires and the Paraguay River, navigable as far as Cuyabá, the capital of Matto Grosso. The friars had done wonderful work in many parts of the State of Matto Grosso. In fact, what little good in the way of civilization had been done in that State had been done almost entirely by those monks. They had established an excellent college in Cuyabá, where all kinds of trades and professions were taught. In the port of Corumbá a similar school was established, and then there were the several colonies among the Indians, such as the Sagrado Coração de Jesus on the Rio Barreiro, the Immaculada Conceição on the Rio das Garças, the Sangradouro Colony, and the Palmeiras.

[Illustration: The Observatory at the Salesian Colony.

(Padre Colbacchini in the Foreground.)]

[Illustration: Bororo Women and Children.]

As in this work I have limited myself to write on things which have come directly under my observation, I shall not have an opportunity of speaking of the work of the Salesians at Cuyabá or Corumbá--two cities I did not visit--but I feel it my duty to say a few words on the work of sacrifice, love and devotion performed by the friars in those remote regions.

In the colony at Tachos, situated on a height, there were several neat buildings for the friars and a village for the Indians. What interested me most was to see how much of the land around had been converted with success to agricultural purposes. I inspected the buildings where useful trades were taught to the Indians of both sexes. Weaving-looms and spinning-wheels had been imported at great expense and endless trouble, as well as blacksmiths' and carpenters' tools of all kinds. A delightfully neat garden with European flowers was indeed a great joy to one's eyes, now unaccustomed to so gay and tidy a sight. What pleased me most of all was to notice how devoted to the Salesians the Indians were, and how happy and well cared for they seemed to be. They had the most humble reverence for the Fathers.

Padre Antonio Colbacchini, the Father Superior, an Italian, was an extremely intelligent and practical man, one of the hardest workers I have ever met. With a great love for science he had established a small observatory on a high hill at a considerable distance from the mission buildings. The abnegation with which Father Clemente Dorozecki, in charge of the instruments, would get up in the middle of the night and in all weathers go and watch for the minimum temperature--their instruments were primitive, and they did not possess self-registering thermometers--was indeed more than praiseworthy.

My readers can easily imagine my surprise when one day Padre Colbacchini treated me, after dinner, to an orchestral concert of such operas as *Il Trovatore*, *Aida*, and the *Barbiere di Siviglia*, played on brass and stringed instruments by Indian boys. The Bororos showed great fondness for music, and readily learned to play any tune without knowing a single note of music. Naturally great patience was required on the part of the teacher in order to obtain a collective melody which would not seriously impair the drum of one's ear. The result was truly marvellous. Brass instruments were preferred by the Indians. The trombone was the most loved of all. As the Indians all possessed powerful lungs, they were well suited for wind instruments.



The colony was situated in one of the most picturesque spots of Matto Grosso. When out for a walk I came upon a great natural wall of rock with immense spurs of lava, the surface of which was cut up into regular geometrical patterns, squares and lozenges. I think that in that particular case the peculiarity was due to the lava having flowed over curved surfaces. In coming in contact with the atmosphere it had cooled more rapidly on the upper face than the under, and in contracting quickly had split at regular intervals, thus forming the geometrical pattern.

It was undoubted that we were there in the former centre of inconceivable volcanic activity. In other parts of a great dome of rock I came upon strange holes in the rock--extremely common all over that region--which might at first glance be mistaken for depressions formed by glacial action, but which were not. They were merely moulds of highly ferruginous rock, granular on its surface and not smoothed, as one would expect in the walls of cavities made by the friction of revolving ice and rock. Nor did I ever find at the bottom of any of those pits, worn-down, smooth spherical or spheroid rocks, such as are usually found in pits of glacial formation. Those pits had been formed by lava and molten iron flowing around easily crumbled blocks of rock, or perhaps by large balls of erupted mud which had dropped on molten lava, that had then solidified round them, while the mud or soft rock had subsequently been dissolved by rain, leaving the mould intact. The latter theory would seem to me the more plausible, as many of those pits showed much indented, raised edges, as if splashing had taken place when the rock now forming the mould was in semi-liquid form. Only once or twice did I notice hollows with a suggestion of spiral grooves in their walls; but I think that those had been caused at a more recent date by water flowing in and describing a spiral as it travelled downward in the interior of the vessels.

On the hill where the observatory was situated two circular volcanic vents were to be seen. The hill, which had a slope on one side, had evidently been split, as on reaching the top I found that an almost vertical precipice was on the other side. Quantities of quartz and crystals were to be found on that hill. All over that region quaintly-shaped rocks were also to be found, some like small cubic or rectangular boxes, others not unlike inkstands, others in hollowed cylinders or spheres. Many--and those were the quaintest of all--were of a rectangular shape, which when split disclosed a rectangular hollow inside. These natural boxes were mostly of iron rock, laminated, which had evidently collected when in a liquid state round some soft matter, that had subsequently evaporated or disappeared with the intense heat, leaving empty spaces inside. The laminations were about one-eighth of an inch thick.

Padre Colbacchini told me that some distance off a curious pool of water existed which he called the "electric spring." When you placed your hand in it you received a slight electric shock, while a similar impression to that of an electric current continued to be felt as long as you kept your hand in the water.

The mission buildings at Tachos were at an elevation of 1,600 ft., the observatory, 100 ft. higher. The temperature on May 23rd was max. 81°, min. 68·4 Fahr. From the observatory hill an uncommon sight was before us. Seven large and small isolated conical and domed hills stood in perfect alignment from N.N.E. to S.S.W. in two different sets.

In that region the prevalent wind was from the E.S.E. during the months of May, June, July and August. In September the wind veered gradually to the north and north-east; whereas during the rainy season winds from the north, north-west and south-east were the most prevalent, especially the north-westerly wind. When the wind came from the north it was generally accompanied by heavy rain. The rainy season in that particular zone of the immense Matto Grosso state extended from October to the end of April.

The Rio Barreiros flowed in a northerly direction (elev. 1,500 ft.) over a bed of red lava, ashes, red earth, and sand. After leaving this river we quickly rose again to an altitude of 1,700 ft. upon a first hill, then to 1,800 ft. on a second, and 1,850 ft. on a third elevation over a great spur of red lava, extending in a graceful curve well into the valley below.

Exquisite was the view of the great plain below us, with its magnificent campos stretching as far as the eye could see, far away to the horizon line. In the far distance, scattered here and there, rose the peculiar flat-topped isolated mountains before described. Again all that day we marched over ashes, red sand, and volcanic débris. The highest point we reached was 1,950 ft. A snake dashed across our way among the hoofs of my mule, but no harm was done.

Near Camp Bugueirão (elev. 1,800 ft.), where we halted, there was a delightful, clear, tiny spring emerging from white volcanic crystallized rock. Then more campos over lovely undulations in the country. Close by was what the Brazilians call a *furnas* (from the Latin *fornus*)--a somewhat misapplied term by which they named any deep hollow or chasm, whether vertical like a precipice or horizontal such as a cave.

It was getting slightly less cold during the nights. On May 24th the Fahrenheit thermometer registered a minimum of 60° and a maximum temperature of 75°.

Owing to the usual trouble of recovering the mules in the morning we only left camp at 10.30 a.m., rising over great masses of ferruginous rock, which showed through the deposits of ashes and sand at an elevation of 1,950 ft. The immense view of the campos in great undulations was really exquisite to the west and south-west.

My mules were then travelling over a strange narrow strip of rock at a height of 2,050 ft.--in some places only a few yards across--on the top of vertical walls dividing two deep valleys, one to the south, very extensive, with great lava-flows; another to the north. In the latter valley an immense extinct crater was visible, in three well-defined internal terraces and a deep central depression.

Upon climbing on the summit of a high conical hill I further discovered that the crater had an elongated shape, the longest diameter being from north to south, the southern and lower part being overlapped by a voluminous flow of lava which also covered a great part of the mountain slope. Strange monoliths were numerous, among the many fantastically shaped rocks, and also boulders lying about at all angles. One like a huge table rested on the top of another, upon which it had fallen with great force, as could be seen by the vertical splitting of the rock underneath. The rock above appeared simply broiled--and so were the huge masses of débris, especially of ferruginous rock, which had evidently been ejected by that crater. The entire summit of the crater cone (2,100 ft. above the sea level) was of hard black baked rock.

Close by, to the north, was another peculiar oval depression, the highest part of which to the north-west was in four distinct terraces in the interior. The eastern part was more flattened, not unlike a huge soup plate. In the centre was another deep depression--possibly an extinct crater too. This second crater was to the north of the high-domed crater described above.

In the near west we had mere undulations over which we gradually travelled, but the country was getting much more disturbed than it had appeared since leaving the Araguaya River. Due west farther away stood before us a weird-looking plateau with a vertical high wall to the north. To the south it showed three terraces, the two lower ones supported on perpendicular cliffs, whereas a convex slope was between the second and third, or top terrace. To the south-west in the far distance another high plateau could be perceived, also with vertical cliffs to the north, but slanting at its southern end--a shape characteristic of nearly all the isolated mountains of that zone.

Looking south we perceived great tongues of lava extending from east to west--the eastern point being higher than the western, showing that the lava had flowed there from east to west. Then there was also a great sloping grassy slant, possibly over another extensive lava-flow, from the crater we had examined. Extending toward the south-west was another tongue of lava of great width when measured from north-west to south-east, the latter (south-east) being its lowest point. On its north-east side this great flow had a high vertical face. Between these enormous tongues of lava, east to west and south-east to north-west, was a depression or

channel extending as far as a distant high dome in three terraces to the south-west. On our course we came upon more curious flattened eruptive rocks, which had split on falling with great force to earth after having been ejected from a volcano.

Other parallel ranges could be clearly perceived. To bearings magnetic  $160^\circ$  were again to be seen our old friends the two strange gabled-roof and tower mountains.

I climbed up on the Paredãozinho volcano (2,100 ft. above the sea level) to examine its extinct crater, subdivided into two distinct large craters and a subsidiary one.

One of these craters extended from east to west, and had in one section on its rim a giant dome split into quadrangular and lozenge-shaped sections, not unlike magnified mosaic work. Next to it was a great hill with a vertical natural wall overlooking the crater itself. The horizontal strata of this natural wall, each about a foot thick, looked exactly like a wonderful masonry work, so perfectly straight were the strata, and the square and rectangular rocks laid in lines with such extraordinary regularity. This wall stood upon solid masses of rock of immense size--hundreds of feet in height.

The lip of the crater on the south side was just like the well-laid pavement of a city, so regularly had the lava cracked in contracting, thus leaving four- and five-sided geometrical figures, all well fitting in with their neighbours. Again, in this case, the lava, flowing over a convex surface, had contracted on the surface and caused the wonderful network of grooves. In one section the crater had the appearance of an ancient Roman or Etruscan amphitheatre with seats in many tiers or steps, separated by vertical cracks--as if cut out into separate blocks of stone.

[Illustration: Strange Formation of Volcanic Rock.]

[Illustration: Volcanic Cavities (Matto Grosso).]

On the east side of the greatest portion of one crater--which would seem to have been the most active of all--I found again immense boulders with stratified rock above them resembling masonry work, just the same as and at the same elevation as the layers I had examined in the larger elongated horseshoe crater. In the centre of the smaller crater there flowed a rivulet of crystal-like water most delicious to drink. Undoubtedly those eastern rocks were the lip of the crater, for I discovered there two flows of lava in corrugations and network designs such as we had observed on the summit of the greater section. I had great difficulty in climbing up the steep internal walls of the crater, and on the steep slopes with dried grass, which was slippery to a degree. On the top of the crater were great masses of carbonated rock; also patches of lapilli, and red and white sand, plentiful everywhere in that zone.

The smaller crater--it seemed to me--must have been a mere safety valve for the larger one. Its elevation, it will be noticed, was the same as that of the latter. From the summit of the one on which I was standing I could perceive the other to the E.N.E., forming the eastern boundary of this immense volcanic hollow. The southern part of this great double crater was subdivided into several sections, all in great rocky terraces--quite vertical except in their lower portion, which was sloping and had evidently been filled to a great extent by an accumulation of ashes and erupted refuse. On the side on which I stood, however, the crater had not the diabolical, quite awe-inspiring, appearance of the larger section of the huge volcanic mouth--quite unscalable by humans in its central section. In the deep cracks in the rock were several small grottoes. I experienced some difficulty and much fatigue in climbing to the top (elev. 1,750 ft.) of the extinct volcano, and especially in reaching the lip of the crater, owing to the thick and much entangled scrub with innumerable thorns.

Our camp was at 1,500 ft., in a delightful spot at the junction of two streams, one from the south descending from the volcano, the other from the north. The two rivers united flowed north--I think eventually into the Rio das Mortes.

When we moved out of camp on May 25th (temperature, minimum 62°, maximum 80° Fahr.) I noticed that, after passing the wall-like section of the crater in the northern aspect, there were strata with a dip south in the inner part of the crater. The northern face of this vertical wall showed thick strata cracked into squares and rectangles with a dip in two different directions at an angle. There a draining channel had formed. Two rows of circular holes--like port-holes--were to be seen, one directly under the summit, the other one-third down the cliff side. A giant rectangular tower of solid rock stood erect parallel to the great wall. Skirting this vertical wall we travelled north-west-by-west, rising gradually to 1,800 ft. on a deep layer of red volcanic sand and grey ashes.

Looking back to the east we had a complete view of the two-tiered plateaux with their vertical northern walls, showing a dip south in their stratification. A crowning mound could also be observed surpassing their height, when we rose still higher to 1,900 ft. on the summit of a ledge of cracked lava with a slant west-wards. On the eastern side, where it had crumbled owing to a subsidence, it showed a rounded moulding, whereas on the other side were great waves of lava. The lava had flowed from east to west.

After leaving this curious spot we went over undulating red and ochre-coloured sand and more grey ashes. We rose twice to an elevation of 2,000 ft. We crossed a streamlet of delicious water flowing north over a red lava bed. Then more and more ashes were found all along. A second stream--also flowing north--was then negotiated, also over a red lava bed (elev. 1,800 ft.), after which we climbed to 2,000 ft., descending soon after to 1,900 ft. on the banks of another river flowing north-east.

At this spot were two more enormous lava-flows--one on each side of the stream, and extending in a tortuous course from south-west to north-east. The lava had flowed north-east.

On rising slowly in deep red sand to an elevation of 2,100 ft. we saw two prominent elevations of brilliant red colouring to the south--they, too, with vertical cliffs to the north. To the west loomed two huge twin plateaux separated by an immense crack, also with vertical walls to the north and a slight dip south in the strata forming the various terraces.

**CHAPTER XIX**

## The Paredão Grande--A Cañon--A Weird Phenomenon--Troublesome Insects

WE had reached a spot of most amazing scenery--the Paredão Grande--a giant hill mass displaying a great crater in its north side. Two high cones stood above the immense red-baked wall at its eastern end, where it was in huge blocks stratified in thicknesses varying from 15 to 20 ft. each. In that eastern section the strata were perfectly horizontal. On the western side of the crater was a colossal quadrangular mountain of red-baked rock--a solid mass of granite with a narrow band, slightly discoloured, all along its summit. There--above--we also perceived a slight grassy slope, and above it again a great natural wall in layers 6 ft. thick. From the bottom of the mountain this upper natural wall resembled the defences of a great castle built on the summit of the giant rock. In approaching this strange sight we had gone over extensive deposits of ashes and yellow lava pellets and balls.

[Illustration: A Vertical Mass of Solid Rock of a Brilliant Red Colour.]

The elevation at the foot of this immense block was 1,970 ft., the summit of the rock 660 ft. higher--so that the reader can easily imagine how impressive this quadrangular block of bright red rock was, several hundred yards in length on each side and 201 metres high.

As we reached camp rather early I went to examine the block from all sides. On the southern side Alcides and I climbed up to within 30 ft. of the summit, and from that high point obtained a stupendous panoramic view of the great expanse of undulating country to the south and south-east, while it was almost absolutely flat to the west as far as the horizon line.

To the south-west were distinguishable some extraordinary-looking cylindrical table-lands--like immense sections of columns--rising well above the horizon line. To the south in the distance a peculiar formation of mountains could be seen--first a separate prismatic mountain like a gabled roof with a well-defined vertical high wall standing all along its longitudinal apex line. Parallel to this and to one another were three sets of mountains, with such steep sides that they seemed like gigantic walls standing up on the flat country. Behind them was a flat-topped plateau with a small cone rising above it. The sides of the latter plateau formed a steep escarpment. To the south-east was a domed plateau, red in its lower section, green on the top. Between this plateau and the last wall-like mountain, several hundred feet in height, stood a conical peak with a natural tower of rock upon it.

Beyond, to the south-east, could just be perceived two pyramidal mountains, but they were very distant and scarcely visible. The valley itself was greatly furrowed in deep, long channels. Due south were dome-like mounds--each of these, mind you, standing out individually upon an almost flat plain.

In the north-western corners of the great quadrangular Paredão rock I saw a spot where it would have been quite easy to climb up to the summit, as portions of the rock had crumbled down and had left an incline. But I had no object in making the ascent on that side, especially as I had already obtained the view I required from the south side. Also because I was heavily laden, carrying cameras, aneroids, a large prismatic compass, and three heavy bags of money slung to the belt round my waist, and did not feel up to the extra and useless exertion. Great arches with a span of over 80 metres were to be seen in the lower part of the western wall. To the south there was a huge spur of lava with the geometrical pattern upon its surface we had already observed elsewhere. In this particular case, too, it appeared to me that the peculiar net of surface channels had been formed in coming in contact with the air, and not underground in the boiling cauldron of the volcano when the ebullition of the rock ceased. They were only found at a lower elevation because they had gone down with a great subsidence which had taken place, and in which neither the quadrangular Paredão Grande, nor the peculiar isolated mountains we had observed from its height, had been affected. They had remained standing when all the rest sank for some six hundred feet and, in places, more. That might perhaps account for the

extraordinary shapes of all those mountains, which could not otherwise be explained.

[Illustration: The Paredão Grande (Matto-Grosso).]

At the foot of the vertical giant block on the west many domes of lava, channelled in a quadrangular network pattern, and ridges and cones, were found, all with a slope to the west. I had a great struggle in my research work that day, owing to the thick scrub with vicious thorns that tore one's clothes and skin mercilessly.

We came upon an immense deep crack in the earth surface--a regular cañon--which extended all along the centre of the great valley. On the opposite side of it were again big domes of lava in corrugated designs, also a gigantic circular crater. Many natural crucibles of iron rock, some cylindrical in shape, others oval, others formed not unlike Pompeian lamps--while others still were square or rectangular or lozenge-shaped--were to be seen in many spots on the moraine-like tails that extended southward, like the tentacles of an octopus, and in the heaps of much carbonized rock and solidified froth produced by what was once boiling rock. The mounds of froth were usually collected in depressions.

The west side of the Paredão was decidedly the most interesting of all. Its great arches showed that it must have once formed the sides of a great cauldron--the top of which had subsequently collapsed or been blown off. This seemed quite apparent from the discoloration in the rocky cliff some 50 ft. above the arches, which followed the exact line of what must have been the thickness of the vault. The rock in that discoloured section was perfectly smooth, whereas above that it became much cracked vertically in layers, and gave the appearance of a masonry wall.

Toward the south-western corner there was a prismatic tower. Where the peculiar isolated rocks near the tower formed a spur, a dip was noticeable in the flow of the once molten rock, following what must have been at that time the surface soil over the cauldron's roof.

A huge triangular crater could be seen, from which started an enormous crack of great length in the lava-flow of the valley to the west.

The southern face of that stupendous rocky quadrangle was not quite so vertical as the west and north sides, and was more in tiers or steps of lava--but very steep indeed. It had in its lower part a great spur extending southward.

As I have said, Alcides and I arrived within 30 ft. of the summit of the great Paredão, at an elevation of 2,550 ft., the summit being 2,580 ft.; but owing to the last 30 ft. being absolutely vertical and the top rock of a crumbling nature, and as my object in wishing to obtain a full view of the country to the south had been attained, I did not think it worth while to court an accident for nothing. It was well after sunset when we were up there, and it would take a long time to return to camp. So we hastened on our return journey.

The sunset that night--which we watched from that high point of vantage--was really too stupendous for words, and not unlike an aurora borealis--red, gold and violet lines radiating from the sun like a gorgeous fan and expanding as they approached the summit of the sky vault. The descent was more difficult than the ascent, owing to the slippery nature of the rock.

At night, while back in camp, we saw to the W.N.W., quite low on the horizon, a brilliant planet--possibly Venus. The stars and planets appeared always wonderfully bright and extraordinarily large on fine nights. Whether it was an optical illusion or not I do not know, but the phenomenon, which lasted some hours, was seen by all my men, and appeared also when the planet was seen through a powerful hand telescope. It seemed to discharge powerful intermittent flashes, red and greenish, only toward the earth. Those flashes were similar to and more luminous than the tail of a small comet, and of course much shorter--perhaps four to five times the diameter of the planet in their entire length.

Whether this phenomenon was due to an actual astral disturbance, or to light-signalling to the earth or other planet, it would be difficult--in fact, impossible--to ascertain with the means I had at my command. Perhaps it was only an optical illusion caused by refraction and deflected rays of vision, owing to the effect upon the atmosphere of the heated rocky mass by our side and under us--such as is the case in effects of mirage. I am not prepared to express an opinion, and only state what my men and I saw, merely suggesting what seem to me the most plausible explanations.

At moments the planet seemed perfectly spherical, with a marvellously definite outline, and then the flashes were shot out especially to the right as one looked at the planet, and downward slightly at an angle, not quite perpendicularly.

That night, May 25th-26th, was cold: min. 58° Fahr. But during the day at 9 a.m. the thermometer already registered 85° Fahr.

The sky, half covered by flimsy transparent mist to the east, and by globular thin clouds, large overhead and of smaller dimensions to the west, developed later in the day into a charming mackerel sky, with two great arches of mist to the south, and delicate horizontal layers of mist near the earth.

It was only when we were some distance off that we obtained a full and glorious view of the western side of the Paredão. The upper stratum showed a slight dip north, then there was a ledge on which grass seemed to flourish, and below it two parallel strata in a wavy line from north to south. Those two strata could be traced again--after a dip--in the range with two cones, separated as we have seen by a deep gap from the great wall-cliffs of the Paredão. The indication of what must have been once an enormous dome over a huge cavity or cauldron could be noticed in the western cliff, and also numerous chambers, large and small--at least, judging by the arches in great numbers noticeable in the wall. In other words, you had there the same effect as the one often seen in cities when houses are pulled down and the remains of the various rooms are visible on the remaining side walls.

Looking north as we left the disturbed region of the Paredão Grande, we came upon a great valley, with a depression in its centre. We were still travelling on volcanic ochre-coloured sand in deep layers, especially as we rose to an altitude of 2,350 ft., overlooking a huge basin. We had then a good general view of the southern aspect of the Paredão Grande. In its side a huge gap with vertical walls--a vent perhaps--could be noticed, reaching as far as the summit of the mountain. It was interesting to note that all the great cracks in the earth's crust found in that region almost invariably had a direction from north to south, so that the ranges which remained bordering them must have split in a lateral movement east and west.

Six kilometres from camp through the forest we came upon some singularly delicious green, smooth grassy slopes. In other places were perfectly circular or oval concave basins of volcanic ashes, in the centre of which stood charming groups of *burity* palms and trees with most luxuriant foliage. These *bosquets* existed in the hollow of all the basins where profuse infiltrations of moisture caused the luxuriant vegetation.

We were at an elevation of 2,350 ft. On going down to a stream (elev. 2,130 ft.) we encountered great flows of lava. It had flowed in a westerly direction. We were proceeding through enchanting vegetation when we came to a second and a third *cuvette* or basin adorned with plentiful healthy palms in its central point.

As I was admiring the curious sight of these clusters of high vegetation absolutely surrounded by a wide band of lawn--such as one would see in a well-kept English park--a heavy and sudden storm arrived, which in a few seconds drenched us to the marrow of our bones. I have seldom seen or felt drops of water of such weight and size as when the rain began, followed within a few seconds by a downpour in bucketfuls.

Animals, baggage, and men, dripping all over, went along, rising to 2,400 ft. above the sea level, by the side of a conical hill. A huge block of volcanic rock--shot and deposited there evidently from elsewhere--was to be

seen near by.

Eighteen kilometres from our last camp we descended to a streamlet, dividing a grassy basin like the preceding ones. Again I noticed here that all divisions between ranges--caused by volcanic or other violent action, and not by erosion--were in a direction from north to south. We had this in the Paredão Grande, and in the triple division of the top-dyked mountains on the south, and also in the gabled and tower mountains we had observed for some days to the south-west.

Again during the night I saw to the west the phenomenon of the previous evening repeated--the strange flashes directly under and occasionally to the left of the brilliant planet--that is to say to the right of the person observing it.

This was from Camp Areal, where we suffered terribly during the day from our friends the *pium*, which filled our eyes and ears and stung us all over; and at sunset from the *polvora* or *polvorinha* (or powder), so called because of their infinitesimal size--most persistent mosquitoes, so greedy that they preferred to be squashed rather than escape when they were sucking our blood on our hands and faces. Fortunately, during the night--with the cold (min. Fahr. 56°)--we had a little respite, and these brutes disappeared, only to return to their attack at sunrise with the warmth of the sun. At 9 a.m. the thermometer already registered a temperature of 95° Fahr. in the sun--a jump of 39°, which, notwithstanding mosquitoes and *pium*, my men greatly enjoyed.

[Illustration: The Paredão Grande, showing Vertical Rocks with Great Arches.]

I have never seen men suffer more from the cold than my followers. They were simply paralyzed and frozen at that comparatively high temperature. They moaned and groaned and wept all night, although they slept in their clothes and were tightly wrapped up in heavy blankets. Moreover, they had spread a heavy waterproof double tent over the lot of them, as they lay closely packed to one another, covering heads and all, and had arranged a blazing fire enough to roast an ox quite close to them.

Personally, I was quite happy under a mere shelter tent--open for precaution on all sides, owing to preceding experiences, so that I could see what was going on all around without getting up from my camp bed. I only had a mere thin camel-hair blanket over me. I never slept in my clothes, preferring the comfort of ample silk pyjamas. In the morning I always indulged in my cold shower bath, two large buckets of water being poured by Alcides upon my head and back, amid the shivering yells of my trembling companions, who, at a distance, watched the operation, wrapped up to such an extent that merely their eyes were exposed.

"He is mad!" I often heard them murmur with chattering teeth.

Beneath heavy horizontal clouds low in the sky and ball-like cloudlets above, we started off once more from an elevation of 2,100 ft. at the camp to proceed over a plateau 2,300 ft. high and some 6 kil. broad from east to west. Then we descended into another charming *cuvette* (elev. 2,100 ft.), and farther on to a streamlet flowing north, the Rio Coriseo.

We were then travelling over reddish and ochre-coloured volcanic sand, going through stunted and fairly open *matto* (forest), higher up at 2,250 ft. in successive undulations crossing our route at right angles. In one of the depressions (elev. 2,150 ft.) was a river--the Rio Torresino--flowing north. Quantities of yellow globular lava pellets and lumpy blocks--evidently ejected by a volcano--were seen.

The stream Cabeça de Boi--forming after the Rio Macacos (or River of Monkeys) a tributary of the Rio das Mortes, into which flowed all the rivulets we had lately met--was next crossed (elev. 2,130 ft.). Over more and deep beds of ashes we journeyed at 2,270 ft. on the southern edge of a great grassy basin extending from east to west. Again a delightful group of palms and healthy trees was in the typical depression. Ant-hills were innumerable on all sides. One could not help admiring their architectural lines, which formed all kinds of



miniature fortresses and castles. We were worried to death by the *pium* or *lambe-olhos* (eye-lickers), as the Brazilians call them, which followed us all day in swarms around our heads and hands, entering our mouths, noses, eyes and ears. Only for a few moments, when there blew a gust of wind, were we freed from this pest, but they soon returned to their attack with renewed vigour.

We rose again to an altitude of 2,380 ft. on another great dome of red lava, which had flowed northwards, as could be plainly seen as we ascended on its rounded back. Upon it were quantities of crystals and yellow lava pellets and pebbles and carbonated rock, resting on whitish and grey ashes. On the summit, where fully exposed, numerous perforations, cracks and striations were visible in the flow, we were able to observe plainly how the lava in a liquid state had flowed and quickly cooled while other strata of liquid lava flowed over it, one overlapping another like the scales of a fish, and forming so many oval or ovoid bosses with channels between.

From that high point we had a perfectly level sky-line all around us, except for the Paredão Grande and the Paredãozinho, then to the E.N.E. of us.

At an elevation of 2,520 ft. we perceived that day to the E.S.E. a double-towered massive rocky mountain of a brilliant red colour, reminding one of the shape of an Egyptian temple, and a lower hill range in undulations behind it to the south, projecting at its sides.

We were marching on the northern edge of deep and extensive depressions to the south and south-east of us. Domed undulations in progressive steps from north to south were noticeable in the southern portion of the landscape, and from south to north in the northern and much-wooded zone.

When we were at an elevation of 2,550 ft. we had still red and yellow sand and ashes with stunted and sparse vegetation. Upon descending we skirted the southern side of another peculiar oval basin--this time one which possessed a thin strip or row of tall vegetation in perfect alignment in the central line of depression. A deep deposit of grey ashes and sand encircled this *cuvette*. The general longitudinal direction of the oval was from the south, the highest point, to the north, the lowest of the rim.

Having travelled 28 kil. from Areal we made camp on a streamlet flowing north.

The company of my men was a great trial to me--a penance I had to bear in silence. What was more, I could not let it appear in the slightest degree that it was a penance to me, if I did not wish to make matters worse. Pusillanimity and fear are two qualities which I cannot quite understand nor admit in men. Hence, it is well to be imagined what I suffered in being with followers who, with the exception of Alcides and Filippe the negro, were afraid of everything.

One of the men had a toothache. His last tooth in the lower jaw was so badly decayed that merely the outside shell remained. No doubt it gave him great pain. I offered to remove it for him--without a guarantee of painless extraction. The fear of greater pain than he endured--even for a few minutes--was too much for him. He would not hear of parting with what remained of the tooth. Result: for twelve consecutive days and nights that fellow cried and moaned incessantly--holding his jaw with both hands while riding a quiet mule, and sobbing *hai, hai, hai, hai!* all day long at each step of the animal--with variations of *hoi, hoi, hoi, hoi*, when the mule went a little quicker, and significant loud shrieks of *uppeppé, uppeppé, uppeppé* when the animal began to trot, giving the rider an extra pang. That intense pain invariably stopped at meal-times, and it did not seem to have an appreciable effect on the man's ravenous appetite. My men never let a chance go by to let their companions share to the fullest extent in their sufferings. They had no consideration whatever for other people's feelings. In all the months they were with me they never once showed the slightest trace of thoughtfulness towards me, or indeed even towards any of their comrades.

Mean to an incredible degree in their nature--and I am certain no one could have been more generous than I

was to them in every possible way--they believed that no matter what I did was due to wishing to save money. If I would not allow them to blaze away dozens of cartridges at a rock or a lizard--cartridges were a most expensive luxury in Central Brazil, and, what was more, could not be replaced--it was because I wished to economize. If one day I ate a smaller tin of sardines because I was not so hungry, remarks flew freely about that I was a miser; if I did not pitch a tent because I preferred, for many reasons, sleeping out in the open on fine nights, it was, according to them, because I wished to spare the tent to sell it again at a higher price when I returned home! They discussed these things in a high voice and in a most offensive way, making my hands itch on many occasions and my blood boil. But I had made up my mind that I would never lose my temper with them, nor my calm; and I never did, trying as it was to keep my promise.

With all this meanness of which they were accusing me, these poltroons were clothed in garments such as they had never before possessed in their lives; they were gorging themselves with food such as they had never dreamt of having in their homes, where they had lived like pariah dogs--and huge heaps were thrown daily to the dogs--and they were paid a salary five times higher than they could have possibly earned under Brazilian employers.

What annoyed me a great deal with these men was the really criminal way in which they--notwithstanding my instructions--always tried to smash my cameras and scientific instruments and to injure anything I possessed. Those men were vandals by nature. The more valuable an object was, the greater the pleasure they seemed to take in damaging it.

Thus another and unnecessary burden was placed upon me in order to save my instruments from destruction, not only from natural accidents but through the infamy of my followers. Those fellows seemed to take no pride in anything. Even the beautiful and expensive repeating rifles and automatic pistols I had given each man had been reduced to scrap-iron. Yet they were so scared of Indians that the first time we met some, they handed over to them anything that took their fancy--and which belonged to me, of course--for fear of incurring their ill-favour. During my absence from camp they even gave away to the Indians a handsome dog I had, which I never was able to trace again.

Like all people with a dastardly nature, they could on no account speak the truth--even when it would have been to their advantage. They could never look you straight in the face. Hence, full of distrust for everybody, all the responsibility of every kind of work in connection with the expedition fell upon me. I not only had to do my own scientific work, but had to supervise in its minutest detail all the work done by them, and all the time. It was indeed like travelling with a band of mischievous demented people. The mental strain was considerable for me.

On that day's march we had passed two crosses erected, the Salesians had told me, on the spot where two men had been murdered by passing Brazilians--not by Indians. Their usual way of procedure was to shoot people in the back--never in front--or else when you were asleep. Nearly all carried a razor on their person--not to shave with, but in order to cut people's throats as a vengeance, or even under less provocation. This was usually done in a quick way by severing the artery at the neck while the person to be killed was asleep.

The Brazilians of the interior were almost altogether the descendants of criminal Portuguese, who had been exiled to the country, and intermarried with the lowest possible class of African slaves. They seemed to feel strongly their inferiority when facing a European, and imagined--in which they were not far wrong--the contempt with which, although it was covered by the greatest politeness, one looked down upon them. That was perhaps the only excuse one could offer for their vile behaviour, which, according to their low mental qualities, they liked to display in order to prove their independence and superiority.

We made our camp in a heavenly spot--barring the devilish *borrachudo* (mosquitoes)--on the bank of a crystal-like streamlet flowing north (elev. 2,200 ft.). We were really fortunate to have excellent and plentiful water all the time. The thermometer went down during the night to a minimum of 54° Fahr. There were more

shivers and moans from my men. Only Alcides and Filippe behaved in a manly way. The others were in terror of attacks from the *onça pintada (felis onça)* or spotted jaguar of Brazil, and of the *terrivel tamanduas bandeira*, a toothless pachyderm, with a long and hairy tail, long nails, and powerful arms, the embrace of which is said to be sufficient to kill a man, or even a jaguar, so foolish as to endeavour wrestling with it. It had a long protruding nose or proboscis, which it inserted into ant-heaps. A tongue of abnormal length was further pushed out, and then quickly withdrawn when crammed with attacking ants. Ants were its favourite food. Although my men talked all the time of the terrible *bandeiras*, we never had the good fortune to receive the fond embraces of one.

We had a beautiful sky--perfectly clear--on May 28th, except perhaps a faint curtain of mist near the horizon to the west. Two of my horses had unfortunately strayed; and as the men searched the *matto* with trembling knees in fear of meeting a *bandeira* instead of the missing horses, they were not recovered until late in the afternoon, so that we did not depart until 4 p.m.

We went up to the top of an undulation (elev. 2,400 ft.), on grey ashes as usual in the lower part of the hill, and red volcanic sand on the summit. That afternoon's journey was not unlike tobogganing up and down all the time--at elevations varying from 2,500 to 2,350 ft.--over domes of sand, ashes, and eruptive rock, and dykes with depressions, some 100 ft. deep or so, and all extending from north to south.

We saw some gorgeous red *araras* or macaws of giant size. They were a beautiful sight as they flew, with their hoarse shrieks, above our heads.

At sunset we were travelling along the north edge of a great grassy depression wooded in its central pit--the line of depression and of the central vegetation being from north to south.

[Illustration: Mushroom-shaped Rocks of Volcanic Formation.]

[Illustration: A Great Earthquake Fissure in the Terrestrial Crust (Matto Grosso).]

We were treated to a glorious sunset. The entire sky had become of a deep violet colour and Indian red, relieved here and there by golden tints, with blue cloudlets of wonderful regularity in a line. Curiously enough, the most brilliant colouring was to the east and not to the west, as would have been expected. Eventually the entire sky became of a glorious yellow, like a golden cupola--blending into a lovely emerald green in its highest point overhead.

Again we found ourselves on another large dome of eruptive rock, in some places reduced into fine tobacco-coloured powder, getting somewhat darker in colour where the under stratum was of sand and soft conglomerate easily crumbled under pressure, and containing pellets of black ferruginous rock and grains of iron. Large blocks of iron rock were exposed to the air in many places.

We arrived at the third Salesian colony of St. José or Sangrador, near which was a small settlement of Brazilians--a bad lot indeed. One of my best horses was stolen here, and I was never able to recover it. I remained in that unpleasant place for three days, endeavouring to recover the animal, but it was of no avail.

The Salesians had a handsome property, the agricultural resources of which they were fast developing. Sugar-cane, mandioca, rice, beans, and Indian corn were raised with success. Father Antonio Malan, Inspector-General of the Salesians, arrived from the west, via Cuyabá. He was an extremely intelligent and enterprising man--who should be congratulated on selecting such excellent sites for the various colonies, as well as for the sensible, businesslike fashion in which the colonies were conducted. They were indeed the only few bright spots where the light of civilization shone in those sadly abandoned regions.

Here are the meagre entries in my diary for the two following days:--

May 29th. Remained at Sangrador in search of missing horse. Temperature: min. 54°; max. 83° Fahr. Perfectly clear sky.

May 30th. Obligated to remain one more day at Sangrador. Horse missing still. All men have gone searching the forest for it. Temperature: min. 56½° Fahr; max. 75° Fahr. Elevation 2,050 ft.

It was indeed a great treat to be able to converse with so intelligent a gentleman as Father Malan after the company I had been in since leaving Goyaz.

Father Malan was a man with a heart of gold and great courage. Under him the Salesians will some day continue their good work and spread happiness and culture among the few Indians who now remain in Matto Grosso. What had already been done by the Salesians was amazing. No doubt, with their great enterprise, they would certainly continue their good work of civilization and science combined.

Although the Salesians tried hard to induce men to accompany my expedition, their efforts were rewarded with no success; so that I had to be content with the handful of men I had with me. I foresaw disaster from that moment, for thirty was the least number of men I needed to carry out my work properly--and thirty good men at that. Instead, I only had six men, two of them extraordinarily plucky but quite uncontrollable; the others absolutely worthless.

Had I been a wise man I should have turned back. But I am not a wise man, and I never turn back; so that there only remained one thing to do--go on as best I could, come what might.

**CHAPTER XX**

## Wild Animals--An Immense Chasm--Interesting Cloud Effects

ON May 31st (thermometer min. 56°, max. 74° Fahr.) I decided to abandon the missing horse and proceed on my journey. I suspected, with reason, that the animal had been stolen. It was no use wasting any more time searching for it. We thus bade good-bye for good to the Salesians, and left the great basin of the Sangrador River (elev. 2,050 ft.).

We travelled over sparsely wooded country to 2,350 ft. Tobacco-coloured soil was still under our feet, yellow spattered lava, then again reddish soil, wonderfully rich and fertile, if only it could be cultivated. The country was here peculiar for its many undulations until we arrived on the rim of a large basin, extending from north-west to south-east, of great campos, with stunted vegetation at first, but later with a truly luxuriant growth of vigorous-looking *Jtauba preta* (*Oreodaphne Hookeriana* Meissn.), with thick deep green foliage.

We crossed two streamlets flowing north. On going uphill we travelled on masses of volcanic pellets (elev. 2,500 ft.). To the south we could see a number of hills, the sides of which showed the great effects of erosion by wind and water. Nearly all those hill ranges extended from east to west. A long depression could be observed cutting them from north to south.

That was a fine day for cloud effects, especially along the horizon, where they displayed horizontal lines, while they had great ball-like tops. Higher up, to the north-west, was feathery mist turning the sky to a delicate pale blue. A heavy, immense stratum of cloud in four perfectly parallel terraces extended on the arc from west to north.

We descended into a *cuvette* with the usual cluster of vegetation in the centre and campos around. To the south-west of that *cuvette* was an elongated but well-rounded mountain, extending from east to west, and beyond, to the S.S.W., in the far distance, an almost identical replica of it. We travelled on deep volcanic sand on the west slope of the *cuvette* and in deep ashes at the bottom until we arrived at the Sangradorzinho River, flowing north.

June 1st (thermometer min. 55½° Fahr.; max. 74°; elev. 2,150 ft.). Heavy mist and rain-clouds, heavy and sultry atmosphere. Sky almost entirely covered by clouds.

Owing to trouble among my followers and waiting for one of my men, who had remained behind in a last effort to find the missing horse, we were unable to leave camp until nearly noon. We rose to an elevation of 2,400 ft., leaving behind the great *cuvette*, and marching over parallel domes extending from north to south. Between those domes in the depressions were sandy *cuvettes* of verdant grass and the usual central *bosquets*.

Cinders and sand were still plentiful, with stunted, thin trees growing upon them. Several times that day we reached an elevation of 2,550 ft. After passing a streamlet flowing north, we kept at that elevation for a considerable distance, after which, having descended 100 ft. (2,450 ft.), we found ourselves in a most enchanting, oval-shaped *cuvette* of cinders well covered with fresh verdure, and in its centre from north to south a row of *burity* palms.

That was indeed a day of great surprises in the way of scenery. No sooner had we left that beautiful *cuvette* than we came to a magnificent flat open valley extending from E.S.E. to W.N.W. In its northern part, where a pool of stagnant water was to be found, were innumerable *burity* palms. It was evident that during the rainy season that plain (elev. 2,350 ft.) must be entirely under water. In many places it was swampy, even at the time of my visit. It was most refreshing to the eyes to see such expanses of lovely green healthy grass. The mules and horses enjoyed it more than we did, neighing to their hearts' content when we emerged into the great verdant meadow. They tore away with their teeth at the delicious grass as they cantered along gaily.

Some of the enjoyment of the delightful scenery was taken away from me--not only that day, but every day during almost an entire year--owing to the stupid obstinacy of my men. They carried their magazine rifles fully loaded--eight cartridges in each--and while marching insisted on keeping the rifles cocked; they would not hear of keeping them at safety--so that any extra jerk or a twig of a tree catching the trigger might cause the weapons to go off at any moment. This would have mattered little if they had slung their rifles in the usual way, pointing skyward or else towards the earth. But no-one could ever induce a Brazilian to do things in a sensible way. No, indeed; they must carry their rifles horizontally upon the shoulder, the muzzles of the nearest weapons always pointing at me. It was no use remonstrating, as they might perhaps have misunderstood it as fear. So all I could do was to trust in Providence. I could not have done better, for Providence indeed watched over me and protected me on that expedition in a most merciful way--for which I am truly grateful. On several occasions--as was to be expected from the careless way in which the weapons were carried--now one rifle then another went off unexpectedly, and I came mighty near being shot. On other occasions the mules had narrow escapes. Once a bullet went right through the hat of one of my men, just missing his head.

In any case, I beg the reader to realize how pleasant it was to have the muzzle of a loaded rifle, ready to be fired, pointing at you in front for an average of eight to twelve hours a day for several months. I generally rode last in the caravan in order to prevent straggling, and also to see that any baggage which fell off the pack-saddles was recovered. This was unpleasant in more ways than one. First the clouds of dust raised by the animals as we marched over the sand and cinders, which filled my eyes, mouth and nose; then the constant attention to watch for lost baggage--besides the work of writing my notes as we rode along. The sound of the dangling bells of the mules was monotonous to a degree, and so was the aspect of the animals' tails swinging and slashing from one side to the other in order to drive away tormenting flies. Occasionally, when stung fiercely by a horse-fly, one or two animals would dash away wildly, tearing off in their career low branches of trees and even altogether knocking down good-sized trees, four or five inches in diameter.

This would seem impossible in any other country, but not in Brazil, where the majority of the trees were nearly entirely eaten up inside by ants. The roots, owing to the substratum of lava spread horizontally near the surface, offered little resistance to side pressure upon the tree itself, so that frequently even the weight of a man leaning against a tree was sufficient to knock it down. I never shall forget how impressed I was the first time I saw my men cut the way through the forest, slashing down right and left good-sized trees with one swing each of their *falcon*--heavy-bladed knives some 2 ft. long.

What terrific strength! I thought, until I happened to lean against a tree, and down went the tree and myself too. Upon examination I found that merely the bark remained, with a few filaments inside--the rest of the interior having been entirely devoured by ants. Yet some of the top branches seemed still alive, and had leaves. Again, even when quite sound, those trees were extremely anæmic and soft, quite watery inside, and could be cut almost as easily as celery.

This does not mean that all the trees of Brazil were worthless. No, indeed. These remarks apply merely to that particular portion of Brazil in which I was then travelling--where, barring the *burity* palms in the moist lands and marshes, the trees were mostly rickety and dwarfed, with mouldy barks, malformed limbs, and scanty leaves. That is why, when we came to the healthy mass of *burity* palms and the lovely young grass, one felt just the same as when, after having been through a hospital, one emerges into the fresh air among healthy people.

That night we encamped on the heavenly meadow. We felt we had reached Paradise. For the first time great flocks of parrots and gorgeously-coloured macaws played about and enlivened the air with their shrill whistles and shrieks, and flew over the palms, gently swung to and fro by the wind. Then innumerable *colibris*--the tiny humming-birds, of marvellous iridescent metallic tints--sucked now from one then from another flower while still flying. Indeed, that spot seemed the rendez-vous of all the animals of that region. There you found *onças* (jaguar), *anta* (a large pachyderm), the *Tapirus Americanus*, the *tamandua bandeira*, with its worm-like

tongue, (or *Myrmecophaga jubata*), and plenty of *veado* (*Cervus elaphus*). The footmarks of all those animals were innumerable near the water.

The man I had left behind in order to make a further attempt at recovering the lost horse arrived that evening, his search having been unsuccessful. Undoubtedly the horse had been stolen.

[Illustration: Strange Geometrical Pattern of Lava over Giant Volcanic Dome.]

Although the place where we had made camp was a regular paradise to look at--in the day-time--it might have been compared to warmer regions at night. Mosquitoes of all sizes and of all degrees of viciousness rose in swarms from the swamp at sunset, and made our life absolutely miserable. To counterbalance the torture we had a wonderful sunset to look at. First the sky, of a golden colour, was intersected by graceful curves dividing it into sections like a melon; then it gradually became overladen with horizontal black and crimson lines to the west, black to the east and overhead.

June the 2nd was my birthday. I am superstitious by nature, and I would have given anything to celebrate it with some lucky event, although I was at a loss to think of anything lucky that could have happened to me there. Indeed, I began my new year badly--much worse even than I expected. That was an ill-omen to me. First of all there was a terrible row among my men in camp. They had taken to their rifles. They wanted to shoot the cook. The man deserved punishment, perhaps, but not quite so severe a one. After a great deal of arguing I quieted them and got them to lay down their weapons. The cook's life was spared--worse luck for me. I was sorry for it when I had my breakfast, for cooking more diabolical than his could not be imagined. During breakfast the news came that another horse of my caravan had been lost. So there was the prospect of another day wasted to recover it. My men were unable to trace it, so I resigned myself to the monetary loss and also to the inconvenience its absence would cause us.

My men felt the cold intensely during the night, the thermometer being as low as 51° Fahr. (minimum). During the day the maximum temperature was 85° Fahr. and 96° in the sun.

My only consolation that day was watching the innumerable birds and gazing at the magnificent sunset. The latter consisted that evening of three lines forming arches--two black to the west and the third white--stretching across the sky from north to south. From the higher black line radiations spread, subdividing the sky into rectangular designs--of almost equal size. To the east were great globular masses of mist somewhat confused in shape.

The water at this camp was bad, the marsh being over a bed of decayed vegetable matter, which rendered the water of a brownish black colour, like strong tea. Its taste was foul. By digging a well a few yards from the lagoon I succeeded, however, in obtaining clean and good water, which filtered through the ashes and sand.

Our camp was at an elevation of 2,300 ft. During the night, June 2nd-3rd, the thermometer was higher than usual (min. 58° Fahr.), but my men felt the cold more than the previous night because of the heavy mist which set in after sunset, followed by a drizzling rain which damped everything. My men were all attacked by fever, which rendered them more irritable and ill-tempered than ever--if possible.

We did not leave camp until 11.30 a.m., rising again to the summit of the plateau some 50 ft. higher. There we had to describe a wide arc of a circle, as through the trees we perceived on our left an immense chasm, beyond which was a much disturbed landscape of striking ruggedness. We could see a huge circular crater with eroded lips, rising like the chipped edges of a gigantic cup, in the centre of the great volcanic basin. That depression with high vertical walls all round displayed a large gap to the W.N.W. and another to the south-west.

Twelve kilometres from our last camp--and still marching along the edge of the circle on the summit of the

plateau--we came to a grassy *cuvette*, and then to another hollow with a few *burity* palms. The wall overlooking the great circular depression was perpendicular, of red igneous rock, with projecting spurs ending in conical, much-corrugated hills. The curious opening to the south-west was much broken up in two places with gaps. In the distance beyond were three ranges of hills, the colour of which appeared a pure cobalt blue.

The central crater was formed by rugged red walls with spurs on the east and south-east sides. In the bottom was water with trees all round its edge. There were four square holes from which boiling water gurgled like feeble geysers, and three more holes of a more irregular shape.

The hill range on which we stood projected well into the centre of the great circular basin. It had on the west side perfectly vertical walls of black igneous rock. Its summit was chiefly formed of ferruginous erupted rock thrown up while in a state of ebullition, which had cooled into a conglomerate of minute globular masses, in shape like the bubbles of boiling water. The great circle around us, as we stood on the outermost point of the projecting spur, was most impressive, with its brilliantly coloured red walls.

My men killed a *coatí*--a peculiar, long-nosed carnivorous animal, which had characteristics in common with dogs, monkeys, and pigs. There were two kinds of *coatí* or *guatí*, viz. the *coatí de mundo* (*Nasua solitaria*), and the *coatí de bando* (*Nasua socialis*). Ours was a *Nasua solitaria*. It was a beautiful little animal, about the size of a small cat, with a wonderfully soft brown coat on its back, a yellowish red belly and bright yellow chest and throat. The chin was as white as snow. The long tail, 1½ ft. long--was in black and yellow rings. It possessed powerful fangs on both the upper and lower jaws, a long, black, gritty or granular tongue, short ears, powerful short fore-paws with long nails--quite dog-like; long thighs extremely strong, short hips and hind legs, with callosity up to the knee--evidently to allow that part of the leg to rest flat upon the ground. The *coatí* had velvety black eyes of great beauty, well set in its small well-shaped head. It was a wild little fellow, extremely agile, and could kill a dog much larger than itself with comparative ease.

We circled the eastern and northern part of the great cauldron, always remaining on the summit of the plateau at elevations varying from 2,250 to 2,300 ft. We came upon patches of violet-coloured and then tobacco-coloured sand, and also upon quantities of dark brown sand, generally consolidated into easily friable rock. There were the usual deposits of grey ashes over the underlying volcanic rock which peeped through here and there.

On June 4th we were at the Cabeçeira Koiteh (temperature, min. 53° Fahr.; max. 80° Fahr.; elev. 2,100 ft.). Close to this camp, from an outstretching spur, I obtained another magnificent view. To the E.S.E. stretched from north-east to south-west a flat plateau, and to the east a flat mountainous block with an eroded passage. Headlands branched off from the northern side of the ridges in a north-easterly direction. Between them were basins thickly wooded in their lower depressions. The north-eastern portion of the flat range was almost vertical, with many angular and sharply pointed spurs projecting from it.

In the centre of the greater basin, of which the others were details, a low convex ridge bulged out, with three conical peaks--two of them at the highest point of the curve. Between the first and second cone two twin sub-craters were visible--evidently the two twin circles had formed part of the same crater--in the mountain side of the distant range. A third crater was some distance off to the south-west.

To the south-west in the background was a lovely view of flat highlands with huge tower-like rocks standing upright upon them. Then to the S.S.W. a regular vertical dyke of rock stood on the top of an elongated conical base.

The elevation on the summit of the spur from which we obtained this lovely panorama was 2,200 ft.--or no more than 100 ft. higher than our camp.

We travelled again that same day on the northern edge of the great depression, and met three more *cuvettes* of



grey ashes with an abundant central growth of *buritys*. These were at a general elevation of 2,300 ft., the bottom of the depression being 50 ft. lower. On descending from the table-land, through a gap we discerned far away to the south a long flat-topped plateau extending from south-west to north-east and having a precipitous wall-face.

We got down to the Caxoeirinha stream, where we found an abandoned hut in the eroded hollow of the stream. The water flowed there over a bed of red lava and extremely hard conglomerate rock made up of lava pebbles and solidified ashes. Above this at the sides of the stream was a stratum some 10 ft. thick of grey ashes, and above it a stratum 2 ft. thick of red volcanic dust and sand.

As we got higher again and I stood on a projecting promontory, another wonderful view spread itself before me. The sun, nearly setting, in glorious white radiations, cast deep blue and violet-coloured shadows upon the great abyss to my right (N.W.) which was a kilometre or more in diameter and more than 300 ft. deep--surely another great crater. It seemed as if a natural wall of rock must have once existed, joining the promontory on which I stood to the great mass of prismatic red volcanic rock to the west of us, and ending in a flat triangle with a wide base. The surface soil on the height of the peninsula was of spattered lava and black broiled rock and pellets.

The bottom of the abyss formed two sweeping undulations--the second from the centre much higher than the first--seemingly a great wave of lava vomited by the crater, by which probably the destruction of the wall joining the peninsula had been caused.

To the S.S.E. in the distance stood a high mountain range--or rather a great flat-topped plateau of delicious cobalt blue shades, almost losing itself in the sky. To the east, completing the circle, were two other great spurs of red-baked rock, with precipitous, almost vertical, sides and with much-striated buttresses that ended in conical mounds--eroded into that shape by the action of water and wind.

To the south, beyond, a sloping table-land with a pronounced dip eastward extended from east to west. It towered over everything, and was shaped like a trapezium. In front of this sloping table-land was another long flat-topped range, stretching from E.S.E. to W.N.W. Again in front of this, could be seen an interesting series of prismatic mounds--like parallel barriers. To the S.S.W. rose a large mountainous mass--another plateau. Then came a second range, cut into clear pyramids with rectangular bases, and, beyond, a great expanse of lovely green with some large mounds of a similar shape to those already described. Two more pyramids were also to be observed far, far in the distance, while others of a slightly less angular shape were noticeable upon the great flat stretch due west.

Right under us, at the bottom of the precipice, was thick forest covering, zigzag fashion, the two depressions, roughly in a general direction of south-east to north-west. Those two depressions drained that immense basin. It was there that the streamlet Caxoeirinha had its birth. The Caxoeirinha flowed north-west and fell into the Ponte de Pedra River, which flowed south. Those two streams, with a number of others, formed the head-waters of the great S. Lourenço River, a formidable tributary of the Rio Paraguay or Paraná.

An extraordinary effect of clouds could be seen that day, and a similar occurrence I saw on many other occasions upon the table-lands of Matto Grosso. The clouds reproduced--upside-down--the configuration of the country directly underneath them. That was due, no doubt, to the air currents diverted by the obstacles on the earth's surface, which caused the masses of mist above to assume similar forms--but of course, as I have said, upside-down.

We were still at an elevation of 2,150 ft. The temperature during the night went down to 52° Fahr. My men, as usual, suffered intensely from the cold--at least, judging by the noise they made, the moans and groans and chattering of teeth. They nearly all had violent toothache. Alcides, too, apparently went through agony, but he showed a little more manliness than the rest and did not make quite such a pitiful exhibition of himself.

It was curious how certain racial characteristics were difficult to suppress in individuals. Alcides had some German blood in him--rather far removed. He could not speak German, nor did he know anything about Germany. Yet German characteristics came out in him constantly. For instance, the uncontrollable desire to write his own name and that of his lady-love on trees and rocks all along our passage. Alcides was really very good at calligraphy, and some of his inscriptions and ornamentations were real works of art. Many half-hours did we have to waste at the different camps, waiting for Alcides to finish up the record of his passage in that country, and many blades of penknives--I had a good supply of them to give as presents to natives--did he render useless in incising the lettering on the trees and stones.

[Illustration: Author's Troop of Animals wading across a Shallow Stream.]

Filippe the negro--who was the best-natured of the lot--had become quite swelled-headed with the big salary he received. Arithmetic was not his forte. As he could hardly write, he was trying to work out, with a number of sticks--each representing one day's salary--how much money he had already earned, and how much more he was likely to earn. It evidently seemed to him a large fortune--indeed it was--and his plans of what he would do with all that money in the future were amusing. First of all, the *idée fixe* in his mind was the purchase of a *malletinha*, a small trunk with a strong lock, in which to keep his money and his clothes. I took advantage of this to tell Philippe--they were all just like spoiled children--that the best place for *malletinhas* was Manaus, our chief objective on the River Amazon, some 1,800 kil. away from that point as the crow flew, and about four times, at least, that distance by the way we should travel. Many times a day I had to repeat to Philippe glowing descriptions of the wonders of the *malletinhas*, and I got him so enamoured of the *malletinhas* to be got at Manaus that I made certain that Philippe at least would come along and not leave me. I was sure of one thing--that nowhere in the intervening country would he be able to procure himself a little trunk--nor, indeed, could one procure oneself anything else.

I supplied my men with ample tobacco. Philippe was all day and a great part of the night smoking a pipe. Owing to constant quarrels among my men, I had turned him into a cook. When in camp he had to sit hour after hour watching the boiling of the *feijão*. Enveloped in clouds of smoke, Philippe with his pipe sat in a reverie, dreaming about the *malletinha*. He was quite a good fellow, and at any rate he did work when ordered.

All my men had been given small pocket mirrors--without which no Brazilian will travel anywhere. It was amusing to watch them, a hundred times a day, gazing at the reflection of their faces in the glasses. It was nevertheless somewhat trying to one's temper when one ordered a man to do something and then had to watch him for an endless time admiring his own features in the little mirror, and one had to repeat the order half a dozen times before the glass was duly cleaned with his elbow or upon his trousers and set at rest, and the order carelessly obeyed. Even Alcides--who was far superior to the others in education--could not be kept away from his mirror. While riding he would all the time be gazing at his features instead of looking at the beautiful scenery around us.

On leaving camp we again reached the summit of the plateau (elev. 2,300 ft.), with its patches of red volcanic earth, violet-coloured sand, and snuff-coloured dust--extremely fine in quality. After crossing a streamlet flowing south, we again continued our journey on the flat plateau, slightly higher at that point, or 2,400 ft.

We were in the great plain crossed by the Ponte de Pedra rivulet, flowing southward. Once more we obtained a gorgeous view looking south. Four parallel ranges stretching roughly from south-east to north-west stood in all their grandeur before us. They were of brilliant red volcanic rock. On the second range, from us, rose a curious square block of rock of gigantic size, resembling a castle with its door and all. In the distance, to the south-west, erosion seemed to have taken place on a great scale in the side of the table-land.

The highest point we had so far reached on the plateau on which we were travelling since leaving the Araguaya was 2,400 ft. There again we found another of the extensive grassy *cuvettes*--the flat bottom of

which was only 30 ft. lower than the highest point of the plateau. A luxuriant growth of *burity* palms and *birero* trees adorned the centre, the latter very tall and handsome, with smooth white bark and only a dense tuft of dark green foliage at their tops. In the *cuvettes* I saw, the growth of the tall vegetation invariably ran the long way of the oval.

The sky that evening showed great streaks of transparent lines of mist from west to east, the central radiation of these being formed of lines so precisely parallel that they seemed to have been drawn with rule and dividers. Directly overhead those lines gradually blended into a more indefinite mass. The radiations did not begin from the vanishing sun on the horizon, nor at the point diametrically opposite on the east, but began to appear only one-tenth up the entire circle of the sky, both west and east.

Almost globular cloudlets, with the lower section cut off in a horizontal plane--quite typical, as we have seen, of the cloud formation on that Central Brazilian plateau--crowded the sky, quite low to the north, and also a great many small ball-like clouds which showed with some brilliancy against the blue sky.

The sunsets in Central Brazil were to me always a source of intense joy, interest, and admiration. With certain characteristics which repeated themselves frequently, they always displayed wonderful effects of light and a most peculiar formation of clouds.

Before reaching camp we passed another oval *cuvette* with a longitudinal row of trees--so green and tidy as to be just like a portion of a well-kept English park (elev. 2,350 ft.). Another bit of wonderful scenery, with immense prismatic rocky mountains--really more like dykes--appeared in the distance; and also a vertical walled mountain in the foreground.

**CHAPTER XXI**

A Beautiful Lagoon--Strange Lunar Display--Waves of Lava--Curious Grottoes--Rock Carvings--A Beautiful Waterfall

WE camped at the Lagoa Formosa--or "Beautiful Lagoon"--a large, verdant, oval-shaped lagoon, entirely covered with grass, only 140 ft. lower than the top of the plateau (elev. 2,290 ft.). Barring a slight undulation in the land to the north-east of the marsh, the country was there absolutely flat.

At night I witnessed a marvellous lunar effect. The half-moon was high up in the sky. Soon after sunset two immense concentric arches of mist, with their centres on the horizon to the east, shone like silver rings, their upper edges being lighted by the bluish light of the moon. With the reflection of this in the still waters of the lagoon, the effect was enchanting and intensely picturesque.

My men suffered a great deal from the damp--they were always suffering from everything: from the heat of the sun, the rain, the cold, the long marches.

That night we had a minimum temperature of 51° Fahr., the elevation of our camp being 2,150 ft.

Naturally, over the expanse of water the sunrise was wonderful. The sky was well covered by feathery radiations from the north-east, which were intersected by striations shooting skyward from east to west and forming a charming design. The radiations from the north-east reached right across the sky as far as the horizon to the south-west. What astonished me most in Matto Grosso was the characteristic immobility of the clouds. In the day-time they remained sometimes for hours with hardly any changes or movement. As soon as the sun appeared, rendering the lower sky of a golden yellow and of vivid Indian red above, the northern part of the lagoon was enveloped in mist, which rose in angular blocks, vertical on the south side, slanting at a sharp angle on the north. These pointed peaks of mist remained immobile--as if they had been solid--until the sun was well up in the sky.

I went once more to gaze at the glorious panorama. In the morning light new and important details were revealed, such as a strange series of dykes of a prismatic shape, of which I could count as many as seven. Great transverse depressions or grooves--from S.S.E. to N.N.W., with a dip S.S.E.--could in that light be now plainly detected, and this time two great square castles of rock--instead of one--were disclosed upon the third range of undulations.

The high ridge to the south-west displayed a subsidence on a large scale in its central portion, where bare vertical red walls had been left standing on each side.

Then there were other curious concave depressions or gateways formed in the great table-land--which had for its marked characteristic concave curves on all its slopes.

On leaving camp--nearly at noon, after a serious quarrel and fight among my men, which left me worried to death by the petty nonsense and incessant grumbling of my followers--we journeyed at an elevation of 2,300 ft., finding shortly after an almost circular *cuvette* of deep grey cinders, 100 ft. deep (elevation at the bottom 2,200 ft.).

Twelve kilometres farther on we came upon another great depression extending from east to west, with an enormous belt of grassy land. There was the usual cluster of trees and palms in the centre, but larger than usual. To the south were campos--lovely prairies--with sparse and stunted trees--chiefly *Goma arabica* or acacias.

The elevation of the upper edge of the *cuvette* was 2,500 ft., that of the bottom 2,450 ft. We continued our journey on the top of the plateau, with slight undulations varying in height from 50 to 70 ft. Snuff-coloured soil and red sand were invariably noticeable on the higher points, and grey ashes in the lower points, where erosion had caused depressions.

Then, farther on, the plateau, with an elevation of 2,450 ft., was absolutely flat for several kilometres, and showed sparse vegetation and miserable-looking anæmic trees--the thin soil over solid rock affording them inadequate nourishment.

Eighteen kilometres from our last camp we came upon another oval basin (elev. 2,400 ft. above the sea level), extending longitudinally from N.N.E. to S.S.W. On its huge deposits of cinders grew deliciously green, fresh-looking, healthy grass, and a thick clump of *burity* palms, and *birero* trees of immense height and thick foliage. Those beautiful trees were called by the people of Goyaz "*cutibá*" and "*pintahyba*." They were marvellous in their wonderful alignment among the surrounding circle of gorgeous palms. The latter were in their turn screened in their lower part by a belt of low scrub--so that upon looking at that oasis one could hardly realize that it had not been geometrically laid out by the hands of a skilful gardener.

On the outer rim of the *cuvette*--away from the moisture--hundreds, in fact, thousands of cones, cylinders and domes, from 4 to 6 ft. high, the work of ants, could be seen, all constructed of bluish grey ashes.

We had here a wonderful example, quite sufficient to persuade the most sceptical, of the influence of agglomerations of trees in the formation of clouds. The sky was perfectly clear everywhere except directly above the extensive cluster of trees in the large *cuvette*. Quite low down--only a hundred feet or so above the top of the trees--there hung a heavy white cloud. It was a windless day. The cloud ended on all sides exactly where the trees ended, as sharply as if it had been cut with a knife. It looked exactly like a rectangular canopy over the luxuriant vegetation. This appearance was intensified by undulations in the lower part of the cloud, like festoons.

In proceeding across the immense circular *cuvette* I found that the central line of thick vegetation formed an angle. A streamlet of delicious crystal-like water emerged from among the trees. On its bank lay the skeletons of three mules, suggesting a tragedy.

On leaving the great *cuvette* we rose again to the top of the plateau, 2,550 ft. above sea level. On descending from a large dome to the west over red volcanic sand and red earth, half consolidated into rock easily friable under slight pressure, we were once more travelling across immense campos in a depression of fine cinders and earth, extending from north to south, at an elevation of 2,400 ft. We further traversed two other less important depressions, the deepest being at an elevation of 2,350 ft.

The jutting headlands of the plateau on which we had travelled were all most precipitous--nearly vertical--and of solid dark red volcanic rock.

A magnificent view next confronted us to the south. A huge black square block with a crater was before us, and there appeared what seemed to me to be the remaining sections of a huge volcanic vent and several smaller funnels. The lower lip of the crater formed a terrace. Then another wider crater could be perceived in a circular hollow of the spur of the plateau on which we had travelled, and which stretched out into the underlying plain. That spur extended from north-east to south-west, and in it two circular hollows of great size could be noticed, the sides of which were deeply fluted.

During the entire march that day we had seen quantities of violet-coloured deposits made up of tiny crystals, carbonized and pulverized rock and ferruginous dust.

[Illustration: Central Cluster of Trees and Palms in a Cuvette (Matto Grosso).]

[Illustration: A Giant Wave of Lava.]

On descending from the summit of the plateau, by a very steep slope, we saw many shrubs of *sapatinho*, a medicinal plant of the genus *euphorbiaceæ* (Euphorbia), growing in the interstices of red igneous rock, and among quantities of débris of marble, crystals, and eruptive pebbles.

During the night we had a magnificent lunar display. There was a good deal of moisture in the air, and mist. First of all a gorgeous lunar halo was observed, which later vanished to leave room for a most extraordinary geometrical design upon the partly moon-illuminated clouds and masses of mist. A most perfect luminous equilateral triangle appeared, with its apex downwards to the west and the half-moon in the central point of the base-line of the triangle above. On either side of the apex of the triangle faint concentric circles blended away into the sky near the horizon. Later in the night that curious effect disappeared and a multiple lunar rainbow of amazing beauty and perfection was to be admired.

In ecstasy at the beautiful sight, and in a moment of forgetfulness, I drew the attention of my men to the wonderful spectacle.

"That's the moon!" they answered, with a snarl. Talking among themselves, they contemptuously added: "*He* has never seen the moon before!" and they went on with the never-changing, blood-curdling tales of murders which filled them nightly with delight.

The streamlet flowing south, on the bank of which we camped, took its name of Sapatinho from the many *sapatinho* trees which were in the neighbourhood. It was a curious watercourse, which disappeared into a tunnel in the rock, to reappear only farther off out of a hole in a red lava-flow.

We had marched until late into the night, and it was not until we arrived and made camp that I noticed that Filippe the negro was missing. Several hours elapsed, and as he had not turned up I feared that something had happened to him. Had he been one of the other men I should have thought it a case of desertion; but Filippe was a good fellow, and I had from the beginning felt that he and Alcides would be the two faithful men on that expedition. I went back alone a mile or two in the moonlight to try and find him, but with no success.

At sunrise I ordered two men to go in search of him. The fellows--who had no mercy whatever even for one another--were loth to go back to look for their companion and his mount. When they eventually started they took a pick each to dig his grave in case they found him dead. Fortunately they had only been gone from camp a few minutes when I perceived Filippe riding down the steep incline.

The minimum temperature was only 55° Fahr. during the night, but it was so damp that my men felt the cold intensely, especially as there were gusts of a sharp breeze from the north-east. Moreover, in the deep hollow with thick grass in which we camped (elev. 2,200 ft. above the sea level) we suffered absolute torture from the swarms of *carrapatos* of all sizes, mosquitoes, and flies. The air and earth were thick with them. The water was dirty and almost undrinkable, as it passed through a lot of decomposing vegetation.

I was glad when Filippe reappeared and we were able to leave that terrible spot. Great undulations were now met with, 300 ft. and more in height.

Only 1½ kil. farther on we came to the Presidente stream, flowing south (elev. 2,100 ft.) over a bed of ashes, while its banks were formed of thick deposits of finely powdered yellow volcanic sand and dust.

We went over a huge dome covered with a stratum of brown sand, exposing on its western side a large wall of igneous rock with much-fissured strata dipping to the north-west. Immense isolated rocks showed vertical strata, demonstrating plainly that they had been considerably disturbed at some epoch or other.

We were on the bank of another stream (elev. 1,950 ft.) flowing south--the Capim Branco. We were then in another great and deep basin extending from north-west to south-east, in the north-western part of which could be seen on the summit of the rounded hill-tops and spurs an overlapping of rock, evidently produced when in a molten condition. In the south-western part of the slope encircling this great valley there stood another great barrier, formed also by a flow of molten rock curling over itself, as it were, and above this stood angular and pointed shoots of molten stuff of a subsequent origin. Large slabs of the latter could be separated easily from the underlying flow.

From the summit of that rocky prominence was obtained a lovely panorama of a great plateau, a portion of which had been eroded into a wall (E.N.E.) with three buttresses: another portion was gradually assuming a similar shape. The plateau had a great spur projecting westward. A crater had formed with a broken-up side to the west, leaving the conical-shaped remains of its fragmentary mouth. The plateau ended after describing a sweeping curve--almost a semicircle.

In the centre of the immense basin before us were successions of high undulations--like great waves--extending southward in parallel lines (east to west). From the point of vantage on which I stood I could count as many as eight of those huge lines of waves. Evidently at some remote period--it would be difficult to say how many thousands of years ago--that was a gigantic mass of molten stuff in commotion. In many places it was apparent that the great waves of molten rock had flowed over and partly overlapped the lower ones. In its higher north-easterly point the basin was wooded.

The great basin extended southward. In that direction all the lower ridges with their arched backs showed a depression or dip. On the S.S.W. two more great domes of wonderfully perfect curves were to be observed, and on the south-west stood an isolated gigantic quadrangular mountain of solid rock, with the usual buttresses in the lower portion typical of that region.

To the south-east a lovely square-shaped plateau of marvellously graceful lines stood prominent in the centre of the basin. In the same direction, only a few hundred yards off, was a most peculiar angular rock, which looked exactly like the magnified crest of an immense wave. That was just what it had been formerly--the wave, of course, of a gigantic molten mass of rock, set in violent motion by an immeasurable force. It was the terminal point of the great succession of rocky waves which we had skirted to the north in order to arrive at that point, and which extended from the great semicircle we had passed the previous day.

[Illustration: Strange Rock-Carvings of Matto Grosso.]

At the terminal point of those rocky waves--or wherever the rock was exposed--it was evident that all those undulations had received a similar movement and had formed the great backbone range of rock, fully exposed in the last undulation. I had observed the continuation of this great rock crest the previous day in the basin previous to reaching the Capim Branco valley. There it crossed the spur on which I was--"Observation Spur," I shall call it for purposes of identification--almost at right angles. It seemed as if two forces had been acting simultaneously but in different directions, and at various points had come into conflict and eventually had overrun each other.

The last great rocky crest at Capim Branco, when seen in profile, looked like a huge monolith with a slight inclination to the south-east. The formation of the rock itself showed a frothy appearance, such as is common with any liquefied matter while in a state of ebullition.

It is quite possible, too, that the great wave of molten matter travelling from north-east to south-west, upon encountering some obstacle, had its run interrupted and had cooled down, while the upper portion of it, from the impetus received, curled over the summit of the arrested solidified rock below.

In fact, there was plenty of evidence to show that while the lower stratum cooled down other sheets of lava

flowed above it, forming many successive layers. In the eastern part, where they were at an angle of 40°, these had cracked considerably in cooling. The central part of the great wave was entirely made up of vertically fissured strata. The lower half of the mass of rock showed markedly that it was an anterior wave to the upper.

There was a wide gap formed by the volcanic crack between this and the continuation of the undulations to the south-west, which got lower and lower. Perhaps before the crack occurred that hill was like the others on the east and west of it, padded with red earth. It must have become barren by the great shock which caused the surface of the earth to divide, and which no doubt shook the surface deposits down. In examining its north-eastern neighbour it could be seen that it actually tumbled over when the subsidence occurred, leaving a gap a few hundred metres wide.

A short distance beyond, on the S.S.E., was an interesting table-land sloping to the north-east, on the north side of which could be observed yet one more beautiful semicircular extinct crater. The rim, or lip of lava of this crater, had fissured in such a peculiar way as to give the appearance of a row of rectangular windows. The sections of the crater which remained standing showed two conical buttresses above massive cylindrical bases. From the crater started a huge, deep crack, 30 to 50 ft. deep and 20 to 100 ft. wide, which farther down became the actual bed of the stream. On both sides of this crack was a deep deposit of red earth and sand, the stratum below this being a solid mass of lava. The crater on the north-east side of the mountain had an inclination to the north, but was quite vertical on the south side.

Beautiful crystals were to be found in abundance on this mound, as well as great quantities of marble chips and crystallized rock in various forms.

On the side of this strange mound of rock I found some curious shallow caves, formed by great fissures in the rock. The vertical outer walls of these caves were painted white with lime dissolved in water. There were some puzzling carvings, which interested me greatly. I could not quite make up my mind at first whether those carvings had been made by Indians or whether they were the work of escaped negro slaves who had found shelter in those distant caves. In character they appeared to me Indian. Negroes, as a rule, are not much given to rock-carving in order to record thoughts or events. Moreover, those primitive carvings showed strong characteristics of hunting people, such as the Indians were. There were conventional attempts at designing human figures--both male and female--by mere lines such as a child would draw: one round dot for the head and one line each for the body, arms, and legs. Curiously enough--and this persuaded me that the drawings had been done by Indians--none of the figures possessed more than three fingers or toes to any extremity. As we have seen, the Indians cannot count beyond three--unlike members of most African tribes, who can all count at least up to five. This, nevertheless, did not apply to representations of footmarks, both human and animal--which were reproduced with admirable fidelity, I think because the actual footprints on the rock itself had been used as a guide before the carving had been made. I saw the representation of a human footmark, the left, with five toes, and the shape of the foot correctly drawn. Evidently the artist or a friend had stood on his right foot while applying the left to the side of the rock. When they attempted to draw a human foot on a scale smaller than nature, they limited themselves to carving two lines at a wide angle, to form the heel, and five dots to represent the toes.

The most wonderful of those rock carvings were the footprints of the jaguar (*onça*), reproduced with such perfection that it seemed almost as if they had been left there by the animal itself. Not so happy were the representations of human heads--one evidently of an Indian chief, with an aureole of feathers, showing a painfully distorted vision on the part of the artist. The eyes were formed by two circles in poor alignment, the nose by a vertical line, and the mouth, not under but by the side of the nose, represented by two concentric curves.

A figure in a sitting posture was interesting enough--like a T upside down, with a globe for a head and a cross-bar for arms. The hands had three fingers each, but there were only two toes to each foot.



It was interesting to note how the sculptors of those images caught, in a rudimentary way, the character of the subjects represented. This was chiefly remarkable in the footprints of birds and other animals, such as deer. They seemed particularly fond of representing deer-horns--sometimes with double lines at an angle. That was possibly to commemorate hunting expeditions. A frequent subject of decoration was a crude representation of the female organ; and one a magnified resemblance, angularly drawn, of an Indian male organ garbed in its typical decoration.

[Illustration: Weird Lunar Effect witnessed by Author.]

The face of the rock was absolutely covered with drawings, many being mere reproductions of the same design. Some were so rudimentary that they were absolutely impossible to identify. One fact was certain, that those carvings had been made by men who were trackers by nature and who observed chiefly what they noticed on the ground, instead of around and above them. Thus, there were no representations whatever of foliage or trees, no attempts at reproducing birds, or the sun, the moon, the stars.

The most interesting of all, from an ethnological point of view, were the geometrical designs. They closely resembled the incised lines and punch-marks of the Australian aborigines, and the patterns common in Polynesia. Concentric circles--of more or less perfection--were common, some with a central cross of three and four parallel lines. Coils seemed beyond the drawing powers of Indian artists. Ovals, triangles, squares, the Egyptian cross (T-shaped), series of detached circles (these generally enclosed within a triangle, quadrangle or lozenge) were frequent. Even more frequent were the parallel incised lines, generally used as subsidiary filling or shading of other patterns, such as concentric circles, or sections of triangles or squares.

It may be noted that a certain intelligence was displayed by the artist in dividing circles fairly accurately into four and eight sections, the diameters intersecting pretty well in the centre of the circles. One pattern which seemed to take their fancy was that of an oval or a circle with a number of dots inside.

In examining the cave closely, inside and outside, I also found upon the wall, which was simply covered with those images, some curious marks resembling the letters H P, A P, and W [Symbol: pyramid sign; 2 concentric triangles], which seemed of a more recent date--perhaps left there by some missionary Father or native explorer, or by some escaped slave.

Just below the point where the stream Capim Branco entered the S. Lourenço River (elev. 1,800 ft. above the sea level), there was a most beautiful waterfall--the Salto Floriano Peixoto. Two minor falls, some 30 ft. high (Salto Benjamin) were also to be seen under arches of luxuriant vegetation, just above the point of junction of the two streams.

The roaring and foaming volume of water of the greater fall rolled over a vertical volcanic rock, about 60 ft. high and 60 ft. wide, with a small terrace half way up its face. The bed of the river--below the fall--was, like all the torrents of that region, of strangely shaped lava blocks. With the dense foliage, the innumerable *caité*, a medicinal plant with huge leaves, the festooned liane and creepers--all most verdant in the sombre green light filtering through the foliage and the moisture of the abundant spray from the fall--it was indeed a magnificent sight. In order to see it, however, one had to suffer a great deal, because in forcing one's way through the dense vegetation one got literally covered with *carrapatos* and *carrapatinhos*.

Above the falls, for some hundreds of yards, there were terrific rapids in the river, which flowed over a steep bed of yellow lava in terraces, over steps and over a fourth minor fall some distance off.

#### DISTANCES FROM THE ARAGUAYA TO CAPIM BRANCO

Kil. Metres. Araguaya to Ponte Alto 26 400 Ponte Alto to Fogaça 19 800 Fogaça to Prata 20 Prata to Ponte Queimada 23 700 Ponte Queimada to Bella Vista 19 800 Bella Vista to Agua Quente 26 500 Agua Quente to

Barreiros 10 Barreiros to Agua Emeindada 16 500 Agua Emeindada to Tachos 29 700 Tachos to Bugueirão  
20 Bugueirão to Paredãozinho 20 Paredãozinho to Paredão Grande 20 Paredão Grande to Cabeça de Boi 33  
100 Cabeça de Boi to Sangrador 33 100 Sangrador to Sangradorzinho 20 Sangradorzinho to Varzen Grande  
20 Varzen Grande to Lagõa Secca 23 Lagõa Secca to Caxoerinha 26 500 Caxoerinha to Ponte de Pedra 10  
Ponte de Pedra to Lagõa Formosa 20 Lagõa Formosa to Xico Nunes 20 Xico Nunes to Sapaturo 16 500  
Sapaturo to Presidente 17 Presidente to Capim Branco 14 850 ----- Total 509 450 =====

**CHAPTER XXII**

In Search of the Highest Point of the Brazilian Plateau--Mutiny--Great Domes--Travelling by Compass--A Gigantic Fissure in the Earth's Crust

I MADE up my mind that I would continue my journey westward no farther, and would now proceed due north in order to explore the most important part of the Central Plateau--the very heart of Brazil--precisely where the great Rivers Xingu and Tapajoz had their birth. I believed that we should there find the highest point of the Central Brazilian Plateau. I expected to find in that region the most interesting portion of my journey--from the geographical, anthropological, and geological points of view. I was greatly disappointed from the anthropological aspect, since I met no one at all; but from the geological and geographical I was certainly well repaid for my trouble, great as the trouble was. We had already ridden to a distance of 1,400 kil. from the nearest railway.

[Illustration: A Giant Quadrangular Block of Rock.]

[Illustration: Rock-Carvings in Matto Grosso.]

My men mutinied on hearing of my plan, which I had kept concealed from them. They acted in a most abject manner. They tried to compel me to return the way we had come instead of going forward. As I flatly refused, they claimed their pay and wished to leave me there and then. Without an instant's hesitation they were handed their pay up to date and told they could go. The men had not quite realized that they would have to walk back some 858 kil. to Goyaz, without food and without animals. Alcides and Filippe the negro had remained faithful, and on that occasion stood by my side. Unfortunately, Alcides, who had a most violent temper, quarrelled with Filippe over some paltry matter and drove him over to the inimical camp.

So that there I was--with only one man left. I am not much given to losing heart over anything. Alcides showed a strong heart on that occasion. He and I proceeded for three days to rearrange the baggage and mend the saddles, etc., in order that we two alone might take along the entire caravan of animals. I did not at all look forward to the extra work of packing all the animals twice a day, and twice a day unpacking them. The loads weighed about fifty pounds each, and there were some thirty of them. Then we should have to hunt for the animals in the morning--a job which meant that one had to ride sometimes for miles to track them and bring them all back to camp. This prospect, on top of the work I had already in hand of writing, taking astronomical and meteorological observations, photography, developing negatives, drawing, collecting and classifying botanical and geological specimens, which occupied all day and the greater part of the night, was a little too much for me. But such was my joy at having got rid of my unpleasant companions that I would have put up with any additional discomfort and inconvenience in order to get on. Alcides behaved splendidly on that occasion.

June 8th and 9th were absolutely wasted. The relief from the mental strain of constantly looking after--and being on my guard against--my companions was great. They were days of great happiness to me.

On June 10th Alcides and I were making ready to depart, with all the animals and baggage, when the four mutinous followers and Filippe the negro--most penitent--begged to be re-employed. Under ordinary circumstances I should certainly never have taken them back; but when one was hundreds of miles from everywhere, and had no possible way of finding a man, one had to be patient and make the best of what one could get. I gave them another chance--principally in order to save what I could of my baggage, most of which I was certain I should have had to abandon had I proceeded alone with Alcides.

The Capim Branco river was situated between two undulating ridges of lava.

I steered a course of 300° bearings magnetic (N.W.), beginning a steep climb at once through the thin forest of the plateau to the north. In many places the mules slid and rolled down the precipitous slope of igneous rock and marble débris, scattering the packs in every direction. It was a wonder they were not killed. We urged the animals on, we pushed and pulled them, we held them with all our might by the bridles when they began to slide. After many narrow escapes we reached the summit--an immense flat stretch of campos with stunted trees and delicious crisp air--quite delightful after the stifling atmosphere of the Capim Branco basin. The elevation above the sea level was 2,300 ft. On the summit of the plateau was a deep stratum of red soil. Having marched across the entire width of the plateau, we found, on descending on the opposite side, another series of dome-like mounds of crimson volcanic rock, with hardly any vegetation on them--joined together, and forming many headlands, as it were. Beyond an empty space--an opening in the landscape--a great barrier crossed the range of domes almost at right angles.

We descended through thick undergrowth, under big *jatoba do matto* (*Hymenoclea Courbaril* L.) trees. The *jatoba* or *jatahy* wood has a high specific gravity, and is considered one of the woods with the highest resistance to disintegration in Brazil--as high as 1 kg. 315 gr. per square centimetre.

At 2,050 ft. we found a streamlet flowing southward. We were then in a grassy basin--another *cuvette* with two central tufts of thickly packed trees. We were lucky enough to see some *coco babento* palms, from which we shook down dates which were excellent, although somewhat troublesome to eat, owing to the innumerable filaments protecting the central large stone. These filaments stuck between one's teeth, and were most difficult to remove. The dates were the size and shape of an ordinary English walnut and extremely oily.

It was a real joy to see fine healthy trees again, after the miserable specimens we had seen of late. Even there, too, the powerful trees which emerged from the lower entangled scrub and dense foliage were greatly contorted, as if they had gone through a terrific effort in order to push their way through to reach the light and air. Liane innumerable and of all sizes hung straight or festooned from the highest trees or coiled in a deadly embrace round their branches like snakes. Nor were they the only enemies of trees. Large swellings could be noticed around most of the trees, caused by the terrible *cupim* (*termes album*) or white ants, carrying out their destructive work just under the bark. Many indeed were the trees absolutely killed by those industrious little devils.

As we marched through the *matto*, using the large knives freely to open our way, we had to make great deviations in our course--now because of a giant *jatoba* lying dead upon the ground, then to give a wide berth to a group of graceful *akuri* palms, with their huge spiky leaves. Those palms had great bunches of fruit. We were beginning now to find trees with fan-like extensions at the roots and base, such as I had frequently met with in the forests of Mindanao Island (Philippine Archipelago), where they were called *caripapa* and *nonoko* trees. The *vines* or *liane* were getting interesting, some being of great length and of colossal size, twisted round like a ship's cable.

We rose again to an elevation of 2,600 ft. On emerging from the cool dark forest and its refreshing green light, we found ourselves on another plateau with a slightly arched summit, of beautiful campos. From that height we looked over the immense undulating plain to the south. To the south-east we gazed upon a lower flat-topped plateau bounding the valley which, in great sweeping undulations from south-east to north-west, resembled an ocean with waves of colossal magnitude. We travelled across the slightly domed grassy plateau, and found on it a *cuvette*--only slightly depressed this time, but with the usual central line of tall trees with luxuriant foliage, *burity* palms and *pintahyba* trees. There, too, we had a surface stratum of red earth and fine brown dust, with an under stratum of grey ashes. Soon after we came to a second *cuvette*, and farther north a third could be perceived. In fact, the summit of that particular table-land was made up of subsidiary domes dividing *cuvette* from *cuvette* in succession.

In going down to 2,550 ft. we found a streamlet flowing northwest into the Rio das Mortes--or "River of Death." We were there on the great divide between the waters flowing south into the S. Lourenço and

eventually into the Paran, and those flowing north--after thousands of kilometres--into the Amazon. This little rivulet was therefore interesting to me, for it was the first one I had met flowing north since leaving the Araguaya--although not the first whose waters eventually flowed in a circuitous way into the Amazon.

That was a day of great domes--all of them with perfect curves. On them the grazing was magnificent. To the north a wonderful green dome, larger than the others (elev. 2,650 ft.), would have been splendid for cattle raising. Not a sign of life could be seen anywhere. Seldom have I seen nature so still and devoid of animal life. What immensity of rich land wasted! It made one's heart bleed to see it. There was everything there to make the fortunes of a hundred thousand farmers--yet there was not a soul! There was good grazing, plenty of water. There were no roads, no trails, it is true, but with a little enterprise it would be easy to make them. With a railway passing through, that now wasted land should become the richest on earth.

In a depression (elev. 2,450 ft.) we came to a streamlet also flowing north, which had made the soil extremely swampy. We had endless trouble in getting across, the animals sinking and sticking in the black mud up to their necks. One of the mules--more reckless than the others--actually disappeared, baggage and all, while madly struggling to extricate itself from the sucking slush and mud. It took all our efforts combined to save that animal. By the time we had all got across, men, animals, and baggage were a sight worth looking at--all filthy, absolutely smothered in black mud.

We rose upon yet another dome, and then descended to the Rio Manso or Rio das Mortes, the head-waters of which were not far from there, to the south-west, in the Serra da Chapada. The river was there only 15 metres wide, but too deep and rapid for the animals to ford, so we had to follow its bank in order to find a suitable spot. The River das Mortes flowed, roughly, first in an easterly then in a north-easterly direction, and soon, swollen by innumerable streams, became the most powerful tributary of the Araguaya River, which it met almost opposite the centre of the great island of Bananal. In fact, one might almost consider the head-waters of the Rio das Mortes as the secondary sources of the great Araguaya. The Rio das Mortes flowed, at the particular spot where we met it, due north, along the edge of the great dome. The elevation of the top edge was 2,470 ft.

We camped that night on the Ribero do Boi, a swift torrent tributary of the Rio das Mortes (elev. 2,250 ft.), having marched 30 kil. that day. The cold was relatively severe during the night--the thermometer registering a minimum of 48° Fahr.

We were travelling entirely by prismatic compass. My men--who had no faith whatever in what they called the *agulha* (compass)--swore that we were going to sure perdition.

"How can that *agulha*," said they, "possibly tell you where we can find beans (*feijo*), lard (*toucinho*), and sugar bricks (*rapadura*)?" "It is the invention of some madman!" said one. "It will bring us to our death," sadly reflected another. "If I had only known that we should be entrusting our lives all the time to that *agulha*," murmured a third, pointing contemptuously to the compass, "I should have never come. Oh, my poor mother and wife! And my dear little daughter six months old! Oh, shall I ever see them again ... shall I ever see them again?" Here followed a stream of bitter tears, wiped with the ragged sleeve of his shirt.

I thought that a cold bath would do them all good. I ordered them to take all the animals and baggage across the stream. It was a job of some difficulty, owing to the very swift current. A rough bridge had to be constructed over the most dangerous part. The water was freezingly cold.

On leaving the river we at once rose again over another great dome (elev. 2,350 ft.), from which we obtained a most glorious view of other grassy domes, smooth-looking and well-rounded, with a fringe of forest in the depressions between. Down below we could see the Rio das Mortes we had left behind. It came at that spot from the south-east, and after describing an angle turned to the north-east. From the north-west, at an elevation of 2,300 ft., descended the Taperinho, a small tributary which entered the Rio das Mortes.

We went over another domed mount, where I found a spring of most delicious water emerging in a gurgle from the very summit of the dome, at an elevation of 2,400 ft. On all sides we had beautiful domed prominences with wonderful grazing land.

Alcides--careless, like all the others, with his rifle--was nearly killed that day. His rifle went off accidentally, and the bullet went right through the brim of his hat, just grazing his forehead. But we were accustomed to this sort of thing--it had happened so often--and I began to wonder when bullets would really wound or kill somebody. Indeed, we had a guardian angel over us.

[Illustration: A Picturesque Waterfall on the S. Lourenço River.]

We had descended into the belt of forest in the depression (elev. 2,270 ft.), where a streamlet flowed to the north-east into the Rio das Mortes. We were travelling in a north-easterly direction, owing to the formation of the country; but finding that it would take me too much away from my intended course I again altered our direction to a course due north. At an elevation of 2,480 ft. we went over an extraordinary natural bridge of solidified ashes and earth--a regular tunnel--under which passed a streamlet of delicious water--the Puladó Stream. The river emerged some distance off from under the tunnel. Curiously enough, while the vegetation was quite dense both above and below the natural bridge, there was no vegetation at all along the hundred metres forming the width of the bridge. Perhaps that was due to the lack of evaporation in that section, which supplied the trees elsewhere with moisture.

We rode over many domes of an elevation of 2,550 ft., and then over some that were smaller in diameter but of greater height. In the depressions between we invariably found rows of *burity* palms amidst other vegetation, and the characteristic heavily foliated trees.

We encamped near a delicious spring of water on the very summit of a dome. The water emerged from a circular hole and was warm--so much so that the next morning, when my Fahrenheit thermometer registered an atmospheric temperature of 50°, steam rose from the water of the spring. Around the spring a curious conical mound of white finely powdered matter resembling kaolin had formed. This appeared to me to have formerly been a small geyser. The cone was broken on one side and the water did not come out with great force. A few yards down the slope of the dome another similar white cone was to be seen, with a great mass of granular ash-pellets and tufa, such as are commonly found near geysers or thermal springs. We called that camp Cayambola.

On the night of June 12th the minimum temperature was 50° Fahr., the elevation 2,430 ft. The sky was somewhat clouded, the clouds occupying four-tenths of the heavens. At sunrise we observed radiations in the sky--this time, curiously enough, from north-east to south-west, instead of from east to west. The longest and highest semicircle above us was in double filaments, and resembled an immense fish-bone.

We were supposed to be then in a country infested by cannibal Indians--swarms of them. My men were quite amusing in their fears. Four of them were troublesome and insisted on the whole expedition turning back in order to see them safely out of danger. I remembered on those occasions an old Italian proverb which said that to "women, lunatics, and children" the wisest thing is always to say "Yes."

So when they threatened all kinds of things if we did not return I generally answered that we would continue a little farther, then we would see; and from day to day this went on, making forced marches forward all the time--generally of from 30 to 42 kil. daily. The dissatisfaction among my men grew, nevertheless, considerable, and a constant watch had to be kept over them. Alcides and Filipe the negro showed great courage, and, whatever other failings they may have had, they invariably displayed extraordinary bravery from beginning to end.

Alcides' principal faults were his great wastefulness and violent temper and pride, which made it most

difficult to deal with him. He had been entrusted with the commissariat, as with all my other occupations I could not be bothered to sort out and weigh the food for each man at each meal. Alcides would not understand that it was unwise, in a country where absolutely nothing was procurable, to throw away daily little mountains of rice and beans and preserved meat, after the men and our dogs had gorged themselves; and that perhaps it would lead some day to our dying of starvation. In confidence I had told him that we might be several months--perhaps a year--before we should be able to get fresh supplies. A little economy would perhaps save us all from disaster. I wanted everybody to have ample food, but I did not see the use of throwing away daily a larger quantity than the men actually ate. It was true that we still had ample provisions of all kinds for some eight months, but we must be prepared for all emergencies.

Alcides, who was extremely obstinate, would not hear of this. My remarks only made things worse. The waste from that day doubled, and looking ahead into the future it really broke my heart, as I well saw that we should have hard times in front of us--all because of the lack of common-sense on the part of my followers.

On leaving camp we climbed to the summit of another gigantic dome of green pasture land (elev. 2,500 ft.). We filled our lungs with the delicious air, slightly stirred by a fresh northerly breeze. Geographically, we were at a most important site, for it was from that point that the division of waters took place between those flowing eastward into the Araguaya and those flowing westward into the Cuyabá River. So that within a distance of a few kilometres we had visited the region--the very heart of Brazil--from which the waters parted to flow toward three different points of the compass.

From that point we rose still higher to the summit of a great table-land, absolutely flat and waterless for over 30 kil. The soil was red in colour, with slippery dried grass upon it and sparse, stunted vegetation. The trees seldom reached a height of 5 ft. They were mostly *gomarabia* or *goma arabica*--a sickly-looking acacia; *passanto* with its huge leaves, *piqui* or *pequia* (*Aspidosperma sessiliflorum* and *eburneum* Fr. All.), the fibrous *piteira* or *poteira* (*Fourcroya gigantea* Vent.), and short *tocun* or *tucum* palms (*Astrocaryum tucuma* M.). Occasionally one saw a *passanto* tree slightly taller--perhaps some 10 to 12 ft. high--most anæmic-looking.

After having travelled some 24 kil. from our last camp we came to a great expanse of *taquary*, a kind of shrub 3 ft. high with spiky leaves of a wonderful green colour.

We gazed upon the superb view of an enormous plateau to the west with deep indentations in its vertical sides. Huge spurs or rams of rock stretched out across the deep depression, separating the plateau to the west from the one on which we were standing. Both plateaux were of equal height, and had evidently at one time formed one immense flat surface. On our side the plateau showed a huge slip of red volcanic earth, with a lower stratum parallel to it of baked brown rock. Under it were white lime and ashes, in sections or drifts. In the centre of the valley formed by the separation of the two sections there remained a formidable crater--extinct, of course--with an arc-shaped wall standing erect in its centre, and other lower walls forming an elongated quadrangular channel from south-east to north-west in the bottom of the crater. Two conspicuous monoliths stood up behind the huge lip of the crater to the south-west at the bottom of the valley, and also other remnants of the great convulsion of nature which had once taken place there.

[Illustration: A Cañon of Matto Grosso.]

Notwithstanding the constant annoyance of my followers, I really enjoyed my journey over the central plateau. The air was fresh and deliciously crisp and clear. One could see for miles and miles and distinguish the smallest detail in the far-away mountain sides, so pure was the atmosphere. This scene was unlike any in other countries. One could describe an entire circle around oneself, and nowhere did the eye meet a column of smoke rising above ground to indicate the presence of man. Not a bird was to be seen or heard, not a footprint upon the ground of any beast or creature of any kind. The silence of that land was most impressive. Our voices--as we spoke--sounded astonishingly and abnormally sonorous, in that region which for thousands of years had not been contaminated by sound. It seemed as if the sound-waves, undisturbed by the myriads of

sounds which--as is well known--remain floating in the atmosphere in inhabited countries, were heard there in all their full and absolute purity. So much were we all impressed by this fact--my men unconsciously--that all the men began to sing, so pleased they seemed with the powerful vibration of their own voices.

To the north-west another lovely sight was before us--another huge plateau in dim greyish blue--barring the horizon. In front of it was one more table-land, more broken up, and sloping on the south side.

When we reached the north-east edge of the plateau we were travelling upon, we were treated to a fresh marvellous scene. Straight in front of us, on the opposite side of a deep depression--at 30° bearings magnetic--there stood one of the characteristic two-tiered table-lands stretching from east to west. Below us in the depression was an undulating line from north to south of great bosses or domes of exquisite grassy land, resting upon a kind of spur or peninsula jutting out from our plateau--but at a lower elevation--of which it formed part.

A formidable crack in the earth's surface extended from north to south on the east of the chain of domes, whereas to the east again of the giant crack was another row of domed hills, forming--when taken as a mass--an undulating terrace; then a vertical wall, above which rested the sloping side of the plateau on which we stood. It may be observed that the strata in the split vertical wall on our side was absolutely horizontal. On the summit of this rocky stratum lay a deposit, 30 ft. thick, composed of red earth and sand over yellow sandstone and ashes, and, lower, grey ashes compressed and consolidated. The lowest stratum visible on the face of the wall was of bright red-baked rock.

The great depression, taken in its entirety, extended from south-east to north-west. The huge crater was to the south-east. To the south-west there was an immense basin.



## CHAPTER XXIII

The Jangada River--Demented Descendants of Slaves--Appalling Degeneration--Giant Monoliths--The River Roncador--Gigantic Natural Gateways--The Discovery of Fossils

WE had reached the end of the comparatively flat plateau, which varied in elevation on its summit from 2,530 ft. to 2,570 ft. above the sea level. We were next faced by a most precipitous descent in order to go down to the Jangada River--which eventually flowed into the distant Rio Cuyaba. There was, of course, no trail of any kind, and the course of the descent before us was not unlike trying to take our animals down the almost vertical wall of a fortress. With picks and spades we cut a narrow path for a short distance in order to start the reluctant beasts down. I recommended the greatest care to my men, but instead of following my instructions they drove the rebellious quadrupeds with their whips in a heap along the path--only a few inches wide--which we had cut. Result: Collisions among the animals and against the wall, and, next, five mules and baggage rolled down the mountain-side at a vertiginous speed until they had reached the bottom, some hundreds of feet below. Antonio, the strong man of the party, who tried to go to the rescue of one of the animals, was also dragged down, and came within an ace of losing his life. He was able to embrace a shrub with all his might just before rolling over the precipice, and we rescued him. We had to waste a great deal of time cutting an improvised way in the mountain side. Then we had to unload all the animals and convey the loads down on men's heads. Each animal was then with great difficulty and danger led by hand down to the stream.

Great quantities of beautiful marble and crystals were met with, and masses of lava pellets and ferruginous rock. In the Jangada valley we found two hot springs emerging from the side of the plateau from which we had descended. I discovered there two miserable tiny sheds belonging to a family of escaped negro slaves. They had lived seventeen years in that secluded spot. They grew enough Indian corn to support them. All the members of the family were pitifully deformed and demented. Seldom have I seen such miserable-looking specimens of humanity. One was demented to such an extent that it was impossible to get out of him more than a few disconnected groans. He spent most of his time crouched like an animal, and hardly seemed conscious of what took place round him. Another was a deaf and dumb *crétin*; a third possessed a monstrous hare-lip and a deformed jaw; while two women, dried up and skinny, and a child were badly affected by goitre. For a single family that seemed a melancholy spectacle.

[Illustration: How Author's Animals rolled down Trailless Ravines.]

It was really pitiable--everywhere in the interior of Brazil--wherever you came across a family, to find that all its members were *crétins*, and deformed to such an extent as to make them absolutely repulsive. Frequently I had noticed among the common abnormalities supernumerary fingers and toes. One child at this place, in fact, had six toes to each foot, besides being an idiot, deaf and dumb, and affected by goitre. The only one of the family who was able to realize what took place was terrified at our approach, and never got over his terror as long as we remained. He suffered from the illusion that everybody wished to murder him. For some reason or other he believed that I had come specially, all the way from my own country, in order to search for him and kill him. All the most considerate words on my part, the showering of presents, had no effect upon him. He sat some way off, watching me attentively all the time, and whenever I moved my hands in any direction he dashed away shrieking, thinking that I should attempt to strangle him--for his mania was death by strangulation. After a while he returned, and in his broken, almost unintelligible language--his tongue was nearly paralyzed and he had difficulty in articulating properly--begged to be spared.

Those people lived worse than animals--in an appallingly filthy condition, in two miserable, tumble-down sheds, open on all sides, and not more than 8 ft. high. They were reduced to that condition by intermarriage among themselves; brothers with sisters--a most frequent occurrence among the "civilized" of Central Brazil--and even fathers with daughters and sons with their mothers: a disgusting state of affairs which could not very well be helped in a race and in a climate where the animal qualities were extraordinarily developed

while the mental were almost entirely deficient. Worse still, I had several cases under observation in which the animal passions had not been limited to closely related human beings, but extended also to animals, principally dogs. The degeneration of those people was indeed beyond all conception. It was caused, first of all, by the effects of the most terrible corruption of their blood, their subsequent impoverishment of blood through intermarriage, the miserable isolated existence which they led on scarce and bad food, the exposure to all kinds of weather, and the absolute lack of thought--almost paralyzing the brain power. It was heart-rending to think that human beings could possibly degenerate to so low a level, and--what was worse--that beings of that kind were extraordinarily prolific; so that, instead of being exterminated--which would be a mercy for the country--they were in a small way on the increase.

I camped near the sheds of that "happy family," having gone 42 kil. from the Rio das Mortes. I felt sad the whole night, watching them unperceived. It upset me so that I was ill for several days.

The Rio Jangada, at an altitude of 1,550 ft., was 1,000 ft. lower than the top of the plateau. The river flowed west into the Cuyabá River. We crossed the stream, a rapid and foaming torrent. We soon began to climb again on the opposite side over sweeping undulations. We waded through two more streamlets flowing west--the second at an elevation of 1,650 ft. We were travelling partly among campos on the summit of cones and domes, partly through brush or scrub in the depressions. We struggled on, urging the tired animals, rising gradually to 2,150 ft., then to 2,200 ft., over soil strewn with volcanic pebbles and scoriæ. During the night the minimum temperature had been 53° Fahr., but during the day the sun was extremely hot and powerful, and animals and men were sweating freely. We marched northward, then slightly to the north-west, leaving behind, to the south-west of us, two quadrangular table-lands, rising above the undulating line of a depression.

Shortly after, to the E.N.E., we perceived the section of an extinct crater--the easterly point of its summit being in itself a semicircular subsidiary crater. On one side of the greater crater was a conical depression, at the bottom of which (elev. 2,400 ft.) was an extensive bed of lava blocks of great size--hundreds of monolithic rocks standing up like pillars. In fact, they stood all along the side of the crater as well as inside it. Surrounding a pyramidal hill a group of those huge pillars looked--to a casual observer--just like the ruins of a tumble-down abbey.

Three hours' journey from our camp we reached the summit of a dome (elev. 2,500 ft.). Beyond it was a *cuvette* with its typical central line of *burity* palms.

To the west we perceived a marvellous view of three immense dykes of red rock--like walls--stretching from south-west to north-east; then two more great perpendicular dykes of granite were disclosed close by.

Going over domes 2,550 ft. and 2,450 ft. above the sea level, we obtained a vast and immense view of the *serradão*--wild country--before us, a regular ocean of deep green undulations rising quite high to the south; whereas to the north there extended a long plateau with a deep ravine on its southern aspect.

We descended through scrub (elev. 2,400 ft.)--what the Brazilians call *serradão*--and through a growth of stunted trees (elev. 2,450 ft.) to so low an altitude as 2,300 ft. Going along a rocky cliff, we passed a strange volcanic vent-hole with a pyramid of granite of large proportions on each side of its aperture.

We arrived at the Roncador, a picturesque torrent flowing over a bed of lava moulded in the strangest possible shapes, hollows, terraces and grottoes. Most peculiar were the great concave hollows, circular, oval, and of irregular form, which were innumerable and of all sizes along that extensive flow of lava.

[Illustration: Hideous Types characteristic of Central Brazil.

Two women (left) and two men (right).]

We had travelled 30 kil. that day. That was such a picturesque spot that I made camp on the right bank of the torrent. We were all amazed to find an immense block of rock--resembling in size and form the Sphinx of Egypt--balanced to a nicety over the edge of a conical rocky hill. It was, of course, the work of nature. Why that rock remained there at all and did not tumble down, was more than we could understand. There was also a giant monolith and other strange-looking rocks of great size standing up at all angles close by. On climbing the hill where the Sphinx-like rock stood, I discovered a circular crater of great beauty, 300 metres in diameter. The western wall of the crater had been knocked down, but on the eastern inner side, in the central part 150 ft. high, there was a precipitous fall, then a huge smooth inclined plane of lava at an angle of 15° overlapping the top, where it had subsequently been subjected either to violent earthquake shocks or other disturbing influences, as it was badly seamed and fissured. Many segments had crumbled down, leaving the remaining portion of a most extraordinary shape. In the centre of the crater there stood a huge mass of rock 150 ft. high, which looked like an inclined table--a giant slab cleanly cut at its angles, which protruded at great length outside the base formed by broken-up blocks. On looking west from the summit of the extinct volcano one obtained a marvellous view of the vertical cliffs between which the Roncador River flowed.

Then there was a great table-land extending from north to south, composed of red volcanic rock and white limestone. A separate red quadrangular castle-like structure of immense proportions rose in the middle foreground in the north-west upon a conical green grassy base.

Add to this wonderful work of Nature a magnificent sky of gold and brilliant vermilion, as limpid as limpid could be, and you will perhaps imagine why I could not move from the rock on which I sat gazing at that magnificent, almost awe-inspiring, spectacle. Night came on swiftly, as it always does in those latitudes, and I scrambled down the hill, among the sharp, cutting, slippery, shiny rocks, arriving in camp minus a good many patches of skin upon my shins and knuckles.

At the point where I crossed the Roncador River there were three handsome waterfalls in succession, the central one in two terraces, some 90 ft. high. At the foot of the two-tiered waterfall was a great circular basin which had all the appearance of having been formerly a volcanic vent. The flowing water, which tumbled down with terrific force, had further washed its periphery smooth. The centre of the basin was of immense depth. Directly under the fall a spacious grotto was to be seen under a huge projecting rock.

The elevation of the stream above the falls was 2,150 ft., below the falls 2,060 ft. The temperature of the atmosphere was 72° Fahr., and the minimum temperature during the night 58° Fahr.

The Roncador flowed from north-east to south-west as far as the foot of the great plateau we had observed during our march. There, on meeting the great vertical wall, its course was diverted in a northerly direction and then again to the north-west, where the stream eventually fell into the Cuyabá River. The Rio Jangada, on which we had camped the previous day, was a tributary of the Roncador, and so was the streamlet called Pedra Grande, which entered the Roncador on its right side. The Pedra Grande took its name from an immense monolith, worn quite smooth, near its bank.

From the Roncador we continued on our northerly course. The western view of the "balanced Sphinx boulder" was indeed remarkable. It seemed to stand up on a small pivot despite all the laws of gravitation, the heaviest side of the upper rock projecting far out on one side with nothing to balance it on the other.

Cutting our way easily in the scrub, we rose to 2,300 ft. over a flow of red lava (it had flowed in an easterly direction) in several successive strata. The upper stratum was grooved into geometrical patterns, such as we had met before, wherever it showed through the thin layer of red volcanic sand which covered most of it. We were there in a zone of immense natural pillars of rock, some of such great height that they were visible miles off along the range--which extended from south to north, parallel, in fact, to the course we were following.

Still proceeding due north, we arrived on the summit of a great dome, 2,500 ft., from which point we had to

alter our course to the north-west, owing to an isolated impassable barrier which we left on our right (north). It had steep slopes but well-rounded terminal points. It extended from N.N.E. to S.S.W., and had a height of some 150 ft. above the flat *serradão*, on which my skeleton-like mules wended their way among the stunted trees, the bells dangling from their necks monotonously tinkling--not the gay, brisk tinkling of animals full of life, as when we had left Goyaz, but the weak, mournful sound--ding ... ding ... ding--of tired, worn-out beasts, stumbling along anyhow. Occasionally one heard the crashing of broken branches or of trees collapsing at the collision with the packs, or the violent braying of the animals when stung in sensitive parts by an extra-violent fly; otherwise there was silence, the silence of death, all round us.

The poor brutes tore mouthfuls of grass, now on one side then on the other, as they went along; but the grazing was poor in the *serradão*, and the animals found only enough to subsist upon. Two of them were absolutely disabled, owing to accidents we had had; and, with the animals I had lost, this involved loading extra heavily those still able to carry. The constant collisions against the stunted trees in that trail-less region injured the animals considerably and caused nasty sores and swellings all over their bodies. I saw well that the poor beasts would not last much longer. It was impossible to halt a sufficient time to let them recover in that particular region, with food so scarce--it would have taken them months. In the meantime our provisions were being fast consumed--or rather wasted--and we had thousands of kilometres to go yet. My men never suspected this, or they would have never come on; but I knew only too well.

They still insisted on marching with their loaded rifles, fully cocked, resting horizontally upon their shoulders; and as we marched naturally in single file, and as we used cordite cartridges with bullets of high penetration, there was still a prospect of a bullet going through one or more of us. Once or twice again a rifle went off unexpectedly by accident. It would have been terrible for any one of a nervous temperament to be travelling with such companions. On previous expeditions I had generally trusted in myself, but on this particular one I was so disgusted that I had made up my mind to trust in Providence alone. I did well, for had I done otherwise I might have fared much worse than I did.

We went over a pass (elev. 2,400 ft.) between two small domes, quite barren but for a scanty growth of short dried grass. We were marching over masses of lava and conglomerate with innumerable marble pellets. We found ourselves within a regular circle of low hills enclosing a shallow depression. Subsequently we came to a second and then to a third similar depression.

[Illustration: Author's Caravan marching across Trailless Country.]

[Illustration: The Roncador River.]

Continuing in a north-westerly direction we again obtained a gorgeous view of the treble *portal*--by which word the Brazilians describe a monumental entrance of any kind. That is just what those three immense gaps in the plateau looked like: an immense wall of rock forming a high barrier, with three gigantic natural gateways.

After finding a stream of good water on the west side of the plateau we rose again higher, obtaining a splendid bird's-eye view of the picturesque depression we had just crossed. The effects of erosion following those of volcanic activity were evident enough upon the entire landscape. On the west side we had a horseshoe-shaped vertical wall--seemingly containing an extinct crater--and yet another on the north side of the western end of the elongated ellipse which was there formed.

With some difficulty we managed to get the animals up to the summit of the plateau (elev. 2,580 ft.). From there we obtained a sumptuous view beyond. An immense dyke of brilliant red rock, flat-topped, lay majestically to the west. At its foot the Rio Pedra Grande had its birth, and then flowed westward into the Rio Roncador. Four gigantic flat table-lands stood impressively in a line. Three more, equally impressive, loomed in the south-west. Other minor ones, quite wall-like--rectangular in vertical section--appeared in the blue

distance, while the horizon was barred by a long flat plateau.

Looking north as we descended from the table-land, we found on our left another extinct crater--semicircular in shape, with several superimposed strata of lava, each about one foot thick, capping its lip, which was broken up into three sections. The valley below that crater formed a *cuvette*, the bottom of which (elev. 2,200 ft.) showed deep erosion by water in one or two places. Sand covered the lava-flow which had travelled northward. Quantities of heavy, spherical, bullet-like blocks of hard-baked rock were scattered all about--evidently shot out of the crater when active.

We had travelled 80 kil. from Cayambola in three days, and we had reached a spot of slight, well-rounded undulations where grazing was fair. I decided to halt early in the afternoon--more particularly as this spot appeared to me to have been at one time or other submerged--probably it had been a lake bottom. I had, since the beginning of my journey, been searching everywhere for fossils--but in vain. I had not seen the vestiges of a single one. Personally, I was persuaded that Central Brazil could well be geologically classified in the archaic group--the most ancient of the terrestrial crust, and consisting (in Brazil) chiefly of gneiss, mica schists and granite, solidified into their present form by intense eruptive phenomena and dissolved--not by immersion in ocean waters, as some suppose, but by deluges of such potentiality as the human mind can hardly conceive.

It was quite enough to visit the central plateau of Brazil to be persuaded that that continent had never been submerged under a sea; on the contrary, it must have been the oven of the world. The volcanic activity which must have taken place in that part of the world--it was not a separate continent in those days--was quite, as I have said, beyond human conception. This does not mean that at later periods there may not have been temporary lakes--as, for instance, in the spot where we encamped that night--or portions of country which had become flooded, upon the cooling of the earth, and subsequently became drained and dry again.

A wonderful surprise awaited me that day. To the north of my camp was a peculiar round mound. I climbed it, and what was my astonishment in the short ascent to find near the summit, among a lot of lava pellets, marble fragments, crystals, and great lumps of iron ore, a number of vertebræ from the tail and spine of a giant reptile! The vertebræ had been disjointed and scattered somewhat about by wind and water--but there they were; the smaller ones on the side of the hill, the larger on the summit--which led me to believe that the animal had crouched on the top of the hill when dying. Some of the fossil vertebræ were so large and heavy that I hardly had the strength to lift them up. The bones--petrified--were of a beautiful white. Many of them had, unfortunately, become so fractured as to make identification difficult. On following the line of the dorsal vertebræ--somewhat scattered about--I came upon some vertebræ which appeared to me to be cervical vertebræ; and then, behold my joy! in searching around the summit of the mound I perceived the skull. The skull was so big and heavy that I could not carry it away, but I took several photographs and careful drawings of it from all sides.

It was curiously shaped--quite unlike any other fossil skull I have seen. The cranial region proper was extremely short, with smallish round orbits rather low down on the side of the head. The skull had an elongated shape: 35 cm. was its total length; 10 cm. its maximum transverse breadth, and 5 cm. at the central and widest part of palate. The skull itself, with an elongated nasal bone, had a flattened point almost like a beak, or more probably like the base of a proboscis. The front part of the nose had unfortunately become fractured and ended with a flattened segment. A marked arch or hump stood prominent upon the nasal bone. The temporal arcades were quite developed, with prominent supra-orbital bosses. The orbital hollows were 5½ cm. in diameter, whereas the external nares were 9½ cm., the protrusion in front of the nostrils being 10 cm. long. The palate, of great length, had a peculiar complex shape, like a much-elongated U with another smaller U attached to it in the centre of its curve, [Symbol].

The skull had been worn down by age and weathering. Moreover, one side of the upper part of the cranium had been entirely destroyed--seemingly by having rested on red-hot lava. Many of the vertebræ were equally

injured. By even a superficial examination it was easy to reconstruct the tragedy which had taken place on that hillock thousands upon thousands of years ago.

Searching about, I came upon another skull of a huge reptile, and a number of smaller vertebræ than those belonging to the animal above described. The second skull was much flattened, of an elongated shape, very broad, the orbital cavity being high up on the skull--in fact, not unlike the skull of a great serpent. It possessed a long occipital spur, extraordinarily prominent, and fairly well-defined zygomatic arches--but not quite so prominent as in the skull previously discovered. Seen from underneath, there seemed to be a circular cavity on the left front, as if it had contained a large fang. This skull, too, was also much damaged on one side, where it had rested on some burning matter--evidently lava or lapilli. The skull measured longitudinally 48 cm. and was 23 cm. broad. Seen from underneath it resembled a much elongated lozenge.

Although I searched a great deal I could not find the lower mandibles of these two skulls, nor loose teeth--but many indeed were the fossilized fragments of bones of other animals strewn all over the hill-top. I found up there quite a sufficient quantity to make the summit of that hill look of a whitish colour. That was why I had been attracted to it at first sight, and had climbed it in order to discover why it was so white. One immense bone--fractured--was the pelvis of the larger animal. Nearly all those fossils were in terrible preservation, much damaged by fire and water. Some were so eroded as to be quite unidentifiable.

Most interesting of all to me were two smaller skulls--one of a mammal not unlike a leopard or jaguar, the other of an ape or perhaps a primitive human being. The latter cranium, like all the others, had one side completely destroyed by hot lava, which in this instance had also filled up a considerable portion of the brain-case. The human skull was small and under-developed, no sutures showing; the forehead extremely low and slanting, almost flattened, with the superciliary region and glabella very prominent. One of the orbits (the right) was badly damaged. The left, in perfect preservation, was oval, very deep. The form of the palate was of a broad U-shape--abnormally broad for the size of the head. The upper jaw was fairly high and prominent, whereas the zygomatic arch on the left (the right was destroyed) was not unduly prominent--in fact, rather small and less projecting than the supra-orbital region. Of the nasal bone only just a fragment remained. The brain-case was small but well-rounded at the back, where it had comparatively a fairly good breadth behind the auditory meatus.

In my anxiety and enthusiasm, I used up, in photographing the first skull I found, the only two photographic plates which remained that day in the camera I had brought with me up there. In order to obtain a fuller view of the skull on the negatives I placed it on a rudimentary stand I constructed with broken branches of a tree. The sun had already set when I discovered the two smaller skulls, and in any case I should not have been able to photograph them that day. Well recognizing their immense value, I enveloped them in my coat, which I turned into a kind of sack by tying the sleeves together, and, with a number of vertebræ and a knee-joint I had collected, proceeded to carry the entire load, weighing some sixty pounds, back to camp, a mile away.

On my arrival there I met with a good deal of derision from my ignorant men. I was faced with a problem. Had I told the men the immense value of those fossils, I feared they might be tempted to steal them and sell them whenever we first reached a civilized spot--which, true enough, might not be for many months; a fact my men did not know and never for one moment realized. If I did not tell them, I should have to stand their silly derision as long as the journey should last--for they openly and loudly argued among themselves the view that I had gone mad, and what better proof could they have than my carrying a heavy load of "ugly stones" as my personal baggage?

Of the two I came to the conclusion that derision was better than being robbed. So I took no one into my confidence. I merely stored the fossils carefully away in a large leather case, meaning to take them out some day to photograph them as a precaution in case of loss. Unfortunately the opportunity never offered itself, for we made forced marches every day, from early morning until dark, and unpacking and repacking were very inconvenient--each package having loops of rope fastened round, in order to be readily attached to the saddles,

which took much time and trouble to undo. Then the ridicule of my men each time the "ugly stones" were referred to also kept me at first from unduly attracting their attention to them. With the many things I had to occupy my time day and night I ended by forgetting to take the photographs--greatly owing to being almost certain that I should bring the skulls themselves safely back to Europe. But the unexpected always happens. We shall see later on how--after having carried those fossils safely for several months--they were, unknown to me, wilfully flung, together with a quantity of provisions, into a deep part of the Arinos River by my companions, and they were beyond recovery.

Greatly to my regret, we left that interesting spot the next morning. A drenching rain prevented my paying a second visit to the two hillocks where the fossil fragments were to be found, but I took the exact position of them, so that any further expedition could locate the spot with great ease.

It was interesting to note that a Brazilian expedition had discovered some fossil bones of a gigantic animal some 200 kil. south-west of that place, and other remains of a giant animal had been found by another Brazilian expedition on the banks of the Paranatinga River, some 400 or 500 kil. north-east of our position.

We were encamped on the bank of the Rio Pedra Grande--the stream of that name which we had passed that day being merely a tributary. During the night we had observed a double-ringed lunar halo. The moon was almost full. From the horizon directly under the moon were innumerable radiations, not converging toward the moon but, curiously enough, the first two at a tangent to the larger halo, the others at equal intervals on each side.

At sunrise, before the rain-storm began, we were treated to wonderful cloud and light effects. The lower portion of the sky, of brilliant yellow and vivid green, was surmounted by golden and red streaks of wonderful vividness. Later, over the great natural gateways, the sky formed itself into concentric arches of blazing yellow and red, rendered intensely luminous by contrast with the heavy black clouds which were fast collecting overhead. No sooner was the sun well above the horizon than we came in for a heavy downpour.

[Illustration: Fossil Skull of a Giant Animal discovered by Author.

(Side view.)]

[Illustration: Fossil Skull of Giant Animal.

(Seen from underneath.)]

The temperature had been higher (minimum 60° Fahr.) than usual during the night, and heavy. The elevation of our camp was 2,030 ft. above the sea level.

**CHAPTER XXIV**

A Swampy Valley--Impressive Scenery--"Church Rock"--Escaping before a Forest Fire--The Rio Manso--Difficulties of marching across Virgin Country--Beautiful Rapids

ON leaving camp (June 15th) I noticed that the hills on which I had found the fossils formed a semicircle to the west. Rising quickly to an elevation of 2,070 ft., we were in sight of two great table-lands which stood to the west. In crossing the river I found a number of other fossils, among which was one that appeared to be the petrified foot of an animal of enormous proportions.

We soon crossed the little stream Lazineha, which flowed into the Pedra Grande. As we travelled over two ridges (altitude 2,100 ft. and 2,130 ft.) separating deep basins, and the weather cleared a little, the view before us of the entire line of natural gateways, with two additional pyramidal and prismatic peaks to the south, became more and more beautiful. There was a strong breeze blowing from the north-east. At an elevation of 2,150 ft. we found quantities of marble chips and blocks and great masses of ferruginous, froth-like rock.

As we went along we obtained an imposing view to the north of an immense plateau in three terraces, the lower one appearing like the sea--it was so blue--with the brilliant red upper portion rising out of it like a great island. The foreground of dark green, in great undulations, stood out in contrast to the light green of the slopes of the plateau on the top of which we were marching.

Central Brazil was certainly a country of flat sky-lines--so flat that often when the distance became of a pure cobalt blue one had the impression of overlooking an immense ocean, to which the green undulations in sweeping lines in the nearer foreground added the impression of great waves.

It was indeed difficult to realize the stupendous magnitude of the scenes we constantly had before us. That day, for instance, the plateau to the north of us stretched across towards the east for 70° of the compass from bearings magnetic 320° (N.N.W.) to 30° (N.N.E.). Above the plateau was a strange effect of clouds--a succession of arrow-shaped, nebulous masses.

We still came upon basins of grey ashes--*cuvettes*--but in that region these were deeper than those we had observed so far, had luxuriant grass, and in the moist centre the invariable line of *burity* palm and heavily foliated trees.

Travelling on a northerly course, and then to the north-west, we descended, after having marched 20 kil., into a basin (elev. 1,950 ft.) where a thick and wide deposit of fine white sand and minute crystals covered the deeper part of the depression. Then, farther on, the sand was replaced by the usual deposits of grey ashes which filled the remainder of the basin. A streamlet which had its birth in the centre of the basin flowed north into the Rio Manso, along one of the many cracks which were to be seen in that region and in the depressions we had previously crossed. We came upon a mighty flow of red and black lava with a somewhat frothy surface. It was in superposed layers from one to six inches deep, with an inclination to the east of 15°. The flow itself had a direction from west to east.

As we were marching by compass, with no trail whatever, we found ourselves entangled in a swampy valley with tall reeds, from which we had some difficulty in extricating ourselves. We eventually had to retrace our steps for six kilometres in order to find an easier way for our animals. After an examination of the country with my telescope from a high spot, I decided to go westward across a flat swampy plain of ashes, sand and water--most troublesome for the mules and horses. They sank deep into the soft ground and frequently rolled over, damaging saddles and baggage. One or two of my men had involuntary baths when the animals' knees gave way under them.



As soon as we had emerged from that wearisome marsh the animals and men were so tired--although we had only gone 22 kil. from our last camp, without counting the deviation (28 kil. with deviation)--that I had to encamp on the bank of the streamlet Fasciná, coming from the west. There we had the laborious task of spreading to dry all the articles that had got wet--including my bedding, tent, and a quantity of my clothing, which was not packed like all the rest in air- and water-tight cases.

The stream Fasciná flowed into the Rio Furnas and eventually into the Rio Manso to the north--the latter a tributary of the Cuyabá River. That region had been rich in Mangabeira (the *Hancornia speciosa* M.)--a wild lactiferous plant of much value, producing a fruit called the *mangaba*.

June 16th. Minimum temperature 54° Fahr.; elevation 1,940 ft. On leaving camp, after a good deal of trouble in recovering our animals in the morning, as they had strayed in all directions, we found ourselves travelling along the edge of a large grassy basin (elev. 2,000 ft.) extending from south-east to north-west, with a wonderful growth of *burity* palms; then upon a second basin (elev. 2,100 ft.) with deep deposits of ashes. We climbed higher, to 2,150 ft., where we found a third oval *cuvette* with a surface layer of ashes--merely a continuation of the preceding *cuvette*. We here resumed our northerly course, going through what the Brazilians call *chapada*, or high land scantily wooded.

To the south-west we had a high plateau with round natural towers of red rock, resembling the walls of a fortress. Those red cylindrical towers stood all along the summit of the range--with immense square blocks of grey rock above them in horizontal strata. In the centre of that long range could be perceived a double-tiered crater and several grottoes. In its northern section the range was vertical, with red and yellow rocky walls over 300 ft. high. On the summit of that rocky stratum were other strata with a dip to the south. Half way up could be observed a red ledge about 10 ft. thick (also with a dip to the south) all along the entire length of the range. Colossal blocks and flows of lava were to be seen 300 yards east of this range. In one place was an immense natural arch--like the work of a skilful mason. At the northern end of the range stood a castle--the work of nature--with three square towers, and between them numerous monoliths or pillars standing on walls of columnar formation.

Evidently there was a crater in that northern part, the castle-like structure being merely formed by many superposed layers of yellow lava. Near the throat of the crater the lava was hard baked and of a bluish red colour. In the lower section the strata were each 6 ft. thick, under a smooth band, absolutely horizontal, 100 ft. in thickness. There were then two top layers, each 20 ft. thick, and four more layers each 4 ft. thick, and slightly wavy. The last ones were somewhat shattered, and displayed large blocks moved out of position--apparently by a volcanic explosion.

In going round the northern corner of the range more similar buttresses, like towers, were disclosed--I could count as many as eight--projecting out of the immense vertical block of rock. Those buttresses were of brown and bright yellow rock. The range had a general direction from south-east to north-west.

Great deposits of white sand and ashes were noticeable on the surface. In cuts and in the bed of a streamlet were strata of consolidated ashes in distinct layers one inch thick. The foot of the gigantic rocky mass was at an elevation of 1,700 ft. We were on a slanting plane forming a conical basin in continuation of the crater. To the north, where the basin opened, was a great stretch of cobalt blue in the distance, which looked just like a glimpse of the ocean. But it was not; it was the far-away plateau we had seen for some days.

We were now entering a region of the most impressive and weird scenery I had ever seen, except, indeed, in the Himalaya Mountains. Directly in front of us towered the Morro Plumão, a most striking giant block of rock several hundred feet high, standing quite alone, and resembling a church surmounting a mediæval castle--not unlike St. Michael's Mount, only with land around instead of water. Even quite close to it the illusion was perfect. This wonderful natural structure of dark red rock was in perfectly horizontal strata, each 10 ft. thick, separated and clearly defined by whitish lines, which aided to give the illusion of a wonderful

work of masonry.

"Church-rock," as I called it--or "Spray-rock" (*Plumão*), as my men named it--stood majestically in solitary grandeur in the middle of a great subsidence of the soil. That great subsidence was in turn bordered by immense vertical cliffs of the same rock of which "Church-rock" was formed. Indeed, it was clear that the soil had given way, leaving only that great rock standing. Even my men--for the first time since they had been with me--were deeply impressed by that wonderful spectacle; so much so that they all took off their hats, as Brazilians always do in passing churches.

We traversed the great depression, which gave us irrefutable evidence of what had taken place in that zone. The great rocky, plateau-like mountain to our left had split and fallen over on the north side, describing an arc of a circle of 90°. In fact, as we went along, in places where the rock under foot was exposed, we were treading over laminated rock, the stratification of which was vertical, and corresponded exactly to that of the upstanding wall where the stratification was horizontal.

Behind "Church-rock" to the north-west was a massive plateau, beyond which stretched an immense undulating depression with two outstretching spurs from south-west to north-east upon it. "Church-rock" was 26 kil. from our last camp.

On the north side of "Church-rock," close to the conical hill upon which the giant quadrangle of rock rested, was a hump formed by huge blocks, the top one--a colossal one--just balanced, as if it might tumble over at any moment. Then on the side could be seen a lava-flow and huge masses of lava which had been shot up with great force and curled over, retaining the frothy appearance of its former state of ebullition.

Strangely enough, even when seen from the side and from behind (N.N.W. view), "Church-rock" retained all the semblance of a castle and church perched up on that high pinnacle. From the N.N.W., besides the castellated towers which surmounted all, there appeared a perfect representation of a gabled roof over the body of the church, as well as the flying buttresses of the walls. Behind was a great cylindrical annexe with a semi-spherical superstructure, such as is often to be seen behind Roman Catholic churches. The illusion was really wonderful.

Owing to the pools of water not far from "Church-rock" we called that spot *Caponga de la Lagõa*.

A few hundred yards beyond "Church-rock" we came upon another extraordinary sight: a quadrangular rocky castle--a perfect cube of rock--which stood at a considerable elevation upon a conical base, some distance off the wall-like sides of the plateau. Strangely enough, a thin wall of rock, only a few feet thick, quite vertical, of great height and of great length, joined this quadrangular castle to the plateau. That wall had evidently remained standing when the plateau had subsided. The larger plateau along the foot of which we travelled ended in two great domes, one at each angle of its eastern terminus wall. The eastern part of that plateau was flat-topped, whereas the central portion rose into a double pyramid and looked not unlike a giant tent with a porch attachment. It was of a bright yellow colour--apparently sandstone and ashes. The work of erosion had been greater on the eastern face--owing, I think, to the prevalent wind on that side.

On looking back upon the great range of rock which ended abruptly near "Church-rock" (which, as we have seen, once formed part of it), a great semicircular cavity was disclosed on its western face. The summit of the wall around the cavity rested on an inclined plane, which in its turn rested above a vertical concave wall. The latter wall of rock had conical buttresses at the terminal points.

West-north-west of the great wall was an immense depression. Only a conical hill rose above its last undulations. The upper edge of that depression was at an altitude of 1,550 ft. above the sea level, whereas the top of "Church-rock" was fully a thousand feet higher--viz. 2,550 ft.

[Illustration: A Grand Rock.

"Church rock."]

[Illustration: Church Rock.

(Side view.)]

At the terminus of the first section of the cliff range, interrupted by a great fissure from the second section, another structure in course of formation not unlike "Church-rock" could be observed. It had a quadrangular tower surmounting it. There was in the second section of the range a regular quadrangle of rock, with a high tower upon a conical hill, and another castle-like structure surmounting a conical base. The two were most impressive as they stood in their sombre red against the brilliantly blue sky.

Next to the second section of the range, to the north, was a high mountain of two twin-pointed peaks, shaped like a badly-pitched tent. Then came another plateau, much eroded on its south side. Beyond was an immense black plateau on three successive tiers--and this one, unlike the others of which it was merely a continuation, had sloping instead of vertical sides.

We had a nasty experience that day, which for the moment made us forget the beauty of that wonderful scenery. We were going through high scrub and stunted trees and tall grass, much dried by the intense heat--quite suffocating in the basin with the refraction from the huge rocks. A strong breeze sprang up, and we were delighted--when we saw, fast approaching, a dense black and white cloud rolling, as it were, along the ground. As it got nearer there were such loud crackling and explosions that it seemed like the volleys of musketry in a battle. My horses and mules pricked up their ears, lifting their heads high--sniffing, neighing, and braying. They became restless. Before we had time to realize what was the matter, we saw tongues of flames shoot out from the earth. Within a few seconds, with the wind which was blowing high, we found ourselves with a barrier of fire close upon us behind and fast gaining upon us. The trees seemed to flare up in a moment like matches or fireworks. A wave of terrific heat took our breath away. We were almost suffocated. There was only one way of escape--in front of us. For to the left we had the impassable barrier of rock; to the right the flames had already gained on us in a semicircle like a claw of fire. We stirred on our animals, lashing them. My men, with their heads wrapped to prevent suffocation from the stifling smoke, were in a great state of excitement. They were about to abandon the animals in order to save their own lives; but Alcides, Filippe, and I kept the rear, endeavouring to save men, baggage, and animals. The flames gained on us very quickly. They occasionally almost licked our animals. The mules and horses, now fully enveloped in dense, choking smoke, began to stampede, and soon all the animals were galloping away, sniffing, neighing and braying frantically. In their disorderly flight they crashed against trees and tore off branches; stumbled over rocks and rolled over themselves; struggling up on their feet only to resume their mad race for life.

For some little time it was all we could do to keep a few yards in front of the flames, the heat of which was roasting our backs and necks. At last, in a desperate effort, we managed to get slightly ahead, and when we descended--some of the animals rolled down--into a deep depression, we found ourselves clear of the smoke. The wind was unfortunately blowing the way we were travelling, but in that depression we were sheltered, and the fire would not travel so fast. Our eyes were smarting terribly and we were coughing violently, our parched throats and lungs, filled with the pungent smoke, giving us a feeling of nausea. When we had reached a point of comparative safety we had to readjust all the loads on the pack-saddles, which had almost come undone. It was a wonder to me that in the precipitous flight we had lost nothing.

We had unavoidably deviated several kilometres from our course, as the animals were beyond guiding under those circumstances. Eventually, after a considerable detour in order to avoid the flames, we went over several undulations--especially a peninsula-like spine of rock rising over a great depression, then between two twin mountains. We emerged on the bank of the Rio Manso, flowing northward on a pebbly bed. We crossed it

where it was one hundred metres wide, but only 2 to 3 ft. deep. There was a thick growth of vegetation--a belt some hundred yards wide--on both banks of the river. The Rio Manso was there at an altitude above the sea level of 1,150 ft.

I took observations for longitude, and latitude by double altitudes at that place. (Lat. 13° 53' S; Long. 55° 13' W.) I had to halt there one day in order to give the animals a rest, after the long and reckless march of the previous day--a distance of 42 kil.

The source of the Rio Manso was to the E.S.E. some 120 kil. from the place where we crossed it. Where we encamped it received a small streamlet, flowing over a bed of laminated igneous rock and several successive strata of slate, which in some places were in a vertical position, in others at an angle of 40°. I noticed this vertical foliation and these laminated strata all over the great depression we had crossed in order to reach the Rio Manso.

The Rio Manso, which flowed into the Cuyaba River, was not to be confounded with the Rio Manso forming the head-waters of the Rio das Mortes, which eventually threw itself into the River Araguaya.

Owing to one of my animals having strayed away and the difficulty of finding it again in the tall grass and high vegetation, we were not able to leave camp until the afternoon of June 18th. Soon after starting on the march we went through a marvellous arch of thick foliage, creepers, bamboos, and *akurí* palms, previous to crossing a streamlet 9 metres wide and 1 ft. deep--flowing towards the west. We had no end of trouble near these streamlets, as they flowed between precipitous banks 50 to 70 ft. high. There was no trail. The animals frequently lost their footing over the slippery, steep slope, and rolled down, baggage and all, until they reached the bottom; or else they would sometimes stick half way down against trees and liane, and we had the greatest difficulty in extricating them again.

[Illustration: Quadrangular Rocky Mountain connected by Natural Wall of Rock with the Vertical-sided Range in Background.]

There was a low range extending from north to south along the left bank of the Rio Manso. From a hill 1,470 ft. high above the sea level on the right bank of the river we saw a plateau in four terraces--the third of the line of plateaux we had seen on our preceding march. Upon getting higher we perceived to the south, beyond the four-terraced plateau, another plateau with vertical walls, and to the south-west a high double-humped dome--resembling Mount Vesuvius in Italy. Evidently one more of the innumerable extinct volcanoes to be seen in that region. The mountainous mass extended in a more confused form farther to the south-west. On our side of the Rio Manso the country was gently undulating--in fact, it formed many parallel ridges of low, well-rounded hills with occasional deep hollows or basins between. One could not help being particularly struck by the wonderful regularity and strong similarity of the curves on the parallel hill ranges, as if all had been turned out of the same mould. The hill-range we were on was 1,500 ft. above the sea level. The others--excepting one or two--were lower.

There was an absolutely flat horizon line to the north, with no mountain range in sight. The country opening up before us was from that point almost entirely made up of campos, with *chapada* or growths of trees principally near streams in the valleys. We crossed a watercourse 30 metres wide and 1 ft. deep at an elevation of 1,350 ft. We called it the Palmeira, owing to the many palms upon its banks. Here grew many great *caja* or *cajazeiro* trees (of the genus *Anacardiaceæ*), the largest and tallest trees I had yet seen in Brazil, and *Garappa* or *Garabu* (of the genus *Terebinthaceæ*) trees--very interesting on account of their peculiar winged roots. They resembled the *nonoko*, which were characteristic of the Polynesian Islands and Philippine Archipelago, only the Brazilian ones never attained proportions so large.

With endless trouble we had gone 20 kil. We had come to streams, where again, owing to the precipitous descents on the slippery high banks, several mules fell over and rolled down into the stream. One mule,

particularly, had become very nervous on approaching those places. Foreseeing the punishment which would be meted out, its knees invariably began to tremble and give way, and it let itself roll down purposely, every time we came to those difficult passages. Once down at the bottom, with baggage often immersed deep in water, we had the greatest difficulty in making the wretched animal get up again, and we frequently had to drag it bodily up the opposite slope by means of ropes. I have never seen an animal stand more beating than that brute did. Although I am most kind to animals, I must say for my men that this particular mule often drove us all to absolute despair. Dragging the dead weight of an animal up a steep slope, 40, 50, or even 70 ft. high--we were only seven men--was no joke at all. When you had to repeat the operation several times a day, it was somewhat trying. Once the brute had been dragged up to the top it would quickly get up on its legs, and marched well while on fairly good ground. But in moments of danger it was one of the most pusillanimous animals I have ever possessed.

I had given strict orders that in places of that kind the more timid animals were to be unloaded, and the loads conveyed across on men's backs. My orders were always disobeyed. The result generally was that not only did the men have to carry the loads eventually, but we had to carry the animals as well. Endless time and energy were thus wasted. That is what happens to people who try to save themselves trouble.

At sundown, after having witnessed a glorious view of the valley to the north, we descended rapidly amidst luxuriant vegetation of tall bamboos, *akurí* palms, and festooned liane, until we reached the Palmeira River, flowing from north to south. Having crossed it, we continued for 3½ kil. through dense vegetation, and then recrossed it at a spot where it passed within enormous fissures in colossal masses of highly polished yellow lava. After solidification these masses of lava had been subjected to violent commotion, as their stratification was nearly in a vertical position.

Wherever possible I took observations for latitude and longitude, in order to ascertain my exact position; an 8-in. sextant, mercurial artificial horizon and chronometers being used for the purpose. It is not easy to describe the torture I had to go through when taking those tedious astronomical observations. The glass roof of the artificial horizon had unfortunately got broken. I had to use a great deal of ingenuity in order to screen the mercury from the wind so as to obtain a well-defined reflection. No sooner was I getting a perfect contact of the sun's image and its reflection than some huge fly or other insect would begin to promenade on the mercury, disturbing its surface. Butterflies were even more troublesome, as they left upon the mercury--by the luminosity of which they were greatly attracted--sediments of multi-coloured powder and down from their wings and bodies. The mercury had to be carefully re-filtered before work could proceed. Then, what was worse, when both your hands were occupied--one holding the sextant, the other gently screwing the vernier--hundreds of mosquitoes, taking advantage of your helpless condition, buzzed round and settled on your nose, ears, neck, eyelids and forehead, stinging you for all they were worth. Swarms of bees--a dwarf kind, with body in yellow and black stripes; fortunately these did not sting--also placidly roamed upon every available patch of skin with a provoking tickling. A great number of them settled along the edges of the eyelids, attracted by the sheen of the retina of the eye, into which they gazed with great interest. Others, more inquisitive, would explore the inside of your ears; while millions--actually millions--of *pium*, the tiny gnats--more impertinent than all the others taken together--dashed with great force up your nose, into your eyes, into your mouth, and far into your ears, and were most troublesome to remove. Your ankles and knees and wherever the skin was soft were itching terribly with *carrapatinhos*, and before you got through with your work you were also swarming all over with ants of all sizes--careering all over your body and inflicting painful bites whenever you placed your hand upon your clothes to arrest their progress. When you had endured the torture long enough, and had managed to take a satisfactory solar observation, you generally had to remove all your clothes in order to get rid of the unpleasant parasites--and you then had a good hour's hard work cut out for you.

[Illustration: Quadrangular Rocky Mountain showing Rocky Wall connecting it with the Neighbouring Range.]

[Illustration: Author's Caravan in the Heart of Matto Grosso.]

We continued our march northward, the temperature in the sun being 105° Fahr. The minimum temperature had been 60° Fahr. during the night of June 17th, and 64° on June 18th. We crossed the Piraputanga River, flowing into the Rio Manso, and then passed over a magnificent flow of yellow, red and black lava, the Cambayuvah River, a tributary of the Palmeira.

The Cambayuvah flowed through a great volcanic crack 75 ft. high, the sides of the crack showing much-fissured strata in a vertical position. A smaller streamlet entered the Cambayuvah where we crossed it. Wonderfully beautiful, indeed, were the rapids among brilliantly coloured red and yellow rocks, the water winding its way among high upstanding pillars and sharp blades of laminated rock.

A beautiful waterfall tumbled over with a great noise into a pool, scooped out of an immense block of such hardened rock that even the force of that violent stream seemed to have had but little erosive effect upon it. The edges of it were as sharp as possible, instead of being worn smooth and rounded by the constant rapid flow of water. The rock had been hard baked, and was of a shiny black colour, almost as shiny as crystal. At the bottom of those picturesque rapids was a circular volcanic vent, the periphery of which had been blackened by the action of fire. The Cambayuvah followed a general course of south-east to north-west.

We camped near that enchanting spot--most picturesque, but terrible for my animals, as the grazing was poor. My mules, when let free at the end of the march, stood helpless around the camp, looking reproachfully at us, and making no effort to go far afield in order to get something to eat. The poor things were quite exhausted. I saw well that they could not last much longer. My men were constantly worrying me, and saying that we were going to sure perdition. They had become painfully home-sick, and had they not been dead-tired too--more so, perhaps, than the mules and horses--I should have expected great trouble from them. As it was, to lead on those men with persuasion and kindness was an exhausting mental effort for me. Once or twice the suggestion was made that if I did not agree to go back the way we had come I might perhaps get killed and they would return alone. When I enquired whether any of them could find their way back alone, they said "no"; so I suggested that perhaps it would be to their advantage to let me live. I might eventually see them out of that difficulty.

In all my travels I have seldom come across men more helpless at finding their way about, or realizing in which direction they had travelled. Barring Alcides, none of them had any more idea whether we had travelled south, north, east, or west of Goyaz, than the man in the moon. Naturally I did not exert myself to enlighten them unduly, for there lay my great and only hold over them. I had fully realized that I was travelling with an itinerant lunatic asylum, and I treated my men accordingly. No matter what they did or said, I always managed to have things my own way. Never by violence, or by a persuasive flow of language--the means used by the average mortal. No, indeed; but by mere gentleness and kindness; very often by absolute silence. Few people realize the force of silence on momentous occasions; but of course few people know how to remain silently silent--if I may so express it--in moments when their life is seriously at stake. Silence is indeed the greatest force a man can use, if he knows how to use it. It is certainly invaluable in exploring, when naturally one is not always thrown into contact with the best of people.

The animals strayed away during the night, and it took all the best part of four hours to recover them in the morning. Instinct is a wonderful thing. They had all travelled to a place where, over undulating country, fairly open campos, slightly wooded with stunted trees, were to be found, and where they could obtain something to eat. When we crossed those campos after our departure from camp, foliated rock showed through the surface soil in many spots, in strata either displaced and left vertical--in many cases at an angle of 38°--or in its original horizontal plane. Elsewhere dips in all kinds of directions showed that there must have been a good deal of commotion in that region when that part of the country subsided and formed the basin we were then crossing. The typical feature of all those undulations was their arched backs.

We were at a low elevation--only 1,300 ft. above the sea level. We were travelling over immense quantities of marble pebbles and volcanic débris. We there made the acquaintance of the *gramadin*, a plant with curved spikes, which seldom attained a height of more than one inch above the ground. It was terribly poisonous if touched.

We went over three successive ridges (elev. 1,300 ft.). On the summit of each ridge we found a profusion of marble débris and even large blocks immaculately white or else yellow--probably rendered of the latter colour by contact with iron, plentiful in that region.

On the summit of the sixth ridge (elev. 1,330 ft.), that day, we came upon large sheets of foliated rock--again almost absolutely vertical in its stratification--and great masses of thin slate plates or foliations extending from east to west.

Farther on, from a high point, 1,450 ft. above the sea level, we could gaze once more upon a gorgeous panoramic view of the marvellous scenery we had left behind--the great plateaux of rock as red as fire, and "Church-rock" looming high against the sky. We kept on rising upon various undulations--that day's march was one of continuous ascents and descents. At 1,600 ft. we found more masses of vertically foliated slate, ashes consolidated into easily-friable sheets, and large quantities of beautiful marble.

To the north and north-east we had delightful scenery, the *pao d'arco* trees in full bloom, of a reddish-purple colour, adding greatly to the vivid colour-scheme of that view, with its cobalt blue of the distant mountains and the Veronese green of the campos in the foreground. Nearly all the ridges we had crossed which extended from north-east to south-west were well rounded--fairly well padded with sediments of earth, sand and ashes.

[Illustration: A Giant Dome of Lava.]

[Illustration: Campos and Chapada of Matto Grosso.]

We descended to 1,300 ft. (above the sea level) through thin forest, in a valley where bamboo was abundant as well as *gamelleira* trees with their winged roots of great size. The *gamelleira* was somewhat larger than the *garappa* or *garabu*. We found in that valley a beautiful grove of *akurí* palms, the palms being 10 to 15 ft. high. In going through--cutting our way with *falcons*--long heavy-bladed knives specially made for cutting through forests--we were much worried by spiders' webs of great size, from which we had trouble in extricating our heads and hands as we went along. There were thousands of those webs at the entrance of the forest, and we dragged them all along on our passage. With their viscous properties they clung to us, and we could only shake them off with difficulty.

Most interesting of all was the *cepa d'agua*--a powerful liana, four inches in diameter, festooned from the highest branches of trees, and which when cut ejected most delicious cool water. Then there was a tree called by the Brazilians "*mulher pobre*," or "poor woman's tree"--do you know why?--because from its juice it was possible to make soap, which saved the expense of buying it. There was a roundabout way of reasoning for you.

Eighteen kilometres from our last camp we came to a rapid streamlet of the most limpid water, the Rio Mazagan (elev. 1,300 ft. above the sea level), four metres wide and four inches deep. When we drank it it nearly made us ill, so foul was its taste of sulphur and lead. The treacherous stream flowed into the Cuyabá River.

There were many *tamburi* trees of great proportions, handsome trees with clean, healthy white bark and minute leaves--at the summit of the tree only. In the forest, although the taller trees were generally far apart, none of them had branches or leaves lower than 30 to 40 ft. from the ground. The *angico* or *angicu* (*Piptadenia rigida* Benth.), which was quite plentiful, was also a good-looking tree of appreciable height and

circumference.

Upon emerging from the beautiful forest, quite clear underneath with only a few ferns, we crossed great campos--"*campina grande*," as my Brazilians called them. Skirting the forest in a northerly direction, we went over a low hill range with delightful clear campos and patches of forest. We crossed another streamlet of foul-tasting water--with a strong flavour apparently of lead.

In the great undulating valley we left behind--as we now altered our course slightly to the north-west--was prominent a double-humped hill which rose higher than any other except in the north-west portion of the landscape. There a high chain of hills could be seen.

When we crossed over the second ridge (elev. 1,400 ft.), strewn with yellow lava pellets, at the end of extensive campos we obtained an imposing view to the north. An elevated flat-topped table-land of great magnitude rose in front of us--a perfectly straight line against the sky, but terminating abruptly with three gigantic steps, with a subsidiary one upon the second step, at its western end. This plateau stood out, a brilliant mass of cobalt blue with great projecting spurs, like a half-section of a cone surmounted by a semi-cylindrical tower along the southern wall of the plateau. Then a strange hill mass of four distinct composite domed heights with minor peaks stood between the plateau and us--and extended, like most of the other ranges, from south-east to north-west.



## CHAPTER XXV

The Blue Mountains--The Cuyabá River--Inaccurate Maps--A Rebellion in Camp--Infamy of Author's Followers--The Lagõa dos Veados and the Seven Lakes--Falling back on Diamantino--Another Mutiny--Slavery--Descending from the Tableland

WE had gone 96 kil. in four days' marching since leaving the Rio Manso. We were only a few kilometres from the Serra Azul, or Blue Mountains--truly mountains of the most vivid and purest cobalt blue I had ever seen--quite a wonderful spectacle.

We made our camp in a prairie with good grazing for our animals. Although we were at a comparatively low elevation--1,150 ft. above the sea level--the minimum temperature of the atmosphere was 56° Fahr. during the night.

On leaving camp--still proceeding north--we descended to 1,100 ft. into a lovely stretch of magnificent grass with a lagoon. The level of the water was low, as we were then at the end of the dry season. On the flat grassy land were curious semi-spherical mounds, 4 to 6 metres in diameter and from 2 to 6 ft. high. On each of these mounds were a few stunted trees. No trees whatever existed except upon these small mounds, the explanation being, I think, that the mounds had formed around the trees while these were growing, and not that the trees had grown upon the mounds.

As we were getting nearer, the Serra Azul to the north was most impressive. I think that it was partly due to the bluish foliage of the vegetation upon it that the range, even close by, appeared of so vivid a blue, and also to the deep blue shadows cast by the spurs which projected, some to the south-east, others due south--that is, it will be understood, on the southern face of the range.

Thick deposits of cinders lay in the valley. On approaching an intermediate and lower range we cut our way through scrub--chiefly of *sciadera* trees, seldom growing to a greater height than 7 ft. The domed hills showed through the grass great blocks of volcanic rock, while at the foot of the hills could be noticed huge boulders of consolidated ashes with veins of crystals and marble. There, too, the stratification was vertical. There was lamination in some of the rock, but not in the granite blocks nor in the blocks of marble, which appeared to have been subjected to enormous heat. Some of the rock had been in a state of absolute ebullition.

[Illustration: Marvellous Scenery of the Central Brazilian Plateau.]

[Illustration: "Church rock" standing in the centre.]

At the spot where we crossed the range--starting our ascent from an elevation of 1,100 ft.--were immense holes, vents and cracks in the earth's crust. As we rose slightly higher among many chains of low hills, we were upon a horizontal stratum of laminated granite. Higher still we passed a semicircular hill composed of immense blocks of granite. In the centre of the semicircle was a great round hole, 30 ft. in diameter--an extinct crater. Farther on, ascending upon an inclined plane, we came to another similar semicircle--not of rock that time, but of red earth and cinders. When we reached the highest point (elev. 1,270 ft.) of the divide we had to our left huge pinnacles and pillars of rock of the most fantastic shapes, monoliths from 10 to 15 ft. high, and rocks hollowed by the action of fire. Big boulders, which had become perfectly rounded by having been shot through the air and revolved at a great speed while in a half-solid condition, were to be seen scattered all over the inclined planes of the saddle of the divide. Giant cacti grew in abundance in the interstices between rocks. Although most of the rocks were blackened outside, by chipping off the outer surface one found that they contained inside beautiful white marble or else greyish granite. The latter was striated with thin layers--not more than a quarter or half an inch thick--of crystallized matter, forming veins in the blocks or dividing two strata.

Everywhere could be noticed remarkable perforations of all sizes in the rocks, great spherical or ovoid hollows, or cylindrical tubular channels. In the ground were many volcanic vents with lips baked by fire.

On our right, a kilometre or so farther on, after having gone through an extensive stretch of red sand and lapilli, we came across three hills, the central one of which had the appearance of a cylindrical tower of masonry with windows and doors. It was a wonderful freak of nature. Under this huge tower were several caves and grottoes.

Descending upon the opposite side of the range, at an elevation of 1,200 ft. we found the dry bed of a streamlet, which flowed in a northerly direction when it did flow at all. On emerging from the wide hill mass--about 18 kil. across--we found ourselves among a lot of *burity* palms on the western spur of the Serra Azul. When we were actually upon them, the Blue Mountains lost their blue appearance and were more of a greyish green, owing to the vegetation which covered most of their slopes. The range was formed of three distinct terraces, the lower one being of greater height than the two upper ones. A number of low hill ranges starting from the main range branched off like spurs towards the south. The uppermost terrace of the main range was supported on a high vertical wall of red rock.

On meeting the Rio Coralzinho we skirted it for some distance through the forest, then marched among a great many domes, small and large; after which we crossed a wonderful field of huge monoliths, superposed boulders, and rocks of all kinds of fantastic shapes.

We had marched 30 kil. that day. We encamped on the River Piraputangas--a tributary on the left side of the Cuyabá Grande River--the Cuyabá Grande being in its turn a tributary on the right of the Cuyabá River.

The Cuyabá River described almost an arc of a circle--in fact, quite a semicircle--its birth taking place in the Serra Azul. Where we crossed it we were only a short distance to the west from its point of origin.

Where we had made our camp we were in a large grassy plain about six kilometres long and nearly two kilometres wide. The rainy season was fast approaching. We came in for a regular downpour during the night, accompanied by high wind, which knocked down all our tents, as the pegs would not hold in the soft, moist ground. We had a busy time endeavouring to protect the baggage. We all were absolutely soaked. The minimum temperature was 52° Fahr. In the morning, after the wind had abated and the rain had stopped, we were enveloped in thick fog.

We had descended to so low an altitude as 750 ft. above the sea level on the north side of the Serra Azul--the lowest elevation we had been at for some considerable time. We had descended altogether from the highest part of the great Central Brazilian plateau. From that point all the waters would be flowing to the north-east or north. We were, in fact, within a stone's throw--to be more accurate, within the radius of a few kilometres--of the birthplace of the Rio Novo, the head-waters of the River Arinos, of the Rio Verde (Green River), and of the several sources of the Rio S. Manoel or das Tres Barras, or Paranatinga; and not distant from the sources of the great Xingu River.

The Serra Azul, extending from west to east, was interesting geographically, not only because it marked the northern terminus of the highest terrace of the great central plateau, but also because from it or near it rose two of the greatest rivers of Central Brazil--the Xingu and the Arinos (Tapajoz), the latter the most central and important river of Brazil, crossing the entire Republic from south to north, as far as the Amazon.

On June 21st we crossed the Piraputangas (elev. 750 ft. above the sea level), where, owing to the steep banks, we had much difficulty in taking mules and baggage to the opposite side. We then proceeded across another large plain, skirting the spurs of the Serra Azul. Nine kilometres from camp we came to a stream 80 metres wide, which flowed from north-east to south-west. It had an average depth of 1½ ft. It was, I think, the Cuyabá Grande.

It was not easy to identify those rivers, as the existing maps of that country were absolutely worthless, most of them being filled in with fancy mountains and rivers, which either did not exist at all or were sometimes hundreds of kilometres out of their position. There were frequently mistakes of two, three, and more degrees in the latitudes and longitudes even of important places. As for the tributary rivers, of which merely the mouths were known and named, they had supplied good material for the imagination of more or less artistic cartographers in order to fill in the rest of their course. Even the German map and the American maps of the International Bureau of American Republics, which were the two best, were extremely inaccurate in their representation of that region. For instance, the latter map--and nearly all the other maps--placed the Serra Azul some 180 or 200 kil. south of its actual position. The German map was some 70 kil. out. The Serra Azul could be seen from a great distance, and had been marked approximately and not by actual observations on the spot. Nor, of course, had the tributaries of the Cuyabá been explored or even seen except at their mouths; hence their imaginary courses.

[Illustration: A Street of Diamantino.]

[Illustration: The Dogs of the Expedition.]

Considering how the maps of those regions had been got together, it was really wonderful that, with all their blunders, they gave as much information as they did. Unhappy, nevertheless, would be the poor traveller who relied on those maps in making a journey across the country. For instance, if you expected to come upon a certain river in one day and did not get there until after ten or fifteen days' hard marching; if you expected to find a mountain range--nearly as high as the Himalayas or at least as high as the Andes, according to the deep shading on the maps--and found instead an interminable flat plain; and if you saw on your map rivers marked navigable, and found rapids instead, in comparison with which the terrible ones of Niagara are mere child's play, you would certainly become rather sceptical of prettily-drawn maps.

On most of the maps of Brazil one saw marked to the east of the Araguaya, in the Goyaz Province, an immense range with no less a name than Cordilheira Geral la Serra do Estrondo--or "General Range of the Mountains of Noise." They were marked as the most prominent range in Brazil--quite as high as the Andes of Peru, Bolivia, and Chili; whereas, as a matter of fact, I was told on good authority that they were mere low hills, where there were any hills at all.

To come to great geographical mistakes which came under my direct observation, I found a very palpable one in the head-waters of the Cuyabá River, which had their source to the north of the Serra Azul and not to the south, as marked on many maps, including the Brazilian official maps.

We had to our left the Serra das Pedra--"Range of Rocks"--an extraordinarily rocky range, which was crossed almost at right angles by the Chapadão das Porcas. We marched through a wonderful growth of palmeiras, some of the palms being as much as 30 ft. high. *Buritys* were innumerable along a small stream--the Rio Estivado--flowing south-west into the Cubayá River. There were great quantities of *mangabeira* trees. We proceeded northward along a *chapada*--a capital Brazilian name which denotes a locality that is neither a forest nor a prairie. The *chapada* had scanty trees and scrub, but not enough to make it into a forest.

We were marching over low hills with surface deposits of sand and cinders. We gradually reached an elevation of 1,050 ft. some 18 kil. from camp, and shortly after--and only 50 ft. lower--entered a refreshing grove of giant *palmeiras* and *buritys* along the Rio das Porcas, flowing westward. There, north of the stream, we went across more clean campos, 1,700 metres wide, bounded to the north by the thickly-wooded hill-range Keboh, extending before us from east to west.

We crossed this range in the centre, during a strong gale from the south-west. The wind cleared the sky, that had been overcast and had made the atmosphere heavy. Again that afternoon, when the wind ceased, I noticed the peculiar striations in the sky--not in straight lines that time, but in great and most regular curves

converging to the west.

The valley got narrower as we went along. Two twin conical hills ended the northern extremity of the range (south-east to north-west) which we had on our left--a great mass of granite blocks in the centre of the plain rising higher and higher into regular domes. The plain itself, on an incline, showed two swellings of great magnitude, the one to our right about 120 ft. higher than the plain, the elevation of which was 1,000 ft. On the west side of those two swellings was a confused mass of huge blocks of granite--of all sizes and shapes--which to all appearances had been shot up from underneath by some internal force. They were outwardly much blackened by the action of fire, but internally were of a grey tint. A little farther we were encircled by basaltic columns of great height, many of them fractured, forming a fantastic sky-line. Some resembled the spires of a cathedral; groups of others had the appearance of the ruins of an ancient fortress; others stood up like giant obelisks; while accumulations of others formed more or less regular pyramids.

After leaving that strange basin, we were once more travelling across patches of clean *chapada* and dirty *chapada*--according to the soil and quantity of moisture; then over arid campos spreading for 15 kil. without one single drop of water.

At sundown, after having gone over several undulations varying from 850 to 900 ft. above the sea level, we went over a hill slightly higher--950 ft.--with a summit of ashes, red earth, and yellow lava pellets, as well as great sheets of foliated lava.

Under a most wonderful effect of light to the west--three superposed horizontal bands of luminous yellow, violet and brilliant vermilion, over the deep cobalt mountain range in the distance--we arrived, my men being thirsty and tired, at a little rivulet. We had marched 42 kil. that day.

My men felt the cold intensely during the night--the minimum temperature was 48° Fahr., with a high, cutting wind. Yet we were at a low elevation, merely 750 ft. above the sea level. There were, as usual, moans and groans all night, more toothache and rheumatic pains and bones aching in the morning. The discontent among my men had reached a trying point. They worried me continuously to such an extent--indeed, as never in my life I had been worried before--that I was within an ace of breaking my vow of never losing my patience and calm. In my long experience of exploring I have always had to deal with the most troublesome types of men imaginable, but never with any quite so unpleasant as those I had in Brazil.

When, the next morning, I ordered them to pack the animals in order to proceed on our journey, there was an unpleasant scene approaching mutiny. They knocked things about and refused to go on. Then they sat, rifles in hand, a little way off, grumbling and grunting, with vicious expressions upon their faces. They were going to do wonderful things--they were indeed! I overheard them. One man came forward--the spokesman. The men claimed their money up to date since the last payment made to them--only a fortnight before. They all wished to go.

"Certainly," was my immediate reply. Without a moment's hesitation they were each handed over their full pay, and without giving the slightest attention to them, Alcides, who had remained faithful, and I--poor Filipe had been dragged against himself into the plot--collected all the animals and packed them. Without one look or word--as if they had not existed--I started off the troop of animals and got on my saddle to depart last. With the corner of my eye I kept a watch on them--as with men of that kind the chief danger was when you had your back turned.

I had gone only a few yards when I heard some one sobbing behind my mule. As I turned round, the two outstretched hands of Filipe were handing me back the sum of money I had paid a few moments before. He was begging me to keep it safely for him. Then two more hands urged me to take back for safe keeping the wages they had just received. The faces of the owners of those hands were too comic for words: the cheeks shining with abundant tears that streamed down, the eyes red and swollen, the mouths stretched in nervous

strain from ear to ear. Behind came two more men, looking as mournful as if they were being led to execution.

They all begged to be re-employed. I let them follow--on foot--for several kilometres without saying a word--struggling through the heavy marching painfully and wading across chest-deep in the streams. We crossed the Riberão Chabo or Guebo, 25 metres wide and 3 ft. deep, at an elevation of 730 ft., then shortly after we waded through another stream flowing south, with a zone of wonderful *palmeiras* along its banks. We then emerged into a magnificent plain with a barrier of low hills to the north-west. Six kilometres farther we waded across the Planchão stream, 5 metres wide and 6 in. deep. Marching on horseback was delightful, the maximum temperature being only 74° Fahr. in the shade. Another stream, flowing from north to south, the Planchãozinho, whose foul water was quite disgusting to drink, although beautifully limpid, was then negotiated.

I was delighted at meeting with so many streams, for there was nothing my men hated more than to get into the water. They felt very sorry for themselves, to be struggling along as best they could, following the animals like humble sheep instead of being comfortably mounted on quadrupeds. We travelled a considerable distance through campos, but owing to some baggage which had been lost we eventually had to retrace our steps as far as the Planchãozinho River, on the banks of which we encamped. This was unfortunate, as the water had a sickening flavour and made even our coffee and tea taste like poison.

Misfortunes never come alone. In overhauling my baggage I discovered, to my dismay, that my men--in order to force me to go back the way we had come--had gradually thrown away most of the provisions, which should have lasted us some six to seven months longer. We had only sufficient food to last us a few days. The men confessed their misdeed. The country provided absolutely nothing to eat, and I had to face the problem of either dying of starvation or falling back on some place where we could purchase fresh provisions. It was out of the question--unless one wished to commit suicide and a quintuple murder--to endeavour to push on towards my goal, Manaus on the Amazon, some 1,600 kil. distant as the crow flies, or at least 4,000 to 5,000 kil. travelling, with possible deviations, without some of which it was not possible to travel. We could certainly not fall back on our point of departure, the terminus of the railway at Araguary, 1,596 kil. distant; nor on Goyaz, the last city we had seen, 1,116 kil. away--so that the only way to escape death was to fall back on the ancient settlement of Diamantino, the farthest village in Central Brazil, a place once established by the first Portuguese settlers of Brazil while in search of diamonds.

Diamantino was practically in the very centre of the thicker part of South America, without counting Patagonia. It was almost equidistant--roughly speaking, some 2,560 kil. as the crow flies--from Pernambuco on the Atlantic Coast to the east, Callao (Lima) in Peru on the Pacific Coast to the west, Georgetown in British Guyana to the north, and Buenos Ayres in the Argentine Republic. Although so far in the interior and almost inaccessible from the north, east, and west, Diamantino could be reached comparatively easily from the south, travelling by river up the Parana, Paraguay, and the Cuyabá Rivers, as far as Rosario--thence by trail to Diamantino. I had heard that the place was once flourishing, but had since become almost totally abandoned. I thought that perhaps I might be able to purchase sufficient provisions to get along; and--hope being one of my everlasting good qualities--I also dreamt that perhaps I might there get fresh men.

It was indeed with a bleeding heart--when I had reached a point some 200 kil. north of the Serra Azul--that I had to alter my course, which had been practically due north, into a south-westerly direction, and endeavour to find Diamantino. My men were delighted at the prospect of seeing human beings again. We had met no one for some weeks. We made terrific marches daily in order to reach that village before the food gave out altogether.

The nights were cold--47° Fahr. being the minimum at our camp on June 23rd.

We crossed a small range of hills over a pass 930 ft. above the sea level, and found ourselves in a spacious *cuvette* with the usual central line of *buritys* and thick vegetation (elev. 900 ft.). Soaring over our heads were a

number of *gavião caboclo* (*Heterospidias meridionalis*), a kind of falcon, rending the air with their unmusical shrieks.

[Illustration: Matto-Grosso Girl, a Mixture of Portuguese, Indian and Negro Blood.]

[Illustration: Brazilian Child, a Mixture of Portuguese and Negro.]

After leaving the *cuvette* we began to ascend the Estivado Range, very steep and rocky. Near the summit we struggled through a field of great igneous boulders, chiefly upright pillars of granite and white marble. Upon the pass (elev. 1,400 ft.) was a circular depression some 300 metres in diameter, perfectly flat-bottomed and grassy. It was surrounded by cones from 80 to 100 ft. high. On the south-east side of the range--very steep--was abundant rock, whereas to the north-west side was a padding of brown earth on a gentle incline divided into terraces. Here and there pointed noses of volcanic blocks, similar to those we had found on the opposite side of the range, showed through. We went across a depression where water dripping down the mountain-side had remained stagnant, rendering that spot almost impassable. The animals sank chest-deep into slush, crashing through the thick and much-entangled growth of live and fallen bamboos.

More campos, fairly wide, were found beyond this, and great stretches of foliated slate and sandstone in strata turned over into a vertical position, and quantities of débris. Then again we cut our way through a cool growth of bamboos, handsome *palmeiras* and *akuri* palms; after which we emerged into campos once more, rising gradually to an elevation of 1,550 ft. upon an undulating terrace of the second section of the Estivado range.

Pulling and pushing the mules and horses over a lot of boulders and up a steep incline, we reached the highest point of the range on our route--1,800 ft. above the sea level. Again the stratification of red and grey rock in layers from 6 ins. to 1 ft. thick, standing vertically, showed what a geological commotion there must have been in those regions. The summit of the range, extending from north to south, appeared like the teeth of a saw, so broken up was it into repeated undulations. On the west side of the range we found a gentle slope of clear campos with merely a few stunted trees upon them.

Before us to the west stood high the level sky-line of a table-land, showing perfectly straight parallel strata of rock extending all along its face, but slightly undulated near the summit of the range. Otherwise its grassy slopes were quite undisturbed in their virgin smoothness.

In the distance to the north of our course was a great lagoon--the Lagõa dos Veados, "Lagoon of the Deer"--a most important point in South America, for it was there that the great Arinos (Tapajoz) River rose. The lagoon--3 kil. long and less than 1 kil. wide--had no visible outlet, but some hundreds of metres away a spring came out of the earth, forming the Rio Preto (Black River). The Rio Preto, soon joined by the Rio Novo which we had seen descending from the Serra Azul, formed the Arinos River and could certainly be considered the head-waters of that immense tributary of the Amazon.

A short distance south of Diamantino were the Sete Lagoas, or Seven Lakes--as a matter of fact, they numbered more than seven--circular pools only a few yards in diameter but extraordinarily deep, evidently of volcanic origin, and filled with water at a later time. Around their edges a remarkably luxuriant growth of *buritys* could be admired. A great valley extending south with a central ridge could be distinguished. On it was the meeting-place of the Rio Diamantino and the Rio do Ouro (River of Gold), which, with the Sete Lagoas, formed another most important point of South America, for it was there that the Great Paraguay or Parana River rose.

It was thus interesting to note that within almost a stone's throw rose two of the most powerful rivers of South America--one flowing due north into the Amazon, the other almost due south as far as Buenos Ayres and Montevideo, where it entered the Atlantic Ocean.

A great confusion is made on most maps between those lagoons and the actual birth-places of those important streams. The ancient Jesuits and friars had a fair idea of geography. I have in my possession a remarkable work in Italian published in Rome in 1698 by Father John Joseph of S. Teresa--a barefooted Carmelite. It is entitled *The History of the Wars in the Kingdom of Brazil between the Crown of Portugal and the Republic of Holland*. The book contains a number of extraordinary maps of Brazil. Those of the principal harbours give a splendid idea of the places represented. The coastline of the continent is indicated with fair accuracy. It is curious to note that the author of that book and the cartographer place the sources of the Amazon and of the River Plate in the same spot, as descending on opposite sides of a range extending from east to west--a range which does not exist, unless it was intended to represent the Central Brazilian plateau. "The River S. Francisco," Father John Joseph goes on to state, "has also its birth in the spot where the Amazon is born, but this is not sure." The cartographer, in fact, places the head-waters of that river close to the head-waters of the Amazon, and makes them flow through a large lagoon in the heart of Brazil--evidently the Great "Lagõa dos Veados" or else the "Sete Lagoas" to which reference has previously been made in this chapter. "The Rio Grande (Rio Parana, Paraguay), one of the most celebrated in Brazil," proceeds the Carmelite Father, "is born already swollen by plentiful waters (*sic*) in the interior of terra firma! Near its sources it forms a lagoon 20 leagues in circumference." All this is, of course, geographically wrong. The Rio S. Francisco has its birth far to the south-east in Minas Geraes, some hundreds of kilometres distant from that lagoon and several thousand from the real source of the Amazon.

Also the friar must have mistaken--evidently from information received--the sources of the Arinos for the sources of the Amazon, which are really located some 15° of longitude west. It is nevertheless curious that so far back as 1698 the existence of the lagoon should be known at all--perhaps they had heard of it from the adventurous Paulista Bandeirantes--and that they should have placed it nearly in its proper latitude and longitude on their maps. Apparently Father John Joseph was not aware of the existence of the Great Araguaya and Xingu Rivers. Having compiled his map from information, he confused those rivers into the S. Francisco River.

Upon descending from the Serra into the valley we soon came to a large forest with a luxuriant edge of *peroba* (a word originating, I believe, from the words *ipe* and *roba* in the *Tupi* language), which was known in four different varieties: viz. the *peroba amarella* (yellow), *parda* (brown), *revessa* (knotty), and *rosa* (rose-coloured), technically named: *Aspidosperma polyneuron* M. Arg., *Aspidosperma leucomelum* Warmg., *Aspidosperma sp.*, *Aspidosperma dasycarpon* A.

Then there were also plentiful *garabu* and other tall trees. Before getting to the edge of the forest I noticed among the rocks some beautiful specimens of the *apita* cactus, 10 ft. and more in height, in appearance not unlike giant artichokes.

Near its beginning, where it was 3 metres wide and 6 in. deep, we crossed the Estivado River, which with a group of other streamlets may share the honour of being one of the sources of the Arinos. It flowed in a north-westerly direction.

We were pushing on for all we were worth, for we had come to the end of our food. Up and down we went over a troublesome series of great elongated ridges--like parallel dunes--the highest elevation on them being 2,050 ft., the depressions 1,950 ft. We came to a sweetly pretty streamlet, the Mollah, flowing north into the Paraguay River, and shortly afterwards to the Caittä and the Corisho (elev. 1,500 ft.). They were the three real and true sources of the Paraguay, within a short distance of the Seven Lakes.

We had marched 50 kil. that day over rough country. My animals were quite exhausted. Yet early next morning we pushed on once more over transverse undulations and across grassy *cuvettes*, slightly conical, with circular pools of water in the centre and a florid growth of bamboos in the lowest point of the *cuvettes*. We ascended over more dyke-like obstructions on our way (elev. 1,700 ft.) and descended once more into a vast basin of campos with stunted trees. At its lowest point there was from north-east to south-west a line of

magnificent tall trees. The forest was so dense there that when we entered it we were quite in the dark, as if going through a tunnel. There were fine specimens of various kinds of the *jua* or *juaz* or *jurubeba* (solanum), a medicinal plant 5 to 6 ft. high with enormous dentate leaves--shaped not unlike a vine leaf--possessing upright spikes on their dorsal or mid-rib and on the veins of the leaf.

Then there was plentiful "*cepa de pappo*," a common liana like a huge boa-constrictor winding its way in a spiral up the tallest trees. I saw some of those liane 3 in. in diameter, with a smooth whitish bark.

The soil at the bottom of the valley (1,500 ft. above sea level) was mostly composed of cinders, but up the slopes white sand was predominant, mixed with ashes. We travelled over a lava flow which formed the bed of the River Macucu, flowing eastward. Guided by the noise, we found a most beautiful waterfall, 100 ft. high, over an extinct circular crater with vertical walls. We kept on rising over a gentle incline, and having reached an elevation of 1,750 ft. we found ourselves suddenly on the upper edge of a great crescent-shaped depression extending in a semicircle from north-east to south-west. Its walls were one-tiered to the west, with a flat table-land on their summit, but were divided into two terraces in the northern part where ranges of hills rose on the plateau.

We had a rapid, steep descent among great rectangular blocks of conglomerate (white marble pebbles embedded in iron rock), great sheets of lava, and sediments of red earth, solidified in places into half-formed rock. I noticed extensive lava flows which had run towards the west; then we came upon extraordinary quantities of loose white marble pebbles and chips. We made our way down upon a kind of spur of red lava, frightfully slippery for my animals. The poor beasts were quite worn out with fatigue.

From the round dome of the headland we perceived to the south a second great circle of flat-topped heights. The immense flow of red lava on which we were radiated terrific heat which it had absorbed from the sun's rays. My dogs, being nearer the ground than we were, had great difficulty in breathing. Their heads and tails hung low, and their tongues dangled fully out of their mouths. They stumbled along panting pitifully. Even we on our mounts felt nearly suffocated by the stifling heat from the sun above and the lava below. The dogs were amusing enough, curling down quickly to rest wherever a mangy shrub gave the slightest suspicion of a shade. The men, more stupid always than beasts, were sweating and swearing freely, and thumped mercilessly on the rumps of the tired animals with the butts and muzzles of their rifles in order to urge them along.

The very sound of the mules' neck-bells seemed tired and worn; its brisk tinkling of our days of vigour had given room to a monotonous and feeble, almost dead, ding ... dong, at long intervals--well suggesting the exhaustion of the poor animals, which were just able to drag along. The slightest obstacle--a loose stone, a step in the lava, and now one animal, then another, would collapse and roll down, and we had to dismount and help them up on their feet again--quite a hard job, I can tell you, when the animals were nearly dead and would not get up again.

As we went along more and more headlands of the great plateau appeared before us to the west. We still went on descending on the top of the long spur of lava. When not too busy with our animals--and quite out of breath with the heat and stifling air from the heated rock--I sometimes glanced at the glorious panorama on both sides of us. When we had proceeded farther I ascertained that there were really two crescents contained side by side within a larger crescent. Under us to the south a vast undulating plain stretched as far as the eye could see towards the south-west and west. On describing a revolution upon your heels your eye met the other end of the larger crescent plateau to the north-west. The Serra do Tombador extended in a south-westerly direction from north of Diamantino to S. Luiz de Caceres, to the west of the Paraguay River. The height of the spur on which we were was 1,350 ft. above the sea level.

We had come in a great circle on the upper edge. A trail could be seen crossing the great undulating valley below us. It passed at the western terminus of the spur we were on. Evidently that was the trail connecting Diamantino with Cuyabá (the capital of Matto Grosso) via Rosario. The sight of a trail was most exhilarating



to my men. Suddenly and quite unexpectedly we came upon a few wretched, tumble-down houses--if one may call them so--smothered in vegetation which grew everywhere. My animals themselves seemed astonished at the unusual sight. The horses neighed and the mules brayed loudly. Masonry work perhaps suggested to them more substantial meals. Down a precipitous ravine, over large boulders and stumbling into big holes, into which the mules disappeared for a few seconds at a time ... there was the main street of Diamantino.

The village--the local people called it "a city"--was the very picture of misery, yet to us it seemed as if we had dropped into the middle of London or Paris. There were a few resident traders, two or three Brazilians, two Italians, and a Turk. All were most hospitable and kind. The chief industry of the place was rubber, which found its way to the coast via the Paraguay River.

Formerly Diamantino was a flourishing place because diamonds were found in abundance. Even now they can be found along the river, but the difficulty of access, even by the easiest way, and the great expense of living there have gradually depopulated the place, which was quite in an abandoned state when I was there.

Here are some of the minimum prices which the rubber collectors had to pay for articles of necessity: Beans, 1s. 6d. to 2s. per litre,[1] or about 4s. a pound; rice, 2s. per litre; flour, 1s. 4d. per litre, about 4s. a pound; sugar, 5s. per kilo (2 pounds), rapadura, or sugar block, 4s. per small cake; tobacco, 5s. per metre of twist; salt, 2s. 8d. to 3s. per litre; coffee, 6s. 6d. per kilo; lard, 6s. 6d. per kilo; purified lard in tins, 16s. to 20s. per 2 kilos. Bars of the commonest laundry soap, 4s. each bar; chickens 10s. to 15s. each; eggs, 10s. to 12s. a dozen; small tins or sardines (containing five sardines) of the most inferior kind, 10s. to 15s. a tin; a one-pound tin of the commonest French salt butter, 15s.

A genial banquet was offered me on my arrival. The school-mistress was set to prepare an excellent and plentiful meal. The mayor and all the notabilities of the place in their Sunday clothing came to fetch me at the house of the firm of Orlando Bros., where I had been most hospitably sheltered, and where I had been requested to wait for them. At the appointed time they arrived--in frock-coats, and each carrying an umbrella.

"Is it raining?" I inquired in my astonishment at seeing the array of articles which I had not seen for several months--especially as a few minutes before I had been outside and it was a lovely starlit night.

"Oh no, indeed, it is not raining; we carry the umbrellas in due honour to you!" they replied in a chorus, accompanied by a grand bow.

This was such an extraordinary compliment that it really took me some time before I could grasp the meaning of it. It seemed that according to the social rules of Diamantino, Matto Grosso, no one could be considered fully dressed unless carrying an umbrella. Rain or shine, the people of Diamantino carried their umbrellas on grand occasions.

After that one of the gentlemen pulled out of his pocket a long slip of paper and proceeded to read a speech of welcome. I answered in a few humble words. Another gentleman--there were eight altogether--produced another slip which he duly read in a sonorous voice. Again I replied as best I could. Then, as I was getting really anxious lest some one else should be speechifying again, the mayor of the place offered me his arm, and followed in a most respectful manner by the others, we adjourned to the schoolroom, where the feast was spread upon the table.

More speeches when we entered the room, more speeches before we sat down, speeches in the middle of dinner, speeches after dinner. Unaware of what was coming, I had exhausted all the compliments I could think of in my first speech, and I had to tax my poor brain considerably to reply with grace--especially as I had to speak in Portuguese--to the many charming things which my thoughtful hosts said. The banquet went off well. It is difficult to imagine more considerate, kindly people than those exiles in that far-away spot.

I took careful and repeated astronomical observations for latitude and longitude in order to establish the exact position of that settlement. Lat. 14° 21'·7 S.; Long. 56° 56' W. I purchased all the food I could possibly collect--enough to last us some six months, which cost me a small fortune--as I intended to push out of the place and proceed northward at once.

Four of my men became badly intoxicated upon our arrival. There was another mutiny. They again claimed their pay up to date and wished to leave me. At once they received their money. It was such a relief to me when they went off, even for a few hours, that I was always glad to give them the money and have a short mental rest while they kept away. Unfortunately it was impossible to obtain a single extra man in Diamantino. Labour was scarce, and the few labourers in existence were in absolute slavery. Indeed, slavery existed--it exists to-day--in all Central Brazil, just as it did before slavery was abolished. Only in the old days of legal slavery it was limited to negroes; now the slaves are negroes, mulattoes, white people, even some Europeans. I have seen with my own eyes a German gentleman of refinement in that humble condition.

In the present condition of things the slave, in the first instance, sells himself or is sold by his family. There were indeed few, if any, of the labouring classes in Matto Grosso and Goyaz provinces who were free men or women. All were owned by somebody, and if you wished to employ them--especially to take them away from a village or a city--you had to purchase them from their owners. That meant that if you intended to employ a man--even for a few days--you had to disburse a purchase sum equivalent to two or three hundred pounds sterling, sometimes more. In the following way it was made impossible for the slaves to become free again. Taking advantage of the poverty and vanity of those people, loans of money were offered them in the first instance, and also luxuries in the way of tinned food, clothing, revolvers and rifles. When once they had accepted, and could not repay the sum or value of the articles received, they became the property of the lender, who took good care to increase the debt constantly by supplying cheap articles to them at fifty times their actual cost. The *seringueiro*, or rubber collector, had a *caderneta*, or booklet and the master a *livro maestro*, or account book, in which often double the quantity of articles actually received by the rubber collector were entered. The debt thus increased by leaps and bounds, and in a short time a labourer owed his master, two, three hundred pounds. The rubber collectors tried hard to repay the debt in rubber, which they sold to their masters at a low rate; but it was always easy for the masters to keep the men in debt.

It must be said for the masters that their slaves were not in any way ill-treated; on the contrary--except that a man was seldom given the slightest chance of redeeming himself--they were indeed treated as well as circumstances permitted. Labour, it must be remembered, was so scarce and valuable--it was almost an impossibility to obtain labour in Central Brazil--that it was the care of the master not to lose a labourer.

Much is to be said for the honour of even the worst types of Brazilians. Although many of them would not think twice of murdering or robbing a stranger of all he possessed, they were seldom known to defraud their owners by escaping. A man who ran away from his owner was looked down upon by the entire community. Again, it must be stated that the chances of escape, in those distant regions, were indeed very remote. An escaped slave with no money could not go very far and he would soon die of starvation.

I must confess that, although I tried hard to discover a way by which labour could be obtained and retained in Brazil with the existing laws, I could not find one practicable except that used by the Brazilians, viz. slavery.

The people of Diamantino tried hard to induce one or two men to accompany me--and I was willing to buy them out and eventually would have set them free altogether at the end of the expedition--but they were all so terrified of the Indians if they left the "city" that they preferred to remain slaves.

Alcides had gone round to look for a barber. There was only one in Diamantino, and he was in prison for the murder of his wife, or for some other such trifling matter. Armed with a pair of my scissors, Alcides went to the prison to have his hair cut. Once there he took the opportunity to explain to the prisoner that it could be arranged to procure his escape if he were willing to join the expedition. The barber--who had not inquired

which way we should be travelling--jumped at the idea. This necessitated having my hair cut too--rather a trial with scissors that did not cut--in order to arrange matters further in detail. With a special permission from the local authorities the barber was let out accompanied by two policemen--the only two in the place--in order that he might reduce my hair by half its length or more.

While I underwent actual torture in having my hair clipped--as the prisoner's hands were trembling with excitement, and my ears had various narrow escapes--Alcides, who, when he wished, had very persuasive manners, induced not only the prisoner, but the two policemen--all three--to escape and join the expedition. I must say that I did not at all look forward to the prospect of my three new companions; but we were in terrible want of hands. I had visions that my expedition would be entirely wrecked. There was a limit to human endurance and we could not perform miracles. We still had thousands of kilometres to travel over most difficult and dangerous country. Besides, I reflected, after all, I might only be performing an act of kindness by relieving the town of the expense and trouble of keeping its only prisoner, not to speak of the police force.

All was satisfactorily arranged, when the prisoner inquired where we were going. You should have seen his face when I told him.

"No, no, no!" he quickly replied. "No, no, no, no!" and he waved my scissors in the air. "I will not come! I will remain in prison all my life rather than be eaten up by cannibals! No, no, no, no ... no, no, no, no..." he went on muttering at intervals as he gave the last clipping touches to my hair. He hastened through his job, received his pay in silence, and asked the policemen to take him back quickly to the prison. When the chains, which had temporarily been removed, were put again around his wrists, he departed shaking his head and muttering again--"No, no, no, no..."

The wise policemen, too, said that naturally, as their prisoner would not escape, they were obliged to remain and keep guard over him ... it was not through lack of courage that they would not come; it was because of their duty!

Of course, Alcides was sadly disappointed, but I was delighted, when it all fell through.

I owe the success of my expeditions to the fact that, no matter what happens, I never will stop anywhere. It is quite fatal, on expeditions of that kind, to stop for any length of time. If you do, the fatigue, the worry, and illness make it generally impossible to start again--all things which you do not feel quite so much as long as you can keep moving. Many a disaster in exploring expeditions could easily have been avoided, had the people known this secret of successful travelling. Push on at all costs--until, of course, you are actually dead.

With my reduced party of two men (Alcides and Filippe) I had to arrange matters differently, and decided to abandon part of my baggage--all things, in fact, which were not absolutely necessary, taking only food, instruments for scientific observations, cameras and photographic plates.

Alcides and Filippe--who by then had become most adventurous--and I were about to start on July 1st, and were making things ready, when two of my deserters returned and begged me to take them along again. They had found living at their own cost rather expensive, and had realized that it would have been an impossibility for them to get out of that place again with the funds at their disposal. Each meal had cost them a small fortune. Animals were extremely expensive, and it was then the wrong season for launches to come up the river as far as Rosario, the nearest port to the south.

"We will come with you," said they, in a sudden outburst of devotion. "We will come. We are brave men. You have always been good and generous to us. We are sorry for what we have done. Order us and we will kill anybody you like for you!"

Brazilians of that class have only one idea in their heads--killing, killing, killing!

That was more devotion than I demanded. In order to spare Alcides and Filippe, and myself--as the work thrown upon us would have indeed been beyond our possible strength--I re-employed the two men on the express condition that they should murder no one while they were with me.

At noon of July 1st, accompanied by a mounted escort of honour of the leading citizens with the Mayor at their head, I left Diamantino (elev. 1,030 ft.), travelling north-east. We ascended to the summit of a table-land--the first terrace of which was at an elevation of 1,250 ft., the higher at 1,600 ft. The last words I had heard from a venerable old man as I rode out of Diamantino still rang in my ears.

"You are going to sure death--good-bye!..." On reaching the top of the plateau the courteous friends who had accompanied me also bade me an affectionate farewell. I could see by their faces and their manner that they were saying good-bye to one they believed a doomed man.

"If by chance you come out alive," said the Mayor, in a tentative way, "we should like to have news of you."

On dismal occasions of that kind the sky is always gloomy and black and there is always drizzling rain. So that day, too, the weather did not fail to add to our depressed spirits.

On leaving our friends we started to plunge once more into the unknown. On reaching the top edge of the plateau we witnessed a wonderful sight, rendered more poetic by the slight vagueness of a veil of mist. To the south of Diamantino was the Serra Tombador, extending as far as S. Luiz de Caceres, about 250 kil. as the crow flies to the south-west. Then below us was the Lagõa dos Veados with no outlet, and close by the head-waters of the Rio Preto (a tributary of the Arinos). The Serra do Tombador was parallel nearly all along with the River Paraguay.

Owing to departing so late in the day from Diamantino, and the time we had wasted on the way with social compliments, we were only able to go 12 kil. that afternoon. We halted near the shed of a *seringueiro* (rubber collector), at an elevation of 1,530 ft., close to the Chapesà, a streamlet flowing into the Agua Fria (cold water), which in its turn threw itself into the Rio Preto.

It was muggy and warm during the night--min. 65° Fahr.--with swarms of mosquitoes. We were glad to leave the next morning, following a north-westerly course across a wonderfully beautiful meadow with circular groups of trees and a long belt of vegetation along the stream. It was then that I made my first acquaintance in Brazil with the *seringueira* (*Syphonia elastica* or *Hevea brasiliensis*), which was fairly plentiful in that region. As we shall see, that rubber tree, producing the best rubber known, became more and more common as we proceeded north.

In the cuts of rivers, soft red volcanic rock was exposed, with a surface layer of white sand and grey ashes in the flat meadow. The padding of earth was thin. Except close to rivers and in extinct craters where the accumulations of earth and cinders were often deeper with a good supply of moisture from underneath, the trees were feeble and anæmic. There again I was amazed to find how unstable and weak most trees were. One could knock them down with a mere hard push--as the roots had no hold in the ground, where they spread horizontally almost on the surface, owing to the rock underneath which prevented their penetrating farther than the thin upper layer of earth, sand, and ashes. If you happened to lean against a tree 4 or 5 in. in diameter, it was not uncommon to see the tree tumble down and you too. The wood also of those trees was very brittle and watery, with no power of resistance worth mentioning.

Many were the streamlets which flowed into the Rio Preto at elevations from 1,450 to 1,500 ft., viz. the Burity Comprido, the Bujui, the Grinko, the Pomba, the Corgo do Campo, the Riberão Grande, and the Stiva. Many of those streamlets had beautiful beds of white marble pebbles, which made their cool and clear water look and taste perfectly delicious. Others, with soft black mud bottoms--especially in *cuvettes*--were extremely troublesome to cross.

On the banks of those streams were marvellous *pacobeira* palms--a kind of giant banana palm, attaining a height of 30 to 40 ft., with a stem, ovoid in section, of great length, and from which shot out paddle-like leaves of immense size and of a gorgeous green, 6 to 7 ft. long and 3 ft. wide.

On July 3rd we went through thick, dirty, low scrub and forest, except along streams, the banks of which were lined with tall anæmic trees 1 inch in diameter with a mere bunch of leaves from branches at the summit. We again met with several *cuvettes*--very grassy, with the usual florid growth of trees in the centre. Those depressions were 1,400 ft. above the sea level. From many of the trees hung huge globes, like tumours. They were nests of *cupim*, the destructive white ants (*termes album*), of which there were swarms everywhere in that region. In one night they ate up the bottoms of most of my wooden boxes and rendered many of our possessions useless. They ate up our clothes, injured our saddles by eating the stitching--anything that was not of metal, glass, or polished leather was destroyed by those little devils.

We were beginning to descend gradually on the northern side of the table-land. After crossing a pass 1,350 ft. above the sea level we arrived on a lagoon to our left. Shortly after we reached the left bank of the Arinos River, separated there from the lagoon by a narrow tongue of high land--some 30 ft. high--between the two waters.

It was thus that on July 4th we encamped on that great tributary of the Amazon. We were still thousands of kilometres away from its mouth. My animals were quite exhausted and were unable to continue. Moreover, the forest near this great river--already, so near its birthplace, over 100 metres wide--would have made their coming along quite impossible, as the grazing was getting scarce, and would be scarcer still as we went on north. Then as the River Arinos took me in the direction in which I intended to travel, I had made up my mind to abandon the animals at that spot and attempt to navigate the river--diabolical as its reputation was.

We had now travelled on horseback some 2,000 kil. from the last railway station, of which about 600 kil. were over absolutely unknown country. Rough as the travelling had been, it was mere child's play compared with the experiences we had to endure from that day on.

[Illustration: Map showing Author's Route.]

[Illustration: Map showing the Arinos and Arinos-Juruena Rivers.]

FOOTNOTES:

[Footnote 1: A litre is a cube the sides of which are 3-7/8 in.]

END OF VOL. I

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[Illustration: The Mouth of the Putamayo River.]

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ACROSS UNKNOWN SOUTH AMERICA

BY

A. HENRY SAVAGE-LANDOR

WITH 2 MAPS, 8 COLOURED PLATES, AND 260 ILLUSTRATIONS FROM PHOTOGRAPHS BY THE AUTHOR

*IN TWO VOLUMES*

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**CHAPTER I**

The River Arinos--A Rickety Canoe--Mapping the River--The *Siphonia Elastica*--Rubber and its Collection--An Enormously Rich Country--A German in Slavery

WE struck the River Arinos at a point called Porto Velho. There were at that place the miserable sheds of three *seringueiros* (rubber-collectors). I had made for that particular spot because I had heard that a big canoe carved out of the trunk of a tree probably existed there. I was told that the canoe was large enough to carry many people. It had been constructed, it seemed, some ten years previously by a rubber-collecting expedition which came to grief, was abandoned, and had since been taken possession of by *seringueiros*. I had purchased it on chance from its last owner for Rs. 300,000. With accessories I gave about Rs. 450,000, or roughly, £30. It was the only canoe upon that river.

I considered myself lucky, when I arrived at Porto Velho, to find that the canoe actually existed at all. There she was, floating more or less gracefully upon the water. She had a total length of 42 ft., was 3½ ft. wide, and had been roughly scooped out of a giant tree which was not quite straight. Her lines, therefore, were not as elegant as might have been expected. For instance, her starboard and port sides were not absolutely straight lines, but described curves--in fact, the port side almost an angle. That gave the canoe an original appearance, which to my practical mind at once suggested great difficulty of steering. Her sides, coarsely cut with an axe, were from 3 to 5 in. thick; her bottom from 6 in. to 1 ft. thick. The two extremities were solid blocks, so that her weight--she was carved out of unusually heavy wood--was altogether over 2,000 lb.

When I went down to the water to examine my purchase I found that the vessel was in a pitiful condition and needed sound repairing before she could proceed on a long journey. She was sufficiently good for crossing the stream--that was all she was used for by the *seringueiros*--but it would be a different matter to go down rapids for some thousands of kilometres. It took all the strength of my men, the *seringueiros*, and myself combined to pull the canoe out of the water upon the beach and to turn her over. We worked hard for two days with saws and hammers, knives, tar and wadding, in order to stop up a gigantic crack which extended from one end of the canoe to the other under her bottom. Although the crack did not go right through, I could well imagine that a hard knock against a rock might be quite sufficient to split the canoe in two. We scraped her and cleaned her; we overhauled and strengthened her thoroughly; we cut rough seats inside, and built an elevated deck upon which the baggage might be comparatively safe from moisture.

We were proud of our work when we launched her. Wiping the dripping perspiration from our foreheads, necks and arms, we looked just as if we had come out of a bath, we sweated so in our efforts to push her back into the water, the heat near the water, screened as it was from the breeze by the high banks and trees, being suffocating! We gazed at her--the queen of the Arinos River. She looked lovely in our eyes. On her stern I fixed the steering gear, a huge paddle 12 ft. long; and upon a neatly-made staff, which I had cut myself, I hoisted the British flag, which had hitherto flown over my tent. It was, I think, the first time the British flag had waved over that river. The canoe was baptized the "Elfrida," after my sister's name.

It will be remembered that only four men remained with me. Not one of them had ever been in a canoe before--except to be ferried across a river, perhaps--not one had the slightest idea of navigation, and it followed, of course, that not one had ever used a paddle or steered a canoe.

As the river had never been surveyed, it was my intention to make an accurate map of its entire course as far as its junction with the Tres Barras, several thousand kils. away, from which point I imagined the river must be slightly better known. Therefore, as I should be busy all day long with the prismatic compass and watch, constantly taking notes of the direction of the stream and the distances covered (checked almost daily by astronomical observations) I should not be able to take an active part in the navigation.

The canoe was undermanned. Imagine her length--42 ft.--with only two men to paddle. A third man was stationed on her bow to punt when possible and be on the look-out for rocks; while Alcides, whom I had promoted to the rank of quartermaster, was in charge of the steering. I had taken the precaution to make a number of extra paddles. We carried a large quantity of fishing-lines with hooks of all sizes, and cartridges of dynamite.

The river was most placid and beautiful, and the water wonderfully clear. Unlike rivers elsewhere, the Arinos did not show a branch or a twig floating on its waters, not a leaf on its mirror-like surface. That did not mean that branches of trees--sometimes even whole trees--did not fall into the river, but, as I have stated already, the specific gravity of woods in that part of Brazil was so heavy that none floated. Hence the ever-clean surface of all the streams.

We were then in a region of truly beautiful forest, with *figueira* (*Ficus* of various kinds), trees of immense size, and numerous large *cambará*. The bark of the latter--reddish in colour--when stewed in boiling water, gave a refreshing decoction not unlike tea and quite good to drink.

Most interesting of all the trees was, however, the seringueira (*Siphonia elastica*), which was extraordinarily plentiful in belts or zones along the courses of rivers in that region. As is well known, the seringueira, which grows wild in the forest there, is one of the most valuable lactiferous plants in the world. Its latex, properly coagulated, forms the best quality of rubber known.

[Illustration: Rubber Tree showing Incisions and the Collar and Tin Cup for the Collection of the Latex.]

[Illustration: Coagulating Rubber into a Ball.]

There are, of course, many latex-giving plants of the *Euphorbiæ*, *Artocarpæ* and *Lobeliæ* families, but no other are perhaps such abundant givers of latex as the Brazilian seringueira (of the *Euphorbiæ* family), a tree plentiful not only in Matto Grosso on all the head-waters and courses of the rivers flowing into the Amazon, but also abundant in the Provinces of Para and the Amazon. In less quantities the seringueira is also to be found in Ceará, Rio Grande do Norte and Maranhão.

The seringueira prevailed chiefly near the water, in swampy places, or in places inundated when the river was high. Never was the tree to be found at a distance away from water.

The height of the seringueira varies from 25 ft. to 50 ft. Its diameter is seldom more than 35 in. Its leaf is composed of three elongated leaflets, smooth-edged and complete in themselves. The seed is smooth-skinned, and of a reddish tone. The fruit consists of a well-rounded wooden capsule enclosing three cells which contain white oily almonds not disagreeable to eat. From the almonds an oil of a light red colour, not unlike the colour of old port wine, can be extracted. That oil can be substituted for linseed oil, and has the further advantage of not desiccating so quickly. Mixed with copal and turpentine it gives a handsome varnish. It can be used advantageously in the manufacture of printing-ink and soap. So that every part of the seringueira can be put to some use or other.

Among the other more important trees which produce rubber may be mentioned the *Siphonia brevifolia*, the *Siphonia brasiliensis*, *Siphonia rhytidocarpa*, and the *Siphonia lutea*, all found chiefly in the State of Para. In other parts of Brazil grow the *Ficus anthelmintica*, the *Ficus doliaria* (or *gameilleira*), the *Ficus elastica*, *Ficus indica*, *Ficus religiosa*, *Ficus radula*, *Ficus elliptica*, *Ficus prinoides*, the *Plumeria phagedenica*, the *Plumeria drastica*, the *Sorveira* or *Collophora utilis*, and the *Mangabeira* or *Harncornia speciosa*.

At present we shall be chiefly interested in the seringueira (*Siphonia elastica*).

The collection of the latex from the seringueira and the subsequent process of coagulation were simple

enough. A *seringueiro*, or rubber-collector, started from his hut early every morning carrying with him a small steel axe or pick, the head of which was 3 in. long and shaped like a bird's beak; a tin bucket, and some *barro*--soft clay which had been soaked in water. He walked along the *estrada* or track which he had cleared for himself, leading from one rubber tree to the next. There may be twenty, thirty, fifty or more rubber trees that have been tapped on one *estrada*, according to the district and the activity of the *seringueiro*. In the case of a new tree a collar of the fibre of burity palm was in the first instance nailed with pegs of hard wood round the stem, not horizontally, but at an angle: sometimes, when necessary, in a spiral. In other cases a similar band of clay was made to encircle the tree. These collars served as channels, compelling the latex, as it exuded from cuts made in the tree, to flow into a small tin cup suspended at the lowest point of the collar. The incisions were never made lower than 2 or 3 ft. from the ground. They must not penetrate deeper than the entire thickness of the bark of the tree, and they must on no account touch or wound the actual wood, or the tree would suffer greatly--even die. In some regions the incisions were made longitudinally, in others transversely. The operation was repeated by the *seringueiro* each time on every rubber tree as he went along the *estrada*, the latex flowing freely enough into the tin cup after each fresh incision had been made.

The *seringueiro* thus tapped each tree on his way out along the *estrada*, which in some cases may be several miles long; in other cases, where rubber trees were plentiful, only a few hundred yards in length. On his return journey the *seringueiro* emptied each small tin cup--by that time filled with latex--into the large bucket which invariably accompanied him on his daily round. Rubber-trees possess in a way at least one characteristic of cows. The more milk or latex one judiciously extracts from them, the more they give, up to a certain point. But, indeed, such a thing is known as exhausting a tree in a short time. A good *seringueiro* usually gives the trees a rest from the time they are in bloom until the fruit is mature. In some regions even a much longer respite is given to the trees--generally during the entire rainy season. In some localities, too, in order to let the latex flow more freely, a vertical incision is made above and meeting a horizontal one. At intervals oblique incisions are cut next to the vertical ones, but in Matto Grosso I never saw that complicated system of incisions adopted--only vertical incisions parallel to one another at a distance of 0.25 m. (9-7/8 in.) being made there, and in rows one above another. Some of the trees had actually hundreds of those cuts--many, of course, healed. Each cut only exudes latex for a comparatively short time, merely an hour or so.

During the first month after a tree is tapped, the supply of latex is generally plentiful; the second month it gives less; less still the third month. On an average twenty trees give about one litre of latex a day. Three litres of latex are necessary in order to obtain one litre of rubber. At the head-waters of the Arinos River 600 trees gave from 30 to 35 arobas (450 to 525 kils.) of fine rubber in the first month, and about 20 arobas (300 kils.) of *sarnambé* (second quality with impurities). One aroba is 15 kils.

The latex of the *seringueira* in the Arinos region was of a beautiful white, quite liquid, and with a pungent, almost sickening, odour. When a new tree was tapped, the lower towards the ground the incisions were made the better. If after considerable tapping the tree did not yield much, it was advisable to incise the tree higher up. In that region the trees exuded latex more abundantly when they began to have new leaves in October. Late in the dry season the latex flowed less freely. When the weather was windy all the latex seemed to contract to the summit of the trees and hardly flowed at all from the incisions. When it rained, on the contrary, it flowed freely, but was spoilt by being mixed with water; so that a good *seringueiro* must know well not only where and how, but also when to tap the trees, in order to get good results.

[Illustration: Balls of Rubber outside a *Seringueiro*'s Hut.]

[Illustration: Method of Pressing Rubber into Cakes.]

The alum process of coagulation being used.]

Several ways were employed in order to coagulate the latex. The simplest was the one used in Matto Grosso. The latex was poured into a rectangular wooden mould, 0.61 m. long (2 ft.), 0.46 m. wide (1½ ft.), and 0.15

m. deep (about 6 in.). Upon the latex was placed a solution of alum and warm water. Then coagulation took place. In order to compress the coagulating latex into solid cakes, a primitive lever arrangement was used--merely a heavy wooden bar, one end of which was inserted into the cavity of a tree, above the wooden mould, while at the other end of the bar heavy logs of wood were suspended. One night was sufficient for the latex to coagulate thoroughly and be properly compressed into cakes, weighing each about 22½ kils. The cakes were lifted out by belts of liane which had been previously laid into the moulds.

The discoverer of the method of coagulating rubber with alum was Henry S. Strauss. He also found that by keeping the latex in hermetically sealed vessels it could be preserved in a liquid state. The same result could be obtained with ammonia.

In the Amazon and Para Provinces a different process was used. The latex was coagulated by placing it near the fire. The heat evaporated the aqueous part and coagulated the vegetable albumen. In order to make what was called a *garrafa*, or large ball of rubber--some weighed 20, 30, 40 kils. and more--a small ball of latex was made to coagulate round a horizontal bar of wood. That ball was gradually increased in circumference by smearing it over with more latex, which became gradually coagulated and dried by the heat and smoke produced by the burning of certain woods, and of the oily seeds of the *urucuri* palm, technically known as the *Attalea excelsa*. In this process the rubber did not remain white, as with the alum process; in fact, it became dark brown, almost black, owing, of course, to the smoke. Locally, the smoking process was said to be the better of the two, for the coagulation with alum took away somewhat from the elasticity of the rubber.

Interesting was the *sorveira* (*Collophora utilis*), a tree which gave latex that was quite delicious to drink, but could not be coagulated. The trees, to any untrained person, closely resembled the seringueira, only the leaves were more minute and differently shaped. It must be remembered that nearly all the trees of the Brazilian forest had leaves only at a very great height above the ground, and it was not always easy to see their shape, especially when close to other trees where the foliage got interwoven into an almost solid mass. We frequently enjoyed the sweet milk of the *sorveira*--it tasted slightly of fresh walnuts with sugar on them. It was unsafe to drink too much of it, as it had injurious effects upon one's digestive organs.

There was there also the *leiteiro* (or producer of milk), a smaller tree, and the liana *macaco*, which both produced abundant milk, but in neither case had a way, so far, been found to coagulate it.

The two days spent at Porto Velho were interesting. The four men who had remained with me behaved fairly well, principally owing to the prospect, that, in drifting down stream, they would not have to work, and would be saved the heavy trouble of grooming, packing and unpacking the animals, and the tedious job every morning of riding miles through the country in order to recover those that had strayed away during the night.

"Thank heaven!" exclaimed Antonio, as he gazed at the canoe, "we shall not have to hunt for her every morning!"

"Yes," answered Filippe, "no more pack-saddles to fix, no more leading the animals to drink. She"--pointing to the canoe--"can drink all the time if she likes...."

Filippe was a prophet. The canoe did "drink" all the time, much to our concern. Little did my men suspect before we started that they would have the hardest time of their lives--so hard, indeed, that it was amazing humans could endure it at all.

One of the three seringueiros at Porto Velho interested me greatly. He was a tall, gentlemanly, refined person, who seldom uttered a word. I noticed that he avoided meeting me, and, although extremely civil, seemed afraid to enter into conversation. The little shed he had built himself (7 ft. by 4 ft., and 7 ft. high) was extraordinarily neat, and open on all sides--quite unlike the sheds Brazilian rubber collectors build themselves.

From my tent I watched him. The man got up before sunrise every day, going at once to the river for a swim. Humming some sort of a song, he would then go through a series of gymnastic exercises, interrupted by sonorous slaps upon different parts of his anatomy to kill impertinent mosquitoes, of which there were swarms on the Arinos River. That done, he would assume a suit of working-clothes, and, returning to his shed, would pick up his tools and noiselessly depart, so as not to disturb our sleep! At sunset, when he returned, he immediately proceeded to the river to have another swim and to get rid of the many insects which always collected upon one's person in going through the forest. Then he put on a clean suit of clothes, and, saluting us from a distance, went to his shed to rest.

I was certain the man was not a Brazilian, but as curiosity is not one of my chief characteristics I took no special notice of him. This brought him round to my tent one evening. The man was a German by birth, of a good family and excellent education. He could speak German, English, French, Spanish and Portuguese to perfection, and was well versed in the literature of those languages. He had evidently drifted about for many years in many parts of South America in search of a fortune, in the Argentine, in Uruguay, and had ended by becoming a slave in Brazil. Yes, the poor old man was a voluntary slave. He had borrowed from his employer and was unable to repay. He was therefore a slave in the true sense of the word, as his employer could, according to local custom, sell him to any one he chose.

[Illustration: The Upper Arinos River.]

[Illustration: The Arinos River above the Rapids.]

I was terribly upset to see a European in such a position, and, what was worse, I was not in a position to help. Nor indeed was help asked for or wanted. The old fellow bore the burden bravely, and said he had never been happier in his life. Supposing he were made to return to his own country--from which he had been absent so many years--he philosophically argued, what could he be, with no money and no friends, but a most unhappy man? All his relatives and friends must have died; the habits he had acquired in the wilds were not suitable for European cities; he was too old to change them. The German was an extraordinarily fine type of a man, honest, straightforward, brave. He spoke in the kindest and fairest way of his master. He had sold himself because of necessity. It was now a matter of honour, and he would remain a slave until it was possible to repay the purchase money--some four hundred pounds sterling, if I remember rightly--which he never expected to be able to repay at all.

The German told me some interesting things about the immediate neighbourhood of the camp. The Indians of the Cayapo tribe, who lived close by, did not interfere with the seringueiros. He had been there several years in succession, and he had never seen an Indian. The seringueiros only went to collect rubber during some three or four months each year, after which time they returned to the distant towns south as far as Cuyabá and Corumbá. At the beginning of the rainy season, when the time came for them to retire, the Indians generally began to remind the seringueiros that it was time to go, by placing obstacles on the estrada, by removing cups or even the collars from the rubber trees. But so far in that region, although footmarks of Indians and other signs of them had been noticed, not one individual had been actually seen. Their voices were frequently heard in the distance singing war songs.

"Hark!" said the German to me, "do you hear them?"

I listened attentively. Far, far down the river a faint chorus of voices could just be heard--intermittent sounds of "huá ... huá ... huá ... huá." In the stillness of the night the sound could be distinguished clearly. It went on until sunrise, when it gradually died out.

There was a big lagoon to the west of Porto Velho, formed by the river at high water. The lagoon dried up during the dry season. It was separated from the river only by a narrow tongue of land, 80 ft. high.



I took careful and repeated observations for latitude, longitude, and altitude, the latter by a boiling-point thermometer, from our point of departure at the headwaters of the Arinos River. The elevation of the river was there 1,200 ft. by aneroid, 1,271 ft. by the hypsometrical apparatus. The latitude was  $14^{\circ} 2' 2''$  South; the longitude  $56^{\circ} 17'$  West of Greenwich.

We were having beautiful, clear skies. Only on July 4th at sunset a solitary streak of mist extended to the summit of the sky.

I had two plans in my mind when I decided to descend the Arinos River. One was to abandon that river at the point where it met the Juruena River and strike across country westward until the Madeira-Mamore Railway was met. The other plan--even more difficult--was to continue down the river as far as its junction with the Tres Barras, from which place I would strike across the virgin forest as far as the Madeira River. I had not the faintest idea how I could realize either plan with the ridiculously meagre resources at my disposal. I had money enough, but unfortunately that was one of the few spots on earth where money was of little use. Again I trusted in Providence to come to our help. Both plans involved thousands of kilometres of navigation of a diabolical river, in an almost uncontrollable canoe, with an insufficient and absolutely incapable crew. Then would come the crossing of the virgin forest on foot, for some hundreds of kilometres--nobody knew how many. The least number of men necessary in order to be able to carry provisions sufficient to execute either plan was thirty. I only had four. Yet I started. The second plan was successfully carried out, but necessarily at the cost almost of all our lives, and with sufferings unimaginable.

**CHAPTER II**

Hoisting the British Flag--An Escaped Slave--A Dilemma--Benedicto--The *Lutra Brasiliensis*--The Seringueiros--A Marvellous River--Rapids

ON July 6th we packed the canoe with our baggage and dogs. The British flag was hoisted at the stern of the canoe, and with tender embraces from the seringueiros, whose eyes were wet with tears--they imagined that we were going to certain death--we pulled out of Porto Velho at seven minutes to eleven o'clock a.m.

"We will pray with all our hearts that you may reach the end of your journey safely!... Beware of the rapids; they are terrible.... Be careful because the canoe does not steer true.... Do not let the canoe knock too hard against rocks, or she may split in two!... Good-bye!... good-bye!"

With those encouraging remarks from the seringueiros, who were sobbing bitterly, we drifted with the current, Antonio and Filipe the negro paddling in the style generally adopted for scooping soup with a spoon out of a dish.

I had provided the canoe with a number of improvised paddles we had cut ourselves. There were no two of equal size, shape, or weight. We had chopped them with an axe from sections of a tree. They were originally all intended to be the same, but what we intended to have and what we got were two different matters, as the five of us each worked on a separate paddle.

The seringueiros stood on the high bank, waving their arms in the air. One of them blew plaintive sounds on one of the horns used by them for calling their companions while in the forest. Those horns could be heard enormous distances. Filipe the white man, who was not paddling, fired back a salute of ten shots. There was nothing my men loved more than to waste ammunition. Fortunately we had plenty.

The average width of the river was there from 80 to 100 metres, with a fairly swift current. It was lucky that ours was the only boat on that river, for indeed we needed all that breadth of water in our snake-like navigation. I remonstrated with Alcides, who was at the helm, and advised him to keep the nose of the canoe straight ahead, as we were coming to a *corrideira* or small rapid.

Alcides, who could never be told anything, became enraged at my words of warning, and also at the derision of the other men, as we were drifting side on and he could not straighten her course. Just as we were entering the rapid, in his fury Alcides, in disgust, let go the steering-gear, which he said was useless. We were seized by the current and swung round with some violence, dashing along, scraping the bottom of the canoe on rocks, and bumping now on one side, now on the other, until eventually we were dashed violently over a lot of submerged trees, where the bank had been eroded by the current and there had been a landslide. The canoe nearly capsized, the three dogs and some top baggage being thrown out into the water by the impact. We got stuck so hard among the branches of the trees that we all had to remove our lower garments and get into the water trying to get the canoe off.

My men used pretty language. That small accident was lucky for us. The shouts of my men attracted to the bank a passing man. Half-scared, a wild figure of a mulatto with long, unkempt hair and beard, his body covered by what must have once been a suit of clothes, stood gazing at us, clutching a double-barrelled gun in his hands.

"Is there a revolution in Matto Grosso?" he inquired when I caught sight of him. "Why do you fly the red flag?"

"That is not the flag of revolution, that is the flag of peace. It is the English flag."

"The English flag! The English flag!" he exclaimed, running down the slope of the river bank. "You are English!... Oh, sir, take me with you! I entreat you take me with you! I am an escaped slave.... I owe my master much money.... I can never repay it.... I am a seringueiro. My estrada is some miles down the river. I have been there alone suffering for months. I had no more food, nothing. There is very little fish in the river. The life is too terrible. I can stand it no more. If you do not take me with you I shall kill myself."

I tried to persuade the strange figure to return to his master--the master lived in comfort in the city of Cuyabá. "If you chose to borrow money and sell yourself, it was only right that you should repay your debt." That was the only way I could look at it. But the man would not hear of it. If I did not take him he would kill himself--there, before me, he repeated; that was all.

So difficult a dilemma to solve--at so inconvenient a moment, when we were as busy as busy could be, trying to disentangle the canoe--was rather tiresome. The strange man, having laid his gun upon the ground, helped us with all his might in our work. When the canoe got off, the strange man, gun and all, jumped clumsily into her and nearly capsized her a second time. He implored me with tears in his eyes to take him along. He would work day and night; he would present me with his double-barrelled gun (an old muzzle-loader); he did not want pay--he only wanted to get freed from his master, who, he said, robbed and ill-treated him.

"Do you swear upon all that is most sacred that you have made up your mind not to go back to your master?"

"Yes. If you say 'No' to me, I shall kill myself now."

Benedicto--that was his name--spoke with quiet determination.

"Very good, Benedicto. You can remain. What is more, you shall receive from this moment the same pay as the other men. You can keep your old gun, too."

Benedicto embraced and kissed my hands, then my feet. The poor man's joy was so great that it was really worth living to see that such moments of happiness could be procured in a man's lifetime.

Benedicto was a free man again, and for the first time in his life was earning genuine money! He was handed a paddle, and he paddled away for all he was worth, splashing with water those in front and behind him. He was in a state of great excitement, tears flowing freely down his cheeks and beard, and dripping on to his knees as he sat in the bottom of the canoe. He sobbed to his heart's content, and kept on splashing us all over with his paddle. We were all so touched by that pathetic scene that we preferred getting wet to remonstrating.

Fortunately the river was placid enough under the *corrideira*. When things had quieted down a little, I taught Benedicto and the others how to paddle properly, and Alcides how to steer straight. I had then five men. That improved matters greatly, as four could paddle while the fifth was steering.

The Arinos River flowed from Porto Velho in a south-westerly, then in a due westerly direction, then north, then again west, from which last point it doubled, as it were, and proceeded east and south-east, returning to within quite a short distance of our original point of departure. We sounded our horn, and immediately heard in reply the horn of the seringueiros at Porto Velho. Judging by the sound, the distance could not have been more than a few hundred metres, although we had travelled some six thousand metres down stream.

[Illustration: The First Rocks in the Arinos River.]

[Illustration: Enormous Globular Rocks typical of the Arinos River.]

For the first time I noticed swallows flying swiftly over the river, close to the water. Another easy *corrideira* was encountered. When we had been out several hours my men were already beginning to get into the right

way of paddling, and Alcides was commencing to understand the capricious mysteries of the steering-gear.

On account of my men's inexperience--and due credit being given to the current--we went at the rate of 13 kils. an hour. Innumerable were the rubber trees all along the banks. Occasionally small sand beaches were met with. Here and there a fallen giant tree obstructed part of the river. Families of *ariranhas* (*Lutra brasiliensis*) played in the water. The pretty little animals--not unlike otters--raised their heads above water, and, hissing loudly, frequently came to attack the canoe. They were extraordinarily brave. They were greatly attracted by the vivid red of the British flag, which in their imagination suggested blood. They became wildly excited when I waved the flag at them, and when I placed it near the water they would charge the canoe--so much so that two or three times my men were able to kill them by striking them on the head with the heavy wooden paddles.

The river was at its lowest when I descended it, which made it all the more difficult for us, as we were treated to innumerable small rapids which would otherwise have been entirely covered over with water. A great island (80 m. long) of pebbles and beautiful crystals was passed in the centre of the stream, which there formed two channels; one entirely blocked by fallen trees and accumulated rolling material, the other, 40 m. wide, very deep and swift.

The banks of the river were about 20 ft. high, generally of red earth, with a stratum of white sand above. The vegetation was luxuriant and extraordinarily tidy along the summit of the banks. The water was quite crystal-like, it was so clear. All the time our nostrils were fully expanded to inhale the delicious scent of the forest, which closely resembled that of jessamine. Masses of violet-coloured convolvuli were festooned from the trees. That was a great treat for me, after the months I had gone through when my entire days were spent eating up dust raised in clouds by the troop of animals marching in front of me.

When you came to survey a river it was really amazing what zigzags water could make in cutting its way through a country. From north-west the Arinos veered south-west, and from south-west to north-east.

By one o'clock we were in a spacious basin, 200 m. in diameter, close to which a small tributary, 2 m. wide, entered the Arinos on the left bank. Farther down on the right bank were neat beaches of white and red sand. We stopped for a few moments at a seringueiro's shed. The poor fellow--a negro--was in a pitiable condition from malarial fever.

Those martyrs of labour were much to be pitied, and also admired. There, hundreds of miles away from everybody, they stayed, abandoned in the forest until the agents of their masters who had dropped them there found it convenient to come and fetch them back again. If they came back at all and never failed, it was not, you can be sure, for the interest they took in human life, but because of the quantity of valuable rubber which they expected would be collected before their return. Those poor creatures had no possible way of escape, except under extraordinary circumstances. They were conveyed to their stations overland by means of pack animals, which at once were sent back and did not return until the end of the collecting season. Even then, if the seringueiro wanted to get away, he was frequently compelled to purchase an animal from his employer at three or four times its actual value--that is to say, perhaps sixty or eighty pounds sterling. So that the more a man worked or earned the more he became indebted to his master.

Like all men who have lived a great deal in exile and solitude, the seringueiros--nearly all blacks or mulattos--were extraordinarily generous. They always wanted to give you all they possessed--which was next to nothing, but meant a fortune to them. They would deprive themselves of anything if they thought they could give the slightest pleasure.

We left the seringueiro. I feared the poor man could not live long in his broken-down condition. He was most grateful for some medicine and provisions I left with him. His farewell to us was in so melancholy a voice, as he tried to lift himself out of an improvised bamboo couch, that for days it rang in my ears, and before my

eyes constantly remained his skeleton-like, sunken features as he waved his farewell and fell back exhausted.

Behind a narrow barrier of sand, about 10 ft. high, as we proceeded down stream in a north-westerly direction, was a large lagoon.

The river was really too beautiful for words, the clear green water reflecting with precision in deeper tones the view before us. Only when its course was disturbed and diverted by a sharp rock or by the branches of a fallen and dying tree, the successive angular ridges of the troubled water shone like polished silver in parallel lines from the reflected light of the sun, just like a huge luminous skeleton of a fish.

The trees were truly wonderful along the river--tall and healthy, with dense deep green foliage. But Nature seemed absolutely asleep. Barring the few swallows we had seen soon after our departure, and the *ariranhas*, we went the whole day without hearing the song of a bird, or the howling of a wild animal. We did hear a noise resembling the bark of a dog--so much did it resemble it that my dogs barked back. But it came not from a dog at all. The peculiar noise was made by a large bird.

[Illustration: A Rocky Barrier in the River.]

[Illustration: A Picturesque Double Waterfall on the Arinos River.]

After passing a handsome beach of white sand on our left, the river described sharp angles, west, north-west, north-east, then north. There were rapids, fairly strong, although not dangerous in any way. The river was forced through a channel 50 m. wide, in which the current was very strong. To make things worse, a giant tree had fallen and obstructed much of the passage, compelling us to negotiate the rapid in its worst part. A large bay, 180 m. in diameter, opened out below that point. Farther came a perfectly straight stretch of water for 3,000 m. Halfway down that stretch, to the right, we passed the mouth of the Agua Clara, a charming rivulet of crystalline water, 10 m. wide. A conglomerate stratum of alluvial formation, composed of well-rounded pebbles held together by red earth, and crumbling easily under pressure of the fingers, showed through in many places. The beaches of handsome, fine white sand were most interesting.

The forest was getting thin on both sides. In fact, late in the afternoon we had open country on the left bank--only a few trees being visible near the water's edge, and an occasional giant *jatobá* (*Hymenocoea Courbaril* L.), the latter chiefly on the right bank. The right bank was sparsely wooded, and at one time we had open campos on both sides of us.

A streamlet 3 m. wide entered the Arinos on the left. We got to one point where the river proved treacherous, although apparently almost tranquil on the surface. The Brazilians have an excellent name for such places--*rebojo*, or a curve formed by sudden deviation of a current. If we had not been careful in going across such places, it would have been easy for the canoe to have been turned over and sucked under.

Patches of thick forest were met on either bank, and in those patches numerous indeed were the rubber trees. In the afternoon we saw chiefly campos and *chapada*, or thin scrub.

Considering all, we did well--chiefly owing to the strong current--on our first day of navigation. We had gone some 70 kils. when we halted at sunset, at the junction of the very deep streamlet Quarustera with the Arinos. The elevation of our camp, 60 ft. above the river, was 1,200 ft.

The nights were cool enough--minimum 55° Fahr. on the night of June 6th--7th. There was a thick haze over the river in the morning, and as we did not know what we might be coming upon suddenly we did not make a start until 7.15. After crossing a large and shallow bay the stream was forced into a channel 50 m. wide. There was open country--campos--on the right bank. A curious isolated volcanic boulder split in two was then observed in the stream, while the banks were of alluvially deposited conglomerate. From that spot luxuriant

forest was on the right bank once more, while open country was on the left. Upon examination I found that the thick forest was merely a band or zone near the water--behind was open country.

Farther, the river went through a neck 40 m. wide where the current was very swift. The banks almost all along were from 10 to 20 ft. high. Slender *tucuma* or *tucuman* palms were to be seen, which had stems only 3 to 4 in. in diameter, but were 30 to 40 ft. high, and had a ball-like tuft of leaves at the top. We then came upon open country (*chapada*) on both sides, and went over small *corrideiras*, which we got to like, as we travelled along on them at a greater speed than in the still waters, with a minimum of exertion. The river seemed to be getting narrower all the time that day, and, of course, deeper. In many spots it went through a channel not more than 30 m. wide.

We heard--but not for long--the cackling of the *jacu* (*Penelope cristata*), a handsome gallinaceous bird. The *jacu* made most delicious eating. Then that day flocks of small green parrots flew over our heads on several occasions.

*Ariranhas* gave us once more a good deal of amusement and sport. It was seldom one found such cheeky and inquisitive animals. They would pop their heads out of the water quite close to the canoe and sniff and grind their teeth at us. They had beautiful little heads--something between a cat and a seal--with lovely, but wicked, black eyes of wonderful luminosity. They had a perfect craving for blood. The Brazilians have strange tales about them--not exactly fit for publication.

The sand beaches were not so frequent as we advanced on our journey. We noticed instead extensive beaches of gravel. Another tributary stream, 10 m. wide at its mouth, entered the Arinos from the east. There was heavy forest there with plenty of rubber-trees on the right bank, whereas the country was open on the left bank.

Farther down, the banks became low, so that the slightest rise in the river would inundate the country. The forest was particularly thick, and the rubber trees plentiful, along a stretch of 4,300 m. of river in a perfectly straight line.

The river was getting more and more beautiful at every turn. We emerged into a bay 300 m. in diameter. Great blocks of conglomerate were strewn about. A great spur projected to the centre of the bay. The richness in rubber of that region was amazing. Wonderful giant trees, heavily laden with dark green foliage, were reflected in deeper tones in the water of the river--there almost stagnant because held up by some obstacle lower down. Innumerable festoons of creepers hung down from those trees. The stream was there 80 m. wide, and beautiful that day in great stretches of 4,300 m., 1,400 m., 1,000 m., 3,000 m., 1,500 m., and 1,200 m.--in a perfectly straight line. The forest was occasionally interrupted on one side or the other by great expanses of *chapada*.

Immense *bacabeira* palms, 40 to 50 ft. high, were numerous, most graceful to look at, with their ten or eleven huge compound leaves placed like an open fan. Yellow filaments of some length hung in a cluster where the petiole of the leaves met.

We arrived at a *pedreria*--an accumulation of rocks--extending almost right across the stream, and which was the cause of the placidity of the waters above it. There were two channels--one to bearings magnetic 330°, the other to 360°--on either side of a central island. We followed the first and larger channel. The island, which had a most luxuriant growth of trees upon it, was subdivided into two by a channel 10 m. wide at its south-eastern end.

For purposes of identification I named all the islands we saw. The larger of these two I called Esmeralda Island. In order to establish its exact position I landed and took observations for latitude and longitude. Lat. 13° 15' 6" S.; long. 56° 46' W.

[Illustration: An Island of the Arinos River.]

[Illustration: Vegetation on an Island in the River Arinos.]

We were then at an elevation of 1,150 ft. The temperature in the shade was 77° Fahr. and 98° in the sun. Six-tenths of the sky was covered with thick globular clouds, which made the air heavy, although the temperature was not excessively high. It must be remembered that we in the canoe were in the sun all the time and suffered a good deal in the morning and afternoon, when the sun was not high, by the refraction of the sun's rays from the water. The refracted light was so powerful that it interfered a good deal with the navigation. The river looked like a molten surface of boiling silver, which absolutely blinded us at times, and made it impossible to see what was ahead in the water.

Esmeralda Island was formerly joined at its most south-westerly point to the western bank of the river. From that point the river described an arc of a circle as far as bearings magnetic 20° (N.N.E.). We negotiated successfully two small rapids with large volcanic rocks just under the surface of the water. We just escaped going over one of them, which would have certainly capsized the canoe. As it was we merely scraped the side of the canoe against it.

The left bank, which had crumbled down, showed strata of conglomerate and yellow sand, with upper alluvial deposits of a light grey colour.

We were travelling due north in a straight line of 1,800 m. when we came upon the entrance of a lakelet on the west side of an islet. A huge fish--some 5 ft. in length--unaccustomed to the unusual sight of human beings, played about under our canoe for some time, much to the excitement of my men. Birds of superb metallic blue, vivid yellow, and iridescent plumage played about among the trees. On the left bank farther down was a great growth of high bamboos, then again forest with plenty of vigorous rubber trees.

Again small and fairly swift rapids were encountered in a turn of the river from bearings magnetic 70° to 250°. A tributary stream which came from the south entered the Arinos on its left bank. Then we came to another island forming two channels--one (N.W.) 20 m. wide, with some rough-looking rapids; the other channel (N.), larger and shallower, divided in its turn in two by a mound of yellow gravel.

Alcides, who steered, had an idea that in going down rapids you should always send the canoe over places where the water broke and foamed, which meant rocks underneath, and not keep her in the centre of the channel where the water was deeper. This idea was, I think, suggested by his inability to swim, and the hope that if we got wrecked he could touch bottom with his feet, so that his life might be in comparative safety. I tried to argue the point with him, but it was no use. It invariably led to such unpleasantness that once more I decided to trust in Providence, as long as we went forward.

I had just shouted to Alcides to keep in the centre of the channel. Of course he disobeyed. We were caught in the strong current. One moment later there was a violent bump which knocked us all off our seats and sent us sprawling in the bottom of the canoe. We had stuck fast between two rocks. The canoe, being of such great length, vibrated to and fro with the current forcing it at the side. Laden as she was with baggage, in a few moments she became filled with water, and it was only after working hard for the best part of an hour that we were able to extricate ourselves from our position. We had hardly finished baling the water out on resuming our course than, 1,500 m. farther, we came to more rapids, then 700 m. beyond yet other rapids.

The forest was fairly thick all along on both banks, with innumerable healthy rubber trees. Although the forest seemed impenetrable at first sight, I always found that it was easy enough to go through it if one knew how. Quite close to the water naturally the vegetation was somewhat entangled. In many places were extensive patches of bamboos of considerable height; but there is a way of disentangling the most confused growth, if you happen to understand how those plants and liane grow and get twisted. Any one with a keen sense of

observation should experience no difficulty whatever in going through the densest forest anywhere in the world--even without using a knife--although, of course, the latter is useful when you wish to keep up a certain speed in your marching.

Eleven kilometres and a half from the last rapids--having travelled north-west, south-west, east, and even due south, so winding was the course of the river--we came to a tributary stream 10 m. wide, on the left side of the Arinos. Eight kilometres farther we passed the inlet--then dry--of a small lagoon fed by the stream. The river banks, where eroded by the water, showed a lower layer of reddish-brown rock with a bright red ferruginous stratum above it. The top layer, 10 ft. thick, seemed formed of lime and alluvial deposits.

We emerged into a large basin 200 m. across, with a charming little island in the centre forming two channels with fairly strong rapids. We followed the channel on the right. At that point the river folded over itself into a great elbow. A cliff, 120 ft. high, towered on one side in brilliant red and yellow. The lower half of the strata was perfectly horizontal; the upper half at an angle of  $45^\circ$  to the lower. The vivid colouring was intensified by contrast with a beautiful beach of immaculate white sand on the left side of the great elbow.

I observed a wonderful double lunar halo on the night of July 7-8, the outer circle in successive tints of most delicate yellow, orange, pale blue and white--the yellow being nearest the centre.



**CHAPTER III**

Dangerous Navigation--Eddies--Whirlpools--An Extraordinary Creature--The Man X.--Pedro de Toledo Island--An Interesting Rodent

WE were rather proud of ourselves, as we had gone 69 kils. on July 7th, paddling away--barring the interval for lunch--from 7.15 in the morning until 7.30 at night.

The night was fairly cold--minimum 57° Fahr.; the elevation 1,100 ft. Where I made camp at the elbow of the stream (on the left bank) there were innumerable rubber trees. A similar wealth of *Siphonia elastica* appeared to be on the opposite bank, where the forest was luxuriant.

On July 8th we began our journey by going down rapids. Then after some 15,300 m. of fairly smooth navigation we crossed a basin 130 m. wide, where we encountered strong eddies--most unpleasant, as they swerved the canoe about in a way that was alarming. Lower down a swift *corrideira* and more eddies gave us some trouble.

A beautiful *ariranha* peeped out of the water close to the canoe, spitting angrily at us. It was attracted by the blood-red of the English flag, which it evidently wanted to bite. My men fired and wounded it; but so vicious were those little otters, and so great their craving for blood, that it still came on to within a foot or two of the canoe, when my men killed it.

The river was there compressed into a deep channel, 85 m. wide, with a strong current, after which it split into two arms--one north-west, 25 m. wide; the other north-east, 30 m. broad. The island thus formed between the two arms was 2,500 m. long. We called it Ariranha Island.

A streamlet 3 m. wide entered the Arinos on the right bank. Where the banks were free from vegetation an undulating stratum of red earth was exposed, directly above which was a stratum from 1 to 2 ft. thick of a brilliant yellow colour. Above that rested the usual grey alluvial deposits from 6 to 8 ft. thick.

From a direction due west the stream suddenly turned north, between high banks. A strong *corrideira* was found before the stream divided itself into three arms--two of those arms flowing north-east, the other north-west. We followed the latter--a channel 20 m. wide, with a high bank of gravel on its left side. Where those arms met again--some 500 m. farther--a basin 200 m. in diameter was formed. A hill 150 ft. high, covered with dense vegetation, faced us to the north. It was quite an unusual sight in such flat country. The stream took a sharp turn at that spot--it positively doubled. Strong eddies were encountered. The greatest care should have been taken in going over places of that kind, but "care" was a word I had absolutely scratched out of my vocabulary as useless in my journey across Brazil. How and why we ever got across those places with the crew I had on board, would indeed be beyond me to explain--unless, as on preceding occasions, it was due to the unceasing protection of a guardian angel.

After crossing a circular basin 200 m. in diameter, the river became suddenly squeezed into a channel 30 m. wide, much strewn with rocks. A somewhat troublesome rapid had to be negotiated there, rendered more difficult by the recent fall, across the best part of the stream, of a giant tree. The branches which stuck out of the water formed a regular barrier and waved to and fro with the violent pressure of the water. Before we could realize where we were, Alcides steered us straight into the branches and foliage of the fallen tree. As we were travelling at an accelerated speed with the strong current, all our hats were scraped off our heads, and, what was worse, our scalps, faces, and arms had patches of skin torn off as we crashed among the branches. It took us some time before we were able to disentangle ourselves, resume navigation, and recover as we went along the various headgear floating independently down the stream.

Another little tributary, 2 m. wide, entered the Arinos on the left side. No sooner had we freed ourselves from the rapids than we were in a circle 80 m. across, with nasty-looking eddies, which swung the undermanned canoe now to one side, then violently to the other, in a dangerous way. We could not have struck a worse time for navigating the river. It was then the end of the dry season and the water at its lowest, so that every possible obstacle that could be found in that river stood to impede our progress. This would not have been the case at high water when navigation in that portion of the stream would have been comparatively smooth and easy. We were thanking our stars that we had passed the vicious eddies safely, when we were confronted by more rapids, with treacherous submerged rocks. Yet another basin, 150 m. wide, was crossed, with large blocks of black rock showing through on the left bank. More rapids were met--quite easy to negotiate. The sky was half covered with feathery radiations from the south.

To the north another hill, 120 ft. high, eroded by water, stood on the left bank of the stream, where red volcanic rock was also visible in a stratum 15 ft. thick, covered by a thick layer of yellow earth. Strong rapids came next. We had had so much luck in the descent of the rapids--which, bad as they were, really were so far quite unimportant as compared to what we were to find later--that my men began to be quite adventurous. Saving trifling mishaps, we were getting on well. The tributaries of the Arinos we had seen so far that day were small streamlets 1 m. wide on the right; another, 2 m. wide--a limpid stream--coming from the south-west on the left. Several springs of clear water filtered through the left bank. In the centre of the river was an extensive bank of gravel held up by blocks of volcanic rock.

[Illustration: Preparing the Canoe to descend a Rapid.]

[Illustration: A Cataract on the Arinos River.]

In a basin 150 m. wide rose a pretty island. Rapids were found in the channels, of which the western was wider and more free from obstacles. For one entire kilometre there were strong eddies and rapids in succession; then came 3,500 m. of fairly easy travelling. The river for 23,500 m. had been flowing almost in a straight line due north, with slight variations of a few degrees to the north-east and once to the north-west. Plenty of *tucum* or *tucuma* palms adorned the right bank; whereas on the left bank was fairly open country.

Again, after some more rapids, the river was squeezed into a neck only 25 m. wide, gradually widening to some 150 m., where whirlpools and eddies of considerable magnitude were formed. On several occasions the canoe was caught in them and swerved right round, describing one or more circles upon herself. Two islets were passed, then a tributary 10 m. wide coming from the east on the right side of us.

A great number of submerged rocks close to the surface formed a ridge 200 m. in length all along the centre of the stream. In a wonderful stretch 4,000 m. long in a perfectly straight line north, the river was from 50 to 100 m. wide. A small tributary rivulet entered it on the west. At the end of that long stretch a wall, 100 ft. high, of brilliantly yellow rock in its lower part, with 15 ft. of vivid red rock above, diverted the stream almost at a right angle toward the west. Rapids and eddies were encountered after passing an obstruction of accumulated gravel in the centre of the river, there 50 m. wide.

Giant trees, not unlike weeping willows, bent over the river, their streamers touching the water. A rocky barrier extended as far as the centre of the stream, leaving only one safe passage on the left side close to the bank. The stream was at that point 100 m. broad, and of great beauty, in a straight line north for 7,400 m.

My men were beginning to paddle a little better, and we were travelling at a considerable speed with the current. We had glorious weather, and although the heat was great our travelling was perfectly delightful. In the daytime we were not worried much by insects. The canoe now and then stuck fast in shallow places or upon rocks, but we all jumped gaily into the water and pushed her along until she floated again. Those baths in the deliciously clear water were quite refreshing. We generally jumped in clothes and all, and left it to the sun to dry the garments upon our backs and legs. I usually wore pyjamas while travelling in the canoe, as they

were more comfortable than other clothes and dried quicker when we came out of the water again.

Many sharp successive turns were met next in the course of the river, which then showed stunted vegetation on the right bank and thick forest on the left. A high natural wall, 100 ft. high, of bright cadmium yellow for 30 ft. in its lower part, of vivid red for 50 ft. above that, and darker red above, barred our way in front (north). On its summit were peculiar white-barked slender trees--so white that they looked almost as if they had been painted, but of course they had not. The entire centre of the river, forming there an extensive basin, was blocked by a high bank of gravel, leaving merely narrow channels close to the banks. The high wall deflected the stream from 290° to bearings magnetic 30°. A range of hills some 300 ft. high then appeared before us, extending from N.N.W. to S.S.E.

We went over a stony place which obstructed almost the entire river, except a narrow channel close to the banks. That was followed by rapids. Some 2 kil. 300 m. farther, a hill range to the north switched the stream sharply from north to north-west, which direction it kept with a mere deviation of 20° for 6,500 m.

The stream was then 100 metres wide nearly all along, and of amazing beauty. Yet another stony place disturbed the placidity of the transparent crystal-like water. At the end of that wonderful stretch of river came another great vertical wall, on the left side--of most brilliant colouring, a stratum of vivid red 60 ft. deep with thin bright horizontal yellow streaks, and an upper stratum 18 ft. thick of a similar dazzling yellow. The northern portion of the cliff differed in colouring, and had a brown lower stratum 30 ft. thick, followed upwards by a yellow stratum 2 ft. thick, and a red stratum--a most brilliant vermilion--15 ft. thick. Above was a pink layer 15 ft. thick and a summit deposit of brown earth 45 ft. deep. There again the river was shifted by that obstacle from b.m. 290° to due north. A charming island--which I baptized Bridget Island--700 m. long and 100 m. wide, absolutely smothered in vegetation, was found there. It had an extensive spur of yellow sand and gravel. The right bank was sparsely wooded with open country behind. Two channels were found, one flowing north-west, 40 m. wide, the other north-east, 30 m. broad. We followed the latter, where the rapids seemed less fearsome than in the broader channel.

At the end of Bridget Island another island, 500 m. long, was found, which we called Lucky Island. This second island was 200 m. down stream from the first, and was situated at the junction of the River dos Patos ("river of ducks") with the River Arinos on the right side of the latter stream.

We were amazed to see opposite the island on the right bank a fishing tackle and some clothes. As we had already gone 89 kil. 850 m. that day, having kept an average speed of 11 kil. 250 m. an hour, and the sun was about to set, we decided to halt on "Lucky Island" for the night. We were busy preparing our dinner when a strange figure appeared on the right bank, rifle in hand. His astonishment at seeing us was no greater than ours at seeing him.

"Who were we?" "Where did we come from?" "What did we want there?" "Where were we going?"

All those questions having been duly answered, I sent my canoe over to ferry the fellow across. He was one of the queerest men I have ever met. His eyes constantly roamed about like those of a wild feline animal. He never kept still a moment, springing up unexpectedly to his feet when he was sitting down, and squatting himself down when he had been standing up. All the time he was handling his rifle--a very handsome one--and with rapid movements watched intently now one then another of our party. He seemed in a state of great nervous strain and excitement. He appeared to be a first or second cross of Indians and negroes--quite young, some twenty-four years of age. He had very little clothing upon his person, which showed limbs of extraordinary muscular strength. Seldom is it given to one to see so cruel a face, seldom were criminal characteristics so clearly marked on any one's countenance and in the formation of the skull. A man with a face like that could be capable of any crime. His conversation supplied ample further testimony that his physiognomy had not deceived me. I had so far thought that my men were the coarsest, the most brutal individuals I had ever met, but they were not in it at all with the strange figure we had before us. The

conversation of my men had seemed to me disgustingly vulgar, but it now appeared the acme of refinement when the new man opened his mouth to talk. Good gracious me! what extraordinary oaths--what perversion of ideas--what foaming hatred for the Creator, our Saviour, all the saints imaginable, and humanity in general! Evidently the poor man had a screw loose somewhere within his brain-case.

I gave him some tobacco, a quantity of which I carried for my men. Without a word of acknowledgment he seized it, and, with paper my men gave him, proceeded to make himself a cigarette.

"I am tired of this life," said he, as he rolled the tobacco. "I am a slave. I owe my master 1 conto 200 milreis (£80). He sold me this rifle, and some cartridges, and I cannot repay him. I am rotting away with fever. I am dying of starvation, I am going mad in this place.... I have no more food, and have been unable for three days to catch fish. Do not let me die here. Take me with you. I will give you my rifle, this ring"--a cheap ring which he proceeded to take from his finger--"I shall work hard and require no pay if you will save me from death."

I told him that he had better consider his position seriously before doing anything rash. We should not be leaving until the next morning.

The man, whom we shall call X, as I do not wish to divulge his real name, sat up the entire night talking to my men. His excitement was great--at least, judging by the loudness of his voice. During those long sleepless hours--with all of them shouting at the top of their voices it was impossible to sleep--I overheard the entire history of his life. What a life! I prayed my stars that X would change his mind and decide to stay where he was, for though I needed extra men badly I feared that his company would not be a welcome addition to our party, bad as it was. Like all men who have lived much in seclusion, he possessed marvellous vitality and magnetism. My men were simply hypnotised by the remarkable tales of his deeds, or rather misdeeds.

Long before we were ready to start, X went to seat himself in the canoe to make sure we should not leave him behind. When I asked him to reconsider once more what he was doing, which was not fair to his master, no matter how bad he may have been, X positively refused to remain there.

"If you do not want me to come," he said with determination, "you will have to fling me into the water and keep my head under until I am drowned."

That was rather a trying dilemma. Much as I disapprove of slavery, I did not like the idea of taking matters into my own hands and freeing other people's slaves; yet it was impossible to refuse assistance to a suffering man when he asked for it. In any case I had no wish to be responsible for his death.

"X," I said to him, "you have quite made up your mind to go with us?"

"Yes."

"Will you promise faithfully that you will work and give no trouble?"

"May my old father and mother be struck by lightning this moment if I shall give you trouble!" was his reply.

"Very good, X. You can keep your rifle and cartridges and your ring"--he had just deposited them at my feet--"they are your own property. I do not want them. You shall receive the same salary as the other men from this day as long as you do your work satisfactorily."

X jumped out of the canoe to embrace me. On his brutal face was for a moment an expression of gratitude ... he rested his head upon my shoulder and sobbed for many minutes.

With a crew of six men, things were a little better for us. Four could paddle while one steered, and the sixth stood on the prow with a long pole punting, or on the look-out for dangerous obstacles.

X paddled with such vigour that Alcides at the helm had the greatest difficulty in keeping the canoe straight. It had a good effect on the other men, who also paddled away with all their might, and we were speeding along with the strong current almost as fast as a steam launch.

The minimum temperature during the night (July 8th-9th) had been 57° Fahr. The elevation above the sea level of Lucky Island was 1,100 ft.

The River dos Patos came from the S.S.E., then bent to the east where its sources were.

Lucky Island was 250 m. in length. The river had an average width of 80 m. As we went along my men sang gaily, particularly X, who seemed like a bird let out of its cage, so happy did he feel at being a free man again. His repertoire was not of the choicest kind, but what was lacking in quality was made up in quantity. For some hours we were treated to a vocal concert, X's solos sending my men into fits of merriment. His wit--of the crudest kind--was sometimes funny.

This great gaiety seemed most weird in that region where silence reigned supreme always. The voices seemed to travel immense distances, echoed from one side to the other of the river. Words were reproduced with great clearness by the echo two or three times over. Especially when we had forest on both sides of the stream was the echo particularly perfect.

Quantities of rubber trees--absolutely going to waste--were to be seen now on one side, then on the other, of the river where the banks were wooded.

[Illustration: A Rapid on the Arinos River.]

[Illustration: Taking the Canoe through a Narrow Channel.]

Another most beautiful island, 800 m. long and 80 m. wide--Pedro de Toledo Island--was passed. It had a channel 10 m. wide in a north-westerly direction, another, which we followed, 50 m. broad, north-east. On emerging from this channel at the end of the island we were in a basin 140 m. in diameter. Some 3 kils. farther, another great basin was crossed--very shallow, only 2 ft. deep--with a gravel bottom. The current was swift. Then, 2 kils. beyond, yet another basin, 100 metres wide, 1½ ft. deep, with strong eddies, was crossed. The river, which had so far kept more or less in a northerly direction, at that point actually swung round in two consecutive angles from 350° north to due south, in which direction it flowed for 1,000 m. An immaculately white beach was on the right of us, on which we duly stranded. It was quite enough for Alcides to see an obstacle of any kind in the river for him to send the canoe right over it. I seized that opportunity to land and commence a most interesting collection of the innumerable minute sand plants which were to be found on those beaches.

Where the river turned north once more there stood a hill 100 ft. high, the lower half of which was of red volcanic rock, the upper half of yellow earth. Along the water's edge a thick and florid growth of bamboo could be seen in many places, while on the edge of the forest hung myriads of purple convolvuli. For hundreds of kilometres the Arinos was indeed one of the most ideally beautiful rivers I have ever seen. Its banks of alluvial formation, 25 to 30 ft. high, had *chapada* on their tops. Farther on the *chapada* gave way once more to dense forest with plentiful rubber trees. Another basin, 150 m. in diameter, was met with, after which we entered a channel from 40 to 50 m. wide, through which the stream was compressed.

A pretty little islet of gravel, 100 m. long, 20 m. wide, and rising 6 ft. above the water, had a tuft of trees growing on it, and a spur, also of gravel, extending westward for more than another 100 m. The river in that

section flowed in a W.N.W. direction for 1,400 m.

We soon after came to a shallow basin (1 ft. deep) 100 m. wide, in which eddies were strong and troublesome. There were many pointed rocks scattered about in its bed of gravel, as well as three parallel rocky barriers right across the basin.

A rivulet 2 m. wide at the mouth entered the Arinos on the right side, while on the left side we had an island 800 m. long, leaving two channels, one 10 m. wide, the other 40 m. A tiny streamlet flowed into the main stream on the left. Banks, regular dunes of gravel, were formed where the river broadened into basins. We came to a basin 400 m. wide and extremely shallow. Three channels--W.N.W., N.W., and N.N.E.--were formed in the river by two islands, each 400 m. long--the Two Sisters Islands--which were in the centre. We found the N.N.E. channel the best. Where the river narrowed again to a width of 50 m. huge rocks stood in the centre. From that point for some 300 m. we went over a succession of gravel banks and nasty rocks forming barriers across the stream.

Small streamlets entered the Arinos, one on the left, the other on the right. A cluster of high rocks was on the right bank. On both sides were extensive white sand beaches. The river soon widened to 100 m. in a basin with an islet 12 ft. high, and a cluster of trees on its north-east side. Another island 6 ft. high, 80 m. long--Mosquito Island--with a spit of gravel to the south, was near it.

Rubber trees were most plentiful on the right bank where the forest was thick, whereas on the left bank was *chapada*. Huge gorgeous butterflies with black-striped brown wings and velvety bodies flew in great numbers around the canoe. Some settled on my hat, hands, and on the sleeves of my white shirt. They were so unaccustomed to see human beings that when touched they did not attempt to fly away.

The river was getting more and more wonderful every hour as we went along--in great straight lines of 3,500 m., 3,000 m., 2,200 m., 2,000 m., 4,000 m., in length.

Some ducks rose from the water only a few yards in front of the canoe. The man who was behind me fired with his carbine close to my head. The bullet grazed my right ear. It was a trifle trying to be travelling with such careless sportsmen, but the best thing was to say nothing and go on.

A big island--Passos Island--300 m. long, preceded by a smaller islet 80 m. long--Passos Junior I.--was subsequently passed, where the river formed a channel (N.W.) 50 m. wide and a minor one (W.) 30 m.

The river there changed from a westerly course to W.S.W. Once more we had before us a great wall of red rock which at first seemed to bar our way. In the lower section of the wall was a cave eroded by water and extending some way back. It was too low to be entered by the canoe. The lower stratum of the wall was at an angle--in other words, had a dip of  $21^{\circ}$ --while the stratum above it, 30 ft. in thickness, intersected by a yellow band, was perfectly horizontal. On the left side of this high natural wall was a charming waterfall of limpid water. Farther on a great land-slip displayed for a length of 40 m. brilliant red earth over a stratum 60 ft. thick of white chalk. The river, which described a number of turns, was bordered on the left side by a hill range covered with handsome trees.

The ardour of my men for rowing had already passed away. They smoked and sang the whole time, and let the current--fortunately strong--carry us along. Whenever I remonstrated they scooped the water carelessly with their paddles for a few minutes. As is the case with individuals mentally deficient, everything seemed to distract them. One moment it was the flight of a *jacutinga*--a handsome black gallinaceous bird with a white crest. Another moment it was the jump of an inquisitive fish. Many *mergulhão commun* (*Podiceps Americanus*), wonderfully graceful, velvety black birds with long beaks, flew about unconcerned from tree to tree. Whenever anything moved about anywhere, the paddles were abandoned, the rifles were seized, and there was a regular fusillade. The men seldom hit anything, although on many occasions, with the unsteady

canoe, we all of us had narrow escapes. One day the man in front of me fired a shot at a bird--but so close to my head, not more than one foot away, that the concussion blinded me for several seconds. On other occasions the rifles went off when they were not expected to. I had ceased to give orders of any kind about the careful use of the weapons. It was time and lung-power absolutely wasted, and only made things worse.

After floating down a beautiful stretch of 3,000 m., two more islands were reached within a great circle over 200 m. wide. A small tributary entered the Arinos on the right bank. Another island, 500 m. long, was seen farther down, at the end of which, where two channels met again, violent eddies were produced by the meeting of the two strong currents.

Immense quantities of *Siphonia elastica* were there to be seen on both sides of the stream in the forest, which was getting more and more luxuriant as we proceeded on our journey farther north. Many wild banana palms (*bananeira do matto*) were to be seen here and there along the lovely, deliciously clean river, with its extraordinarily tidy banks.

Another great basin, 300 m. in diameter, was met, with three islands and two gravel beaches in its centre. The two principal islands--Paolo and Francesca--were each 100 m. long and 50 m. wide.

We now made the acquaintance of the *capivara* (*Hydrochoerus capibara*), a rodent which we found common farther down in those waters. It was a stupid animal. When fired at several times by my men it remained perfectly still, gazing at its enemies. It was only when a bullet hit the ground too near that it would move away, surprised more than concerned.

After going down a *corrideira* (small rapid) we encountered thousands of white and lemon-yellow butterflies. On islets of red earth swarms of them were basking in the sun--which was getting hotter and hotter as we got farther north.

Again we were soon after faced by a high natural wall of brilliant yellow and red colouring. In its western part it showed a white stratum 3 ft. thick upon a layer of yellow lava of an equal thickness. A stratum of lighter yellow was nearest the surface of the water, while above was a thick layer of grey earth. On the right side, at this point, a tributary streamlet flowed into the Arinos. The basin formed by the crescent-shaped wall was perfectly circular. When the river emerged from it, it folded back from 40° b.m. to 290°.

Owing to the steepness of the banks we experienced difficulty in finding a suitable camping place for the night. Eventually at sunset we had to clear with our big knives a patch in the dirty forest on the edge of the stream. I never liked to camp out of sight of the canoe in case anything happened during the night--an attack, a flood, a forest fire, or anybody trying to steal or get away with the canoe; the danger from my own men being quite as great as from any enemy I could have found. I well knew that if we lost that canoe we were done for entirely.

There was a great falling off in the distance covered that day owing to the laziness of my men. We had only gone 67 kil. 600 m.--or 22 kil. 250 m. less than the previous day, when we had travelled less hours and gone easily over a distance of 89 kil. 850 m.

**CHAPTER IV**

*Oleo Pardo* Trees--Beautiful Palms--The River Bottom--Swarms of Butterflies--Millions of Bees--A Continuous Torture

THE night of July 10th was cool--minimum temperature 58° F. When we departed at 7.10 in the morning the river was extremely tortuous at first--in one place actually veering from north to due south. On the right side of us was a lake divided by a low bank, 3 to 5 ft. high, from the river by which it was fed. The entrance into the lake was narrow. We had hardly gone 1 kil. when we found ourselves in a great basin 300 m. long, 200 m. wide, with one large island--Nellie Island--150 m. in length, and several other small islets in its centre.

Another lagoon was shortly after reached on the right bank, its inlet being 10 m. wide.

The waters of the Arinos were, at this point, of a leaden placidity. We seemed to travel slowly now that the current did not help us. The river was again compressed into a deep channel 50 m. wide. Before us loomed a cliff 100 ft. high, reflected with irreproachable faithfulness in the almost still waters of the stream. There was not a breath of wind to disturb the mirror-like surface, nor to cool our sweating brows in the stifling heat of the broiling sun. The lower 40 to 60 ft. of the cliff was red, the upper light yellow--almost white. Where we reached this rocky wall there was a circle 150 m. in diameter, with a low, thickly-wooded triangular island, 80 m. long, 100 m. wide--Eleonora Island.

The north-eastern passage was shallow, with a stony bottom. We followed the northern channel along the vertical wall. On leaving the island we came to a stretch 2,500 m. long of beautiful water flowing due north, with ideally fascinating banks embellished by dense vegetation--neat, clean, and healthy--of the richest green.

After crossing a bay, 100 m. wide, with volcanic rocks showing through on both banks and in the river bed, the stream was squeezed through a rocky neck 25 m. wide, and spread again immediately afterwards to its normal width of 50 m. We were beginning to find big rocks more frequently, many in the river channel--a bad sign for us, for I feared we might soon encounter rapids.

Wonderful *oleo pardo* trees (*Myrocarpus frondosus* Fr. All.), with their octopus-like branches hanging down to the water, were fairly common in that region. There were two kinds of *oleo* trees in Brazil--the brown or *oleo pardo* and the red or *oleo vermelho*, the latter technically known as *Myrospermum erythroxyton* Fr. All.

We subsequently entered a basin 150 m. wide which contained a circular island 100 m. in diameter--Horus Island.

Eight hundred metres farther we came to another large circular bay with a large globular mass of lava on its left side. The current was very swift over a nasty rocky bottom. The canoe was suddenly flung by the current between an accumulation of rocks and an island, and, as we found it impossible to turn, floated down at an uncomfortable speed through a narrow channel, dodging as best we could the many ugly rocks just below the surface of the water. At the end of this channel we encountered violent eddies forming wide circles of most treacherous water--although on the surface it looked placid enough.

The tributary Sumidoro, 30 m. wide at its mouth, entered the Arinos from the west-south-west at this point. Its water was deliciously clear. A little way off to the left we could hear the noise of a waterfall on the Sumidoro, before it joined the Arinos.

The river, after the meeting of this important tributary, became even more exquisitely beautiful than before. Rocks strewn about added to the picturesqueness of the landscape as well as to the dangers of navigation, while springs of crystalline water, cool and quite delicious to drink, descended here and there from the banks.



The river had an average width of 60 m. in this part, and was much strewn with broken-up volcanic boulders, especially on the left bank. On the right bank was a beach of immaculate white sand. For 300 m. we went over a great stony place with shallow water. We had to be careful, but all the same many times did we bump with great force and get stuck upon submerged rocks--which we could not see owing to the blinding, glittering refraction of the sun upon the troubled waters.

A tributary 4 m. wide, coming from the north-east, entered the Arinos on the right bank. A great number of rubber trees were to be seen on the right bank, where the forest was luxuriant; but not on the left bank, where the growth of trees was scanty. *Carandá* or *burity* or *tucuman* palms were plentiful along the water's edge near the spot where a small rivulet entered the Arinos on the left bank. Two thousand metres farther down we came upon denuded country, low, and liable to inundation when the river rose. Farther on were campos and open country, with the exception of a thin row of trees immediately along the river. On the left we had luxuriant forest, wonderfully healthy, neat and clean. The stream was there beautiful--60 to 70 m. wide.

When we had gone 10 kils. 800 m. more the entire channel became strewn with rocks and mounds only 1 ft. below the surface of the water, and not unlike parallel small dunes of sand with a deposit of gravel upon them. For 700 m. the river was obstructed and navigation rendered somewhat troublesome.

Where the river turned from bearings magnetic  $310^\circ$  to  $360^\circ$  (due N.) we went over a nasty stony place with a strong *corradeira* above it, and we were confronted with a rocky barrier almost the entire width across the stream. We kept on the west side, the only way where it was possible to get the canoe through. A little farther another *corradeira*, stronger than the first, obliged us to find a passage on the east side of the river--which bore upon its bank *campos* and *chapada*. Curious mounds of white sand and gravel were visible in the centre of the river, and also near the left bank below the second *corradeira*; then we came to parallel ridges of white sand and gravel right across the river bottom at an angle of  $45^\circ$  in relation to the general direction of the stream.

Two tributaries, one 3 m. wide on the left bank, the other 4 m. wide on the right side (the latter coming from the north-east), swelled the Arinos from that point. The width of the stream was now increased to 80 m., the water being shallow. The bed of the river was ever changing, and supplied me with constant interest. It was adorned with strangely precise triangles of beautiful white sand exposed through a layer of gravel which covered most of the river bottom.

A thickly-wooded hill range, 150 ft. high and extending from W.S.W. to E.N.E., stood to the north of us. Its slopes, eroded by the water, had caused a landslip, leaving bare vertical red rock for half the height of the hill-range and two much eroded spurs of bright yellow and white earth extending into the stream.

The river at that point turned from north to east. Open country was again on our right after leaving the hill range, and lowlands liable to inundation. Soon afterwards, however, higher land appeared with banks 35 ft. high.

Swarms of small white butterflies played upon the banks on the edge of the water.

Sand and gravel mounds were numerous in the centre of the channel, with occasional basins of shallow water with *corradeiras* upon them. For instance, in one of those places for 150 m. the river was only from 1 to 3 ft. deep, and we had to drag the long heavy canoe, which drew 2 ft. of water, along the undulating gravel bed. In fact, we spent a good deal of our time every day in the water, pushing or pulling along the canoe over innumerable obstacles, her great length making it difficult to navigate her properly through the many shallow and tortuous passages.

In a circular basin, 120 m. in diameter, beyond that point we encountered strong eddies near the left bank. On the north side big rocks emerged from the water and a *corradeira* was formed.

An island 50 m. long and two other islets were separated from the mainland by two channels, one 20 m. wide and only 3 in. deep--the other 60 m. wide and 3 ft. deep. The right bank was there 45 ft. high.

Fifteen hundred metres farther down we entered another basin 200 m. in diameter, with an island 80 m. long and eight dry beaches of gravel.

My men were greatly excited in trying to capture a *capivara* they had wounded. We actually got the animal on board, but my men were so timid in going near it that it jumped overboard again and made its escape.

The right bank, which had been high, was now reduced to only 4 ft. above the water; whereas the left bank rose to a height of 46 ft. A rivulet 3 m. wide coming from the west had cut its way through the latter bank.

The main river was getting more and more magnificent at every turn. I should have enjoyed the journey very much had it not been for the constant attention I had to pay to my men, who left their paddles and steering gear at every moment in order to fire recklessly at birds or *ariranhas* or *capivaras*, much to the danger of everybody on board. They would blaze away with their repeating rifles--and bullet cartridges, of course--at parrots and even *colibri* birds 100 or 200 metres off. They said the rifles were bad because they could never hit anything! I had ceased scolding them. They made me positively ill with pity, I was only praying for our supply of cartridges to come to an end soon, so that if we were to die at all it might not be through being pierced by one of our own bullets.

The river had been flowing, with slight deviations, northwards.

We came to an enchanting island 70 m. wide, with thick vegetation upon it and fine rocks.

The river in that portion flowed practically north in great stretches of 6,000 and 4,000 m. Another large and beautiful island, 250 m. long and 70 wide--Ghislaine Island--was passed, and we admired the gorgeous vegetation upon it.

Below the island the river was 100 m. wide and very shallow--not more than from 1 to 4 ft. in depth. We halted at sunset, having gone that day 92 kil. 300 m.

During the night of July 11th my men suffered a great deal from cold, the thermometer being as low as 45° Fahrenheit. In the morning there was a thick fog over the river--so thick that we had to delay our departure until eight o'clock, as we could not see more than two or three metres ahead.

Two kilometres beyond we came to a rivulet, 2 m. wide, on the left bank, and soon after to a small *corrideira* with a navigable channel in the centre. Three hundred metres farther down we passed another tributary on the right bank. There was open country with sparse stunted trees on the left of us, thick forest with plenty of rubber trees on the right. I noticed several good specimens of the *pao dolce*--a tree with a curious cluster of yellow flowers not unlike the flower of wistaria upside down. Not only was the *pao dolce* pretty to look at, but a most refreshing beverage could be made from a decoction of its leaves.

The course of the river was winding, with basins and rapids of no great importance. Another tributary 2 m. wide was reached on the left bank, and soon after another tiny streamlet entered the Arinos from the same side.

I had a narrow escape. One of the men, who was sitting behind me in the canoe, saw an *ariranha* (*Lutra Brasiliensis*) put its head out of the water only ten metres in front of the canoe. In his great hurry to kill the beautiful animal he seized his rifle and emptied the eight shots out of his magazine, firing the first three shots close to my head on the left side, the other five just as close on the other side. The muzzle of his rifle was so near my ear that the noise deafened me for several minutes and my hair was almost singed off. The *ariranha*,

needless to say, escaped unhurt, and luckily so did I.

We went over a long strip of shallow water from 1 to 3 ft. deep. We now had open country on the right bank, with a small streamlet finding its way into the Arinos on that side. The river was flowing again in long straight stretches--3,000 m., 2,000 m., 2,500 m. in length. In the portions where the banks were thickly wooded innumerable rubber trees were to be seen.

In the centre of a basin 150 m. wide we found another island, 100 m. long and 50 m. wide, absolutely smothered in vegetation and with a handsome gravel spit at its southern end. Two kilometres farther another basin, 300 m. broad, appeared. An amazing quantity of rubber trees was to be seen round that basin. Near the water we also found fine specimens of the *mate* (*Ilex Paraguayensis* St. Hil.), with its wax-like leaves, much used in certain parts of South America for making a kind of tea.

For close upon 13 kils. the river flowed--with slight deviations--almost always due north, and with its limpid waters was of extraordinary beauty. The country was open on the right side of us. We saw that day two white *urubú* (*Cathartes*). The Brazilians have a curious superstition about them. They say that if you write with a quill taken from the wing of one of these birds any business which you may be transacting will go well; in fact, anything you may wish to do and which you set down on paper with one of these quills and ink is sure to turn out successfully.

That day I again suffered much, while taking astronomical observations, from the millions of bees and other insects which settled in swarms upon my hands and face and stung me all over. We were then in lat. 12° 26' 5 S., long. 56° 37' W. The temperature in the sun was not unbearable--merely 85° Fahr.

In the afternoon, after we had enjoyed an excellent lunch of fish, tinned provisions, and rice--my men also enjoying their *feijao* (boiled beans)--we continued our journey. The river for 9,000 m. displayed first clean *campos* and *chapada* on the left bank and dense forest on the right, then *campos* on the right bank and a belt of forest along the river on the left.

The *campos* were particularly neat in that region--merely a few *burity* and *tucum* palms flourishing on the edge of the water. In other localities a thick growth of beautiful bamboos interspersed with gigantic palms lined the banks.

Where the river turned due east we came to fairly strong rapids. The water was shallow with mounds of gravel, and we bumped about a great deal. Eventually we all had to get into the water and push the canoe along for greater comfort.

The river next formed a huge basin, 900 m. long and 200 m. wide. A small tributary flowed into the Arinos in the crescent-shaped bank on the right. That bank had a height of 80 ft. On its summit quantities of *Siphonia elastica* were to be admired. Farther down it was on the left side that the river had high banks, some 60 ft. high.

We went over a charming little *corrideira*. Strong eddies were encountered on emerging from the rapids. Where the right bank became lower--only 40 ft.--*chapada* replaced the forest. The left bank was but 1 ft. above the level of the river, and the low country beyond (south) was naturally liable to inundation. For 4,000 m. the left bank was never higher than 4 ft. The right bank also suddenly became very low in that region.

Where the river turned from 290° b.m. to 320° b.m., there was a basin 700 m. broad with low banks. An island--Lydia Island--200 m. in circumference, rose within this basin on the north side and was luxuriantly wooded.

We found that day beautiful beaches of gravel, mostly on the right side. Then strong rapids and *corrideiras*;

below these more clean-looking gravel beaches--this time on the left--were visible, and an extensive island of gravel close to the right bank.

For 8,000 m. the gorgeous stream flowed almost in a direct line northward, with dense forest and a wealthy growth of rubber trees on both sides. Wonderful *figueira* trees with their spotless white branches embellished the landscape.

On the left a tributary of some size entered the Arinos from the south-east in two arms with an island between; the largest arm was 40 m. wide, the smaller 10 m. Then another stream entered the Arinos on the right side.

We were again confronted by a large basin enclosed on the north by a crescent-shaped wall 100 ft. high, at the foot of which at the level of the river was a quantity of débris of yellow rock. The river at that spot turned sharply from 20° b.m. (N.N.E.) to 290° b.m.--that is to say, almost north-west. The width of the Arinos at this point was from 80 to 100 m.

Towards sunset we came to a beautiful island 200 m. long. We cleared a sufficiently large space in the dense and gorgeous vegetation to make our camp for the night.

**CHAPTER V**

Great Islands--The Trinchão Fish--A Fisherman's Paradise--Alastor Island--Plentiful Rubber--The Civilized Man's Idea of the Tropical Forest--The War-Cries of the Indians--Swarms of Bees and Butterflies

WE had another cool night on July 12th--minimum temperature 47° F. It was very damp, and in the morning we had, as on the previous day, a thick mist which prevented our starting until it cleared up, at 7.40 a.m. The mist rose in columns and square blocks over the warmish water of the river. The right bank of the Arinos was 40 ft. high.

We had gone some 1,500 m. from our camp when we came to a magnificent island, 400 m. long and 200 m. wide--Griselda Island--which divided the stream into two channels.

All the islands we had seen of late showed on the up-stream side a more or less extensive spit of beautifully coloured gravel and glittering crystals. The latter shone in the sun with such iridescent luminosity that it gave those islands a fairy-like appearance.

We encountered troublesome eddies which swung the canoe about, and in one case actually spun her completely round in a most alarming manner, tearing out of Alcides' hands the steering gear, which we had some trouble in recovering.

There were many handsome large-leafed *pacová*, somewhat resembling banana palms; also quantities of *Siphonia elastica*, although these were not quite so plentiful as farther south nor the trees so high. A tiny brook of delicious water descended into the Arinos from the left bank.

Ten thousand five hundred metres farther down from Griselda Island we came to another island, 300 m. long and 50 m. broad--Negrino Island--with the usual spit of gravel and beautiful crystals on the south side. This island was 10 ft. high above the water, with some trees on it, but not such luxuriant vegetation as on most of the other islands we had seen.

A stream 5 m. wide at the mouth, coming from the N.N.W., entered the Arinos on the right side. The main river had a direction of 305° b.m.--that is to say, virtually north-west. Great volcanic slabs of rock and sand-banks were now reached.

The sun was not extraordinarily hot--90° F. at noon. The country on either side was open--chiefly *chapada*. Beautiful gravel beaches were now seen, extending half-way across the river, particularly from the left side.

Another tributary 5 m. wide coming from the N.N.E. was passed on our right, and beyond this a thick forest with rubber trees was visible, while *chapada* continued on the left.

Round a big basin 200 m. in diameter, containing shallow water from 1 to 6 ft. deep, stood a mass of gigantic trees with verdant healthy foliage, and innumerable abnormally tall *burity* palms, over 100 ft. high, and *tucum* (*Astrocaryum tucuma*)--also of immense size.

Many huge *trinchão* fish followed our canoe for some time, gazing curiously at us. They came so impudently near that my men actually hit them on the head with their paddles.

One more streamlet entered the Arinos on the right side just before we reached a big basin, 250 m. in diameter, with wonderful gravel beaches in regular little mounds stretching half-way across the basin. Another little tributary (on the right side) came next, 7,000 m. farther down stream. The vegetation was there so dense and so entangled that we could find nowhere a suitable spot on which to land for our midday halt. About noon, however, *chapada* and open country again appeared on the right bank for a distance of some 2,000 m.

[Illustration: A Formidable Vortex.]

[Illustration: Going down a Violent Rapid in a Narrow Channel.]

There we indulged in a plentiful lunch, the country round being as still as death. Not a sign could be seen anywhere of a human being; not a column of smoke indicating the presence of man rose anywhere in the clear sky. Nowhere did we meet disturbed vegetation; nowhere did we notice a trail or a passage through the vegetation coming to the water; nowhere did we meet abandoned camps or any signs whatever that human beings had ever lived there. There was no animal life of fair size on the surface; no parrots, no monkeys, no mammals of any kind--only millions of insects, which made one's life a burden.

It was not so with the river, which was swarming with innocent fish, only too ready to be killed and supply us with excellent meals. The reason, of course, that the river was so full of fish, and that the fish displayed such delightful simplicity, was because there were there no human beings.

Soon after leaving camp--all the happier for an excellent lunch--we came once more to thick, beautiful, clean forest on both sides. Again rubber was plentiful, and absolutely untouched by the collector's hand. The river was getting amazingly beautiful, 200 m. wide all along, the water like a faultless silver mirror irreproachably reflecting each leaf, each branch of the motionless trees on both banks. There was not a breath of wind to disturb the tranquillity of that deliciously restful scene.

Yet one more gorgeous island--Alastor Island--300 m. long and 80 to 100 m. wide, was seen. It was preceded on the south-east side by innumerable gravel mounds just emerging above the water surface, then by a magnificent gravel beach with numberless beautiful crystals. On the left bank a tributary 15 m. wide entered the Arinos from the south-west.

The river was getting more and more entrancing at every turn. Profuse blossoms of the most gorgeous yellow shone resplendent in all their beauty against the background of dark green foliage. The entire edge of the forest was festooned with daintily-leafed creepers and with myriads of convolvuli of the purest amethyst colour.

There was poetry in the scene--frequently disturbed, perhaps, by the inconceivable oaths of the man to whom was entrusted the heavy task of baling out the water from the canoe, which leaked badly. She was fissured from end to end, and we had no effective means of preventing the water coming in; in fact, if the baling were not done quickly and continuously with a bucket, the water soon gained and reached the platform on which we had placed the baggage. Our feet, of course, were in water all day long. We did not mind that so much. In fact, our feet got so soaked with moisture that we could peel off the skin in big patches with the greatest ease.

After travelling across a basin 250 m. broad, we came to a *corradeira* with shallow water. We dashed with great speed sideways over a bank of gravel, and nearly turned turtle. The gravel was banked up against the lee side of the canoe, and with a strong current pushing her we had the greatest trouble to pull her off again.

There was a great deal of rubber, particularly on the left bank, while on the right, *chapada* was again observed. The river was so wonderfully tidy that, had it not been for its great breadth, one would have felt as if going through a watercourse in England.

From the east came a little tributary, 2 m. wide, on the right bank. Another beautiful island, 500 m. long and 80 m. wide--Helena Island--a most enchanting place, preceded by the usual gravel mounds and beach, was passed in the afternoon. Small streamlets entered the main stream, one on each side--one 6 kils. beyond Helena Island, the other one a little farther.

The river maintained its average width of 200 m. nearly all the time. Late in the afternoon we passed on the

left bank a hill 120 ft. high, belonging to a range that extended from E.S.E. to W.N.W. at an angle to the river, which there flowed in a direction almost north. There was plenty of rubber of excellent quality near the water.

Shortly after leaving this range we came to a lagoon, then to open campos behind a thin row of stunted trees on the left bank. The lagoon was situated at a point where the river described a curve from north to 70° b.m. Two small streamlets entered the Arinos on the right. We made camp near a small lagoon in the forest shortly after sunset.

The distance we had travelled during the last two days was 86 kil. 900 m. on July 11th, and 76 kil. 600 m. on July 12th, or altogether 163 kil. 500 m.

To anybody accustomed to travelling in equatorial countries it seems amazing, on returning to civilization, to find what curious notions people have of the tropical forest. Even in the case of writers of distinction I could quote many passages which are painfully ridiculous. One of the greatest modern Italian writers, for instance--who, by the way, in one of his latest novels, copied almost word for word many pages from my books--added the poetic touch that in the tropical forest flowers were found so large that they could not be picked, and fruit so enormous that no human tooth could bite it! Again, the majority of people believe that it is impossible to go through the forest without cutting your way all the time--the "cutting a way through" meaning to most people the constant chopping down of trees of all sizes, undergrowth, bamboos, *liane*, and other creepers. As a matter of fact, any experienced traveller has much less trouble in going through the forest than people imagine. This is not the case with people unacquainted with the forest, or with people whose sense of observation is not much developed. One can go sometimes for miles through the dense forest without once using knives at all; although necessarily a knife must be carried, as there are places where a cut from its blade will make passing through more comfortable. This is particularly true of the Brazilian forest. The forests of that country, especially in the central region where I was then travelling, were wonderfully clean, when once you entered them, although, when seen from the river, they appeared impenetrable. Near the water, owing to the moisture, there was frequently a thick but narrow belt--only a few metres wide--of dense growth. Beyond it, when you were in the forest itself, nothing grew under the trees, and the ground was just as clean as the best kept English park. One could walk in comfort without the slightest trouble, an occasional well-applied blow with the heavy-bladed knife disentangling in a second an interfering *liana* which might stand in one's way.

It must not be forgotten that you can get under or over *liane*, or shift them on one side, without ever having the trouble of severing them. It is only occasionally, when they are entangled, that it saves time to cut them. Barring an occasional thick belt along the Amazon River, it is almost safe to assert that an experienced man can travel, alone, anywhere in the forests of Brazil without carrying a penknife. This is not the case, of course, when you are travelling with a caravan and with baggage, when a sufficiently large passage has to be opened.

In Africa the equatorial forests are incomparably more difficult to traverse than the Brazilian forests, and those who assert the Brazilian forests to be impenetrable only say so because they do not know what they are talking about. Even when it comes to actually chopping down trees in the Brazilian forests, one blow with the axe or with the knife will easily cut down a fair-sized tree. As I have already stated elsewhere, most of the Brazilian forest trees have no resistance whatever. They are full of water, and, with a judicious blow, can be cut almost as easily as celery. Many are the trees also, the inside of which near the ground has been eaten up entirely by ants, and it was not uncommon when you leant heavily against a tree that you and the tree tumbled down. Ants do not seem to attack lactiferous trees, such as those producing rubber, which therefore flourished in that particular region.

Most of the trees in that particular part of the forest were small in diameter, and only had branches or leaves at a very great height. That was why the forests in Brazil looked so extraordinarily clean beneath, in contrast to the equatorial forest in such countries as Central Africa or the Philippine Islands. The wonderful cleanliness of the river, to which I have so often alluded, was a great contrast to the masses of floating decomposing

vegetation which is always to be seen in the African rivers.

The minimum temperature during the night of July 13th was 51° Fahr. During that night we were suddenly roused by our dogs barking furiously. We heard strange noises, as if people were trying to run away quickly through the forest. Indians had, much to our surprise, come quite close to our camp, and had it not been for the alarm given by the dogs we should most likely have been attacked by them. In the morning we heard in the distance their war-cries and piercing ululations, which rent the air. Judging merely by the noise they made, there must have been from thirty to fifty of them. My men were greatly excited over this experience. These Indians belonged, I think, to the Tapanhonas tribe.

We left our camp at 7.45 in the morning. As the river was there in an almost straight line for 8 kil., we continued hearing--more and more faintly, of course, as we went on--for some distance the excited yells of the Indians.

The left bank, through which a streamlet cut its way into the Arinos, was fairly open with *chapada*. An island, 150 m. wide and 200 m. long--Julia Island--was next seen. It had an extensive beach of gravel at its southern end, and the island itself was covered with dense and very beautiful vegetation. Another streamlet 1 m. wide entered the Arinos opposite the island from the left side. Farther on another streamlet, 3 m. wide at the mouth, and coming from the north, flowed into the main stream on the right side. Three and a half kilometres farther another tributary streamlet, also 3 m. wide, was met on the right. We there saw *chapada* on both banks as we went along, with merely a thin edge of trees along the river.

Where the river described a graceful elbow, a charming tongue of land, with deliciously green grass upon it, was most refreshing to the eyes. A river 8 m. wide at the mouth was met a little way beyond on the left side. We noticed opposite that place a beautiful spot for making a camp, but it was not a convenient hour for us, and so we went along.

About 1,500 m. farther down a long narrow island (200 m. long, 80 m. wide)--Gemma Island--heavily wooded, was passed and admired. It had the usual gravel spit on its southern or up-stream point, the river in that particular spot flowing due north in a perfectly straight line for 4,000 m. The island stood in the centre of a basin 200 m. broad. There were *campos* and *chapada* on the left bank.

We landed on the island, and found most beautifully clean forest, nice and cool in the greenish dim light which penetrated through the dense masses of foliage. Particularly noticeable for their beauty were the handsome large mimosas.

On the right bank of the river was forest with plenty of rubber trees, but occasionally even on that side patches of what the Brazilians call *serradão* (close forest) were met with.

A hill range 120 ft. high formed a crescent from west to north-west on the left side of the stream. A kilometre and a half farther forest was to be seen on the left side of the river; whereas on the right was *chapada* and *campos*, quite open. A picturesque rocky island, 15 m. in diameter, in laminated horizontal and rich brown volcanic rock, rose 3 ft. above the water in the centre of the stream. From that spot for 2 kil. I noticed *chapada* on the right bank; then after that was beautiful dense forest on both sides, with innumerable vigorous rubber trees.

The river there was 200 m. wide and had shallow water with strong *corrideiras* over enormous parallel transverse dunes of sand and gravel which formed the bottom. Islets of gravel were exposed, especially near the left bank and in the centre, leaving only a more or less navigable channel near the right bank.

We ran aground many a time along the 500 m. of shallow water, varying from 6 in. to 3 ft. deep. We emerged into a large basin 300 m. wide where eddies of no great strength were formed. On the edge of the beautiful



basin we halted for our lunch, and to take the usual astronomical observations at local noon. We were in lat.  $12^{\circ} 26' \cdot 5$  S.; long.  $56^{\circ} 47'$  W.

I do not know if I have ever seen such swarms of bees and butterflies as I saw at that place. They seemed to swoop down upon us in myriads from all sides. Taking the solar observations with the sextant and artificial horizon, I endured positive torture with the hundreds of bees which settled on my forehead, nose and hands; while thousands of mosquitoes and ants stung my legs, arms and face in those spots where it was not possible to wrap myself up with towels.

It will be noticed in most of the photographs which were taken along the river, and some of which illustrate this book, that all my men have their heads wrapped up. This was done as a protection against the tantalizing insects. The temperature was warm; that day, for instance, was  $105^{\circ}$  F. in the sun and  $86^{\circ}$  in the shade.

We left again at 1.15, my men being--for a change--in a good mood, owing to the amusing time we always had fishing. We had been making excellent progress during the last two or three days. The strange man X enlivened our journey with diabolical songs and with crude wit, which sent his companions into fits of laughter. When they were in a merry mood or excited, I noticed that they paddled along much quicker and better, so I did not try to put a check to the abominable language which would have jarred the feelings of any one not born and bred in the interior of Brazil.

It was quite interesting to me to find in that region so much *chapada* and open country, as I had fully expected to find thick forest all along. What struck me particularly on the Arinos, and which I could not very well explain, was that nearly invariably, when you had thick forest on one side of the stream, you had open country on the other, and only seldom noticed either forest or campos on both sides of the stream at the same time.

After passing *chapada* on the left bank we came to a great many rocks just above water. A river 3 m. wide entered the Arinos on the right side, and there was to be seen an immense quantity of beautiful rubber trees--as yet untouched by human being. The river kept its width of 200 m. After going along *chapada* on the left bank for some 3 kil., we came to magnificent forest--this time on both sides--with a luxuriant growth of rubber trees.

The scene, in its wonderful quietude, was most impressive. It made one's heart bleed to think that such rich land should lie unknown and unexploited in these enlightened and enterprising days of the twentieth century.

The sky above us was always interesting, with its typical filaments of mist, their lengthy radiations faintly marked upon the vivid blue of the sky vault and making a centre in the north. These radiations were in appearance not unlike giant ostrich feathers. They were formed, I think, over the great streams which flowed northwards into the Amazon.

We were troubled that day with numerous eddies and shallow water, owing to the great width of the river. Innumerable mounds of gravel rose in the centre of the stream up to a few inches below the water level.

Another hill range, 100 ft. high, met that day was crescent-shaped, the arc of a circle thus described being from south-east by east to north-east.

The hill range on the north-east side of us was eroded, exposing a red vertical wall 60 ft. high. A small river 2 m. wide coming from the east entered the Arinos on the right bank.

For 3,500 m. from that point the stream had an average width of 250 m., and was really magnificent with the wonderful cleanliness of the water--not the slightest impurity, not a speck of wood or a leaf floating upon its surface.

Fourteen kilometres of heavenly navigation--barring X's language and the comments of his companions--and we came to an ideal triangular island, 1,200 m. long, 200 m. wide at its broadest point, with the usual extensive gravel spit at its southern end--Victor Emmanuel Island. The vegetation upon it was too gorgeous for words, but there was no animal life except insects.

Four kilometres farther a basin 300 m. in diameter and from 1 to 6 ft. deep was crossed, in which a strong *corrideira* was met. The navigable channel was in the centre of the basin. A stream 10 m. wide, of most beautiful crystalline water, which had its origin from the south-west, threw itself into the Arinos on the left side, some 2,000 m. below the basin.

From this point for 8 kil. the river flowed with a slight deviation of 10° in a northerly direction. The left bank of the river was now quite open, with patches of *chapada* and somewhat taller but still stunted vegetation beyond; a thin row of tall trees lined the river side. On the right bank was luxuriant forest, and again plenty of beautiful rubber trees. Two islets of gravel were next seen.

We were experiencing great difficulty in getting suitable camping places at the right time when we needed them. By 4.30, having come across a spot which seemed suitable, we halted, having gone that day 85 kil. 700 m.

**CHAPTER VI**

The *Tapirus Americanus*--Striking Scenery--The *Mate* Tree--Photography in Camp--Brazilian Way of Reasoning--A New Christopher Columbus--The Selection of our Camps--Beautiful Fruit--A Large Tributary

WE were still at an elevation of 1,100 ft. The water was almost stagnant, and was evidently being held up by some obstacle. I feared that we should soon encounter nasty rapids. Watching the sky, I was generally able to foretell what was ahead of us in the river. In fact, a pretty mackerel sky, particularly to the north-west, showed me that the water of our river must be breaking up considerably, either in rapids or waterfalls, in order to produce sufficient moisture in the air to cause the accumulation of those cloudlets. I always noticed that wherever there were heavy rapids farther down clouds of more or less magnitude formed directly above them at a comparatively low elevation, and remained there owing to the perfect stillness of the air.

On the night of July 14th the cold was felt intensely by my men, the thermometer actually showing a minimum of 38° F.

During the night my men had a great excitement. A large pachyderm, an *anta* (*Tapirus Americanus*) inquisitively came in the midst of our camp. It was evidently as much astonished at seeing us as we were in discovering its presence. My men had been firing their cartridges away during the day at rocks, at fish in the river, and so on, so that when their rifles were really needed the magazines were all empty, and gave the *anta* plenty of time to hop away gracefully into the darkness of the forest.

I had given orders to them to keep watch all night, as a precaution against an attack from the Indians, but my orders were, as usual, disobeyed. Personally, I took the first watch every night, sitting up till 2 a.m., which time I occupied in writing up my notes, working out computations of astronomical observations, classifying the botanical and geological specimens collected during the day, and replenishing my cameras with new plates.

My men had eaten up all the supply of beans (*feijao*) I had purchased at Diamantino, and therefore even the cook could not be kept awake during the night. The first rubber collector I had picked up when coming down the Arinos was now our cook, and diabolical indeed was his *cuisine*. Several times already his life had been in danger from the angry attacks of his companions, the quantities of pepper he sprinkled on everything he cooked causing us all to cough sometimes for half-hours at a time. He was very fond of pepper himself, and could not understand why none of us liked it.

During the night we still had a mackerel sky, covering one-third of the sky vault, and a clear triangle of mist, the apex of which was to the west, extending towards the east, close upon the horizon line. When we left in the morning at 7.30, we had *chapada* and *campos* on the right bank and forest on the other side. We had gone some 8½ kil. from our camp when we came to a hill range, 75 ft. high, on the right bank, encircling the river with its thickly wooded slopes. There was a tributary 25 m. wide, a most beautiful stream, on the right bank. It came from 70° b.m. Its water was deliciously clear. Where it entered the Arinos it had deposited a bank of crystals and marble pebbles--yellow, red, and white--which in the dazzling sun shone with great brilliancy at the bottom of the river. Numberless rubber trees were to be seen at that spot on the banks of the Arinos, and also on those of this new important tributary.

Two kilometres farther, where the Arinos was 280 m. wide, it looked just like a big lake of stagnant water. The country was quite open on the left side, first *chapada*, then *campos*.

By 9.30 a.m. we had a most wonderful display of clouds and radiations of what looked like so many mares' tails from the W.S.W. The river at that point flowed for 1 kil. in a direction due south. We came to a basin 300 m. across with a spit of white sand on the north-west side. In this basin was an island--Nattalì Island--200 m. long, 20 m. wide, 10 ft. above water, with a fine beach of sand and gravel on the south side. Gravel

mounds were innumerable in the centre of this stream.

After we had gone some 8 kil. farther down my men shot an *ariranha*. They had a belief that these *ariranhás* would easily kill a man in the water. As we have already seen, they certainly had a great craving for blood and were always brave in attacking. My men called them "water leopards." In fact, the head of the *ariranha* was not unlike the head of a cat or a leopard. Although shot through the body two or three times, the *ariranha* actually came thrice to the attack of the canoe--so that my men were able to seize it by the tail and pull it inside the canoe while it was in a dying condition.

Sixteen kilometres farther down we came to another beautiful tributary with delightfully clear water, 6 m. wide where it met the Arinos. One hundred metres lower down another little tributary, only 4 m. wide, also on the right bank, joined our stream. The first tributary seemed to come from the north-east. At the mouth of this tributary was a spot which would have made a lovely halting place, but as it was too early in the day we reluctantly went on in a north-westerly direction, first for 4 kil., then north-east for 5 kil., passing through a large basin 300 m. wide, containing two islets, then passing charming sand-beaches, and farther on another tributary, 8 m. wide, on the left of us, also with deliciously clear water. When we proceeded on our journey after lunch we found big rocks more frequent in the stream, and went over a field of great boulders just under the surface of the water that stretched half-way across the shallow river.

Eight kilometres from our halting-place we came to an extensive stony place with a strong rapid. One kilometre beyond, a small tributary flowed into the Arinos from the left side. On the left side we had a red and brilliant yellow bank 70 ft. high, part of a small range of hills which turned the river from N.N.W. to N.N.E. Another small tributary 2 m. wide was seen on the left side. Then, 4 kil. farther on, another tributary, also 2 m. wide, and also on the left side, came from the south-west. Three thousand six hundred metres beyond this, we entered a basin 320 m. wide with an island 150 m. long, including its gravel spit. Three more islands were seen a little way beyond--Meraud, Tanis, and Loel Islands, Meraud being the largest. Another island was on the left of the river, leaving a passage 50 m. wide on its west side. The group of islands was of alluvial formation with deposits of gravel below.

The river in that region was too beautiful for words. The foliage of the thick heavy forest on both sides was densely green, the banks most tidy, and running in an almost straight line for 10,000 m. During all that distance the stream was 300 m. wide, and its speckless water reflected with marvellous definition each leaf and branch against the background of deep green. Neat gravel banks occurred frequently in the shallow water.

Some 300 m. down this long straight stretch of river a tributary 8 m. wide, coming from 210° b.m., threw itself into the Arinos. Strong eddies were formed, as many rocks were strewn in the centre of the stream.

One kilometre farther a conglomerate mass of granite and yellow and red lava, with impurities embedded in it, emerged just above the water in the centre of the stream.

Another streamlet, 2 m. wide, and of wonderfully limpid water, joined the Arinos on the right side. It came from the north-east. Then another little streamlet was seen on the left side.

At the end of 10 kil., where the river made a wide angle from 330° b.m. to 350° b.m., and another straight line of 4,000 m. stretched in front of us, we beheld a huge submerged bank of sharp volcanic conglomerate rock. In fact, we unexpectedly almost ran into it. Had we done so at the rate at which we were travelling, our canoe would certainly have been smashed to pieces against the sharp-edged fractured rock--just as sharp at the angles as the blades of knives.

Where the river turned once more from 350° b.m. to 320° b.m. another small tributary appeared on the right bank, and there a lot of handsome *mate* trees (*Ilex paraguayensis*) seemed to flourish, and were certainly pretty to look at.

Farther down we again came to *chapada* on the left bank and heavy foliated forest with a certain number of rubber trees on the right bank. The left bank, where it described a great sweeping circle, was low and sandy, some 12 ft. above the level of the river. Only a thin fringe of low trees grew there on the edge of the water.

Six kilometres from the last tributary on the right bank another streamlet, 3 m. wide, coming from the S.S.W., cut its way through the left bank. Two thousand five hundred metres farther on another tributary 20 m. wide--a deliciously beautiful stream--flowed gracefully into the Arinos on the right side from the north-east.

We made our camp at the junction of the two streams. The camp was extremely bad. It was already late in the evening and we could find no other suitable spot. We had gone that day 83 kils. I was quite satisfied with the progress we had made during the last few days. During the evening I made an excursion on foot along the tributary river to the north-east for several kilometres, but I found nothing of particular interest.

During the night we received another visit from an *anta*, but the pachyderm again escaped before my men had time to kill it. We heard cries of Indians in the distance. My men were in a great state of mind for fear we should be attacked. I sat up the entire night in order to be ready in case of emergency.

I took that opportunity of computing and checking many of the astronomical observations I had taken, and developing a great number of photographic glass plates.

In my experience I have found that the fears people have of spoiling negatives unless one is shut up in an absolutely dark room are quite exaggerated. On that particular occasion, for instance, and on many previous and subsequent occasions, I developed the glass plates--and I think with satisfactory results--out in the open, with merely the fly-leaf of the tent sheltering me overhead so as not to have the direct rays of the stars shining upon the photographic plates. Indeed, there was light enough coming in around the tent for me to see quite plainly what was going on outside. I simply covered up the developing trays as an extra precaution, and seldom--in fact, never--spoiled a negative in process of development.

I also found developing tanks quite serviceable when a great number of negatives had to be developed quickly. The red lamp necessary for photographic work was invariably a great nuisance. I do not believe that a compact, practical dark-room lamp has yet been invented which is really serviceable to an explorer. If it is a candle lamp the candle melts quickly in those hot countries, producing an extra large flame which generally cracks the red glass, and makes so much smoke that the upper aperture becomes blocked and puts the light out when you happen to be at the most crucial point of your work.

The oil lanterns would be better, were it not for the difficulty and messy nuisance of carrying and re-filling the lamp each time with oil. Electric lights, which are the only practical ones, of course are out of the question when you have to be away for a year or a year and a half, the storage batteries getting damaged easily by damp and the innumerable accidents which you have when exploring.

The greatest care had to be used in repacking the developed glass plates. I owe to the care I took of them that I was able to bring back 800 excellent negatives out of 800 glass plates exposed.

The night was a little warmer than usual on July 15th--minimum 53° F. There was a heavy mist over the river when we rose in the morning, and we had to delay our departure until 7.30 a.m. When the mist began to rise it hung about in beautiful curves converging to a common radiating centre to the west.

During the night I had noticed a weird lunar effect--a perfect cross of immense proportions intersecting the crescent moon, which had a radiating halo surrounding it.

Four thousand metres from our camp we came to a tributary 3 m. wide on the left side of the river. It came from the W.S.W. Near this a streamlet 1 m. wide entered the Arinos on the right side, and another streamlet of

equal size farther down on the left bank. There was fairly thin forest on both sides as we went on, kilometre after kilometre, the water of the river being almost stagnant in that part and heavy to paddle along.

Five hundred metres down the straight stretch of river, 4,000 m. long, we came to another charming affluent, 10 m. wide, coming from the E.S.E. Farther on, another tributary 2 m. wide entered the Arinos on the left side, and formed a shallow bank of gravel extending half-way across the stream.

[Illustration: The Result of Half an Hour's Fishing on the Arinos-Juruena.]

As I have stated elsewhere, the mentality of Brazilians was somewhat difficult to understand by people of any other nation. They did everything the wrong way, according to our notions. I had been worried a great deal, the reader may remember, at the most unpractical way in which my men loaded the animals when I had my caravan of mules and horses. I had been more than amazed at Brazilian ideas of architecture, sculpture, painting and music. I had on many occasions been dumbfounded at their ideas of honour and truthfulness. Now once more I was sickly amused--I had by then ceased to be amazed or dumbfounded or angry--at the way my men daily packed the baggage in the canoe. The baggage was naturally taken out of the canoe every night when we made our camp, for the canoe leaked so badly that when we arrived anywhere and halted we had to beach her, or else, where this was not possible, we found her in the morning almost entirely submerged. Naturally we invariably selected shallow places where we could bale the water out and float her again.

Returning to the baggage: the men every morning insisted on loading the canoe in front, where the four men were situated paddling, and the three dogs of the expedition were also accommodated. I sat in the centre of the canoe, and Alcides at the helm naturally stood in the stern. The man whose incessant daily occupation it was to bale out the water of course had to be with the group of four men in the bow, since, the canoe being so heavily weighted at that end, the water found its way down there.

Now, loading the canoe in such a fashion, at the bow, had the double drawback of causing a greater resistance against the water, and therefore nearly doubling the work of the men in paddling. Then again, when we ran aground or struck a rock, the impact was more severe on the canoe--not to speak of the difficulty of getting her off again. The steering, too, was also much more difficult with the stern of the canoe so far out of the water.

I pointed out the mistake to my men, but it was no use arguing, and they refused to follow my advice. Like all ignorant people, they thought they knew everything better than anybody else, and as, in a way, they were the chief sufferers for their own conceit, I thought I would avoid unpleasantness and let them do things their own way as long as we kept going forward on our journey.

Alcides, too, who by now had become imbued with the idea that he was as good a navigator as Christopher Columbus or Vasco da Gama, had the strangest notions of navigation. He never avoided grounding the canoe on every bank he saw; he never avoided dashing the canoe into every rock which stood or did not stand in our way. I never could understand exactly why he did that, except for the mischievous pleasure he derived from giving the men who were sitting at the other end of the canoe a violent bump, which often rolled them over altogether.

When we left Goyaz my men insisted on purchasing life-belts in case we should be travelling by water. As only one of the Goyaz men could swim, I had gladly given them the money to purchase those articles. On our first day of navigation the men amused me very much, as they all appeared garbed in their life-belts, as if we had been going to the rescue of a stranded ship in a tempest. I laughed heartily at the sight. The intense heat of the sun made the heavy cork belts so uncomfortable for them, that they discarded them when they saw that the canoe would actually float on the water, and packed them away inside a wooden box, which they then screwed down tight. The belts remained in that box most of the time, except one day when a man put one on, as I had given him instructions to go some way off in the centre of the stream where the current was rather

swift. By misadventure he lost his footing, and had we not been quick in going to his rescue he certainly would have been drowned.

We tested the life-belts, and I found that not only would they not float after they had been a minute or two in the water, but they became so heavy when soaked with moisture that they would have dragged to the bottom even a fair swimmer. They were evidently old discarded ship belts. The cork, enclosed in a canvas cover, had got decomposed and pulverized, and therefore rendered useless.

As we are referring to the strange ways of looking at things by different nations, I might as well include the endless arguments I had with my men in selecting our camps. I naturally always selected the cleanest spots with a flat ground, so that the tents could be pitched satisfactorily without extra trouble, where there was little vegetation, and where the water was good. My men always quarrelled over this, and insisted on stopping in the filthiest places, either where some trees, rotted away, had fallen down, where the vegetation on the edge of the river needed cutting, and where the ground had to be levelled before I could pitch my camp bed. They always preferred sleeping under the stifling vegetation to where there was an open space and we had the clear sky over us.

They all slept in hammocks--the favourite resting arrangement of the Brazilian--to my mind the most uncomfortable and absurd fashion of resting, especially in tropical regions. First of all, it is almost an impossibility to assume a perfectly horizontal position for your entire body, except--if you are an expert--diagonally; then there is always a certain amount of swing and you are likely to tumble over at any moment; you can never keep the blankets in position, and you expose your entire body to the stings of the mosquitoes, flies and other insects, and of the ants which crawl into your hammock by hundreds from the trees in which they swarm. It was not uncommon when we camped to hear during the night a crash, followed immediately after by oaths. The tree to which one of the hammocks had been fastened had suddenly broken and let the man down with a bump. Then again, the mischievous ants took the greatest delight during the night in cutting the strings of the hammocks, and on several occasions my followers had nasty falls. Yet the Brazilians swear by hammocks.

Another stream 2 m. wide, coming from the north, entered the Arinos on the right bank. A number of *ariranhas*, attracted by the vivid red of the British flag which was flying at the stern of the canoe, followed us for some time and came courageously to the attack, showing their teeth fiercely at us and snarling frantically. Entire families of those delightful little creatures were seen, and they invariably gave us a similar hearty greeting. They followed us sometimes for hundreds and hundreds of metres, and became most excited when I took the flag and waved it at them, and sometimes placed it near the water in order to drive them frantic.

We now had most beautiful forest on both sides. A stream 5 m. wide joined the Arinos on the left side from the west, forming a charming little waterfall as it entered the main stream. A little farther on the right was another streamlet, coming from the south-east. Generally, as in this case, when we reached tributary streams of any importance, gravel banks extended and blocked a great part of, sometimes even half, the main stream.

A picturesque stream, 8 m. wide, coming from the north-east, was then reached on the right side. It flowed through a rocky gate. Five or six kilometres farther on a tiny streamlet dribbled into the Arinos, and also another, 1 m. wide, on the left bank.

At noon that day the sky was extraordinarily interesting. From the north-west extended a wonderful succession of loop coils of transparent mist, giving the sky the appearance of a peacock's extended tail.

Just before we halted for lunch we came to a charming streamlet of delicious water, 2 m. wide, on the right bank.

The days were getting warmer as we advanced farther north. It was hot work sitting in the sun--105° F. that

day--to take observations for latitude and longitude. In the shade the thermometer registered 89° F. Lat. 12° 21'3 S.; long. 57° 16' W.

After lunch, 2½ kil. from our camp, we passed on the left bank a delightful tributary coming from the W.S.W. Its mouth was 8 m. wide, and poured forth waters of the most beautiful emerald green.

Five hundred metres farther down another large tributary, 30 m. wide, coming from the north-east, was observed on the right bank. Farther still, the river formed a large basin 300 m. wide. Lovely forest flourished round the sweeping curve of the basin. There was simply a solid mass of marvellously fresh foliage, with hardly a break through which, it seemed, a human being could pass. In that particular part the leaves came right down to the water, but there was no reason to suppose that they grew equally low inland.

The stream, which was 250 m. broad, showed farther on an immense bank of gravel 700 m. long, which rose above the surface in the shape of two long islands--one 300 m., the other 400 m. in length.

We felt the heat considerably going down the river, as we were always in the sun in the centre of the stream, with a temperature seldom less than 105° F. Especially where thick forest was on both sides of us, there seemed to be no air close to the water. When we came to patches of chapada and open country we could breathe a little better. Several were the tributary streamlets to which we came that afternoon. First we saw one rivulet, 1 m. wide, on the right bank, then 13 kil. 500 m. farther on another affluent, 3 m. wide, coming from the north-east, also on the right bank; then 1,500 m. farther a rivulet ½ m. wide, coming from the south-west (left bank); then 4,500 m. farther a charming stream, 6 m. wide, coming from the north, and meeting with the Arinos near an extensive stony place with shallow and troublesome water. Strong eddies formed at that spot. One more streamlet, 1 m. wide, was reached that day on the right. It came from the north-east.

The river had that day flowed almost continuously in directions varying from north-west to north, barring two sections where its course had been 10° east of north.

After passing the last tributary the river described a sweeping curve, gradually turning so far back as to flow in a south-westerly (240° b.m.) direction.

There was there shallow water with gravel banks in the centre of the stream. Curiously enough, we did not notice so much rubber close to the river in that region, but in an excursion a short distance from the water we came upon *Siphonia elastica* trees, not only along the Arinos but also along the tributaries.

We halted that day at sunset, having gone 73 kil. 400 m.; which, although much less than the previous days, was still fair going for us.



## CHAPTER VII

Ideal Islands--Immense *Figueira* Trees--The "Spider Monkey"--Great Variety of Fish in the Arinos--The Rocky Gateway into Diabolical Waters--Shooting Dangerous Rapids--Cutting a Way through the Forest--A Nasty Rapid--Plentiful Fish

THE night of July 16th was heavy, the thermometer registering a minimum temperature of 62°F. We had great fun fishing during the early hours of the night. In the morning we had hundreds of pounds of fish spread upon the bank of the river, with many excellent specimens of the *motimchun* fish--so called, I believe, because of its noisy and rebellious habits.

The sky was overladen with clouds, and the west showed radiations of light. We had gone 2,500 m. from our camp when we came to a tributary stream on the left side coming from the south. Four thousand four hundred metres farther on, a hill-range 120 ft. high, with heavy forest upon it, encircled a sweeping curve on the left of us to the west and north-west. The cliff of this range, eroded by the river, showed rock of a vivid red right up to its highest point, laminated in perfectly horizontal layers, each 10 ft. thick. Farther on a great basin 350 m. wide and of great beauty had formed.

[Illustration: Leading the Canoe down a Rapid by Rope.]

[Illustration: Characteristic Rocky Barrier across the Arinos River.

(Author's sextant in foreground.)]

Some 10 kil. beyond a beautiful beach of white sand was noticeable on the left bank. We were always glad to see these beaches, as we frequently found on them quantities of tortoise eggs--most delicious to eat.

An island--Gabiella Island--200 m. long divided the river into two channels, the larger one of which--200 m. wide--we followed; the other being but 30 m. broad and much strewn with rocks. The river, from the point where we met the sand beach, flowed in a S.S.W. direction for 6,500 m., when it gradually resumed its course northward. The island, thickly wooded, was extremely beautiful, with trees of great size upon it. Quantities of *ariranhas* were to be found near this island, and they came straight for us with their mouths open, shrieking wildly and snarling and spitting like cats. I was always amazed at their bravery, as they came right on while being shot at by my men, the reports of the rifles enraging them to absolute frenzy.

Shortly after we came to another most beautiful, oval-shaped island, 350 m. long--Maude Island--in a basin extending from east to west for a breadth of not less than 500 m.

Another island--Vera Island--150 m. long and of an elongated shape, was seen in the same basin. It also had luxuriant vegetation upon it, whereas, curiously enough, the banks on either side of the great basin showed *chapada* with stunted trees. Farther on, where a small tributary entered the Arinos on the left side, the country seemed quite open beyond the narrow fringe of trees along the water.

Another streamlet 3 m. wide flowed into the Arinos from the north-east on the right bank. The main river there was of a width of 400 m.

Another great island--Luiz Schnoor Island--also most beautiful, like the others, was next seen. We halted on it for our midday meal, and to take the usual astronomical observations. The sky had, by that time, become beautifully clear, of a dense cobalt blue, and I was able to take twenty-three sights of the sun. I generally took a great many sights with the sextant and artificial horizon, in order to define the latitude and longitude with greater accuracy. We were then in lat. 11° 38'4 S.; long. 57° 35' W.

Gorgeous *gamelleira* or *figueira* trees (*ficus*) were to be seen on that island, standing high up upon arches formed by vigorous roots. In a way the lower part of those *figueiras* resembled a huge octopus, the branches being extremely contorted as they clung to the ground in order to support the weight of the giant tree of which they made part. One could easily walk under the tree among the roots and still have six or eight feet of space left above one's head.

As I went round to explore the island while my men were cooking the dinner, I discovered a small lake in the centre of the island--a most poetic spot, with its neat, delightful vegetation all round it reflected as in a mirror in the golden waters which reproduced in a deeper tone the rich sunset tints of the sky above. I sat myself down to look at the beautiful scene. The poetry vanished at once. There were millions of ants which swarmed all over me the moment I sat down upon the ground, and bit me with such fury that I had to remove my clothes in the greatest haste and jump into the water. That raised a cloud of mosquitoes, which made it most uncomfortable for me when I came out again and was busy searching for ants in my clothes.

My men killed a beautiful long-armed spider monkey. I was sorry, as I had watched the wonderful jumps of this animal from one tree to another. Using the impetus of the swing which they could obtain from the immense length of their arms, as well as the swing of the branch on which they were hanging, they could fly enormous distances through the air. The span from hand to hand in proportion to the size of the body was really amazing.

Luiz Schnoor Island was 450 m. long. Plenty of rubber trees were to be seen on the right bank of the river after passing this great island, especially where the river described a large sweeping curve towards the north-east.

Farther on, close to the right bank, an island 100 m. long and 5 ft. high, of yellow sand and gravel, showed brilliantly with its vivid colouring upon the blue waters of the river. For identification' sake I named it Gravel Island on the map I was making of the river. I seemed to be in fairyland--but for the company of my men--as I floated down the stream, there 400 m. wide.

We had gone hardly 4 kil. when we came to another ideal island--Margherita Island--400 m. long and 200 m. wide, with magnificent trees upon it. A small stream joined the Arinos on the left side. Lower down stream we had thin forest on both sides, with some remarkable *oleo* trees, with their minute grey leaves and the branches, laden with red berries, drooping--weeping-willow-like--right down in the water.

Next we came to sand and gravel banks with islets 1 ft. high emerging from the water in the centre of the river, all those little islets displaying verdant grass on their southern side and pure white sand on the northern side.

The river was at that point flowing in a N.N.E. direction. Then came a long straight line of 6,000 m. of river flowing to 305° b.m. About half-way through this long stretch the stream divided into two large arms, one in direct continuation of the above bearings, the other in a curve, encircling an island 1,000 m. broad. The basin--as still as a lake--in which this island was situated was not less than 1,500 m. across. The island--Charles Landor Island--was 2,000 m. in length. It had plenty of rubber trees upon it, and plenty were to be seen also on the banks. We went some 8 or 10 kil. farther that night, and at five o'clock we halted, having made poor progress that day--only 60 kil.

Immense quantities of fish could be seen in the river. No sooner had we made camp than we got out lines and hooks of all sizes, which we baited with pieces of *toucinho*. One end of the bigger lines we made fast to trees, as the fish we often caught were so powerful that on several occasions they had dragged us into the water and we lost not only the fish but the line as well. We had great sport that night and caught quantities of *trahira* (*Macradon trahira*)--not unlike a giant salmon and quite as good to eat; and also some *surubim* (*Platystoma Lima*), a large fish belonging to the herring family. The *surubim* was flat-headed, and not unlike the *pintado*

fish which I have described in a previous chapter. It had thin scales over the body, and an abnormally powerful lower jaw, with vicious-looking, sharply-pointed teeth on the edge of the upper and lower lip. These curiously situated teeth were far apart, and so firmly inserted in the hard lips that it took a violent blow to remove them.

Although after a few minutes we had killed fish enough to last us--had we been able to preserve it--for some weeks, my men sat up the greater part of the night hauling quantities to the bank. The excitement each time a fish 80 or 100 lb. in weight was hauled out of the water was considerable. The wild yells and exquisite language whenever one of my men was dragged into the water kept me awake the entire night.

We left that camp at 7.30 on July 17th, the minimum temperature having been 66° F. during the night. Heavy globular clouds covered the entire sky. We were then in a region extraordinarily rich in rubber; quantities of *Siphonia elastica* trees were to be seen. It made one's heart bleed to think that nobody was there to collect the riches of that wonderful land.

The river flowed in short sections from north-west to north-north-east, barring a long stretch of 4,000 m., when we came to a great basin 600 m. wide, with two large islands in it; the eastern island--Orlando Island--being 100 m. wide, the western--Elizabeth Chimay Island--220 m. broad and not less than 500 m. long. South of both these islands were islets of gravel 50 m. each in diameter.

Nine thousand five hundred metres below these islands an important tributary, 8 m. wide, flowed into the Arinos from the right bank. It came from the south-east. Close to the left bank, from which it had been separated by the current, leaving a channel only 5 m. wide, another island--Isabel Island--300 m. long was found.

Shortly afterwards we came to a big equilateral-triangular island--Armida Island--fully 1 kil. a side. Albert Island, next to it, was of a narrow elongated shape.

From the beginning of Armida Island the river flowed for 4,000 m. in a direct line to 310° b.m. Four large rocks in a cluster stood in the centre of the stream at the north-north-westerly end of the island. Then we had another stretch of 4,300 m., during which the river was squeezed through a narrow neck, 100 m. wide, between low rocks. Immediately afterwards we emerged into a bay 800 m. broad, with three islets on one side of it. They were rather dry and somewhat mean-looking. I called them Faith, Hope, and Charity Islands.

After that the river was 800 m. wide. A deposit of gravel some 300 m. long was exposed on the right side beyond the last island of the group.

Three kilometres farther we halted for an hour or so, just time enough for me to take the latitude and longitude and for our lunch to be cooked. The usual torture had to be endured from the innumerable insects. The heat was also terrible--107° F. in the sun, 93° in the shade. Lat. 11° 23'·9 S.; long. 57° 39' W.

When we left, we saw 3,500 m. beyond our halting place, beside a great heap of rocks on the left side of the river, a rivulet, 3 m. wide, entering the Arinos on the left.

From that spot the river was contracted from a width of 800 m. to one of only 120 m. Naturally the water was of great depth and the current swift.

Two great volcanic rocks stuck out in the centre of the stream, and two extensive heaps of volcanic rock stood on the right side of us, the rocks being at all angles in a confused mass. Where these rocks were--a spot which my men called the "porteira" or gateway--the river turned sharply from 70° b.m. to 290° b.m. The water seemed almost stagnant there, and we had to make a great effort to get on. It seemed as if there had been an undercurrent pushing us back. The water was surely held up by some obstacle, and I feared we had at last

reached the extensive rapids which I had expected for some days. Rocks were to be seen in abundance all along, and three more sets of giant boulders were reached, one after the other, in the centre of the river, there only 150 m. broad. Strange heaps of broken-up boulders of immense size were to be seen on the right bank; then farther on more great heaps in confusion on the left bank.

A tiny rivulet found its way among the rocks on the right side. The channel was much strewn with dangerous submerged rocks. I thought I would take the navigation into my own hands for a little while, and found a comparatively easy channel on the left side of the river close to the bank.

As I had expected, the rumbling noise of troubled waters was getting louder and louder, and the whitish mist which rose above the horizon line was an unmistakable sign that we had come to a dangerous spot. Soon after, in fact, we arrived at a large circular basin, some 600 m. in diameter, with rocks in the centre of it. Two clusters of magnificent rocks, 30 ft. high, towered on the left side of the river. Then came a long row of rocks, also gigantic, and a sandy beach which had accumulated against them. A little farther another great mass of rocks in disorder stood up against the now once more fierce current.

We made our way tentatively along what seemed to us the safest channel, to 320° b.m., and with trepidation shot the rapids, which were quite fearsome. I must say for my men that by now they had acquired a certain amount of courage--courage, like all things, being a matter of training after all. We went down at a terrific speed amidst the splashing waters, shaving dangerous rocks and escaping collision by miracle. When we got to the bottom of the rapid we were shot into the whirlpool, which we might have avoided with ease had Alcides obeyed the orders I shouted to him.

When I had shot the rapids before in other countries, I had always avoided getting into the centre of the whirlpool; but Alcides, who had never navigated a river before, held the contrary idea, and always insisted on steering the canoe right into the centre of those dangerous rotating waters.

[Illustration: Whirlpool at End of Rapid.]

[Illustration: In Shallow Water.]

It was sufficient to remonstrate as I did, for Alcides to do a thing over and over again with the persistency of a mule, in order to maintain what he thought was his *amour-propre*. As it was, on that occasion, the canoe swerved round with such force that she nearly turned over, and got so filled with water that we had to struggle out of the difficulty as best we could and beach her, or she would have sunk.

At that point an island 400 m. long and 50 m. wide divided the river into two channels. The western channel had a small island of white sand and many rocks on its southern side. Pretty yellow flowers grew wherever a little earth had accumulated upon the rocks.

After going 1,800 m. we found a great basin 600 m. wide with a rocky island and barrier right across it.

Farther on innumerable rocks of all sizes could be seen on the left bank; and 1,500 m. beyond these, where a solid rock rose in the centre of the stream, eddies of wonderful power were produced in the stream.

We glanced at a magnificent island of rock on the left side as we sped along swiftly with the current; but we were so busy with the difficult navigation, and expecting accidents at any moment--what else could I expect with the disobedient, unpractical, obstinate crew I had with me?--that I had not much time to admire the picturesqueness of the scenery.

I had quite foreseen that it was impossible to avoid disaster sooner or later, so that all I could do was to think of which would be the best way to minimize its effects, when it did come.

In the great circular basin which was formed in the river there was a passage to the west, which I did not like at all, so I ordered my men to follow the passage to the north-east. We met there violent eddies which knocked the canoe about in a most alarming manner soon after we had descended a short rapid of some steepness.

Our baggage was simply soaked owing to the amount of water we had shipped on various occasions during the day. We saw ahead of us, only a short distance off, a rapid of some magnitude. We decided to halt at four o'clock in order that we might go and explore on foot along the bank and see whether the canoe could be navigated down, or if we had better unload her and let her down with ropes. We cut a space in the forest, which was there thick, in order to make our camp. We spread all our things to dry during the night. The air was stifling--we had a minimum temperature of 73° F. (July 18th).

I took the accurate elevation of the camp with the hypsometrical apparatus, water boiling at that spot at 210°-4, with the temperature of the air 73° F.; altitude 1,113 ft. above sea level. I also took observations for latitude and longitude: Lat. 11° 17'·5 S.; long. 57° 37' W. We had to remain the entire morning in order to cut a way through the forest and take part of the most valuable baggage on men's backs until a point below the rapids was reached.

We named that place Camp Jahu, as we caught there several enormous fish of that name.

In a reconnaissance we made we found that from Camp Jahu we had to take the canoe along among innumerable rocks scattered in the only navigable channel on the north side of a basin 700 m. wide, with a large island 350 m. wide--Sarah Island--on the southern side of the bay, and another smaller island almost in the centre of the basin. There was a drop 2 ft. high--a regular step--in a barrier of sharply-pointed rocks. We had some two hours' hard work in order to get the canoe safely down. The rocks were so close together that we could not find a passage large enough for the canoe, and we actually had to pull her out of the water over some rocks and then let her down gently on the other side.

After leaving that great *pedraria* there was a clear basin 250 m. wide, ending where two enormous heaps of rock formed a giant gateway. An island, 80 m. wide--Rebecca Island--was found near the left cluster of rocks. Another small island had formed close to the right of the river. We descended by the north-easterly passage, only 4 m. wide, where the current was extremely swift but the rapid comparatively easy to negotiate.

We then followed the channel flowing to 350° b.m., and after passing innumerable rocks made our camp again before coming to a large rapid which we heard rumbling in that direction.

We had worked hard all that day, and all the progress we had made by sunset was a distance of 2,000 m.--or a little more than one mile.

Alcides, Antonio and I immediately proceeded to cut a trail through the forest from that point down to the end of the rapid, 1,200 m. farther down. Then we proceeded to take all the baggage upon our shoulders--a task which occupied several hours. I was greatly surprised to find that the men did this willingly enough, although they were unaccustomed to carrying and the loads were heavy. They laughed heartily at one another as they struggled under the heavy weights, or trod upon thorns, or were jerked about with knocking against trees--the passage we had cut being necessarily not spacious.

I had not seen my men so jolly for a long time--in fact, I do not remember ever having seen them so jolly. I was in hopes that this state of affairs might last, as it was certainly not pleasant to be travelling in such usually morose company.

During the night we caught an immense jahu, weighing over 50 lb., as well as some 200 lb. of smaller fish. As the bank of the stream was rather high and steep, we had a great deal of trouble to land the larger fish safely. Some of my men had exciting experiences, one man falling into the water on receiving a powerful blow from

the tail of the struggling jahu. The scene was a comic one, the terror of the man being amusing to watch.

We carried a great quantity of salt; with it my men set out to preserve the best portions of the fish we had caught--a precaution of which I fully approved.

I noticed that whenever we came across rocky places the number of insects increased to an enormous extent, especially mosquitoes and gnats. I think it was due principally to the fact that in those rocks many cavities were found which got filled with stagnant water which eventually became putrefied.

The place where we halted we called Abelha Camp, because of the millions of bees which worried us to death there, not to speak of the swarms of flies, mosquitoes and ants, and myriads of butterflies which came to settle in swarms upon us. It was indeed curious to note the wonderful tameness of the latter, as they had never seen a human being before.

[Illustration: Fishing on the Arinos: a Jahu.]

[Illustration: Fish of the Arinos River.]

There was a nasty-looking rapid close to the camp. We had to let the empty canoe down carefully by means of ropes, my men on that particular occasion donning their lifebelts again, although they walked on dry land when they were taking the canoe along. When I asked them why they put them on, they said that perhaps the canoe might drag them into the water and they had no wish to get drowned.

We left that camp late in the afternoon--at three o'clock--having wasted the entire morning conveying the canoe to a spot of safety and then carrying all the baggage along overland.

After having gone some 2 kil. farther we came to another rapid and a *pedraria* with nasty rocks right across the channel, the only passage I could see possible for our canoe being in the centre of the stream. That channel was only a few metres wide, and had in the centre of it a large rock just under the surface, which flung the water up in the air. We just managed to shoot that rapid safely, although with trembling hearts.

Farther down, rocks innumerable, rising only two or three feet above water, spread half-way across the channel from the right side. Then rapids and strong eddies were encountered. For 700 m. the river showed foliated rock strewn all along on both banks, and great volcanic boulders of a more rounded shape. The foliation showed a dip westward of 45°.

We were delighted when we discovered in that region many *solveira* or *sorveira* trees, or milk trees, exuding when incised milk most delicious to drink. Then there were plenty of *figueiras* or *gameilleiras* and wild bananas. We wasted much time extracting milk from the *solveiras* and eating wild fruit.

Monkeys were to be seen in that part. They seemed most astonished on perceiving us, and came quite close, gazing at us in the most inquisitive manner.

We felt that we had come to a real heaven on earth, except for the river, which could have given points to the River Styx of infernal fame.

When we returned to the canoe we found obstructions of all kinds in the stream. Small rapid succeeded small rapid. Rocky islets and scattered rocks rendered navigation complicated.

Where the river turned sharply to the N.N.E. another dangerous rapid was reached, with rocks scattered all over the channel, some just submerged. We tried to shoot that rapid on the east side, but we got badly stuck on a submerged rock, and once more the canoe filled with water. It took us the best part of an hour to extricate

ourselves from our uncomfortable position.

A beautiful island 400 m. long and 200 m. wide--Maria Island--was then reached. It had a long spur of white sand at its south-easterly end, and pretty vegetation upon it. Strange domes of rock were near by, one particular dome of great size showing a spit of white sand 70 m. long, on its north-westerly side. Many other islets of rock rose above the water along the bank of the larger island, while rapids of some magnitude existed at the end of the island.

We hardly ever came to a stretch of placid water. No sooner had we left the last rapid than, the river turning sharply at that point, we went over a strong *corrideira*, so strewn with obstacles that in the terrific current we had a narrow escape of having our unmanageable, long canoe smashed against one of the innumerable rocks.

As we went on at a great speed I had just time to notice rocks of all sizes and shapes along both banks, and strange rocks in the middle of the river, one or two of them with stunted trees growing in fissures which had become filled with earth.

Another island, 300 m. long--Martia Island--with a picturesque spur of rock at its south-easterly end, was next reached as we were going swiftly down a *corrideira* in the channel to the right which we were following.

After the *corrideira*, as I was busy writing a description of the landscape, I was thrown off my seat. My men also had a similar experience, the canoe nearly turning turtle and becoming filled with water. Alcides had steered us right into the centre of a whirlpool.

These unexpected baths were not much to my taste--not so much for the discomfort they caused my person, as for the trouble they gave me in protecting my notebooks and instruments. Also, in these accidents we lost a considerable amount of our supply of salt, which melted away in the water, and the supply of flour and rice suffered from these unnecessary immersions.

A channel 30 m. wide separated Martia Island from a second island--Camilla Island--100 m. long, which must once certainly have formed part of it, but which had been separated by the eroding waters of the stream. Both islands were wooded, and were extremely pretty. Great heaps of rock, 20 m. in diameter and even more, occupied the centre of the stream after we had passed the last island.

We had only gone 12 kil. 300 m. that day, so difficult had been the navigation.

During the night in less than one hour we caught two large *jahu*, one huge *pacu* (*Prochilodus argenteus*), the latter shaped like a sole, but of a much greater size, and with brilliant red patches on its body--a most delicately-tasting fish to eat--and a number of large *trahira* (*Machrodon trahira*), also called by the Brazilians *rubaffo* because of the noise they make in the water. Altogether over 200 lb. of fish were got out of the water in less than sixty minutes.

We found many *jenipapeiros* (or *genipapeiro*) trees, from the stewed bark of which we made excellent tea. Its fruit was good to eat, and we used it for making sweets.

During the night of July 19th the minimum temperature was 67° F.

We started off gaily enough in the morning, passing first a great boulder, 10 m. in diameter, sticking right out of the water; then an island 200 m. long contained in a basin 500 m. wide. We left the island--Ruby Island--which was 80 m. long, on our left, and went down a channel with strong eddies and whirlpools. Looking back at the eastern channel, we were glad we had not followed it, as it was extremely rocky.

[Illustration: A Fine Cataract on the Arinos-Juruena River.]

The river was contracting in narrow necks and expanding into large basins, another of these being 450 m. broad. A strong rapid existed here, owing to the barrier formed across the stream by a central island of rock and other boulders. After that came a basin 700 m. wide, with three islands--Teffe I., Nair I., Rock I.--in its western part. The central and eastern passages were difficult owing to the quantity of rocks which stood in the way, so we took the canoe down the channel from S.S.W. to N.N.E., which was also extremely bad, and where we had to let her down with the greatest care by means of ropes, the baggage having been previously unloaded. Even then the canoe got filled with water. That involved a great loss of time and waste of energy, so that we had to halt longer than usual in the middle of the day.

Our halting place was most picturesque, situated on volcanic rocks of great beauty, and overlooking a canal cut into the rocks, with strong and foaming rapids from east to west. Strong eddies formed at the end of the rapids.

After leaving the camp and negotiating the rapids, we came to an island 150 m. long--Magda Island--separated by a rocky narrow channel from another island, 50 m. long, west of it.

After the last rapid we were in a basin 800 m. wide and 1,000 m. long. Strong *corradeiras* or rapids occurred all the time, and rocks alone or in groups standing wherever they were not wanted. Farther on we came to another big basin, 1,000 m. wide, with a square island on its western side. The island--Eva Island--was 400 m. broad and of course of an equal length.

Another island, triangular in shape, 700 m. long--Rose Island--was then observed, after we had gone over some strong rapids in the passage on the east side of it.

The river was flowing in a northerly direction, and shortly afterwards formed two channels--one north-west, the other south-west--which soon joined again.

A beautiful bank of white sand 120 m. long and 4 ft. high stretched along the edge of the water on the left side of us. Soon afterwards we entered an immense basin, 1,300 m. broad with a large island--May Island--on its western side.

One kilometre farther the island ended at a place where a lot of rocks stood out of the water. A little lower down other rocks spread right across the river in two parallel lines, forming very strong rapids, which were shot, our canoe coming within an ace of turning over.

The basin which followed was extremely rocky, with strong whirlpools, most troublesome to negotiate. Another island of irregular shape, 200 m. long and 200 m. wide--Rita Island--was found in a large basin, 1,000 m. broad, where we came to strong rapids and violent eddies and whirlpools, the latter most dangerous-looking. The water revolved with such force that it formed in the centre of each vortex holes from one to two feet in diameter.

The channel flowing north on the left side of the river seemed the better of the two, but it was strewn with rocks against which we had many collisions, owing to the strong current, the unmanageable canoe and the disobedient crew.

Another island 350 m. long--Eloisa Island--was to the north-east of Rita Island. Fifteen hundred metres farther on another *corradeira* occurred. A small tributary entered the Arinos on the right side.

We were then travelling in a N.N.E. direction, the river being in a straight line for some 3,000 m., in the course of which we came to a small island on the left side; then to a great island, 3,000 m. long--Albert Rex Island--with beautiful forest upon it. There were two other islets in this channel, one a mere cluster of rocks, the other, north-east of the first and 150 m. in diameter--Belgium Island--having pretty vegetation upon it.



A fourth and fifth--Laeken Island, 300 m. in length, and Elizabeth R. Island, 5,000 m. in length--were separated by a narrow channel. The latter had most gorgeous vegetation upon it; so tidy was everything in the thick forest, and the ground under it so clean that you might have imagined yourself in an English park.

Those islands were really too beautiful for words. Not being a poet, I cannot find appropriate language to describe their wonderful charm.

The river had a tendency to flow toward the west, and even for 1 kil. in a south-westerly direction. It had a width of 700 m. A small island 50 m. in diameter, chiefly formed of accumulated rounded rocks which had rolled down and deposits of gravel, had formed in the centre of the stream. Beyond it a charming little island, 180 m. long--Germaine Island--was found, on which we made our camp. It had an extensive gravel beach, on which I found beautiful crystals and pebbles of wonderfully coloured marble.

**CHAPTER VIII**

Magnificent Basins--Innumerable Rapids--Narrow Escapes--The Destructive Sauba Ants--Disobedient Followers--A Range of Mountains--Inquisitive Monkeys--Luck in Fishing--Rocky Barriers--Venus

WE left at 8 a.m. on July 20th, the minimum temperature during the night having been 57° F. We had hardly gone 1½ kil. when we came to another island, 500 m. long--Mabel Island--quite as beautiful as the one on which we had camped. Small rapids were encountered where we just managed to avoid dangerous submerged rocks close to the right bank, near the entrance of a basin 900 m. wide.

All those basins were really magnificent to look at. This one, for instance, displayed a lovely island--Noailles Island--500 m. long, and 200 m. wide on its left side. Picturesque rocks of a vivid red colour peeped out of the water and broke the current, the spray that rose in the air forming pretty rainbows. There was a channel there, 300 m. wide, after passing the last island. Then came one more great basin 700 m. wide, and yet another pretty island, with a rocky spur.

[Illustration: Preparing the Canoe prior to descending a Rapid.]

[Illustration: A Nasty Rapid.]

We followed a course of 10° b.m. on the left side of the island--Margie Island--which was 500 m. long, and had a number of subsidiary islands formed by picturesque groups of rock.

We then came to one more great basin, with an immense quantity of rock in its western part. Many of the boulders showed a foliation in their strata with a dip of 45° east. The accumulation of boulders formed a formidable barrier before we reached an island most beautiful to gaze upon, so luxuriant was the vegetation on it.

This particular island was 200 m. long; next to it was another 150 m. long; then, joined to this by a link of high rocks to the south-east, was a third, also of considerable beauty. So charming were these islands that I called the group the Three Graces Islands.

The river turned due west from that point in a channel of continuous rapids and violent eddies for some 3,000 m. We went down, the canoe being knocked about in a most alarming way on one or two occasions, and shipping so much water as to reach almost up to our knees inside it.

It was fortunate that all my photographic plates, note-books and instruments were in water-tight boxes, or they certainly would have been damaged beyond saving. This was not the case with my clothes, shoes, and bedding, which had now been wet for many days with no possibility of drying them, as we were travelling all day long and every day, and during the night the heavy dew prevented them from getting dry. Why we did not get rheumatism I do not know, as not only did we wear wet things all day long, but we slept in blankets soaked with moisture.

The moment I dreaded most was that in which we emerged from the rapid into the whirlpool which always followed, and in which the canoe swerved with such terrific force that it was all we could do to hold on and not be flung clean out of her--owing, of course, to the centrifugal force as she revolved quickly.

Making a survey of the river was getting to be a complicated and serious job, what with the numberless islands we encountered, the continuous rapids, and the constant changes of direction. I was busy writing, as fast as I could--only interrupted momentarily by involuntary shower-baths--prismatic compass and watch in hand all the time, the latter in order to measure the distances as accurately as possible.

We had now come to another group of islands in a line in the centre of the river. They had been at one time evidently all one, which had subsequently been eroded into five separate islands and an extensive bank of gravel and sand. Taken in succession from south to north, there was first an oblong island, thickly wooded, 120 m. long--Nina Island--having on its western side an elongated bank of sand and gravel; then, where a barrier of rocks stretched transversely across the stream and where extremely bad rapids occurred--three of them in succession, each worse than the last--was another island--Providence Island--1,400 m. in length.

When we reached any rapid we had to be quick in judging which was the best channel to follow, as the current was so strong that we had not sufficient strength to pull back against it. I generally selected the channel, my men by this time having gained sufficient confidence in my judgment, since so far we had had no serious mishap. But I foresaw that we should soon have an accident, as they were getting foolhardy, and in their ignorance attributed the wonderful luck we had had entirely to their own skill in navigation.

On that particular occasion we had hardly time to recover from shooting the first rapid with the velocity of an arrow, and were wet all over with the splash of the water, when we came to the second and third rapids, where the channel was so narrow and rocks were scattered so near the surface, that it was really a marvel to me how we got through without capsizing. The men in their excitement were shrieking wildly as we dashed through the foaming waters, and there were also yells of positive terror from the man ahead, who with a long pole in hand tried to save the canoe from dashing now upon one rock then upon another.

Below the rapids the three other islands were Dora Island, 200 m. long; Edna Island, 500 m. long; and Lucia Island, 700 m. long.

The river was flowing in a westerly and south-westerly direction, the banks showing a quantity of rubber trees all along. A tiny islet 50 m. long had been eroded from the right bank, just above a strong *corrideira*, easily identifiable by later travellers who may visit it, since a huge rock stands there in the centre of the river.

On the left side of the river foliated rock 10 ft. high was exposed for the length of 1 kil. Dense forest was to be seen on both sides of the river all along the rapids.

Two more islands, each 100 m. in diameter--Romeo and Juliet Islands--close to each other, were then seen on one side of the main channel, which was 200 m. wide.

From this point the river actually flowed in a S.S.W. direction ( $230^{\circ}$  b.m.), and for 2,500 m. we had to negotiate strong and troublesome rapids with variations of shallow water, usually with a bottom of sharp rocks. The water in many of those places, coming with great force, hit the bottom and was thrown up again in high waves which swamped our canoe each time we went through them. In one place we got stuck on a rock in the middle of the foaming waters, and had a hard job to get the canoe off again and prevent her sinking when we had done so.

Where the river turned for another 2 kil. 500 m. more to the west, another elongated island rose on the left side of the stream. The island--Laurita Island--was only 80 m. broad, but had a total length of 1,800 m.

More rapids and shallow water above a bottom of red volcanic débris were found. A small tributary 2 m. wide at the mouth entered the Arinos on the left bank, not far from the spot where a rocky rugged island rose in the centre of the stream.

I halted at 11.30 in order to take the usual observations for latitude and longitude and soundings of the river. The stream, which was 320 m. broad, below some rapids, showed a depth of 6 ft. the entire way across. Farther down, where it contracted to 200 m. in breadth, it showed a depth of 8 ft. in the centre with a maximum depth of 10 ft. to the right and left of it, gradually decreasing to 5 ft., 3 ft., 2 ft., and 1 ft. as it neared the banks. Lat.  $11^{\circ} 7' 3''$  S.; long.  $57^{\circ} 46'$  W.

[Illustration: A Giant Central Wave emerging from a Narrow Channel.]

When we resumed our journey after lunch, we came to another thickly wooded island, 1,000 m. long, 350 m. wide--J. Carlos Rodriguez Island--with a cluster of huge rocks on its southern end.

We had a few minutes of comparatively easy navigation, the river being extraordinarily beautiful in straight stretches of 3,000 m., 2,000 m., and 3,000 m., to 340°, 350°, and 360° (N.) bearings magnetic. In the first 3,000 m. we came upon another strong rapid over a barrier of rocks which extended right across the stream. Beyond the rapids the usual troublesome whirlpools occurred. A polished dome of rock 10 ft. high emerged in mid-stream. Then another charming island--Nona Island--with a spit of white sand at its southern end rose gracefully out of the river. It had a breadth of 100 m. and a length of 600 m.

More *corrideiras* and eddies had to be gone over that day. We seemed to be spending our entire time trying to avoid--not always successfully--collisions with dangerous rocks. We came to another beautiful island, 200 m. long and 100 m. wide--Emma Island--screened at its southern end by high-domed volcanic rocks, and soon after to a rocky island on our right, separated by a narrow channel from a larger and thickly wooded island, 300 m. long and 100 m. wide--Georgia Island.

The rapids seemed to be getting worse and worse as we went down the stream. After passing these three islands we came to a most dangerous spot, the rapids there being strewn all over with nasty-looking rocks which did not seem to leave a clear passage anywhere in a straight line. After 500 m. of anxious travelling we encountered more rapids and troublesome eddies. We had by that time got accustomed to the danger, and even felt travelling dull and stupid when we came to a few metres of placid water.

As we were going down a stretch of 3,000 m. to 350° b.m. we found the centre of the river blocked by great masses of rock; then, a little farther, rocks occupied the left of the river. We went through a narrow passage between those high rocks, finding ourselves carried away helplessly into a rapid of alarming swiftness, which subsequently shot us into a terrific whirlpool.

Alcides was steering us right into the centre of the terrifying rotating waters, when I jumped up and, seizing the steering gear out of his hands, was just able to avoid disaster. As it was, the canoe switched off at a tangent with a heavy list to port, leapt out of the water like a flying fish, and when she dropped again into the water was carried off at a great speed, with a heavy list on and filling fast. I do not know why she did not capsize altogether.

We then had rocks on the left side, rocks on the right side; a barrier of many rocks across the entire stream, with a thickly wooded island, 70 m. wide and 200 m. long--Lilian Island--on the left side. There were a great many scattered rocks at the northern end of the island, where a small rapid was found. Then we were confronted by 4,000 m. of river in a straight line. We had gone but 2,000 m. along that stretch when we came to a lovely rectangular island, with a spit of rock extending for 120 m. eastward, and separated by a narrow channel from the island itself. The island--Susan Island--was 100 m. broad and 250 m. long, with its fore-part of gravel as usual. It was in a basin 500 m. wide.

The river turned to the W.S.W., and was there placid enough, although the current was swift. Where the river flowed once more in a more northerly direction we found rocks and two tiny wooded islands on the left side of the stream, one 20 m., the other 70 m. long. There a *corrideira* occurred soon after we had negotiated a dangerous rapid--dangerous because of the number of intricate rocks which forced the canoe to describe a snake-like dance like a double S, bumping and swerving with such force from the restless waters underneath, that it was all we could do to prevent her turning over.

In a basin 700 m. wide which was further crossed, we admired a picturesque rocky island of a beautiful emerald green colour in the centre of the stream. An immense barrier of rock was on the north-east side of this

basin. Before we halted, absolutely worn out by the heavy work of the day, we descended another troublesome rapid--fortunately that time with no mishaps of any kind.

At five o'clock we made our camp in the only spot we could find that was suitable; but no sooner had we landed than we were fiercely attacked by millions of *sauba* or *carregadores* ants which gave us a lively time during the entire night. Those ants, which were there absolutely in millions, were from 1 in. to 1¼ in. in length, and possessed powerful clippers on the head with which they bit us, giving intense pain. When you had thousands of them climbing up your legs and over your body, and dropping upon you from the tree branches which were alive with them, and clinging to you with all their might once they had got you with their clippers, you began to think what a fool you had been to leave your happy home in England.

As I shall have an opportunity of speaking at greater length of the *saubas* later in this volume, I shall leave them now, merely mentioning that during the entire night we were unable to sleep owing to those brutes. And that was not all: we had many of our clothes, shoes, and other articles entirely destroyed by them.

We called that place Camp Carregador. The nights had become by then quite stifling and damp, the minimum temperature on July 21st being 63° F.

No sooner had we started on our journey that day than we came to rapids. A lot of rocks stood everywhere in the stream. The river after that flowed in a snake-like fashion for 5,000 m. in a general direction N.N.E., and was there comparatively free from serious obstacles. We came to a triangular island 700 m. long--Ada Island--separated from a second island by a channel 50 m. wide. This second island--Hugo Island--formed an isosceles triangle of 800 m. each side. These two islands were evidently at one time joined together, forming a lozenge-shaped island, and had been eroded in the centre by the back-wash of the stream at the spot where it formed an angle.

Where the river turned from 315° b.m. to 340° b.m., it was much strewn with sharp cutting rocks. We were thrown with great violence on one of these and very nearly capsized. Great heaps of volcanic boulders were now seen on the right side of the channel, and one island 50 m. long--Nora Island--with a few shrubs on it.

[Illustration: A Dangerous Rapid.]

[Illustration: Taking the Canoe and Part of the Baggage down a Narrow Passage among Rocks.]

A great heap of rock was fixed in the centre of the stream, forming a kind of spur, beyond which a regular barrier of rock spread from south-west to north-east right across the stream. We had difficulty in finding a suitable passage, but eventually got through close to the right bank in a small *corrideira*, easily recognizable by subsequent travellers, as by the side of it was a rocky hill of a conical shape 30 ft. high with a tuft of trees on its summit. On both banks of the stream rubber trees were plentiful. For 5,000 m. the river had been proceeding in a perfectly straight line to the N.N.W.

My work was extremely tiring, as not only was my time employed surveying the river carefully and writing up plentiful notes, but also I had to control the navigation as much as I could and be ready for any emergency, owing to the capricious nature of my men and their unbounded disobedience. Orders could not be given direct, as they were always disobeyed, so that to obtain what I wished I generally had to give the contrary order. For instance, if I wanted to avoid a rock I ordered Alcides to run the canoe on to the rock; if I wanted to shoot a rapid I ordered them to take the canoe down with ropes, and so on.

Innumerable rocks were now encountered all the time. In places regular great tables or platforms of polished rock were to be seen under the surface in the clear water. A wonderful group of gigantic rocks was then reached, with a most charming island peeping through behind.

We came to an island 450 m. long and 30 m. wide--Anna Island--where two more barriers of rock were found right across the stream. Beyond, a bank 150 m. long of deliciously white sand was observed, where some 2 kil. of placid navigation was gone through; but no sooner had we covered that short distance than strong eddies were again met with at the point where the river expanded to a somewhat greater width.

After going almost due west for a short distance the river gradually swung round to due north, a most beautiful view opening before us as we got round the sweeping curve. For 5,000 m. the river now ran in a perfectly straight line, with its beautiful clear water flowing over a rocky bed. In the far distance loomed the first range of mountains we had seen since leaving the Serra Azul. I had got so tired of gazing at a flat horizon line that the sight of the range gave me unbounded pleasure. But I had not much time to gaze upon the scenery, for rocks of all sizes and shapes were strewn all along the channel.

Two small islets, each 20 m. long, were passed on the right bank. Then came more picturesque groups of rock on the right and on the left of us as we paddled gaily along, and refreshing accumulations of pure white sand. Farther on, an island 50 m. wide and 60 m. long, with a southerly crown of huge boulders--Corona Island--was to be seen close to the right bank.

Some thousand metres before we got to the end of the long stretch, yet another elongated island 50 m. long lay close to the left bank. The island was thickly wooded. From that spot a basin fully 1,000 m. broad spread out. The easterly portion was a mass of rock, exposed a few feet above the surface. These rocks extended right across the basin as far as an island 350 m. long--Josephine Island. The vegetation was indescribably beautiful in that part. Immense quantities of rubber trees stood majestically, so far unknown and untouched in the luxuriant forest.

Eight distinct groups of rocks were found on the right-hand side of the river where it flowed for 4,000 m. in a N.N.W. direction. I took forty-two sights of the sun that day in order to determine the exact latitude and longitude. Lat.  $10^{\circ} 48'9''$  S.; long.  $58^{\circ} 0'$  W.

When we left again in the afternoon the river, there 350 m. broad, was enchantingly beautiful, absolutely clear of obstacles as far as we could see. There was a stretch of 4,000 m. of placid waters, and we imagined that we had come to the end of our trouble.

Monkeys played gaily among the trees, evidently taking the greatest interest in the canoe. They followed us for long distances, jumping from tree to tree, shrieking with excitement and gazing at us with keen interest. We in the canoe suffered perfect torture from the millions of bees, gnats, and mosquitoes, which settled on us in absolute swarms and stung us for all they were worth. The lips, eyelids, nose and ears seemed to be their favourite spots for drawing blood--perhaps because the remainder of the face and neck was already a mass of stings and the skin had got hardened and parched by the broiling sun. The temperature was warm-- $92^{\circ}$  F. in the shade, and  $103^{\circ}$  in the sun.

At the end of the 4,000 m. another great mass of rocks was found extending from south to north right across the stream. Fortunately we found a channel sufficiently large for navigating our canoe exactly in the centre of the river. After turning to the W.N.W. we found a charming little rocky islet with a solitary tree upon it, and 1 kil. farther a larger island 400 m. long and 300 m. wide in the shape of a triangle--Sylvia Island. This island was separated by a channel 70 m. wide from an immense island--Guanabara Island--6,400 m. long. The channel we followed, the river there flowing to the S.S.W., was 300 m. wide. Great masses of rock were visible on the left side. Where the river flowed in a more westerly direction rocks formed a barrier right across from south-east to north-west.

Then the river once more flowed in a S.S.W. direction through a perfectly beautiful channel. A lovely sand and gravel beach extended from north-east to south-west at the turn of the river where the great Guanabara Island ended.

Some 600 m. farther on a huge dome of rock like a spherical balloon was to be seen, with two smaller rocks by its side. A basin 400 m. wide was then found with an islet of sand 100 m. long on the left side, and a low islet of gravel partly wooded on the right side of the channel. These preceded another accumulation of sand and gravel 100 m. long with a few trees upon it, which was succeeded by a mass of rocks just before reaching a fair-sized island.

Another great spherical rock was seen before entering the channel between the island and the left bank. In the extensive bay great boulders of indescribable beauty were visible.

[Illustration: The Canoe being led down a Rapid.]

Several *capivaras* were basking in the sun on the top of the boulders, and were fired at many times by my men as they stood up to gaze at us in astonishment before they made up their minds to jump into the water and escape.

Close to those rocks an island--Teresa Island--400 m. long was next admired. Strong rapids had to be gone through in a great barrier of rocks at the end of this island. Then no sooner were we thanking our stars that we had negotiated that portion of our journey safely than we were among a lot of globular boulders, some 30 ft. high.

For 800 m. we had a placid time, the water of the stream being so beautifully green, so transparent, that we could see the bottom quite clearly. Our happiness did not last long. We had more rapids and a great rocky bank spreading from south-east to north-west right across the stream, and forming in one portion an island.

We went down another strong rapid between great and dangerously situated rocks and a large island. Then came another wonderful group of high domed rocks, one of the great domes displaying a sharp northern spur like the ram of a battleship. Next to it were three cylindrical rocks, just like towers, one of which leant over the dome.

Yet another rapid was shot through with no misadventure, and when we came to the end of a large island 4,500 m. long and 80 m. wide--Priscilla Island--preceded by a smaller islet of sand and gravel, we arrived at a direct stretch of 4,000 m. of river, flowing to the west. Another rocky islet with an accumulation of sand and a lot of scattered rocks by its side, then a high island, were passed on our right, and farther on we found another great group of globular rocks at the point where Daphne Island, 350 m. in length, began.

I hardly had time to map out the numberless rocks and islands we met before we came upon others. There again we saw three more islands in succession--Mars Island, 500 m. long and 100 m. wide; Jupiter Island, 250 m. long; and a third and smaller one, separated from the second by a channel strewn with huge boulders.

To the N.N.W., at 340° b.m., we saw a hill 300 ft. high, some distance from the stream. Innumerable rocks again occurred in the centre of the channel, and then we came to an extensive triangular island--Barretos Island--the base of which was 300 m. Its left side was 2,000 m. long, its eastern or right side about 1,500 m. A hill range some 300 ft. high was looming before us to the north-east. The second island--Antonio Prado Island--had a total length of 2,000 m. with an average width of 200 m.

On this magnificent island we halted at five o'clock in the afternoon, and I took altitude observations with the hypsometrical apparatus: 1,062 ft. above the sea level.

We were again lucky in fishing that evening. We caught six *trahiras*, several *pacus*, and two young *jahus*--altogether some 120 lb. in weight. My men had wasted so much food, and so much had been spoiled by constant immersions--many of the tinned meats had been altogether spoiled by the tins having got rusty and gradually perforated--that I was beginning to feel rather anxious in case our journey should last longer

than I expected. Unfortunately, we had lost most of our salt, and we had no way of preserving the fish, which we had to leave on the banks, absolutely wasted. In order, however, to show how lazy my men were, it is enough to say that, rather than take the slight trouble of placing some pieces of the excellent fish on board the canoe instead of trusting entirely to the luck we might have in fishing the next evening, they had to go the entire day without food. For some reason or other we could not get a single fish to bite, and we did not find a single bird or monkey to shoot.

I was rather interested to observe, in looking over my notes, that nearly all the rocky barriers we had met stretching across the river extended from south-east to north-west. I believe that similar barriers stretched in the same direction in the other southern tributaries of the Amazon, the Xingu and the Madeira Rivers, but, curiously enough, this was not the case with the River Araguaya.

We had made our camp that particular night on a lovely beach of white sand, which I found perfectly delicious, but which my men hated, as there were no trees on which they could hang their hammocks. They did not like to go into the luxuriant forest of the beautiful island, as they were afraid to go too far away from me, and I did not wish to go too far away from the canoe, which we had beached on the gravel bank, in case the river should rise suddenly or something should happen to make her float away. As I have said, I never, during the entire journey, let that canoe go out of my sight for one single moment. The men, therefore, went into the forest to cut big poles, which they afterwards planted with much exertion, in the sand near my camp-bed.

Some amusing scenes happened during the night, when the poles gradually gave way with the weight of the men in the hammocks, and, tumbling down altogether, gave them severe blows on their heads and bodies.

[Illustration: Crocodile about to attack one of the Dogs of the Expedition.

Photographed by author at a distance of three metres (Rio Arinos-Juruena).]

The stars were simply magnificent in brilliancy as I lay on my camp-bed. One particularly, to 290° b.m. N.W.--the planet Venus--was extraordinarily brilliant, appearing six times as big as any other planet visible that night. It threw off radiations of wonderful luminosity, quite strong enough to illuminate with a whitish light a great circular surface of the sky around it.

In the morning, before we left, Alcides--who loved carving names and inscriptions on every tree and stone--duly incised the name of Antonio Prado, with which I baptized the island in honour of the greatest Brazilian living, upon a giant *figueira* tree on the southern edge of the extensive beach of sand and gravel.



**CHAPTER IX**

Dogs--Macaws--Crocodiles--A Serious Accident--Men flung into a Whirlpool--The Loss of Provisions and Valuable Baggage--More Dangerous Rapids--Wonderful Scenery--Dangerous Work--On the Edge of a Waterfall--A Risky Experience--Bravery of Author's Brazilian Followers--A High Wind from the North-East--A Big Lake

THE night was heavy and damp. All our things were soaked in the morning with the dew which had fallen. We were enveloped in a thick mist when we woke up. It became a dense fog when the sun rose, and did not clear up until the sun was fairly high above the horizon. The minimum temperature during the night had been 62° F. (July 22nd).

We were unable to leave until eight o'clock, as the river was dangerous enough when we could see where we were going, and it would have been rather foolish to add one more risk to our travelling in the fog.

My men were extremely irritable and morose that morning, and even our dogs were most troublesome. We had had a great deal of trouble with the dogs; they were as disobedient and untrainable as the men. Nearly every morning we had to waste a considerable time in getting the animals back into the canoe. When we were ready to start they generally dashed away into the forest and the men had to go and fetch them and bring them back. That particular morning one dog--the best we had--escaped, and my men searched for more than an hour, but were unable to find him. In trying to run after him they got their feet full of thorns, and they became so enraged that they decided to abandon the dog on the island. I called him for more than half an hour, trying to save his life, but the animal refused to come. So, much to my sorrow, we had to pull out without him, and undoubtedly the poor beast eventually must have died of starvation, as there was no food whatever to be obtained in the forest on the island.

The dogs were quite amusing to watch while in the canoe, their terror when we shot rapids being quite manifest. They were an additional source of danger to us, for once or twice while shooting rapids strewn with rocks they would jump out of the canoe on to the rocks as we were shaving past them, and we lost much time on several occasions in order to rescue them. In going through the forest the poor animals had suffered much from the attacks of ants and all kinds of insects, many parasites having got inside their ears and where the skin was softer under their legs, causing terrible sores.

They never got fond of anybody, no matter how well they were treated. In fact, unlike all other dogs of any other country, they never seemed even to recognize any of us. Alcides had become the owner of the abandoned dog in a peculiar way at the beginning of our journey, when travelling with my caravan of mules. The dog was going along with a man travelling in the opposite direction to ours. Alcides, who at the time was eating some bread, whistled to the dog, and from that moment the animal left his master and came along with us.

Perhaps Brazilian dogs do not give affection because they never receive any. They were so timid that when you lifted your hand to caress them they would dash away yelling, with their tails between their legs, as if you had been about to strike them. I tried time after time to make friends with them--and I am generally quick at making friends with animals--but I gave up in despair the hope of gaining the slightest affection from those dogs.

When we came to the end of the island we found another great barrier of foliated rock extending from east to west, 500 m. across. The basin showed, moreover, three sets of giant rocks on the left side. In the north-easterly part where the river narrowed again there stood a range of hills 300 ft. high, extending from west to east, and parallel to the rocky barrier across the basin. A streamlet 3 m. wide coming from the south-west entered the Arinos from the left bank. The hill range which stood along the right bank of the river showed a rocky formation of a greyish colour right up to its summit, and was, in fact, a mere great rocky

barrier with only a few trees growing in interstices which had been filled with earth and sand. The southern aspect of the range was an almost vertical wall.

The river was proceeding mostly in a westerly and north-westerly direction for long stretches of 3,500 m., 4,000 m., 2,000 m., until we came to an equilateral-triangular island, 300 m. each side--Erminia Island. A small channel not more than 20 m. across separated this from an irregularly-shaped island, 600 m. long--Niobe Island. After this came a low island of sand and gravel 5 ft. high and 300 m. long, with merely a few trees upon it, whereas the other two islands were covered with dense and most beautiful vegetation. The main channel of the river was 400 m. wide.

*Araras* (macaws) of great size and of a beautiful vermilion colour flew overhead, shrieking wildly at the sight of us. We began to find a great many *jacarés* (*Caiman fissipis*) or crocodiles. I saw one sleeping placidly on an islet of gravel. I landed and photographed it, subsequently waking it with a start by throwing a stone at it. My men, who were following cautiously behind me, opened a fusillade and killed it.

It was really amusing to watch the astonishment of the few animals and birds we met in that deserted part of Brazil, as none of them had seen a human being. They evidently did not know what to make of us. They generally looked with curiosity and surprise, and my men could fire shot after shot before they would attempt to run, or, if they were birds, fly away.

There were in that region some fine specimens of the *cigana* (*Opisthocomus cristatus*) and of the *jacú* (*Penelope cristata*). The *cigana* was beautiful to look at, with brown and yellow stripes, not unlike a pheasant, and a tuft of bright yellow feathers on the head. All of a sudden we came upon great numbers of these birds, and they supplied us with good meals.

[Illustration: Terrifying Rapid shot by Author and his Men in their Canoe.]

There were again plenty of rubber trees in the forest, plenty of fish in the river. The climate was not too hot--merely 87° F. in the shade, 105° in the sun--the insects not too troublesome; so that it seemed to us a paradise on earth.

We had now before us a great expanse of 5,000 m. of straight river to 345° b.m., with two parallel ranges of hills extending from west to east. The second range was the higher of the two--some 600 ft., whereas the first was only 200 ft. high.

What I took to be a great river coming from 75° b.m. (N.E.), 250 m. wide, joined the Arinos from the right side; but I was puzzled whether this was not a mere arm of the Arinos. In the quick survey I was making, and with the many things which occupied my mind at every moment, the river being moreover so wide, it was impossible, single-handed, to survey everything carefully on every side. Therefore this may have been a mere arm of the Arinos which I mistook for a tributary. It was not possible for me to deviate from my course every moment to go and ascertain problematic details, but it will be quite easy for subsequent travellers to clear up this point now that attention has been drawn to it.

An island, 1,000 m. long--Olivia Island--was found at the point where the main arm of the river flowed in a direction of 345° b.m., and where to the north-west, north, and north-east, three hill ranges were before us--one 300 ft. high, extending from south-west to north-east on the left side of the river; another thickly wooded hill from west to east, also 300 ft. high; and yet another one, the highest of all, behind it from S.S.W. to N.N.E., on the right bank. The river was 350 m. wide, and its water almost stagnant.

Another barrier of rock held up the stream. We came to an island 800 m. long, 300 m. wide--Sabrina Island--on the left side of the stream, which showed a beautiful spit of white sand at its southern end.

I halted on the bank where the island began in order to take observations for latitude and longitude, and as the day was a very clear one I took forty-eight consecutive sights of the sun with the sextant. Lat.  $10^{\circ} 35' \cdot 1$  S.; long.  $58^{\circ} 12'$  W. While I was busy observing the sun I thought I heard curious noises in the forest just behind me. The dogs all of a sudden jumped up, barking furiously, and I heard the sounds of what seemed an escaping person dashing away through the thick growth near the stream. My men were greatly excited, saying it was an Indian who had come quite close to me, and was about to shoot an arrow while I was busy with my sextant and chronometers. All through lunch they sat with their loaded rifles next to them, in case we might be attacked.

The river now flowed in a straight line for 5,000 m. in a north-westerly direction. Half-way along was a large triangular island--Pandora Island; then farther on the left another island, 2,000 m. long--Sibyl Island.

The river was of extraordinary beauty in that region. The tall range of hills to the north-west of us showed beautiful cobalt-blue tones against the whitish and grey sky; while the dark green foliage of the trees and the yellow blooms of the *Oleo pardo* trees visible here and there, the immaculate white sandy beach along the water line, together with the brilliantly red and yellow rocks which stood out of the crystalline emerald water, formed indeed a beautiful scene for the painter's brush.

It did not do to be poetically inclined when travelling on the Arinos. I had hardly time to realize how beautiful that scene was when we found ourselves confronted by another big barrier of rocks, through which we went over a swift *corrideira*.

A basin was formed, 900 m. wide, with an extensive island of rock on the right side of it. Then we suddenly came to a terrible-looking rapid at an incline so steep that I foresaw trouble in store for us. There was no way of stopping anywhere, as the current was swiftly taking us down.

"We are lost!" shouted one man. "Jesus Maria Santissima!"

"Paddle away! paddle away, for Heaven's sake!" I shouted, as I knew that speed alone could save us from disaster.

Down went the canoe at an angle of  $45^{\circ}$  in the foaming and twisting waters of the rapid. Where the water curled right over itself the heavy canoe was lifted up in the air like a feather, and as I turned round to shout to Alcides to steer straight ahead I saw his expanded eyes looking in terror at the terrific whirlpool which was facing us at the bottom of the rapid.

"No! no!" cried Alcides.

"Straight--straight! For God's sake, straight!" shouted I; and as I saw the canoe swerve to the right I again shouted to Alcides to steer straight in order to avoid the dangerous part of the whirlpool.

Alcides would not steer straight, but steered us instead on the right for the very centre of the whirlpool. No sooner did the prow of the canoe enter the circle of the rotating water, which formed a deep concave hollow 70 or 80 m. in diameter, than, dipping her nose in the water, she was flung right up into the air, revolving on herself. Baggage and men all tumbled over, two men being thrown with terrific force clean out of the canoe. A lot of baggage disappeared into the whirlpool. The canoe, although filled with water, righted herself and spun round helplessly at an alarming speed. The impact had been so violent that the men, in tumbling over, had lost all the paddles except one.

We heard the cries of the two men in the water, and I saw them struggle in order to keep themselves afloat. I gave a sigh of relief that the two men--already a long distance from us--were, by a great stroke of luck, the only two who could swim. I urged them to have courage and we would come to their rescue, although for a

moment I could not think how we should do it, as we had only one paddle left and the steering gear had got torn away from its socket, although Alcides with great courage had managed to save it. I ordered my men to paddle with their hands and with the large oar which was used for steering. We were tossed about in a terrific manner, the men and canoe going round and round the whirlpool in an absolutely helpless fashion.

[Illustration: Author's Men shooting a Crocodile.]

What distressed me more than anything was when I saw the two men getting nearer and nearer the centre, although they made a desperate struggle to swim away from it. In our effort to get to them by using the steering oar, the canoe, for some reason or other, swung round upon herself two or three times, and I saw with gladness the men gradually getting nearer. It was a moment of joy when I saw Antonio, who was a powerful swimmer, within only a few feet of the canoe. His face was ghastly, with an expression of terror upon it. He was quite exhausted, and was shouting pitifully for help. The man X was a few yards farther off.

The canoe suddenly swung round, going right against Antonio, who grasped the side of the boat and proceeded in such haste to climb on board that he came within an ace of capsizing her. A few moments later we were alongside of X, but he was so exhausted that he had not the strength to climb up. We seized him and with great difficulty lifted him inside the canoe.

We continued to go round and round the vortex in a helpless fashion, endeavouring with the steering oar to get out of that perilous position. As I gazed around I saw my camp bed and bedding, which were enclosed in a water-tight canvas bag, still floating close to the centre of the whirlpool. Alas! a moment later they were sucked down. Most of our cooking utensils which were loose in the canoe had been washed overboard. Two of our casseroles were floating gracefully in a circle round the whirlpool.

It is curious how people's mentality will work on such occasions. After we had been some minutes endeavouring to get away from the centre of the whirlpool, one of my men, who had recovered from the fright, saw the cooking pans, which were about to disappear. His first impulse was to shout that we must go and get them!

It was with some relief that we were able to extricate ourselves, and eventually reached the outer edge of the whirlpool, where the water changed direction, and the canoe was swung violently, entering a patch of comparatively placid water. Paddling with our hands we slowly reached the bank, and nearly an hour later--it having taken us all that time to go about 150 m.--we baled the water out of the canoe and proceeded to examine the amount of our loss.

Nearly all the cooking utensils, as I have said, had disappeared; two boxes of tinned provisions had gone overboard and were lost for ever; a bag of flour and a bag of rice had vanished in those terrible waters; a package containing a great part of my clothes had also gone for ever, as well as some of the clothing of my men. What was worse than all for me, my camp-bed and all my bedding were lost, which would compel me in the future to sleep either on the ground--which was practically impossible in that region owing to the number of ants and other insects--or else do as I did, sleep on four wooden packing-boxes, which I placed in a line. They made a most uneven and hard bed, as I had, of course, no mattress and no covering of any kind. A despatch-box, with some money, a lot of important official letters and other documents, were lost, and also my mercurial artificial horizon and one of my chronometers. A number of other things of less importance were also gone and quite beyond recovery.

We worked hard all that afternoon and the greater part of the night in shaping new paddles out of trees we had cut down with the axes, which were fortunately not lost. The new paddles were even more primitive and clumsy than those we had before.

We dried what remained of our baggage in the sun during the afternoon. The beautiful sandy beach on which

we had landed looked very gay with all the articles I had spread out from some of my trunks, including a dress-suit which I hung on a young palm, and other such articles, which looked rather incongruous in that particular region. All the white linen clothes I possessed had gone, and there only remained some good serge clothes which I had kept for my arrival in civilized places again. My water-tight boxes had been knocked about so much that they had got injured and let in a good deal of moisture.

One of my valuable cameras was badly damaged in the accident, and one of my sextants was soaked to such an extent that it took me the best part of two hours to clean it all up again. I saved the negatives which were in the damaged camera by developing them at once during the night while they were still wet.

My men were greatly excited over the accident, especially the two who had fallen into the water. In a way I was glad it had happened, as I was in hopes it might be a good lesson to them and they might be a little more careful in the future. Had Alcides obeyed my orders we should have gone through safely. I pointed that out to him, but it was no use; even then he maintained that in order to be safe you must steer right into the whirlpool and not out of it--which really made me begin to feel rather nervous, as I fully expected, as we went along, to find worse rapids than those we had negotiated so far, since we still had to get down from 1,000 ft. or so to the sea level.

We halted for the remainder of the day. I spent a miserable night sleeping on the packing-boxes, now that my bed had gone for ever. I did not deserve that bit of ill-luck, for indeed my camp-bed was the only thing I possessed which gave me a little comfort. After working hard all day and the greater part of the night, a few hours spent lying down flat on the stretched canvas of the bed were most enjoyable; although never, throughout the entire journey, was I able to sleep soundly, as I always had to be on the alert, never knowing what might happen.

[Illustration: A Cataract in the River Arinos.]

[Illustration: Author's Canoe among Great Volcanic Rocks.]

The night of July 22nd was fairly cool, the minimum temperature being 58° F. When we proceeded on our journey in the morning we passed an island 1,500 m. long--Arabella Island. The river was now flowing due west. Again we came upon rocks in the centre and upon the right side of the river, with a strong *corrideira* and with dangerous submerged rocks close to the surface. There was an islet 150 m. long on the right side in a basin 500 m. broad. A hill 100 ft. high stood on the left side of the stream, while a hill range 300 ft. high was now visible to the W.N.W.

We had little time to admire the beautiful scenery, for we soon found ourselves upon another great barrier with a terrible-looking rapid. I asked my men if they preferred to shoot it, as the exertion of loading and unloading the canoe was certainly heavy.

"No, no, no, no!" they all cried in a chorus.

We therefore unloaded the canoe, and with considerable trouble and waste of time we led her down the rapid by means of ropes. Even led in that fashion with the greatest care, the canoe was entirely filled with water.

Islets of rock of considerable beauty rose from the river on the right-hand side. As we got a little way farther, slightly more to the north-west, another hill range, perhaps a little higher than the one we had already observed, began to disclose itself to the north-west, on the right side of the river. As we advanced I further ascertained that the first range extended in a general direction from south-west to north-east. The river had actually eroded its way through this range. Strong rapids were again met with at that point, the channel being strewn with innumerable sharp-edged rocks, most unpleasant if you were to come in contact with them.

A small islet with a picturesque spur of rock on the north side was here seen; then a larger island, 300 m. long--Evelina Island--also on the left side. The river flowed for 3,000 m. in a N.N.W. direction, and at the end of that distance a rectangular island, 200 m. long and 80 m. wide--Eileen Island--embellished it. Like most of the islands in that particular portion of the river it had a beautiful spur of rock on its eastern side, preceded by a little islet also of rock. We passed to the left of this island. It was separated by a channel 80 m. wide from another narrow island, 200 m. to the west of it--Diana Island.

Just before getting to a third range extending from south-west to north-east, and, like the other two, about 300 ft. high, we came upon a long barrier of rock spreading diagonally for about 1,000 m. from south-west to north-east. A long narrow island (200 m. long)--Bertha Island--began from that point close to the right bank, and another had been separated by the water from the bank itself. A tributary 2 m. wide was observed on the left side. We kept close to the left bank and passed on our right an island 300 m. long--Sophia Island.

So numerous were the islands following one another that I was beginning to have great difficulty in supplying sufficient names for them all.

More rapids were reached, and were of terrific force--especially in the centre of the river. It took me some little time to find a suitable passage, but at last I found a channel 25 m. wide through which I got the canoe among innumerable rocks. We went over a great *filare*--by which word the Italians cleverly define an extensive alignment in the stratum--of rock of extreme hardness which had evidently been fractured in some violent commotion of the earth, and had left sharp edges which cut just like knives close to the surface of the water. This rocky obstacle extended as usual from south-east to north-west.

A tiny streamlet entered the river on the left not far from the hill range on that same side. The trees in that particular region had a most peculiar appearance: their high, perfectly straight stems, quite free from branches or leaves up to their very summit, looked like so many columns, mostly of a whitish colour. Many, however, were encircled, others absolutely smothered with creepers. The scenery was really beautiful; it was like travelling through fairyland.

In the centre of the basin 400 m. wide to which we next came was an island, 80 m. in diameter--Gingillo Island--and to the south-west of it a small islet with an extensive beach and accumulation of rocks in a northerly direction. On the southern side of the river a sand beach, interspersed with rocks, spread almost across, as far as the latter island.

I took 55 astronomical sights in order to get the exact latitude and longitude (lat.  $10^{\circ} 30' \cdot 7$  S.; long.  $58^{\circ} 19'$  W.), and to check the time of the second chronometer, which still remained in my possession. We had made poor progress that day as far as the distance went--only 17 kil. 100 m.

We had come to some nasty rapids, which at first looked quite impassable by water, some of the waves shooting up so high in the air as to make it out of the question for any canoe to go through.

There was another extensive *filare* of rock, so beautifully polished that it looked almost as if it had been varnished over. It was evidently an ancient flow of lava, with great holes in it here and there. The flow spread from south-west to north-east, was of a brilliant shining yellow, and most beautiful to look at.

I had to make my camp on the rocks near this rapid, where we unloaded the canoe in order to take her down by means of ropes by the eastern channel--very narrow and very unpleasant, but it was the only one possible. It was all we could do to hold the canoe as she tobogganed down the incline, and we had some nasty falls on the slippery rock trying to hold her.

We had a dangerous bit of work to do the moment we had descended the rapid, for we had then to navigate the canoe right across the basin, where whirlpools of some magnitude were formed, directly over a waterfall

of some height and pouring down great volumes of water with a terrific roar on the north-east side of the basin; then along the really terrifying rapid on the south-west side. It was necessary to do that, as I had observed that it was only on the opposite side of the river that we could possibly take the canoe down, and no other course was open to us than to go across that dangerous spot.

We had to be smart about it, or we certainly should have perished. My men behaved splendidly. We had reloaded the canoe. The quarter of an hour or so which it took us to cross that basin was somewhat exciting, as we struggled through the various whirlpools, the current all the time dragging us closer and closer to the waterfall, while my men were paddling with all their might and Alcides was steering right against the current in order to prevent the fatal leap.

I urged the men on, and they paddled and paddled away, their eyes fixed on the fall which was by that time only a few metres away from us. They were exhausted in the frantic effort, and their paddles seemed to have no effect in propelling the canoe. The men, who were always talkative, were now silent; only the man X exclaimed, as we were only eight or ten metres from the fall: "Good-bye, father and mother! I shall never see you again!" The other men gave a ghastly grin.

[Illustration: Preparing to descend a Rapid.]

[Illustration: A Cataract in the Arinos River.]

"Go on! Row! row!--For God's sake row!" I shouted to them, as I saw they had given themselves up for lost. "Row!" I shouted once more; and as if the strength had suddenly come back to them they made a frantic effort. The canoe went a little faster for a minute or two--just enough for us to clear the waterfall and to drift alongside some rocks which stood in the centre of the stream. We were saved.

My men were so exhausted that we had to rest there for some time before we could proceed to cross the dreadful rapid down the other portion of the barrier.

I was glad we had had that experience, because it showed me that after all it was possible to make brave men of men who were absolutely pusillanimous before. When I mentioned that we still had to go over the other dangerous part, they said, much to my delight:

"We are Brazilians--we are afraid of nothing! We will come with you." And what is more, they did.

They smoked a few cigarettes. I had always supplied them with ample tobacco in order to keep them in a good temper. Then when I gave the order to start they jumped gaily into the canoe, shouting again:

"We are Brazilians! We are afraid of nothing!"

So we began negotiating the second portion of that nasty crossing. There is nothing I admire more than courage. My men went up in my estimation that day at least a hundred per cent.

The second part of our crossing was just as dangerous as the first part--perhaps more so. The men, however, behaved splendidly, and rowed with such vigour that we got through safely and quickly above the most difficult portion, and eventually landed upon a mass of rocks on the opposite side of the stream.

There we had a busy time, as we had once more to unload the canoe, cut a way through the forest in order to convey the baggage overland to a spot about half a mile farther down stream; then we had to come back to take the canoe by means of ropes down the rapid itself.

It was necessary for one of us to be inside the canoe in order to steer her while being led down. Alcides, who

was indeed an extraordinarily brave man, would not hand over his job to anybody else, and insisted on being allowed to steer the canoe. It was with great reluctance that I allowed him, as he could not swim. When we proceeded to let the canoe down by the small western channel, the foaming waters and high waves rolling back upon themselves with great force were most troublesome to negotiate. The canoe was repeatedly lifted right out of the water, and gave us holding the ropes such violent jerks that we were flung in all directions. When I got up again, still holding on to the rope, Alcides had disappeared. He had been pitched clean out of the canoe. Fortunately, a moment later I saw that he was clinging to the steering gear, which we had made extra fast in order that it might stand the great strain.

We managed to pull the canoe and Alcides close to the rocks. Eventually we all had to go into the water up to our necks and lead the canoe by hand with the greatest care in the swift current for the remaining distance. Once or twice we were nearly overpowered by the current, and we were glad when, nearly two hours later, our job was finished, and, absolutely exhausted, we made camp for the night on the rocks.

The men were so excited that during the entire night they sat up commenting on the experience of the day. Their remarks were quite amusing, especially their imitations of the rush of the water, the bumping of the canoe, and Alcides' sudden disappearance and narrow escape from drowning.

The waterfall and rapids spread across the river at that spot for some 650 m. During the night of July 24th the thermometer showed a minimum temperature of 62° F.

I noticed a small streamlet 1 m. wide on the left bank, and to the W.S.W. a conical hill rising over a gently sloping undulating range 350 ft. above the river level--that is to say, about 1,400 ft. above the sea level.

A strong wind sprang up, which caught us sideways and produced such high waves breaking over the canoe, and so severe a motion, that my men became ill. We had to stop, until the wind abated, on a small charming island. As we were approaching the island Alcides sent us right over a rock which was sticking some 2 ft. above water. The bottom of the canoe was so scraped in the violent collision that a good deal of the stuffing with which we had filled the longitudinal crack was torn off, and she quickly filled with water. When we halted more garments had to be destroyed in order to fill up the aperture to the best of our ability.

When the storm was over we continued our journey, going over some rapids in quite a novel way. The men were quarrelling among themselves and had stopped paddling, the paddles being waved in the air in a threatening way as they spoke violently to one another. Alcides had also left the steering gear, and in his fury against the other men had seized his rifle in order to give force to his words. We were approaching the rapid. I advised them to continue their quarrel after we had gone through, but they would not listen to me. The prow of the canoe, just as we were about to enter the rapid, was caught in a rock, and the canoe swung right round, so that we shot the rapid floating down stern first. We shipped a lot of water, the refreshing bath somewhat cooling the excitement of my men, who, realizing the danger when we entered the whirlpool, took to paddling again.

I discovered from their conversation during the night that my men were imbued with the idea that I had a guardian angel attending my person, and that no matter what happened while they were with me they would have no mishap.

The river gradually turned northwards again. I noticed on the right side a hill-range 350 ft. high, extending from south-west to north-east.

The wind came up again, tossing the canoe about considerably. My men once more became seasick owing to the rolling. The new paddles we had made from fresh wood after our accident in the rapids did not prove much of a success, the wood splitting badly. We had to keep the various pieces together by tying them with string. I could not help laughing when I looked at my men paddling. One paddle had a quadrangular blade;



another formed an elongated oval; a third had originally been circular but was then reduced to the shape of a half-moon, the other half having been washed away.

[Illustration: Lake formed where the Arinos and Juruena Rivers meet.]

[Illustration: Going through a Rapid.]

For 4,000 m. the river had flowed due west, then it turned to 310° b.m. Two large islands in succession--one 400 m. long and 350 m. wide--Pericles Island; the second of an equal width to the first, and 700 m. long--Aspasia Island--were seen.

A high wind from the north-east and east continued the entire day, and broke into occasional severe gusts that were most troublesome to us. Heavy rain-clouds hung over our heads. My men felt cold and shivery and quite miserable in the choppy waters, which made them extremely ill. Their faces were green and yellow, their eyes had a pitiful expression in them. They looked as if they were all being led to execution. The temperature of the atmosphere was only 75° F.

Shortly before sunset, after a beautiful stretch of river of 4,000 m. to 335° b.m. (N.N.W.), followed by one of 4,000 m. 5° farther to the north, we came to an immense basin--a regular lake--4,000 m. long, 1,500 m. wide, with two lovely islands in its northerly part. It was there that the great River Juruena, coming from the south-west, joined the Arinos. We had the greatest difficulty in crossing the big, deep lake, because of the high wind which was blowing at the time. The waves were high and caught us on one side; the rolling was so heavy that on many occasions we shipped a great deal of water and nearly capsized. When we got into the centre of the lake the wind increased in fury. My men were very ill and much scared--for we had a great expanse of water on all sides and we could not bale the water out of the canoe fast enough, so quickly was she filling. I urged on the men all the time and took an extra paddle myself to encourage them. We made slow progress, the men suffering greatly. I had to wait for their convenience every few moments when they were badly indisposed.

We tossed about for the best part of two hours, until at last we reached the opposite side of the lake. In a hurry to land, Alcides threw the canoe over some rocks on which the water was breaking with fury. However, the water was shallow at that point. We jumped out, and eventually, trembling with cold, we beached the canoe on a most beautiful island, where we made our camp for the night.

**CHAPTER X**

The Point of Junction of the Arinos and Juruena Rivers--Elfrida Landor Island--Terrible Days of Navigation--Immense Islands--An Old Indian Camp--A Fight between a Dog and an *Ariranha*--George Rex Island--A Huge *Sucuriú* Snake

THE spot where the two great rivers met was most impressive, especially from the island on which we stood, directly opposite the entrance of the two streams. The immense lake was spread before us, and beyond were the two great rivers meeting at an angle. Great walls of verdant forest lined all the banks and islands before us. Curiously enough, both in the Arinos and in the Juruena two long narrow islands appeared parallel to the banks of each stream. The islands resembled each other in size. The Juruena had two islands near its mouth, one narrow and long, the other in the shape of a quadrangle. The Arinos also showed a long and narrow island at its mouth, and another ending in a point.

It was my intention to take soundings right across the mouth of the Arinos and also across the mouth of the Juruena, but unluckily, owing to the strong easterly wind which prevailed that day, it was quite impossible for me to attempt such a task at the mouth of the Arinos, and equally impossible was it to proceed back across the lake to the mouth of the Juruena to measure the volume of water which came out of that river. Without any attempt at mathematical accuracy I should say that the two rivers carried an almost equal volume of water.

Where we landed there were two separate islands, one of which I named after my sister--the Elfrida Landor Island; the other one, next to it, I named Francesco Island. The Elfrida Landor Island--really most beautiful to look at--was 800 m. long; Francesco Island was 1,200 m. in length but not quite so broad.

There was a most picturesque channel 200 m. wide, with marvellous rocks forming a barrier across it, on the right side of the river, between Francesco Island and the right bank. The main part of the stream, however, flowed in a much larger channel between the left bank and Elfrida Landor Island.

The joint Arinos-Juruena River had now a total width of 500 m., and flowed in a direction of  $15^\circ$  bearings magnetic. I took accurate observations with the hypsometrical apparatus in order to determine the exact elevation of that important spot: water boiled at the junction of the Juruena and Arinos at  $210^\circ\cdot4\frac{3}{4}$ , while the temperature of the air was  $70^\circ$  F.; in other words the elevation of the place was 987 ft. above the sea level.

[Illustration: Author's Canoe going down a Cataract.]

I also took observations there for latitude and longitude. Lat.  $10^\circ 21'\cdot7$  S.; long.  $58^\circ 35'$  W. The Juruena entered the lake from bearings magnetic  $250^\circ$  (W.S.W.), the Arinos from bearings magnetic  $100^\circ$  (E.S.E.). The minimum temperature during the night on Elfrida Island was  $57^\circ$  F. My men suffered a great deal from the cold, as they had got badly chilled with the wet and the high wind during the day. Most of them complained of severe rheumatic pains and violent toothache. They could not understand why I did not have any pains of any kind--and to tell the truth, neither could I, after all we had gone through of late.

When we left Elfrida Landor Island on July 25th we had a beautiful stretch of river 4,000 m. long in a straight line, but with a good many rocks strewn in the channel. The men paddled unwillingly, as they said they were aching all over; but the current was strong and we were going along fairly quickly. My men said that we must now have come to the end of all the rapids. I did not care to disillusion them, although I suspected that we still had hard days in store. We had not proceeded very far when a rumbling noise warned us that we were approaching danger. There was a rapid on the east side of the river, but it left a fairly easy passage on the west. A little farther, however, we came to a very bad rapid, and had to unload the canoe, which we were obliged to let down carefully with ropes. My men, who felt feverish and irritable, owing to our previous day's experience, were greatly upset at this new obstacle facing us.

The river was 500 m. wide at this part. The rocks on which we trod when we took the canoe down were so sharp that they cut our feet. It was not possible to wear shoes, as when we had them on we slipped on the rock and had no hold upon the ropes. My men, in their state of weakness, had not sufficient strength to hold the canoe, and the moment she entered the swift current she escaped, dragging one man into the rapid. I jumped into the water after him, and just managed to grab him before he was swept away altogether in the terrific current. We were all drenched, and as the wind blew with great violence that day, and there was no sun to warm us up, we felt the cold very much.

The canoe was thrown mercilessly now against one rock, then against another; but, as luck would have it, after she had made several pirouettes, we, running all the time with our bleeding feet on the sharp rocks along the bank, were eventually able to recapture her at the end of the rapid. Then came the job of going back to fetch all the baggage and bring it down, baling the water out of the canoe, and starting off once more.

My men were tired; they said they could stand the work no more, and they wanted to remain there and die. It took much persuasion to make them come on. I succeeded principally by giving them a good example, carrying down most of the loads that day myself from the upper end of the rapid to the lower--a distance of several hundred metres. I was getting tired, too, of carrying the heavy loads, but I never let my men see it; that would have been fatal.

The river was divided into two channels by a group of islands which must at one time have been one great triangular one, subsequently worn by parallel and transverse channels into seven islands. The first, most southerly, was 300 m. broad, 150 m. long, and of a triangular shape. The three immediately behind this, and of irregular shapes, had an average length of some 700 m.; whereas the last group of three, all of elongated shapes, had a length of 300 m. each. I was getting to the end of the list of names for all those islands, and I was at a loss to find seven names all of a sudden, so I called the group the Seven Sisters Islands. At the end of the group the river narrowed to 400 m. in width between a long island to the west and the right bank, and flowed due north for 12,000 m. in a direct line--indeed a most beautiful sight. Fifteen hundred metres down that distance a great barrier of columnar or cylindrical rocks stuck out of the water from W.S.W. to E.N.E. North of those rocks on the left side, upon the island, not less than 5,000 m. long--Lunghissima Island--was a beautiful yellow sand beach 200 m. long, which formed a separate islet with trees upon its northerly half. Numerous rocks obstructed the east side (right) of the river.

Farther on, another lovely sandy islet 100 m. long had formed behind a number of rocks, and was of a clean, beautiful yellowish white, with a few shrubs and trees growing upon it. All those sand beaches were extremely interesting to me. I invariably landed upon them. I had made a wonderful collection of all the minute plants and delightful miniature flowers which grew upon these beaches--an immense variety, indeed, but of such small dimensions and of such delicate tints that it required sometimes a great strain of eyesight to see them at all. Some were really most beautiful. I spent a good deal of time and patience in collecting, pressing, and classifying those dainty little sand-plants, and I was beginning to flatter myself that I had formed a complete collection.

At the spot where Lunghissima Island came to an end a large triangular island was to be seen on the left of us. A great barrier of rocks stretched across the stream, a prominent cluster of picturesque boulders forming a powerful spur which cut the current at the southern part of the triangle of land.

Although the thermometer marked 93° in the sun my men complained of the intense cold, partly because they all had fever, partly also because the wind was extremely strong that day and caused waves of some size in the stream, which dashed against the canoe and splashed us all over. Again my men were seasick that day, and got furious with me as I could not help laughing at their plight.

With a slight deviation of 20° to the west came another stretch of 4,000 m. in a straight line. A two-humped range of hills now loomed before us to the north-west. We had gone along the side of another elongated island

8,000 metres in length--Yolanda Island. When we came to the end of this great island, two other islands parallel to each other were disclosed to the west of us, one 1,000 m. long--Carmela Island--the other 600 m.--Stella Island. The first had a pretty island 300 m. long--Hilda Island--next to it on the east side. We halted at the end of Yolanda Island and there took observations for latitude and longitude, thirty-one consecutive sights of the sun being taken. Lat.  $10^{\circ} 13' 3''$  S; long.  $58^{\circ} 35'$  W.

[Illustration: The Immense Waves encountered by Author in emerging from the Channel in the Rapid of the Inferno.

(The canoe with its occupants shot up vertically in the air.)]

When we resumed our journey four more islets were visible and a barrier of rock from north-west to south-east again stretching right across the stream. Just beyond lay Romola Island, 1,200 m. long and equally broad. At the end of the island we found a channel 100 m. wide, separating it from two neighbours on the east; in fact, much to my dismay, we found ourselves in a regular maze of islands and rocks, and my time was fully employed keeping an account of and measuring them.

A crescent-shaped island--Urania Island--1,000 m. in length, with most wonderful vegetation upon it, was now on our left. That region was extraordinarily rich in rubber. The channel which we had followed was strewn all over with rocks. Another island, 400 m. long--Caterina Island--followed. The current in the Arinos-Juruena River had a speed of 80 m. a minute. The river in places where no islands lay had a width of 200 m. The water was most beautifully clear, of a lovely emerald green, with a wonderful white sand bottom clearly visible although the river had considerable depth in many places. Yet another island, 600 m. long--Una Island--came in sight to the right of us; then another between two companions, forming almost a circle round the central isle. The river now formed a basin not less than 800 m. wide with innumerable rocks at the entrance. We went on kilometre after kilometre, spending our time in avoiding unpleasant rocks, when again we came first to fairly strong rapids, then to an extremely dangerous rapid, which we shot, as we were carried away into it before we had time to realize where we were. We had the greatest difficulty in extricating ourselves from the many terrifying whirlpools at the end of the rapid, in a great basin 900 m. wide. We found a most beautiful halting place on a natural terrace of volcanic rock some 20 ft. above the river, with a dome of rock in the centre.

I met signs of Indians close to the river. Evidently a tribe had once halted there, but apparently many years before our arrival. I discovered their fireplaces, several carved pieces of wood, and some fragments of rudimentary pottery in the neighbourhood of this picturesque spot. In exploring round the place I also found some almost entirely obliterated indications of several ancient trails which had been made by the Indians in the forest.

Looking toward bearings magnetic  $340^{\circ}$ , and also in the opposite direction to the south, most gorgeous river scenes were before us. This was by far the most beautiful spot I had come across on the river so far. I therefore named the huge island on which I stood George Rex Island. I gave Alcides orders to carve the name on a tree, but as he was an anarchist he refused to do it, excusing himself by saying that he had injured his hand.

At that camp we caught over 400 lb. of fish in less than half an hour--three *jahus* among the number, each weighing over 40 lb. Then we also captured two *cachorra* or dog fish, which possessed vicious-looking molars of great length, not unlike those of a big dog. Each of these fish weighed over 30 lb. Then we got eight *trahiras*, some 20 lb. each in weight. With the little salt which remained we preserved some of the fish, as we were now getting very short of food. However, we had excellent meals most of the time on the river, frying the fish with fat which we extracted from the fish itself.

During the night of July 26th we had a minimum temperature of  $55^{\circ}$  F., but as we had had plenty to eat the

previous evening--in fact, too much--we did not feel the cold quite so severely.

*Ariranhas* in large families were plentiful near that spot, and came close several times, grinding their teeth at us, especially when we were slaughtering the fish on the bank. We kept watch during the entire night, as on that occasion they were truly vicious. Our dogs, for a change, became quite sportive. One of them, named Negrino, got furious with the *ariranhas*, and, driven mad by their unmusical noises, actually jumped into the stream to go to their attack. In a moment he had quantities of *ariranhas* upon him, and was bitten savagely, one ear being nearly torn off. He endeavoured to beat a retreat, but by that time he was in mid-stream and struggling for dear life against his enemies. We put out in the canoe at once and went to his rescue, eventually getting him on board in an exhausted condition, and bleeding terribly all over.

We enjoyed a hearty breakfast of boiled and fried fish before leaving camp at 9 o'clock in the morning. We were sorry to leave the beautiful camp--the best we had had since we had been on the River Arinos. There were before us two great channels. The one flowing east was the larger of the two, fully 400 m. wide and 3,000 m. long in a straight line. As we were paddling along we passed on our left a triangular island the southern side of which was 2,000 m. long, the south-east side 500 m.--Angela Island.

Where the river deviated to 30° b.m. a perfectly straight stretch of 8,000 m. was before us--a most beautiful sight. Two parallel islands, only 50 m. wide, one 400 m. the other 300 m. long, were on the right of us, in the part of the river where George Rex Island, which was still to the right of us, described a graceful semicircle. Fifteen hundred metres farther down George Rex Island came to an end with a beautiful spit of sand 200 m. long. Just beyond, still on our right, another island, 400 m. long--Rosalinda Island--was passed, also with a lovely spit of sand 200 m. in extent. The river at this place had a total width of 500 m. At a point 5,000 m. down the straight stretch due east we came to three parallel elongated islands, two of them 300 m. long, the third 1,000 m. in length, all three on the right of us as we floated down. A barrier of rocks extended right across the stream from north-west to south-east, at a spot where on our left side, at b.m. 330°, a hill range extended northwards. With a slight deviation of 10° eastward (40° b.m.) another beautiful stretch of 6,000 m. was before us. More islands, more clusters of picturesque rocks were passed. First came a group of two islands, the larger 350 m. long--Vanessa Island; then a beautiful clean sand-spit 150 m. long, almost in mid-stream, preceded a group of three parallel islands--Philomela Island, 400 m. long, Portia Island, 300 m. and Psyche Island, 4,500 m. Beyond these were two more islands, one triangular in shape in the centre of the stream--Rhea Island--some 250 m. long, with a strong *corrideira* at its north-easterly terminus.

[Illustration: A Giant Sucurí Snake with Entire Deer contained in its Digestive Organs.]

A most gorgeous sand-bank of great length now lay on our left, while on the right we had two small islets, one 100 m. long, another, beyond it, 500 m. long. A tributary entered the Arinos-Juruena at that spot on the right side. Where the river turned again due east for 3,000 m., another set of parallel islands with a chain of hills beyond them on the right bank was to be seen. The hill range extended from north-west to south-east. All these ranges, with a backbone of rock underneath, formed, as it were, the ribs which held up the central plateau of Brazil. We were now in a region of wonderful accumulations of sand; nearly all the islands showed a sand-spit of great length on the up-stream side. Great islands occurred once more: Paulina Island, 2,500 m. long, on our left; another, 200 m. long--Olivia Island--on our right; and a third--Clara Island--just beyond it. A long tail of rocks followed, and the channel was strewn with dangerous rocks where the river had cut its way through the range of hills.

What must have been formerly an immense island which had become cut up into three was now on the left of us as we followed the central channel in an easterly direction. The first of these was comparatively small; the next--Tristan Island--was 1,500 m. long; the third--Isolda Island--1,000 m. long. All were of extraordinary beauty. Rubber trees were to be seen, but not in such great numbers as we had found farther up the stream. Evidently the soil was somewhat too rocky and not sufficiently moist for their healthy growth.

From due east the river suddenly turned to due north, diverted by the great rib of rock which had formerly made part of the hill range we had now on our right. We had a good deal of trouble here, as difficult rapids were encountered, and sharp, cutting rocks, collision with which would have been fatal for us. Our canoe, after the many bumps we had already experienced, gave alarming signs that she might split in two longitudinally at any moment. For 5,000 m. the river flowed in a northerly direction. Great domes of granite and immense boulders were scattered near the left bank, and rocks of all sizes and shapes emerged from the water all over the basin, which was 600 m. across. Another barrier of rock stretched from north-east to south-east and formed a high drop in the river. We had to unload the canoe once more upon some rocks in mid-stream, then let her gently down the step of foaming waters by ropes. We were then in a magnificent basin 1,000 m. wide, with a great cluster of impressive rocks on the right side, in front of two enchantingly beautiful islands--Melisande Island, 400 m. long, Pelleas Island, 700 m. long--on the left.

Whenever I was gazing enraptured at the heavenly scenery Alcides always managed to send the canoe on to some rock, which quickly brought me back, not to earth but to water. His principle in life was always to do the worst thing and then you knew that nothing worse could happen--a topsy-turvy philosophy for which we all had to suffer. Emerging from the basin, we had two channels before us, one to the N.N.E., the other N.N.W. Gigantic palm trees such as we had seen along the River Arinos were now to be seen all along the banks of the river. We saw in the water not far from us a large *sucuriú* snake (*Eunectes murinus*), fully 6 in. in diameter. It peeped its head out of the water to gaze curiously into our canoe, and caused some excitement among my men.

Another immense barrier of rocks with most troublesome rapids extended from south-west to north-east right across the stream. That seemed a great place for snakes, especially in the narrow and tortuous channel which we followed, between a great island--Victor Emmanuel Island--and the left bank. We were going along fairly gaily when I saw a huge snake--another *sucuriú*--floating upon the water among the foliage and branches of a fallen tree. The section of the body which I could perceive measured fully 2½ ft. in diameter, and I must say that for one moment--we were only about 20 ft. away from it--I was somewhat surprised, as my quickly calculating mind constructed in my imagination a snake at least 100 ft. long. My men immediately took to their rifles, and were about to open a fusillade, but I stopped them, not caring to disturb the sleep of so gigantic a reptile. It was with some relief that, as the canoe floated quietly a little farther, I perceived the head of the snake resting gracefully in a sound slumber upon a branch of the tree out of the water. The head was of more normal proportions. We landed a little distance away as quietly as possible, my men trembling all over with excitement and fear in case the reptile should wake up. Then all together they opened a fusillade until a bullet actually struck the snake and it wriggled about. There was a stampede of all my men through the foliage and plants which grew along the stream. The snake was dead. When they had made quite sure that life was extinct my men returned and pulled the snake out of the water. Although the section we had seen floating was so big, the rest of the body was not more than 4 in. in diameter. The snake had eaten an entire *veado* (deer), and that was the cause of the great swelling of the central part of its body. The shape of the devoured animal could be seen plainly inside it. The photograph of the reptile which I took is given in one of the illustrations of this book. The light was not good for photographic purposes, as it was late in the afternoon and the snake, which after all was only 18 ft. 5 in. long, lay under the shadow of the foliage, which made photography rather difficult. As I was trying to get a second photograph my men proceeded with their knives to open the snake and see what was inside. The terrific odour which ensued when they did so made us violently ill, causing desperate vomiting. I have seen it stated, in some books which have been published about South America, that snakes of incredible length are believed to exist on that continent. Undoubtedly the notion has been suggested by the fact that inexperienced travellers have seen immensely broad traces of snakes along the soft ground near rivers. Measuring the diameter of those trails they came to the conclusion that the snake was 80 to 100 ft. long, and without taking further trouble to ascertain they stated they had actually seen a snake of that length. Whereas, as a matter of fact, as in the case I have described, the immense diameter of the snake was merely in the section which enclosed some big animal which had been swallowed.

[Illustration: An Easy Rapid.]

[Illustration: Going through a Narrow Channel.]

**CHAPTER XI**

A Family of *Ariranhas*--Attacked by them--Three Nasty Rapids--Beautiful Sand Beaches--Exciting Experiences--Going down a Thundering Cataract--Alcides' Narrow Escape--A Night's Work in the Midst of a Foaming Rapid in order to rescue the half-submerged Canoe--Filippe's Courage--Visited by a Snake 20 ft. long

WE camped some hundred metres away from the spot where we had killed the *sucuriú*. It was getting late. My men did not sleep a wink the whole night, as they thought perhaps the mate of the snake might come and pay us a visit. We had a lively time the entire night, as we had made our camp over the home of a family of *ariranhas*. They had their young in a small grotto in the bank, and we heard them all night squealing for their mothers, who were grinding their teeth and shrieking furiously a little way off from the bank, not daring to enter their homes while we were near. They were, I think, more frightened of the fire which my men had made than they were of us. There were twenty or thirty of them, and they made so much noise during the night that it was quite out of the question to rest. The vegetation was very thick, the damp considerable, and the air quite stifling, with a minimum temperature of 60° F. Occasionally, when the air moved at all, we could smell our friend the dissected *sucuriú*.

We were glad to leave at eight o'clock the next morning; we seldom could make an earlier start, owing to the slowness of my men in getting their breakfast and mine ready, and reloading the canoe, as all the baggage was taken out every night. Where we had made camp, Victor Emmanuel Island came to an end, the length of the island being some 14 kil. We had great fun just before leaving, the *ariranhas* coming boldly to attack us as we were getting into the canoe. Our dogs, which had been squealing and growling the whole night at the unmusical shrieks of the *ariranhas*, now jumped into the water, and there was a fierce fight between them and the amphibious animals. My men, as usual, fired a great many shots. Eventually we recovered our dogs and started off once more on our journey.

The river flowed from that point at first mostly in a north-easterly direction and in a somewhat winding course; then gradually tended toward the north-west. In the western part of a large basin 1,200 m. broad were two islands and innumerable rocks. Then, farther on, one more long rocky barrier extended from north-west to south-east in the north-western part of the basin. Once more did we have to let the canoe down the terrific rapids by means of ropes.

Where the river turned to the north-west it was 500 m. wide and most beautiful. A great many islands were seen, and innumerable rocks barred the entrance of the channel at the end of the basin above described. Soon after, however, we entered another basin 1,000 m. wide, with more islands and rapids fairly easy to negotiate. Once more did the river turn due north for 6,000 m., after we had gone over another swift and most troublesome rapid, where we had to unload our baggage and take the canoe down carefully with ropes. After that we entered a long channel strewn with rocks. We had not gone far when another strong rapid was encountered, over another great barrier of rock. No sooner had we negotiated that difficult passage than another great barrier of rock, also from south-west to north-east, had to be gone over through a troublesome rapid.

My men were getting tired of exploring, and were perplexed, because the more dangers we surmounted the greater seemed the dangers confronting us. They were beginning to lose the nerve they had temporarily acquired, and were now so scared at the vicious waters that they tried to keep the canoe all the time close to the banks or islands, the river being so deep that they thought this was the best way of saving their lives in case we had a bad accident. The current was extraordinarily swift, and to make things worse a strong north-easterly wind blew with great fury, driving us back and producing such high waves that our canoe was constantly filled with water. The result of keeping so close to the bank, and having our heads continually brushed by the foliage which overhung the stream, was that each time we came in contact with the branch of a tree thousands of ants would drop on to the canoe and upon us, and would bite us furiously. This was most



trying--an additional torture to that we had to endure of being stung all over by other insects which followed the canoe in swarms.

We had not gone much farther along when within 1,000 m. we came to three nasty rapids in succession, over barriers of great rocks intersected by interesting veins of quartz. From that point the river was fairly straight for 7 kil. We had that morning encountered five troublesome rapids, which had given us endless work. When we halted we were simply ravenous. We were fortunate enough to get plenty of fish for lunch, and while my men were enjoying a hearty feast I took the usual astronomical observations, eaten all over as I was by mosquitoes and *piums*, while bees innumerable had settled on my face and arms. The latitude was  $9^{\circ} 40' 4''$  S.; the longitude  $58^{\circ} 34'$  W. The bees had a most peculiar pungent odour, which they seemed to leave on one's skin when they had walked on it. We kept our heads wrapped up in towels; but even then we suffered a great deal.

[Illustration: A Dangerous Vortex.]

[Illustration: Preparing the Canoe to go down a Rapid.]

When we started in the afternoon we continued to travel in a direction of  $330^{\circ}$  b.m., and came to a large basin, easily identifiable by subsequent travellers by three extensive domes of granite on the right side, two of them actually on the bank of the stream at the entrance of the basin. Where an elongated island, 3,000 m. long--Oriana Island--beside which we had travelled, ended on our left, we saw another island that continued half-way down the basin, here some 2,000 m. wide. The second island--Diana Island--was fully 8,000 m. in length. In the centre of this great basin was a triangular island--Pomona Island--4,000 m. long and with a base of 1,500 m. A tributary was visible on the right bank, just opposite a great dome of granite with an appendix of sand and gravel which stood in the middle of the channel. After we had travelled for 2,500 m., a basin some 1,400 m. wide opened again, with a small island, 400 m. long, in the centre--M. Adams Island. This charming islet had a picturesque headland of rock on the south side, and a long spur, also of rock, to the north. We made our camp here. The river was really marvellously beautiful at this point, the vegetation all round being vigorous and healthy, with a great wealth of rubber trees, while the huge volcanic rocks strewn about added much to the picturesqueness of the scene.

It was warm during the night (minimum temperature  $63^{\circ}$  F.), and we were treated to a most tormenting concert of mosquitoes. They swarmed positively in millions around us. With my bed and bedding which I had lost in the rapids I had unfortunately also lost my mosquito net, and I now was suffering greatly from the stings of all the troublesome insects. My bones were aching all over from sleeping on the uneven packing-cases placed in a row which now formed my bed. It took too much time and trouble to unfasten the straps and buckles which kept the boxes tightly closed, and they did not add to the comfort when one lay spread on them.

When we left in the morning of July 28th, going along a beautiful stretch of close upon 25 kil. in great expanses from 4,000 to 6,000 m. long, we passed first of all an elongated quadrangular island 1,500 m. long; then farther on great masses of volcanic rock. At the end of that stretch the river divided into two channels separated by an equilateral-triangular island, the side of which was 2,000 m.--Minerva Island. Another island, also of great beauty, and with a considerable number of rubber trees upon it, was found a little farther, and there a bar of sand spread beneath shallow water right across the stream.

We had gone 31,500 m. that morning. When we found a most beautiful beach of lovely sand we could not resist the temptation of halting on it to prepare our lunch. Our surprise was great when we set foot on the beach to hear shrill whistles beneath us. The beach was formed of whistling--or singing--sand. The reason the sand was musical was because some large insects had bored thousands of holes of great depth into its moistened mass, which allowed the holes to retain their form. When the sand was trodden the pressure drove the warmish air contained in those holes with great force through the contracted apertures and caused a sharp

whistling and occasionally quite melodious notes.

I again took observations for latitude and longitude at this place, but I was beginning to find the work too heavy--not the observing in itself, but the computing of all the observations, at which I was not particularly quick. (Lat.  $9^{\circ} 24' S.$ ; Long.  $58^{\circ} 40' W.$ ) Also, the great care which I had to take of the chronometer under most difficult circumstances was a trial to me, considering the numberless things I had to look after. The only little comfort I had on that journey had been my camp bed, on which I could, if not sleep soundly, at least rest my weary bones for a few hours at night. That had now gone, and I was beginning to feel the strain of the hard work, constant mental exertion, and the total lack of rest.

We had passed a great number of islands in the morning: one 2,000 m. long--Melusine Island; another 300 m.--Janus Island; a third 3,000 m.--Midas Island--by the side of which was another enormous island, some 6,000 m. in length--Miranda Island. Then little islets 200 and 250 m. long, and another big island, 2,000 m. from end to end--A. Masõ Island.

Most beautiful sandy beaches were now constantly seen, mostly, like the one on which we had landed, composed of singing sand. (Some of those beaches were 200 and 300 m. long.) The beach on which we had landed for lunch was at the southern end of a great island, 5,700 m. long, which I named Queen Mary Island.

We left again that afternoon, travelling fairly speedily, chiefly in W.N.W. and S.S.W. directions, varying from  $290^{\circ}$  b.m. to  $230^{\circ}$  b.m. When we came to the end of Queen Mary Island, after passing some really remarkable beaches on which we found a great many turtles' eggs, we came to a large basin, 1,800 m. across, with numberless rocks scattered on the north and south sides of it. The river there flowed due west; in fact, those rocks formed a kind of corona all around the great circle. A crescent-shaped island, 2,800 m. long--Giselle Island--was next passed. The channel through which we went was full of dangerous rocks, and had a width of 280 m.

Soon after another basin 1,600 m. broad was reached, with a formidable barrier of islets and rocks spreading from south to north. The river there flowed in a perfectly straight course for 10 kil. to  $310^{\circ}$  b.m. A most extraordinary-looking islet with a circular terrace of rock on the east side of it, which was passed in mid-stream, was surrounded by a giant crown of pyramidal rocks of great height emerging in sharp points from the water. We had gone but 6,000 m. of that distance when we came to an island on the right side with a gorgeous spit, also of musical sand, 300 m. long. The island itself was only 700 m. long including the sand-spit--Kuvera Island. We were then in an immense basin with leaden waters as still as those of a pond.

We made our camp in a most picturesque spot, an immense beach forming innumerable indentations, really like small dunes of sand deposited by water. The accurate elevation of that place was, according to the observations taken with the hypsometrical apparatus, 967 feet, water boiling at that spot at  $210^{\circ} \frac{3}{4}$ , and the temperature of the atmosphere being  $72\frac{1}{2}^{\circ}$  F. The indented beach, not unlike a giant double-comb, was at the beginning of a great island which I named James Dewar Island, in honour of the great discoverer of liquid air. The minimum temperature during the night of July 29th was  $55^{\circ}$  F.

Since we had come to the enormous sand accumulations along the stream the troublesome insects which worried us day and night seemed to have doubled or trebled in numbers, and we suffered positive torture from them, especially when we landed anywhere.

[Illustration: A Narrow Passage in the Arinos River.]

[Illustration: Treble Vortex.

(The water revolved in three different directions in succession.)]

We left fairly early in the morning, finding soon afterwards a group of sharply pointed rocks, some above the surface of the stream, some--most dangerous--just under the surface. Another basin, 1,000 m. broad, was crossed, which contained two islets and a number of rocks forming a barrier from south-west to north-east. Two kilometres farther along another immense barrier of rocks and numberless islets obstructed the river from south-west to north-east, so that for a little time we could not see which way the stream flowed out of it at all. Sharply-pointed rocks, ugly and fearsome-looking, stood up everywhere. When eventually we did perceive a channel, down which we went, we found terrifying rapids followed by fearful eddies and a most alarming whirlpool.

I could not measure the exact width of the basin there, as there was a regular maze of islands and I could not well see from the canoe where the banks exactly were.

A great island, 2,000 m. long--Normand Island--presently divided the river into two great channels, the north-easterly one of which we followed, finding more fearsome rapids and strong eddies, which knocked the canoe and us about in a dangerous manner.

I was greatly concerned in going down all those rapids, as the canoe was now in a pitiable condition. We had no way of repairing her, and I was afraid that, with the strain of the terrific current, if we had banged too hard against a rock, she might have split in two. I was not so anxious for myself as I was for my men, who would certainly have been drowned, as four of them could not swim. Also, after all the trouble I had taken to make valuable botanical collections and a unique collection of photographs, I was most anxious to bring them all back safely. I was particularly anxious to bring back to Europe the wonderful fossils I had collected on the Plateau of Matto Grosso, which I had long ago packed in one of the cases that were fortunately among the things saved from the previous disasters. My men had invariably grumbled at having to carry that particular heavy box, when we had to unload the canoe and take the baggage on our heads or shoulders at the many rapids we had encountered. They had never once missed an occasion to remonstrate and swear at the absurdity of having to sweat to carry "those blessed stones," or "the devil's own stones," as they called them.

We had gone but a few thousand metres when we once more came to another great barrier, with two islands, stretching, like most of the others, from south-west to north-east. The only point at which we could take the canoe down was in the rapid in the very centre of the stream--a nasty-looking place, I can assure you--followed by a whirlpool of such proportions as would have frightened most humans. I must say for my men that they showed a great deal of courage that day. Whether it was because they did not quite realize the danger, or whether it was because they had got accustomed to it by then, I do not know; but the fact remains that when I ordered them to go down that terrifying place they obeyed without saying a word.

We had to exercise the greatest care, having to jump out on small rocks which stuck up in the middle of the rapid in order to arrest the almost uncontrollable speed of the canoe. Had they missed their footing while jumping on those rocks and holding the ropes attached to the canoe, the men would certainly have lost their lives, as it was out of the question to save anybody in those diabolical waters. Therefore, when you considered the terrific speed at which the canoe was travelling, and that the men must have known that a mistake in judging the distance would have meant utter destruction, you could not but admire them for their really amazing self-confidence. On many occasions, indeed, I had to do the same thing myself, but I must say I never liked it much; although I was in a better position than they were, as I am a good swimmer--not that a swimmer would have much chance in those waters.

A number of islets were seen below the rapids and whirlpool. From that point we discerned on the right bank an elongated hill, 100 ft. high. Slightly beyond, preceded by a great mass of rock, was another island 200 m. long, dividing the stream in two. Two other islands, one 700 m. long--Leda Island--the other one Medea Island, of greater length but much narrower, were disclosed behind it.

Then came another great barrier of rocks extending from south-west to north-east, and more rapids to be

negotiated. A series of elongated islets and sand-banks occurred in the basin which followed, 1,300 m. wide. Beautiful sand-beaches had formed on either side of that lovely bay. The river then narrowed again to a width of 500 m., and we saw a long flat island of sand, 200 m. long and 50 m. wide, enclosed by rocks in the centre of the stream.

We continued our journey, after the usual halt for taking astronomical observations, and had before us a small hill 100 ft. high at bearings magnetic  $300^{\circ}$ .

We came to a series of most dangerous rapids with terrific whirlpools, especially after the first and second rapid. Another great barrier of rocks with huge boulders spread across the stream from south-west to north-east. An isolated hill was to be seen on the left bank where this barrier was found. A strange coffin-shaped boulder of immense size was then reached on the right side of the stream, just after we had passed a delightful sand-spit 100 m. long enclosed within a stockade of pillar-like rocks.

From this point we had 4,000 m. of clear navigation to  $280^{\circ}$  b.m. It seemed heavenly to us to be in smooth waters again, and my men flattered themselves that we had now come to the end of the rapids altogether. But we soon arrived at innumerable rocks in a confused mass right across the stream, between which the river flowed with great force in a contracted neck. We passed between two islands, each 200 m. long, at the end of which was a rapid. An island 1,000 m. long was there formed--Bomfin Island. Dangerous rapids occurred half-way down its length on the right; then followed a mass of square columnar pillars of rock not unlike basalt. That was all very beautiful to look at, but we had endless trouble in extricating our canoe from among the numberless impedimenta which obstructed navigation.

[Illustration: At the August Falls.]

Another most beautiful island, 520 m. long--Jessica Island--was passed just before getting to really formidable rapids, down which we had the greatest difficulty in letting the canoe, even by the judicious use of ropes. The navigable channel of the river--if navigable it could be called--swerved from north-west to due north. In a basin of immense size were a number of islands from 300 to 200 m. in length, and enormous boulders with cataracts of great height between. The roar made by the water falling over was so great that it resembled thunder. The difference of height between the top and the bottom of the rapid was not less than 10 ft. The water in the channel we followed went over a great slope of lava above which numerous boulders had accumulated.

My men became perplexed when they saw the formidable rush of water, but before we had time to do anything we were swept away at such a speed that for one moment I really believed we were lost. My men laughed hysterically, and in that laugh I joined when we came out at the other end still alive. We had shaved several rocks so closely that great patches of the stopping in the side of the canoe had been torn off altogether, and we were filling fast with water.

Our merriment did not last long, for in a few moments we had drifted on to another and worse rapid, much more terrific than the one we had just gone over. We just managed to hold the canoe on the upper edge of the foaming stream, trying to get the ropes ready in order to let her down. We were in mid stream, not less than 200 m. away from the right bank. We unloaded a portion of the baggage on the rocks and proceeded to let the canoe down with ropes--a most dangerous job in that particular rapid, because at the end of the rush of water stood up many rocks, which drove the water back again and eventually switched it off, curling over itself at a very sharp angle on one side and on the other. A diabolic-looking whirlpool of great depth formed on the other side of those rocks.

I fully realized that the strength of us seven men was hardly sufficient to hold the canoe, particularly as all of us were immersed waist-deep and could scarcely keep our footing in that great rush of water. It was only with the greatest care that we could possibly accomplish the feat, and of this I warned my men. In fact, the moment

the canoe came down at an angle on the steep incline she gave such a mighty jerk that my men, with the exception of Alcides, let go the ropes. Some of them had the skin taken clean off their fingers. I saw the canoe give a great leap. To my horror, a moment after the canoe had passed me down the rapid--I was holding one of the ropes at the lower part of the rapid--I saw Alcides, who bravely had never let the rope go, being carried away in the current. I just managed to grab him as he was about to be drawn into the vortex, where most certainly he would have lost his life. I lost my footing too, and we were both thrown against a rock, which I grabbed with one hand while still holding on to Alcides. There we remained powerless for several minutes, swallowing a good deal of water, which went right over our heads with the resistance we made against the current, until Filippe the negro--with wonderful courage, since he was no swimmer--came to our rescue.

Alcides was undoubtedly a brave man, but he certainly had a beastly temper. No sooner had he recovered from the accident than I heard some of the other men tell him that he had had a narrow escape and would have died had I not gone to his rescue. Shouting aloud so that I could hear his remark, he said to the men: "Oh, the Englishman only came to my rescue because there was no danger for him, as he could swim, or else he would not have done it."

[Illustration: Author and his Men in Water up to their Necks for an Entire Night endeavouring to save their Canoe, which in shooting a Rapid had become stuck between Rocks.]

There was no time to lose, and certainly no time for argument. The canoe had most unluckily got stuck at the bottom of the rapid between two rocks, her fore-part being absolutely submerged. The vibration was such in the after-portion which stuck out of the water that I thought any moment she might break in two.

All my men behaved that day with marvellous courage--particularly Filippe, who, much delighted by the words of praise I gave him when he risked his life in coming to our rescue, now offered to risk his life once more in endeavouring to seize one of the ropes which had got loose and was dangling from the canoe in the foaming waters. We tied Filippe with a rope which we removed from one of the packing-cases we had previously landed, and let him down the rapid until he was thrown violently against the canoe. There the plucky fellow was able to get inside and recover the ropes, which he, after repeated attempts, flung on to us. We pulled and pulled for several hours, but the canoe was so jammed between the rocks, and the current was so strong, that we were not able to get her off.

Night had come on, and we were still waist-deep in the water and trembling with cold, trying to save the canoe. She would not move in any direction. It was with some concern that I had seen several articles which had been loose in the canoe being washed out into the water and disappearing in the whirlpool. Then came a worse accident still. While trying to unload two heavy cases of provisions--a ticklish job--the men lost their footing in the current and one after the other the packing-cases also disappeared in the whirlpool.

All these disasters following one another within a few hours were rather trying to us, the loss of the provisions particularly giving me a great shock, as I realized now that we had practically nothing else left to eat except what we could find by shooting or fishing.

When the canoe had been made lighter we succeeded by constantly jerking her in moving her slightly, and eventually, at two o'clock in the morning--the accident having occurred at half-past four in the afternoon--we were able to release her and bring her to safety along the bank.

A great hole had been opened in the side of the canoe where she had struck the rock, and we had to beach her in order to keep her afloat till the morning. Then came the heavy task of taking all the baggage from the rocks in the centre of the stream along the great barrier of sharp cutting stones as far as the bank.

[Illustration: The Salto Augusto from Above.]

We were prostrate with fatigue when we had accomplished all the work. I lay down on the ground to rest; my men fortunately had saved their hammocks, as they were the first things they always took care to save whenever there was a calamity. Not once during the whole journey did my men offer me one of their hammocks when they saw me sleeping with great discomfort on packing-cases or on the ground. Certainly I was too proud to ask them for any favour.

I had hardly gone to sleep when I thought I heard a curious noise by my side, as of something dragging along the ground. I immediately jumped up, and saw a huge snake some 20 ft. long inquisitively looking at me, only half a metre away. I do not know which of us two was more surprised. The snake with sinuous grace moved away from me with gradually accelerated speed, and, passing right under the hammocks of my men, disappeared in the forest behind.

Taking all things into consideration, that was a night worth remembering. What was worst of all was the fact that, with the excitement and the fatigue, I had forgotten to wind the chronometer at the usual hour of seven o'clock in the evening, and when I woke up startled in the morning, remembering the fact, I found the chronometer had stopped altogether. That was the greatest blow of all, after all the trouble I had taken to keep the Greenwich mean time for my observations of longitude. The mishap was not irreparable, as I got the time fairly accurately by using the previous observations at local noon and working out the difference with Greenwich mean time.

So many had been the obstacles we had found that day that, before reaching the rapid where we had the disaster, we had made a progress of 39 kil. 500 m.--poor work indeed as compared to the wonderful distances we had been able to cover on the first days of our navigation of the Arinos River. Considering all, however, it was really marvellous that we could cover even that distance, short as it was.

**CHAPTER XII**

A Tiny Globular Cloudlet warning us--Tossed in a Merciless Manner--Saved by Providence--Vicious Waters--A Diabolical Spot--A Highly Dangerous Crossing--A Terrible Channel--More Bad Rapids--On the Verge of a Fatal Drop down a Waterfall--Saved in Time--A Magnificent Sight--The August Falls--A Mutiny--The Canoe, weighing 2,000 lb., taken across the Forest over a Hill-range

THE thermometer that night, July 30th, showed a minimum of 63° F. We repaired the large hole (about 1 ft. in diameter) in the side of the canoe by stuffing it with a pair of my pyjamas, while one or two shirts which I still had left were torn to shreds in order to fill up the huge crack which went from one end of the canoe almost to the other, and which had become opened again in scraping rocks in the rapid.

We did not leave that camp until 11 o'clock a.m. An isolated hill was visible on the left bank. We had gone some 3,000 m. when we came to another fairly strong rapid. My men were quarrelling among themselves. Alcides, who was fond of gesticulating on such occasions, let the steering gear go in order to give more force to his words by waving his hands in the air, regardless of the danger which was in front of us, with the result that the canoe turned a pirouette upon herself and down the rapid we went backwards.

The river flowed from that place in an easterly direction for some 3,000 m., where a great basin was formed, strewn with rocks and islets and having two large islands in its eastern part. The basin in its widest part had a width of 2,000 m. Then from that point the river went to 50° b.m. for a distance of 6,000 m. A strong north-easterly wind was blowing against us, keeping us back and making our work unduly hard. Great waves tossed us about and made my men seasick, while we got splashed incessantly, the moisture we absorbed being each time quickly evaporated by the fierce wind. We felt cold and shivery and not particularly happy after the experience of the previous night.

Benedicto, who had been entrusted during the journey with the baling out of the canoe, was beginning to find his job too much for him--a job which he had volunteered to do at first when the canoe was not leaking. He now said he wanted to paddle and not bale out the water any more. Although we used a big bucket for that purpose, Benedicto had all his work cut out for him in keeping the canoe only half full of water.

Several times I remonstrated with him that day, as while I was sitting behind him with the wind blowing hard, he flung most of the water on me instead of back into the stream.

I had observed for the last few days a little globular white cloudlet to the north, just above the horizon. Every day that cloudlet was to be seen in the very same position, where it remained motionless most of the day upon the otherwise beautifully clear blue sky. That was an indication to me that we must be nearing a great fall of water or an immense rapid, which caused the evaporation of the water to produce it.

Many were the islands we passed that day, some as much as 800 m. in length. One island, particularly, was picturesque to a degree, with an impressive crown of rock on its westerly side. The river was there some 2,000 m. wide--perhaps even more, as I could not quite see how far the bank was to the left of us owing to some islands which stood in the way.

A barrier of islands describing a crescent then stood before us, the largest island of that group being 800 m. wide and several kilometres long--Belinda Island. I did not measure the exact length of this island, as we got into great trouble there in some strong rapids, and I had to leave my notebooks for a moment in order to assist poor Benedicto in baling out the water so that we could keep afloat.

When our course turned to 10° b.m. we came into full view of a high range to the north of us which spread from north-west to south-east. The river had cut its way right through it. We reached a great basin again, 2,000 m. broad like its predecessor, with four beautiful islands abreast, and a number of other islands varying

from 100 to 500 m. in length behind them, in the centre, while rocks innumerable were scattered about. There was a rapid once more, with a nasty succession of strong whirlpools formed by the deviation of the swift waters encountering the many rocks.

[Illustration: The Upper Terrace of the August Waterfall.]

Beyond the rapids we got a full view of the range before us, which extended from 90° b.m. to 320°. We had hardly recovered from negotiating those eddies when we were confronted by yet another strong rapid, impossible to navigate, where we had to let the canoe down by means of ropes.

The river here was most picturesque, in great straight stretches from 3,000 to 9,000 m. in length. Some 4,000 m. farther down we came to a very bad rapid. My men were extremely tired of unloading and reloading the canoe all the time with the heavy baggage which still remained. They became most ill-tempered when this new rapid appeared before us, blaming me, as it were, for the rapid being there. I told them that if they did not care to unload all they had to do was to shoot the rapid. They quarrelled among themselves. When we got near it my men became terrified. Alcides, who was at the steering gear, mentioned the fact that we should all be drowned in a few moments. He became perplexed when we entered the rapid, which tossed the canoe about in a merciless manner. In one place, where the water, driven through with great force along a narrow channel, formed a central wave of great height, the canoe stood up almost vertically on her stern. Baggage and men all slid down in a heap. The next thing I saw, when the canoe righted herself, was that we were going down the rapid sideways and at a really vertiginous pace. We managed to clear by a mere hair's-breadth two great rocks which stood in the way. Had we struck a rock on that particular occasion we certainly should have all been killed. As luck would have it, before we knew what was happening we were shot into the whirlpool under the rapid, and there we turned round upon ourselves three or four times before my men had recovered from the amazement of finding themselves still alive, and had begun to paddle again after I had told them to do so for the twentieth time.

Filippe the negro exclaimed: "As long as we come with you, sir, we shall never be killed, but you let us go very near death sometimes!" Then they discussed among themselves, saying that I must have some particular mascotte which I carried upon my person and which prevented disaster.

The range which was before us to the north-west developed itself into a flat-topped hill mass about 500 ft. above the level of the river.

Another rapid, fairly violent, was reached some distance beyond, my men this time offering at once, of their own accord, to unload the canoe and take her down carefully with ropes. I pretended not to care, as I wanted to give them a lesson, and said we had better shoot it, as we had done the previous one.

"No, no, no, no!" they all said in a chorus; "there is such a thing as tempting Providence!"

As we got farther down I could perceive that the range extended much farther than I had seen earlier in the day; in fact, from the W.N.W. it spread as far as E.S.E.

Below the last rapid was an island of great beauty--Babin Island--2,000 m. long. The river beyond that island formed two arms, one on each side of a triangular island located in the opening formed in the hill range by the river, where another strong rapid--in fact, a regular small waterfall--was to be found.

It was very difficult to keep count of all the islands which we constantly passed--many elongated, others triangular, others rectangular, others of all kinds of irregular shapes. In my note-books I endeavoured to map out the entire course of the river as well as I could, and I think that, considering the amount of other work I had to do and the difficulties encountered all the time, the map I made to the scale of one centimetre to a kilometre is as accurate as it could possibly be made with the means at my command. In places where I was



uncertain I have left blanks in the map, and have not gone in for the usual method of certain geographers of filling up the space with all kinds of shadings in order to make it look pretty.

We had gone that day 46 kil., the current having been very strong all the time, which made up for the loss of time in dealing with the many rapids.

I took altitude observations with the hypsometrical apparatus, water boiling at that spot at  $210^{\circ} 3\frac{1}{2}$ , the temperature of the air being  $78^{\circ}$  F. The minimum temperature during the night of July 30th was  $63^{\circ}$  F.

We began our journey the next morning by going down a bad rapid and across an awe-inspiring whirlpool. There again we had to lead the empty canoe down with ropes, and even so we had difficulty in getting her through safely.

We were in a region of immense volcanic domes composed of eroded rock, with many small perforations and large holes 2 or 3 ft. in diameter, highly polished inside as if they had been varnished. Those rocks were similar to those I had met in the higher part of the plateau of Matto Grosso. Some of the holes in the rock had been enlarged to a great extent by the water of the river revolving inside them.

After we had passed the great whirlpool we found many curious mounds of sand 20 ft. high among great masses of lava and eruptive rock. Those mounds were formed by musical sand such as we had met before. We called it in this particular place "moaning sand," as instead of whistling as usual it produced a wailing sound like the cry of a hungry puppy.

On the right side of the stream we came to an important tributary 50 m. wide; 500 m. lower down another strong rapid was reached. I was greatly amused to see how my men now invariably pulled up the canoe when we perceived a rapid and unloaded her, carefully taking her down with ropes. One man, nevertheless, had to be in the canoe to steer her. Alcides always volunteered to take the job.

[Illustration: Interesting Geological Formation below the Salto Augusto.]

Two hundred metres below this rapid the river turned a sharp corner. There we met one of the most dangerous rapids and whirlpool I have ever seen. It was quite awe-inspiring to look at those vicious waters, the water in the vortex being raised like a wall two or three feet higher than the greatest waves of the rapid by the force with which it revolved. The entire river--which, as we have seen, was in some places 2,000 m. wide--was now squeezed through a narrow cut in the hill range, two great arms of water joining directly above that spot. The water was naturally forced through that small opening at an incredible pace. The high vertical rocks at the side of the small channel which was there formed made it extremely difficult to take the canoe down by ropes, especially as the summit of those rocks was much cut up, and we, above, could not keep pace with the canoe as she floated swiftly down the rapid. By fastening together a lot of ropes which we had removed from round the different packages we just managed to make them long enough to undertake the dangerous task.

The hill range, a section of which could be seen at that spot, clearly showed that it was made up of gigantic blocks piled on the top of one another up to a height of 100 ft. At high water the river level must reach--as was evident by the erosion and other signs upon those rocks--nearly to the summit of the range; in fact, when I climbed to the top I found plenty of débris among the rocks, undoubtedly left there by the stream. On the north side the range was made up entirely of gigantic slabs of lava some 15 ft. thick and lying at an angle of  $60^{\circ}$  with a dip northward. On the south side of the range I had found, instead, great boulders which had evidently travelled there and were much eroded. It can easily be understood that when the water rose it must be held up by the hill range, and form a big lake.

We wasted an entire day trying to find a way to take the canoe over the hills, as we did not dare risk sending her down by water. My men were positively disheartened and on the verge of revolt, as they contended that it

was all my fault that I had taken them to a diabolical place like that. I plainly told them that if I gave them such high wages it was because I knew there was a great deal of risk, as I had explained to them at the beginning of the expedition, and I expected them to do some hard work in return.

"But," said the philosopher of the party, "what is the use of money to us if after working hard for months and months we are going to be killed?"

I told them that that was not the moment to argue, but to act; if they followed my orders closely, perhaps we might all escape alive.

Alcides, who was certainly a hard worker, although not always in the right direction, had a nasty accident that day and cut his foot badly on the sharp rocks. He was practically incapacitated for work, as he could only stand on one leg, the other leg being contracted with the really ghastly injury.

This was ill-luck, as our strength combined was not sufficient for the work we had to do, and now the loss of one man--the best of my followers--was an extra trial at the most inopportune moment.

The canoe, too, was in a wretched condition after all the many accidents we had had, and we possessed no more tar, and could spare no more clothes, to stop up the leakages which were now plentiful all over her bottom.

The day of July 31st was thus absolutely lost. I was on the verge of abandoning the canoe there altogether and attempting to get down along the banks of the river on foot--which would have been almost suicidal, as we never could have reached a place of safety.

Night came. At sunset we had the usual concert of mosquitoes, all kinds of insects and frogs, in such innumerable quantities that the din made by them collectively was so loud as to resemble the sound of an iron foundry or a battle-ship in course of construction, the sounds produced by the millions of nocturnal singers being quite metallic and reproducing exactly the sound of hammers driving rivets into the steel plates of a ship. Whether it was done purposely or accidentally I do not know, but those little water creatures of the Arinos seemed to keep excellent time, their vigour also being most enviable.

On August 1st we had a minimum temperature of 64° F. during the night.

I still saw that it was out of the question to endeavour to take the canoe over the immense boulders and over the hill range. One faint hope, involving very great danger, loomed in my mind. If we could only cross the river just above the fearsome channel we could perhaps on the other side take down the canoe by water. This plan required great smartness, as, had we miscalculated the speed of the river and the rate at which we could travel across that dangerous water, it would surely mean certain death.

I spoke to my men about it. They said they were ready to go. I explained to them that they must paddle their hardest and not give way for a second until we had got diagonally across the fairly still waters only a few yards above the awful channel. Should we by misfortune be dragged into that channel by the current we might as well say good-bye to the world.

When we started on that job we risked everything. My men behaved splendidly that day. They paddled and paddled for all they were worth, to get across the hundred metres or so, and took the best part of half an hour in the formidable current. For a moment, when the canoe was in the centre where the current was strongest and we were making no headway, I saw a bad look-out for us. I urged them on with shouts of "*Rema! rema!*" (Row! row!) and at last, in a desperate effort, the canoe once more moved forward. It was a relief indeed when men and baggage were safely landed on the opposite side.

All were so exhausted that for a couple of hours it was out of the question to resume work. I occupied that time in taking observations for altitude and longitude, tortured to death as usual by the innumerable bees and *piums*. (Lat. 8° 54'·6 S.; long. 58° 51' W.)

The temperature in the sun was 107° F. The red and black volcanic rocks radiated such heat that we were nearly stifled in the enclosed basin which was formed by the hill range.

In the afternoon we began with the second part of the dangerous task of endeavouring to take the canoe through the current in a north-easterly direction. The channel in that cut was 200 m. long and only 50 m. wide.

The rock was laminated in layers 6 ft. thick, which had been subsequently baked into a solid mass. The lower portion, of beautiful black and quite shiny, threw up by contrast the vivid red colour of the upper part.

[Illustration: The Salto Augusto (Upper Terrace).]

We had an exciting time when we started the canoe with ropes down that rapid. We ran with bare feet upon the sharp broiling rocks. We could not possibly stand on them with our shoes on. We ran along for all we were worth, in order to prevent the canoe escaping. We climbed up and down great cuts from 10 to 30 ft. high in the rock, never letting go the ropes. Our agility that day was remarkable. Even poor Alcides, whose foot I had wrapped up with a piece of my shirt, was coming along pluckily, regardless of the pain which he certainly suffered. Once or twice, when we remained slightly behind in that awful race, the canoe nearly pulled us into the water from our high point on the rocks some 30 to 50 ft. above.

Those 200 m. of channel seemed miles long to us. Eventually, the canoe was brought out safely at the other end. With bleeding feet and hands we returned once more to our point of departure in order to convey all our baggage upon our backs. After two or three journeys backwards and forwards we were able to proceed a short distance down the river, where we could find a suitable camping-place to rest our weary bones for the night.

On leaving the rapids the river took a direction of 310° b.m. There was a high hill to the east and another, equally high, to the west. The chain of hills seen from the north showed much erosion in the centre, where the rock was exposed underneath. On the south side the upper portion of the hill range consisted of a vertical rocky cliff in strata each 6 ft. thick.

Another cut, more unpleasant even than ours, had been made by the river in that same range to the north-east of that through which we had taken the canoe. An island of rock rose between those cuts.

A few hundred metres below the mouth of that ugly channel we found an extensive beach, on which we made our camp for the night. The minimum temperature during the night of August 2nd was 64° F.

When we landed the men were proceeding to cut down the foliage on the edge of the forest, so as to be able to hang their hammocks, when they became greatly excited on discovering several nests of *maribondos* (hornets), graceful cones of a parchment-like material enclosing a number of superposed discs from one to three inches in diameter and about a quarter of an inch apart. Each disc had a perforation in order to let the dwellers in those little homes pass from one chamber to another from the highest of the cone down to the lowest in the apex.

When we left at 7.30 in the morning and had gone but 1,800 m., the river suddenly described a sharp angle and at that point went through a narrow neck. Afterwards it widened once more to an average breadth of 800 m., which it kept for a distance of 3 kil. in a straight line, the channel being there quite clear of rocks and the water beautifully smooth.

The river was indeed lovely in that part. I had a little more time there to look round at the scenery on either

side of us. I noticed that rubber was still to be found, but in small quantities in that region. Rubber trees were only to be seen every now and then. Looking back to the south and south-west on the range of hills we had left behind, I could see that it extended far to the north-west. The highest part of it, however, seemed to be near the point where we had negotiated the dangerous rapid.

We had gone no more than 9,600 m., when we came to another bad rapid over a barrier of rock across the river from north-east to south-west. A tributary 10 m. wide at the mouth occurred on the right just before this rapid. Beautiful trees of great height, with yellow ball-like blooms, enlivened the scenery as we went along. We had little time to appreciate the beauty of the vegetation--we were too busy with the river. No sooner had we got through one rapid than we came to another alarming one, with a sudden drop of over 6 ft. and enormous volumes of water pouring over it.

This rapid described an arc of a circle, forming an awe-inspiring whirlpool below the actual fall. We had some trouble in finding a place where we could get the canoe through. Eventually, with water up to our necks, we let her gradually down the high step in the middle of the river, we standing with great difficulty on submerged rocks. We had then to make several journeys backwards and forwards to convey the various loads to the canoe after we had brought her to a place of safety, our baggage having been left on rocks in mid-stream. This was extremely risky work, for the current was powerful and the water reached in some places up to our necks. I was anxious for the men who could not swim, as I was afraid any moment they might be washed away, and not only should I lose them but also the valuable instruments, photographic plates, etc., which they were conveying across.

Again that day I had seen since the early morning our friend the little white solitary cloudlet, standing out motionless against the otherwise speckless blue sky. Not only that, but on that particular day I could just perceive, directly under that cloudlet, a faint column of white mist connecting it vertically with the ground. I knew by that sign that we could not be far off a big waterfall; in fact, I could hear a distant rumble which made me suspect that we were much nearer than we supposed.

The river was flowing to 70° b.m. Two other rapids--most violent--were reached within a short distance of each other; then, shortly beyond these obstacles, where the river described a graceful turn, we had before us a great surprise. We heard a loud roar like thunder; it had been getting louder and louder, and grew quite deafening when we turned round the corner. Behold! we had no more scenery upon the horizon before us on the river, but the sky came right down to the water. Great clouds of mist rose up in quick succession in graceful circles. There was an island in the centre of the stream; then to the left of the island the sky again came right down to the water. There a curious effect was to be seen, a high pointed cone of water shooting up skyward with terrific force, then rolling upon itself only to give way to another cone of water succeeding it.

[Illustration: Foliated Rock below the August Falls.]

My men were terrified when they suddenly realized the danger which was only a few hundred metres in front of us. There was a mighty waterfall. When my men got excited it was generally troublesome, because they always disagreed and started quarrelling and insulting one another. Some of them wanted to land at once, for fear of being dragged down the fall. Alcides--who wanted to show his bravery on all occasions--said there was no danger at all and we could go in the canoe right as far as the edge of the fall. The others naturally got somewhat scared at so foolhardy a project. Personally I did not like to say a word in the matter, for fear they should think that I was afraid. I saw with some concern that Alcides--whose mind, I believe, was not quite right owing to the hardships we had endured of late--was steering us right for the centre of the waterfall. I told him that it would be preferable to land on the edge of the waterfall rather than go over it, as it was a little too high for the canoe to tumble over. I calculated the height of the fall from 40 to 50 ft., and I was not far wrong, for when I took accurate measurements I found the actual height was 48 ft.

We were beginning to drift very speedily with the current, when Alcides, realizing the danger, steered us

toward the right bank. The men paddled for their lives so as to land as quickly as possible, as we were now less than a hundred metres from the portentous jump. The current was terrific, and the canoe was floating sideways nearer and nearer the awful chasm. The coast line on the right, was almost vertical, and there was no place where we could hold on to anything and land. So down floated the canoe, my men horror-stricken. Once or twice they were able to seize a creeping vine hanging down the steep bank, endeavouring to stop the canoe's headlong career. But the creepers gave way and crashed down upon us, nearly turning over the canoe at the moment just before they snapped.

So down, down we went, until we were now only a few metres from the fatal drop, and I saw no way of arresting the canoe.

"Estamos perdidos!" (We are lost!) shouted the men.

"Not yet! not yet!" I exclaimed, as I perceived two rocks just sticking out of the water. "Make for the rocks!" I shouted to Alcides, and just as we shaved past them I jumped quickly on one of the rocks, holding the canoe, while two of the men also jumped out quickly and held fast to the boat--just in time. We were only 10 or 15 m. from the place where the water curled over and rolled down the fall.

There was no time for arguing or scolding. Upon those rocks my men, who were fond of talking, started a brisk war of words, saying that they would never continue the journey if Alcides were allowed to steer again. Alcides, on the other hand, whose only aim in life was to fight everybody and everything, invited all the other men to a duel with their rifles. I told them they could have the duel after we had finished the journey and not before. We must take the ropes, climb up to the top of the bank, and, first of all, we must tow the canoe back to a place of safety.

After a great deal of shouting, angry words and oaths, absolutely deadened by the thundering roar of the waterfall, they took out the ropes and eventually towed the canoe back. As soon as that was done I went with my camera to gaze at the beautiful sight and photograph it from different points--a job which was not easy, as the waterfall was so encased between vertical rocky walls (foliated in horizontal strata, which varied in thickness from a quarter of an inch to one foot) that it was impossible to get far enough back to obtain a full view of it.

That fall, called the August Fall, was indeed a grand sight. As I have already said, it was divided into two separate falls, between which was an island with a great spur of rock forming a wall between the two cascades. The water flowed over that wall in graceful steps. The fall on the right side of which I stood was in two immense horseshoe-shaped terraces. The continuation of those terraces on each side of the great flow of water formed tiers of red and black volcanic rock lying in horizontal strata so regular as to be not unlike a gigantic Etruscan amphitheatre. The upper tier of the fall on the right formed an arc not less than 300 m. in periphery. The lower crescent formed an arc 400 m. in length.

Upon this lower terrace the rebounding waters were thrown up with great force into the air--the spray forming numerous rainbows in the sun--only to drop down once more in most contorted, diabolical curves, boiling and roaring in their endeavour to force their way through that positive inferno.

As the water came down in great volumes over those two crescents it met once more in the centre in a mighty clash, being flung up at a tremendous height in the air. I do not know that I have ever seen such a fearsome sight, or that I have ever seen water rush with such force anywhere before. It seemed a pity that there was no one to harness that waterfall and use the enormous power it could generate.

On the left side of the river also the waterfall made an amphitheatre of rock somewhat smaller than the right fall. Down below, at the foot of this, it formed huge masses of white foam, above which profuse spray rose up like a heavy mist. Just beyond was disclosed a diabolical whirlpool, far beyond words to describe, which

extended--as white as snow with the amount of foam it carried, twisting and retwisting in a thousand circles on the surface--for over 500 m. from the lower step of the waterfall.

I measured the height of the fall with a string. The exact height of the upper terrace was 6 m. 90 cm.; the height of the lower terrace, 7 m. 73 cm.--or a total height of 14 m. 63 cm.

I also took the differential height with the several aneroids I possessed, and the elevation with the boiling-point thermometers above the fall and below, with a result of 48 ft. for the actual height of the fall.

[Illustration: The Wooden Railway constructed by Author in order to take the Canoe Overland for Two and a Half Kilometres at the August Falls.]

[Illustration: Formation of Rock below the August Falls.]

One fact was certain, and that was that the canoe could not possibly go down by water. There was only one way to get out of that difficulty; that was by taking the canoe overland until we could find a navigable spot in the river down below. To make things worse, there was a hill range on the right bank of the river, on which we were. I must find a way to make the canoe go over that hill range--that was all.

The canoe, I might remind the reader, was 42 ft. long and 3½ ft. wide, of heavy solid wood, her bottom being over a foot thick, her sides from 3 to 5 in. in thickness, her stern and prow, roughly carved out, of great thickness also. I calculated her weight at over 2,000 lb., which was well under her actual weight.

I spoke to my men, and told them that we must take the canoe over the hill range. They had been very morose since our arrival at that spot, as they expected me to give ourselves up for lost when we came to what they believed to be an insuperable obstacle. They mutinied at once and took to their rifles, saying that they would not follow a lunatic any farther, a man who asked them to take a canoe over a hill.

"Do you not know," said one of them to me, with a fierce grin of contempt upon his face, "that canoes are made for the water and not to travel over mountains?"

"Do you not know," shouted Alcides, shaking his fist, "that it would take a hundred strong men to lift that canoe one inch above the water?--and we, including you, are only seven men, tired and worn.... You believe that because you are English you can do what you like. You will next ask the moon to come and row in our canoe so that we may get along! You have gone insane."

"Yes, he is mad!" they all said in a chorus. "We want the balance of our pay and we will leave you at once. Give us our money and we will go--we want to go."

I told them that they could have their money as soon as the canoe had gone over the hill and down the other side, and certainly not before. They could shoot me if they liked, but that would not help them very much, as I knew the way to get on and they did not. If they shot me they would perhaps die of starvation themselves soon. I agreed that it was a beautiful spot to die in, and perhaps they could hasten their departure by jumping into the fall, and thus end all the hardships, and, at least, arguments.

After those words, which I had spoken with gentleness, I turned, and--for the first time since they had been with me--in a stern tone of voice I ordered Philippe and Antonio to take their big knives and proceed to cut down ten or twelve of the straightest trees they could find. They refused. I quietly walked to the rifle which I generally used for shooting game, and inserted in it a clip of five cartridges. I cocked the rifle, and, placing my watch before me on a stone, gave the men five minutes to decide whether they would cut the trees or be shot. I also said that if any of them moved their rifles they would have a bullet put through them.

Filippe and Antonio dropped their rifles on the ground, reluctantly took the knives and walked away, I pointing out to them the tall trees which I wanted cut. I then ordered Alcides to take one of the axes and cut thirty rollers, each about 5 ft. long. The men were silent and yellow-faced with rage.

The trees in that region were easily cut down. After a few minutes down came a tree with a crash, and shortly after another. I walked to the men and patted them on the back, assuring them again that if they obeyed my orders we should soon proceed on our journey and should certainly arrive safely at a point where they could return home and be happy.

Alcides thereupon turned round asking me whether I intended them to cut down the entire forest and then request them to pierce a tunnel through the hill range--or perhaps I might want the whole hill range flattened down for my convenience!

I paid no attention, but ordered him to cut sixty rollers instead of thirty. I had to keep a sharp watch on my men that day, and I had fully decided, if any disobedience took place, I would shoot them. I think they thoroughly realized that, because they carried out all my instructions to the letter.

When that job was done I explored the district carefully, in order to discover which was the easiest point over which the canoe could be made to climb the hill range. Having found a way which I thought suitable, I myself took one of the large knives, and ordered the other men to come with me with all the implements we could use in order to clear a sufficiently wide road through which the canoe could pass. This work lasted many hours, and was certainly trying.

On August 3rd we worked the entire day, from sunrise until seven in the evening, cutting a way through the forest. Then, when we had done that, I constructed, with the longer trees we had cut down, a small railway from the water, where the canoe was. I used the rollers on these rails made of the smoothest trees I could find. When my men grasped the idea--of which they had never dreamed--they became very excited and in a good humour. They worked extremely hard. It was a portentous effort to get the canoe on to the first roller, but once we had got her on the first and second and third rollers, and were able to lift her stern out of the water with levers and pieces of wood we gradually placed under her, she began to move along on the rollers with comparative ease. We moved the rails in front as we went along, and all went well until we got to the foot of the hill.

There the trouble began: first of all because it was difficult to keep the rollers in position on the rails; then also because the moment we started to push the canoe up the hill she would slide back almost as far as, and sometimes farther than, we had pushed her up. By a judicious use of ropes which we made fast to trees on either side, and by a careful study of the laws of leverage, we managed to push up the canoe a few inches at a time. We had some narrow escapes once or twice, when the ropes, under the excessive strain, snapped, and the canoe slid down again, dragging us with her. One tree, to which one of the ropes was fastened, broke, and in its fall just missed killing a man.

When once we had begun pushing the canoe up that hill we could not leave her for a moment, as she would at once proceed to slide back on the rollers.

Fourteen hours' incessant hard work saw us and the canoe on the top of the hill. From there we had before us a very steep descent of some 400 ft., the first 150 ft. almost vertical.

My men all looked at me in a most inquisitive way in order to find out how I should manage to hold the canoe when we let her down that steep incline.

I had fastened some pieces of wood vertically at her stern, which, by scraping on the ground, would hold her to a certain extent. Then, with all the ropes we possessed we made her fast to the trees as we went along, and

let her slide gently, the weight of the canoe being such that deep grooves were actually cut into the trees as the ropes unwound themselves.

[Illustration: Photograph showing the Road cut by Author across the Forest in order to take the Heavy Canoe Overland.]

We were only half-way down that incline when one tree broke. The canoe gave a leap on one side, knocking down Antonio and the man X, the jerk immediately after breaking another tree on the opposite side. Off went the canoe down the hill in her mad career, knocking some of us down, dragging the others, who were holding on to her. Two or three men were badly thrown about, but fortunately no broken bones were recorded. The canoe by that time had, in great leaps, reached nearly the bottom of the hill, but had got so jammed between a rock and a big tree that it required several hours' hard work with our axes and knives in order to disentangle her.

The shock, however, had been too great for the rickety canoe. I became anxious, for I feared she might split in two at any time, and I had no way of repairing her properly. When we got to the water again I patched her up as best I could with improvised nails which I made from pieces of hard wood. With great yells of excitement from my men we launched her once more in the river.

My men boasted how clever they had been to take the heavy canoe over the hill. There was really nothing Brazilians could not do when they wished!

Those forty hours of steady hard work out of the forty-eight hours we had stopped at the falls had seen us over that obstacle, and we were now ready to proceed once more by water.

We had suffered a great deal during those terrible hours from the bees, mosquitoes, hornets, *piums*, ants, and all kinds of other insects which stung us all over. A glance at the photographs which illustrate this volume, of the canoe being taken across the forest, will show all my men--I, naturally, not appearing, as I was taking the photographs--with their heads wrapped up in towels, notwithstanding the great heat, in order to avoid the unbearable torture as much as possible.

The minimum temperature during the night of August 3rd had been 61° F.; during the night of August 4th 72° F. During the day the temperature was 88° F. in the shade, but the air was quite stifling, as the sky was overcast with heavy clouds.

I took careful observations for latitude and longitude in order to fix exactly the position of the great falls. The latitude was 8° 51' 1 S.; the longitude 58° 50' W.

The whirlpool and eddies which extended for 1,000 m. below the great fall were formidable. Never in my life have I seen waters so diabolical. They filled one absolutely with terror as one looked at them.

The river flowed there to bearings magnetic 120°; then to 140° b.m. for 3,000 m., where it was comparatively smooth. To the south-east of us was a hill range fully 600 ft. high. What appeared to me to be a small tributary seemed to enter the river on the left, but my men were so tired that I did not cross over to the other side in order to make certain. On looking behind us I could see that the hill range at the fall extended from north-west to south-east, while another smaller hill range, only 250 ft. above the level of the river, stretched from north to south on the left of the stream. The river was 300 m. wide.

We went no more than 9,200 m. that day.



**CHAPTER XIII**

A Double Whirlpool--Incessant Rapids of Great Magnitude--A Dangerous Channel--Nothing to Eat--Another Disaster

WE had halted on a lovely island--Adelaide Island--with a rocky and sandy extension. The night of August 5th had been stifling, with a minimum temperature of 72° F.

I found my work too much for me now. There was too much to observe on all sides. We were travelling quickly with the swift current. A hill range from east to west, 300 ft. high, ran along the left bank. Farther, where the river went to the north-east for 4,000 m., laminated rock like slate showed through the left bank, especially in a semicircular indentation which had been eroded by the water. There a strong whirlpool had formed. Another great stretch of river, 5,500 m., was now before us, with a small hill 80 ft. high on the right bank. The river next formed a circular basin with three islets and a barrier 500 m. across.

We were now in a region where, fortunately for us, *castanheiro* trees (*vulgo.* the "Para chestnut") were to be found. Fish was scarce in the river. Now that we had almost superhuman work to accomplish, our meals were extremely scanty owing to the loss of our provisions, and we had not sufficient food to keep up our strength.

As we went on I saw to the north-east of us another hill-range 300 ft. high, extending from north-west to south-east, like most of the ranges found in that region. Where a prominent headland stood on the left side, with a hill 250 ft. high upon it, the river turned to 30° b.m. The hill was made up of foliated rock lying in strata that varied from one inch to one foot in thickness.

On the right side of the stream great cubic blocks of rock rested on the polished curves of a huge dome of granite. A quantity of débris stretched from south to north right across the basin, and caused a deviation in the stream.

[Illustration: Conveying the Canoe across the Forest on an Improvised Railway and Rollers.]

A terrific rapid with a sheer drop of 3 ft. was situated here. A double whirlpool of great magnitude was formed at the bottom of the rapid, the water revolving with such force that the concavity was gradually depressed for some 3 ft. and had a great hole in each centre. We shot that rapid. As Alcides on that occasion followed my instructions, the canoe shot past between the two whirlpools, and although even then she nearly capsized, we were able to continue, my men shrieking with merriment at what they now believed to be their invulnerability. We dodged the unpleasant eddies while we floated with great speed in the strong current.

The river, which had contracted that day to 250 m., now expanded once more into a large basin 1,200 m. wide and 1,800 m. long, with most troublesome eddies as we went through it. The river described a great turn from N.N.E. to 180° b.m. or due south.

To add to the pleasures of our existence, we came in for a heavy rain-storm that day, with deafening thunder and blinding lightning. Notwithstanding the great discomfort it caused us, it pleased me very much because of the wonderful effects of light it produced on the river.

Where the stream, in a course which had wriggled like a snake, turned once more due north to 360° b.m., it divided itself into two small channels. High waves were produced where the water, pushed by the wind, was forced against the rapid. There was a good drop in the level of the river at that rapid, and it was a nasty place indeed for us to go through. We got tossed about, splashed all over, but we came out of it all the same, amid the wildly excited yells of my men. They were beginning to think that they were the greatest navigators that had ever lived, and they never let an opportunity pass of reminding each other of that fact.

I halted in the middle of the day to take the usual observations for latitude and longitude (lat.  $8^{\circ} 47'.5$  S.; long.  $58^{\circ} 39'$  W.), but I was interrupted in my work by another heavy rain-storm, which came and drenched us once more. After that dense clouds as black as ink covered the entire sky for the whole afternoon. We were now in the rainy season. Terrific gusts preceded these rain-storms, and were most troublesome to us.

After negotiating the bad rapids, the river went through a basin of boulders of broken foliated rock. There were three small channels. Then beyond, the entire river was forced through a rocky channel from 35 to 40 m. wide, the water rushing through with incredible force on a steep gradient until half-way down the channel, where it actually ran uphill for 50 m. or so, so great was the impetus it had received on its rapid descent to that point.

You can well imagine what a pleasant job it was for us to convey the canoe along with ropes over so delightful a spot. Owing to our insufficient food, our strength had greatly diminished. The ropes we had used on the many rapids were now half-rotted and tied up in innumerable knots. Moreover, the banks of sharp cutting rock were of great height, and our ropes were not long enough to be used separately, so that we decided to use only one long rope made up of all the ropes we possessed tied together. To make matters more difficult, the channel was not perfectly straight, but described two or three sharp corners, where the water was thrown with much vigour in one direction, then, being driven off immediately at a different angle, curled over itself, producing mountains of foaming water forty or fifty feet in height, and leaving great depressions near the inner corner.

We cut down some long poles, and I placed one man with a big pole on guard at each corner close to the water, in order to push the canoe away toward the middle of the stream in case she came too near those dangerous points.

That channel was some 600 m. long. When we were ready we let the canoe go, all spare hands holding fast to the rope, running and scrambling up and down and along the high rocky cliff, the canoe giving us violent jerks when the direction of the current was changed. With much alarm we saw her spring up in the air like a flying-fish on one or two occasions. We ran along like mad, out of breath and sweating, trying to keep ahead of the canoe. The two men with poles also ran along after the danger points were passed, so as to shove her along when she came too near other dangerous rocks.

After a race of great excitement, we all, with bleeding feet and hands--the palms of our hands actually blistered by the rope which slid through our tightly closed fists--were eventually able to pull the canoe safely on shore below the rapid.

In that mad flight I found time to pull out the camera for one second and take a snapshot of the canoe in the middle of the rapid. The photograph is reproduced among the illustrations of this volume.

My men were so tired that it was impossible to go on. Moreover we had before us the second section of that formidable rapid, and we could not negotiate this without emptying the canoe, which was full of water, and readjusting the rope.

We spent the night of August 6th on those rocks, the minimum temperature being  $63^{\circ}$  F.

When we went on with our dangerous work the next morning we had the greatest difficulty in saving the canoe, as in entering the whirlpool she was swamped, and it was all we could do to pull her back towards the bank before she foundered altogether. The actual drop in that rapid was not less than 8 ft. vertically. We just managed to rest her on a submerged rock until we were able to bale some of the water out.

That canoe was really wonderful in a way. My men patted her on the prow as if she had been an animal, and said she was a good canoe. Indeed she was, but in her old age she felt the strain of that exciting journey. Every

time I looked at her I did not know how much longer she might last. Whatever may be said of them, my men must be given credit for their courage in going along in that canoe. I do not believe that there are six other men in Brazil--or perhaps in any other country--who would have ventured to go across even the most placid pond in a similar craft.

After the rapids came a great basin 1,000 m. long, 800 m. wide. There the river described an angle from 20° b.m. to 45° b.m., and we perceived two parallel ranges before us to the N.N.E., the farther one much higher than the one nearer. Some 5 kil. beyond was yet another rapid, but not so troublesome a one this time. The river there diverged from north-east to a direction due west. A hill range, from 150 to 250 ft. high, extended from W.S.W. to E.N.E. An isolated hill, 300 ft. high, could be seen to the E.N.E.

We suffered agony that day from regular clouds of *borrachudos*, terrible little sand mosquitoes which made life an absolute burden in that region. Our faces, arms, and legs were a mass of ink-black marks left by the stings of those vicious brutes. Particularly when our hands were occupied in holding the canoe going down rapids, or busy with dangerous jobs, did swarms of those little rascals attack us with indomitable fury.

[Illustration: Pushing the Canoe Uphill through the Forest.

(Notice men with heads wrapped owing to torturing insects.)]

Another basin was met, 700 m. wide, quite shallow, and with rapids over a barrier of rock extending across it from south-west to north-east. That barrier was most interesting, because in many places great lava-flows were visible; in other places masses of ferruginous rock could be observed, with most extraordinary patterns upon them--triangles, rectangles, trapeziums, and all kinds of other angular geometrical patterns, such as we had met before on the high plateau of Matto Grosso.

We stopped in the middle of the day on an island 1,200 m. long, from which we obtained a fine view of the hill range looming before us from W.S.W. to E.N.E. on the right bank.

I was having great trouble with my chronometer, which the many jerks, falls, and baths did not seem to improve. I checked it whenever I could by observations of local time and by other watches which I carried. But all my instruments were beginning to feel the effects of that journey very much. The wonder to me was that they had got so far in as good condition as they were, considering all we had gone through.

Our lunch was speedy, as we had nothing to eat. The moment I had finished my observations for latitude and longitude we started off once more, my men keeping their eyes all the time on the forest on the look-out for nut-trees, the river that day giving us no fish at all.

Within ten minutes we had shot two powerful rapids, and in one place went over a dangerous submerged wall of rock extending across the river from E.S.E. to W.N.W.

The men--very hungry--were extremely quarrelsome that day and insulting to one another. The canoe went broadside down a rapid we met, the men gesticulating instead of paddling along as they should have done. With a great bump we stuck with a heavy list to starboard on a rock in the middle of the rapid, and presently the canoe was filled with water. Had we not stuck fast on that rock we certainly should have capsized. The water was baled out in due course, the canoe was floated once more. Soon afterwards another strong rapid, with a *pedraria* extending right across the stream from S.S.W. to N.N.E., gave us endless trouble.

I warned Alcides to get us alongside some rocks in order that we might let the canoe down with ropes, as the rapid, with a sheer drop of over 6 ft., looked too dangerous for us to shoot it. But Alcides was furious with the other men, and in order to punish them steered the canoe into the most dangerous part of the rapid. A second later the canoe, at an angle of 45°, was swept away down the foaming current along the slant of the rapid,

which extended there for about 15 m. The channel was a most intricate one, with rocks scattered all over it, so that it was absolutely impossible for the canoe, with her great length, to go through without having an accident.

As we shaved a big rock in the middle of the rapid, and I saw the canoe steering straight for another big rock in front, I knew disaster was imminent, and leapt out on the rock. So frequently was it necessary for me to do so, that I had become quite an expert at jumping, and had acquired almost the agility of a monkey. Alcides, too, seeing the danger, also tried to follow my example, but unfortunately missed his footing and was swept away by the current. I just managed to seize him before he disappeared for good, and dragged him safely on to the rock.

In the meantime the canoe had swung with great vigour and struck the big rock sideways, smashing her side and filling at once with water. All the baggage was swamped; only a portion of the canoe aft remained above the water, many of our things being washed away altogether.

There she stuck, fortunately for us. With considerable danger we managed to undo the ropes which were fastened to her stern. After several hours of hard work--and of extreme peril for the men who could not swim, as we had to work all the time with the water up to our necks in a powerful current, which made it most difficult to keep our footing--we succeeded in pulling her off and taking her alongside the bank.

That disaster was rather a serious one for us, as it injured many of my instruments, particularly the aneroids; but I considered myself fortunate in managing to save all the photographs and notebooks as well as the instruments for taking astronomical observations, which were kept in airtight cases. I lost my favourite pair of shoes, which were by my side in the canoe when I jumped out.

As it so frequently happened that we had to jump into the water--in fact, we spent more time in the water than out--I had adopted as a costume my pyjamas, under which I always wore the belt with the heavy packages of money. The paper money--a very considerable sum--had with the many baths become a solid mass. I could not well spread the banknotes out in the sun to dry, as I did not wish my men to know how much I possessed; so that for many, many weeks I had around my waist those heavy leather wallets soaked in water, my natural heat not being quite sufficient to dry them.

We had worked in the stream until nearly midnight. We had nothing to eat when we had finished our work, and the result was that the next morning my men were still tired.

Two of my cameras were by my side when the canoe was swamped, one containing eighteen plates, the other twelve, all of which had been exposed. The cameras, being heavy, remained at the bottom of the canoe and were saved, but the bath did not do them good. I did not want to lose the plates, so there was only one course to follow, and that was to develop them while they were still wet. While my men slept I sat up a good portion of the night developing all those plates--quite successfully too--and trying to clean and fix up the cameras again for use the next day. One of my other cameras had been destroyed previously by one of my men, who sat on it, and of course smashed it to pieces. Another camera, which was still in excellent condition, having been in an air-tight case, was rather too big to be used for the work in going down the rapids.

During the night of August 7th the minimum temperature was 62° F.

[Illustration: Conveying the Canoe, weighing 2,000 lb., over a Hill Range--The Descent.]

I worked the entire morning with Alcides, trying to mend the poor canoe. The hole which had been made in her side was so big that Alcides could insert his head into it with great ease. It was not until two o'clock in the afternoon that we started once more. Along the river, which flowed in that particular section to the south-west, was a hill range on the north-west. The range rose 300 ft. above the level of the river. We had gone only some

2,000 m. when we came to another bad rapid stretching across the river from south-east to north-west. We were in a hilly region, hills being visible all along the stream. Soon afterwards we came to another powerful fall over a vertical rocky wall extending from north-west to south-east. Such redoubtable waves were produced there by the force of the water shooting over and then rebounding upwards, that we had to use the greatest care in letting down the unloaded canoe. At one moment she was more than two-thirds out of the water, only her stern resting on the top of the fall, the rest projecting outward in the air for some moments until she dropped down again.

Since the day we had taken the canoe over the hill range at the August Falls, I had doubled my men's salaries--although their original salaries were already many times higher than they would receive from Brazilian employers. I fully recognized that the work was hard, and I wished to encourage them in every possible way.

Next, the river went through a narrow gorge, only 80 m. wide, where the current was mighty strong. High volcanic rocks stood on the right side of us. When we emerged from the narrow neck, which measured some 500 m. in length, we found powerful whirlpools. Farther on the river once more went through a bad narrow passage, 40 to 60 m. wide, with a succession of rapids--extremely unpleasant--for a length of 600 m.

My men were in great form that day, and we shot one rapid after another in fine style, Alcides--for a change--being amenable to reason and following my instructions, which carried us through that dangerous section without mishap. The stream Uruguatos entered the Arinos just above the latter rapids.

That day was indeed a trying one for us. Another narrow channel, 50 m. wide, was reached, along the 250 m. length of which we proceeded with great caution. Then a big basin spread out before us, where the current and eddies were terrific. The bottom of the river was mostly rocky, with great holes and depressions which caused the water to rotate in all directions. In some places amidst the foaming waters could be seen great circles of leaden-looking water, as still as oil. It was in a similar place in the Niagara whirlpool that the famous swimmer, Captain Webb, disappeared for ever. We saw thousands of those places on the Arinos.

The line of the banks on both sides was extremely rocky. In front of us we had a hill with extensive campos on its northerly slope. Then we came to the next rapid. We had endless trouble in this rapid, followed by a second one, practically a continuation of the first.

For 1,000 m. the navigation was extremely dangerous. We unloaded and reloaded the canoe dozens of times that day, although the work of taking the baggage over on our heads was not so troublesome now, as we had very little baggage left. But if we had not much, it was still the heaviest cases which remained. All together they weighed between five and six hundred pounds. The river ran beside a range of hills on the left side.

When we halted, exhausted, late at night we had travelled that day the meagre distance of 9,900 m.

My men killed two large spider monkeys, which supplied them with a meal. I could not touch them, as the monkeys looked too human for words. It made me positively ill to see one of my men biting with great gusto at an arm and hand which had been roasted on the flames, and which looked exactly like a portion of a human corpse. The smell, too, of the roasted monkeys was similar to the odour of roasted human beings--which I knew well, as I had on several previous occasions been at rough cremations of people in Japan, in the Himahlya (or Himalayas), and in Africa.

**CHAPTER XIV**

In the Hands of Providence--A Mutiny--Another Mutiny--Foodless--Hard and Dangerous Work--A Near Approach to Hades--Making an Artificial Channel among Thousands of Boulders--An Awe-inspiring Scene--The Fall of S. Simão--A Revolt

WE all slept soundly that night, I taking good care to fasten the canoe well, so that we should not find her gone next morning.

We had a minimum temperature of 63° F. on the night of August 8th.

In the morning my men killed another big monkey, with the most human face I have ever seen on a quadruman--just like a negro's countenance. It came very near us in its curiosity to see what we were doing, and, though shot at several times, remained there watching us, as it had never heard the report of a rifle before. When it fell down it put its hand on the wound across its chest and cried just like a child. I moved away while my men banged it on the head to finish it off.

[Illustration: Author's Canoe being made to travel across the Forest.]

After a hearty breakfast on the part of my men--my own being limited to a small box of sardines, some twenty or thirty boxes still remaining in my supply of provisions--we resumed our journey down the troublesome rapid. We had to do that with ropes, Alcides, with his extraordinary way of thinking, actually going to the trouble of shifting a big rock out of the water, which took him the best part of an hour, rather than let the canoe go round it--in absolutely placid waters in that particular spot. I let him do it rather than have a quarrel, as I firmly believed that in consequence of the great hardships his brain had slightly lost its balance.

After that, strong eddies were again experienced at first, but, for some 3,000 m. beyond, the water looked beautiful and as placid as possible. The river was now flowing mostly in a northerly direction or with slight deviations, chiefly to the east. We came to a most wonderful island with a spur of lava on its southern side, in the shape of a dome, and highly glazed. On each side of that island was a waterfall of some beauty. The eastern channel was only 20 m. wide, and the water fell over a wall of rock some 12 ft. high. Where this wall projected above the foaming water the shiny black carbonized rock showed a number of small grottoes in its horizontal strata, and a number of funnels like volcanic vents. The north-westerly and broader channel had three successive rapids, the central one some 10½ ft. high, with a terrific current rushing over it, and awe-inspiring whirlpools between the successive rapids.

We took the canoe down by the central channel, and when we got to the higher step, shoved her along until she overhung the fall--as we had done the previous day--and then let her drop down with a bump. It was a difficult job to hold her when once she had dropped down, as the waves below were very high and tossed her about in a merciless manner.

My men had by this time become a little more amenable to reason, and in moments of suspense or danger always awaited my orders.

Once more did we eventually pack in the canoe what remained of the baggage; once more did we start--that time across a large basin 1,200 m. broad, with hills on the east side of us on the right bank. On the right of us, on leaving the basin, we had a beautiful island, 300 m. long--Ariadne Island--with a fine sand-spit at its southern end, and gorgeous vegetation upon it. Barring a few boxes of sardines, we had no more provisions of any kind, as all the food had been wasted, or lost in our various accidents.

When I look back upon that journey, I am amazed to think how Providence did help us all along. That day my men were clamouring for food, and were most unpleasant, putting the entire blame upon me and not upon

their own lack of common-sense. They refused to go on. We pulled up along some rocks, baking hot from the sun, which simply roasted our naked feet when we trod upon them.

Some of the men took to their rifles and said they had had quite enough of exploring. The more we went down that river the worse things seemed to get. They would not go a metre farther. They claimed the balance of their salaries at once--I always paid them punctually every month--and said they would start on foot and try to get somewhere, if God would help them.

I agreed to pay them their salaries and let them go, taking a few minutes to distribute the money, as I wished to go to a secluded spot, not caring to undo the large packages of banknotes before them.

I was walking along the rocks, saying to my men that I would be back in a few minutes, when a huge *cachorra*, or dog-fish, weighing some thirty pounds, leapt out of the water and fell on the rocks, wriggling and bounding convulsively. I called the men, who hastily arrived, and with the butts of their rifles killed the fish. While they were busy dissecting it, Alcides, who had not taken part in the quarrel, but had gone to the forest some little way off, hearing the noise, reappeared with a huge monkey he had killed.

I left the men to prepare an excellent and plentiful meal while I retired to a distant spot to count out their salaries. When I returned and handed them the money--after their appetites had been fully satisfied, and they had left next to nothing for me--they said I could keep the money, as they did not want it; they were sorry for what they had said, and would go on wherever I ordered them to go. They said that I certainly must have a guardian angel watching over me, and they were sure that as long as they were in my company they would never die of starvation.

"I have never seen anything like it!" exclaimed the man X, who was the humorist of the party. "We want food and cannot get it, and there *el senhor* strolls a few yards away from us and a huge fish jumps almost into his arms in order to be eaten."

I never cared to let them know of my own surprise at the extraordinary occurrence.

I was rather pleased that day, because my men, in an outburst of friendliness, said they knew that if ever we did die of starvation it would not be my fault, because had they been careful we would still have had three or four months' supply of provisions left. They themselves said how foolish they had been; the provisions we carried had only lasted us thirty days. Nearly three weeks before I had warned Alcides to economize, and the result was that, instead of sorting out food twice a day to the men, he sorted it out four times a day and in double quantities.

[Illustration: Distant View showing Both Falls at the Salto Augusto.]

[Illustration: Launching the Canoe after its Journey over a Hill Range.]

That day we were really in great luck. We had the good fortune to find a *bacopari* tree simply laden with delicious yellow fruit, not unlike unripe cherries, and we absolutely feasted on them.

To show how unpractical my men were, it is sufficient to tell that, unlike any other human beings on the face of the globe when under a fruit-tree, they did not proceed to shake the cherries down by throwing sticks or by climbing up the tree. No, indeed; but they cut down the huge tree, which required about an hour and a half of very hard work. Anyhow, we got the cherries, and that was the principal thing.

We continued our journey over a small rapid with a low hill range spreading from west to east on the left bank. The river here was 300 m. wide. A hill range from 100 to 200 ft. high was also to be seen on the right bank, running parallel with that on the left. Five or six kilometres farther another high range of a gorgeous

cobalt-blue colour and extending from south-west to north-east, stood in front of us. The river in that stretch was most beautiful, and was 900 m. wide. A charming little island 300 m. long was reflected in the water, which looked as still as oil in that particular part, although it actually ran swiftly.

Although that scene was of great placidity, we believed there was more danger ahead of us, for we could hear in the distance the loud roar of another rapid or waterfall. Judging by the noise we knew it must be a big one. Soon afterwards we reached the rapid.

We had the greatest difficulty in approaching this, owing to the strong current we encountered in a small channel we followed near the right bank. The rapid was 400 m. wide and 400 m. long, with a drop of from 4 to 5 ft. Although we expected trouble at that spot, we shot the rapid with comparative ease, but we were badly knocked about, and shipped a considerable amount of water in the high waves thrown violently against the rocks. We camped that night near the rapid, having travelled in the day 26 kil. We made our camp in the forest, and we experienced stifling heat, the minimum temperature (August 9th) being 73° F., with heavy rain which came down upon us through the foliage in regular bucketfuls.

We had nothing to eat in the evening. In the morning our breakfast consisted of two sardines each. We went on in a half-hearted way, my men grumbling all the time, and looking out for birds or monkeys. Seven thousand five hundred metres from our camp we came to a waterfall, where we had endless trouble. The principal channel led to 50° b.m., but the river split up into innumerable channels among islands, islets and rocks that formed a regular maze. The river was in that particular spot 1,200 m. wide, and contained great masses of volcanic rock, much fissured, and having great holes in them. This mass of rock extended from north-east to south-west. There were large cracks, where the mass had split, and had subsequently been eroded by the rush of water. The rock had cutting edges everywhere like those of razors. With endless difficulty we had managed to drag the canoe along nearly to the bottom of that dangerous place, when we were suddenly confronted by a drop of 12 ft. with a terrific rush of water over it. It was impossible for us to negotiate that point, for below was a whirlpool absolutely impassable. We had therefore the tiresome work of dragging back the canoe for some 350 m. up the rapid once more, in order that we might find a more suitable channel. To make things more lively for us, a violent thunderstorm broke out, soaking all our baggage but making little difference to us, as we were soaked already. We had spent that entire day in the water, struggling to take the canoe down the rapid and up once more. By eight o'clock at night we were still working, endeavouring to save the canoe.

We had had no lunch, and now had no dinner. My men felt perfectly miserable, and in their speech did not exactly bless the day they had started with me on that expedition. We had worked hard, and had only covered a distance of 7,500 m. in twelve hours. At sunset, while the storm was raging, we beheld a most wonderful effect of light to the west, very much like a gorgeous aurora borealis. The sky, of intense vermilion, was streaked with beautiful radiations of the brightest lemon-yellow, which showed out vividly against the heavy black clouds directly above our heads. The river reflected the red tints, so that we appeared to be working in a river of blood.

As we had nothing to eat, I thought I would spend my time in taking the correct elevation of that place with the boiling-point thermometers. The man X, the humorist of the party, remarked that if I were killed and went to Heaven or some other place, the first thing I should do would be to take the exact elevation with what he called "the little boiling stove" (the hypsometrical apparatus).

We had a minimum temperature of 62° F. during the night of August 10th.

Next morning I sent my men to reconnoitre, in order to see if they could get some edible fruit. As they stayed away a long time I knew they had found something. In fact, they came back quite in a good humour, as they had found some *jacoba* or *jacuba* trees, with abundant fruit on them, most delicious to eat.



In the meantime I had gone exploring the rapids endeavouring to find a more suitable channel. Eventually, on the east side of the stream, I found a place where we could take the canoe down. There too was a fall of 9 ft., down which we let the canoe with considerable difficulty; then it had to pass over a number of smaller terraces and down winding channels, where we sweated for some hours before we got through our work. Innumerable channels separated by sand-mounds 20 to 30 ft. high had formed along that rapid and also through the vertical wall of cutting volcanic rock which formed a barrier across the stream. Below the fall were two long sand-banks, one with some *burity* palms upon it.

The river flowed 20° west of north for some 4,000 m. We had gone but 2,000 m. of that distance when we came to another rocky barrier, spreading from south-west to north-east, on approaching which we heard the thundering roaring of another rapid. On the left bank we had a hill range all along. The noise of the rapid got louder and louder, and we were soon confronted by a terrifying rush of water at a spot where three arms of the river met with such force that the clashing waters shot up in the air, forming a wave some 40 or 50 ft. high with a foaming crest. The backwash from this great wave was so violent against the rocky banks of the river--very narrow there--that it was quite impossible for the canoe, even empty, to be let down by means of ropes.

My men were in absolute despair, for the farther we went the more insurmountable became the obstacles which confronted us. They said they had agreed to go on a journey of exploration, but surely I was taking them direct to Hades--if we had not got there already. I could not well contradict them, for certainly that particular spot was the nearest possible approach to it.

It does not do ever to lose courage. While my men, in the lowest state of depression, sat on the volcanic rocks, I went about exploring on the right bank until I found a place where the river had eroded a channel but had afterwards filled it with an immense accumulation of rocks. If we could only move those rocks away--several hundreds of them--I saw that it would be possible to push the canoe along the channel which would thus be formed. The work would require a great deal of hard labour.

[Illustration: A Most Dangerous Rapid navigated by Author and his Men.]

You should have seen the faces of my men when I took them to the spot and asked them to remove all the big boulders. In order to set them a good example, I myself started moving the rocks about, the smaller ones for preference. We worked and worked hour after hour, jamming our fingers and feet all the time as we pushed the rocks to one side and the other of the little channel, only 4 ft. wide, which we were making. The language of my men was pretty enough, but as long as they worked I had to put up with it. Alcides, who was really a great worker, and whose principal fault was that he would never save himself, worked with tremendous vigour that day. Somehow or other the men seemed to think the work hard.

When we had taken the canoe safely to the end of the rapid through the channel we had cleared, I went back to the top of the rapid to gaze once more on the wonderful sight where the two principal channels met. The water dashed against a rock in the centre with most impressive fury.

On returning to the bottom of the rapid where I had left the canoe, another most impressive sight was to be seen. In the vertiginous waters emerging from the channel high waves--most unpleasant-looking and in the greatest confusion--clashed against one another for a distance of over 500 m. below the rapid.

My men would not camp that night near the rapid, which they said was the devil's home, so during the night we went 2 kil. down the stream, where, simply worn out, we made our camp. We never could get any fish from the stream now. We had gone only 6,000 m. that day. I reckoned that, travelling at that rate, I should perhaps reach my goal, Manaoas, in five or six years' time--and all the provisions I had left for seven men, all counted, were now eight tins of sardines.

We had a minimum temperature of 64° F. on the night of August 11th.

We had halted just above another big and beautiful waterfall, 20 ft. high, and of immense width. The great rush of water curled over a gigantic dome of volcanic rock with many big holes and fissures. The waterfall was followed by a ghastly rapid 500 m. long. It was impossible to go over the fall, and the only way left us--a most dangerous one--was to let the canoe down a small channel 50 to 80 m. wide, cut among the vertical rocks on the right side of the waterfall. The water in the channel flowed in steeply sloping cascades. The channel twisted round abruptly in two or three places, and in one spot went through a rocky neck 35 m. wide, where the force of the current was so great that I was really perplexed as to how we could take the canoe down without getting her smashed to atoms.

Providence came to my help again. In looking round I discovered an ancient channel, now almost dry and strewn with innumerable rocks, by which it might be possible to take the canoe overland until we could find a smooth place in the water below the rapid. On further exploring that channel, as I was quick enough in noticing its possibilities, I found at the end of it what the Brazilians call a *recanto*--that is to say, a backwater which the river had there formed, and which would be a great help to us in floating the canoe once more.

This plan involved a great deal of hard work, as not only had we to shift many large rocks out of their position, but we had to construct a railway with felled trees and rollers upon them. We could not get perfectly horizontal rails, so that the effort of moving the canoe along inch by inch with levers was trying, especially as we had had insufficient food for many days and our strength was fast failing.

To make matters worse, Alcides that day broke out in revolt. He had, like many ignorant people, the misfortune of believing that he knew everything better than anybody else. I had given him instructions to place the rails and rollers in a certain position, so that the canoe could be shifted over some unpleasant rocks. He, however, insisted on placing the rollers in the wrong place and on using the levers in the wrong spots, so that they not only did not act helpfully, but actually had the contrary effect on the canoe from that which we wanted to obtain. I remonstrated, and showed the men once more how to do it. They agreed with me, except Alcides, who became enraged to such an extent that his eyes bulged out of their orbits in his fury. He brandished one of the big levers in the air, and, shouting at the top of his voice, proceeded to give a long harangue stating that Araguay--his native town--produced greater men than England or any other country, and inciting the other men to open revolt against me.

This was a serious affair and most unexpected, as so far I had counted on Alcides to stand by me, no matter what happened. The other men were undecided. Although they were always ready to revolt, they had more confidence in the brain of an Englishman than in that of an Araguay man. Alcides suggested that they should take possession of the canoe and everything, and that I should be left on the rocks. He shouted to the men to take the canoe along, and he himself pushed with all his might, the canoe not budging the tenth part of an inch.

I sat down on a rock. I merely said that the canoe would not move until I wished it to move. This statement I made because I saw that in their stupidity they had placed some pieces of wood under the canoe which acted as wedges instead of rollers; one piece in particular--a roller which had split in two--could not possibly move along the rough wooden rails. The men pushed and worked with all their might for over three hours, the canoe remaining still like a solid rock. At last they came to me and asked me to show them how to move it. I placed the rollers where they would be effective, removing the wedges which were impeding her journey, and with very little effort the canoe moved along.

With wild yells of excitement the men proclaimed this a miracle, always excepting Alcides, who, with a fierce expression on his face, stood now on one side, fondling his rifle. The other men chaffed him, and even insulted him, saying that he had made them struggle for nothing, as he did not know what he was about. When the rails and the rollers were placed right the canoe slid along the distance which remained to be covered, and

eventually glided gracefully once more into the water.

[Illustration: Letting the Canoe jump a Rapid.]

It was too bad that Alcides--one of the bravest of men--should possess such a mean mind and such an ungrateful nature. Twice I had saved his life when he came within an ace of perishing in dangerous rapids, but never had he given thanks to me--never had he shown the slightest sign of recognition. Never, during the entire time he was in my employ, did he--or any of my other men--say "Good morning" to me when we rose, or "Good night" when we retired to sleep. Two or three nights before this last adventure, during a heavy rainstorm, I had deprived myself of my own tent in order to shelter him and the other men, while I myself got drenched.

"He only does it," said he, "because he needs to keep us alive to do the work, or else he would not do it."

I only received offensive words for any kindnesses I showered on him and the others.

It is seldom one could find a man with a more unpractical mind. He spent most of his energy working uselessly--and, mind you, very hard indeed--for nothing, but he could never be made to apply his strength in a sensible way. If I asked him to cut me a tooth-pick, he would proceed to cut down one of the largest trees in the neighbourhood and work for an hour or two until he had reduced a big section of it into the needed article. He wasted hours daily, and ruined all our axes and cutlery into the bargain, in scraping flat surfaces on rocks and on the hardest trees, on which he subsequently engraved his name and that of his lady-love whom he had left behind. He was really marvellous at calligraphy, and could certainly write the best hand of any man I have ever known.

He quarrelled all the time with all the other men, and to enforce his words was constantly producing his automatic pistol fully loaded or else his rifle.

When I first employed him I had the misfortune to send him on some messages to two or three people, with the result that those former friends became my bitterest enemies, as he had insulted them. He was one of the men who cannot open their mouths without offending. Wasteful to an incredible degree, his only ambition was to show how much he could spend--especially when he was spending other people's money--a most trying thing for me when we were, months before, near any shop. When you mentioned anything to him he immediately said that it was impossible to do it, no matter how simple the matter was. He spent hours looking at himself in a small pocket mirror he carried on his person, and would grumble for long hours over the stings of mosquitoes and gnats which had dared to spoil his features. He used violent language against the impudent rocks which had injured his feet.

His brutality to men and beasts alike was most hurtful to me. He once abandoned his favourite dog on an island, simply because he had kicked it viciously the day before and the dog would not respond to his calls and enter the canoe. He now proposed to kill the other dogs, as he said they had finished their work as watch-dogs, since we never came across any Indians, and it was no use taking them along.

**CHAPTER XV**

Mutiny and Threats--Wasted Efforts--Awful Waters--The Canoe escapes in a Violent Rapid--Another Mutiny--The Canoe recovered--An Appalling Vortex--The Fall of S. Simão--Cutting an Artificial Channel in the Rocks

BRAZILIANS of a low class are unfortunately easily led by words. Alcides, who could not get over his bad temper, once more incited the men to revolt. While I was busy taking altitude observations with the hypsometrical apparatus I kept my eye on them, as I saw plainly that I was coming in for trouble.

Unfortunately for us another bad part of the rapid had to be negotiated, and the only way possible was to take the canoe overland once more. With Alcides at their head, all the men were now in open rebellion, and absolutely refused to work.

"Very good," I said to them. "If you do not like to take the canoe along we shall stay here. I like this spot very much, as it is most picturesque."

The men filled the magazines of their rifles with cartridges, and then came threateningly toward me, shoving the muzzles right in my face.

"You must give us food," said they. "We want to eat, and we want to be taken back to our country."

I advised them to take a walk in the forest and see if they could shoot something there, for if they shot me, one fact was certain, and that was that they would never see their happy homes again.

Two of the men turned away in order to go after game, but the man X levelled his rifle at my head and demanded his money, as he wished to leave at once. The contract I had with him was different from that I had with the other men. I had agreed to pay him on reaching the nearest point of civilization, where I would let him loose again. I therefore said that I would most certainly pay him the very minute he had fulfilled his contract.

I paid no more attention to his threat, although I heard the click of the hammer of his rifle being cocked. I told him to get some wood to make a fire, as I wished to make myself a cup of chocolate.

In unpacking some of my instruments I had made a great discovery--a box of chocolate, which had strayed into a package by mistake.

X seemed undecided whether to shoot or not. I made no attempt to take the rifle out of his hand, as that would have been fatal. After a few moments he sat down on a rock a few yards away, his rifle resting on his knees and pointing in my direction, while I myself collected some small pieces of wood and proceeded to make the fire.

[Illustration: Artificial Canal made by Author and his Men in order to take their Canoe along where the river was Impassable.]

Filippe the negro, who had his eye on the box of chocolate, came and helped to blow the flame. We got some water and boiled it in a large tin cup. While we were doing that I heard rifles being fired in the forest, and presently Antonio returned with some fine *jacu* (*Penelope cristata*) he had shot.

The entire morning of August 12th was absolutely wasted, owing to the conduct of my men. Even after they had had a good meal, not a particle of which they offered me--not that I asked them for it--they were still in a riotous mood.

As was my habit when I had anything to eat, I always shared it in equal parts with them: when the chocolate was ready--notwithstanding their behaviour--I asked them for their cups, and each one received his share of that delicious beverage. As usual also, I sorted out that day the customary allowance of tobacco to each man, which I had been fortunate enough to save in our accidents.

When I offered the chocolate to Alcides, he handed his cup to Filippe to bring to me, and when it was handed back to him he flung it away saying he would prefer to die rather than drink the filthy English stuff.

Matters were a little critical. A great number of rollers were required and a number of wooden rails. Curiously enough, the man X, who had been the most violent that day, was the only one who came to thank me for the chocolate, and offered to work, the others all refusing to move.

He and I cut down three or four trees, when the other men--ashamed of themselves--took the axes and proceeded to work also. But instead of cutting down trees which were straight they cut down the knottiest trees they could find, and made rollers which were absolutely useless. It was their silly way of wasting the little energy they had left. The result was that they had to do the work over again and cut other trees and other rollers.

Eventually we succeeded in pushing the canoe over the rocks until we were some 20 m. from the water again. With some effort we succeeded in shoving her along 18 m. out of those 20 m. There only remained the last 2 m.--unfortunately uphill, which made our effort a little greater. Here the men again stopped work and refused to give that last push to get the canoe over those rocks and then into the water. Once more they said they would shoot me and then proceed through the forest on foot.

Matters looked bad indeed. Those 2 m., with a sharp angle upward, made an insurmountable obstacle which I could not negotiate alone. With the corner of my eye I saw the rifles of my men levelled at me. There was only one way out of that difficulty--to give my men a little excitement.

"Very good!" I said to them. "If we have not the strength to move the canoe over those rocks, we certainly have the courage to shoot the rapid." I said I had never yet known a Brazilian who failed when it came to courage, and I was sure they would not fail, as I had already seen how brave they had been.

Flattery always answers.

"Come along, boys! We will take the canoe back into the rapid."

In a moment they had deposited their rifles on the rocks and they were all helping me to push the canoe back the way we had come.

The rapid in that particular part was devilish--not unlike the narrow channel we had gone through some time before. The passage, with high rocks on either side, was tortuous, and threw the water with great force from one side to the other, producing high waves in the centre in such confusion that it was quite terrifying to look at them.

When my men looked at those awful waters, they suggested that perhaps we had better let the canoe down with ropes. I had quite made up my mind that we should lose the canoe for certain in that spot; and had we gone down in her ourselves we should undoubtedly have lost our lives as well.

When we started taking her down with ropes--our ropes were all rotted by that time, and had no strength whatever--the canoe was tossed about in a merciless manner. I recommended my men as they ran along to beware of the ropes catching on the cutting edges of the high rocks. No sooner had the canoe started down the swift current than one of the ropes at once caught on a rock and snapped. The men who held the other rope

were unable to hold it, and let it go. I saw the canoe give three or four leaps in the centre of the channel and then disappear altogether. That was a sad moment for me. But as my eye roamed along the foaming waters, what was my surprise when I saw the canoe shoot out of the water in a vertical position at the end of the rapid and waterfall! That was the greatest piece of luck I had on that journey. By being flung out of the water with such force she naturally emptied herself of all the water she contained, and I next saw her floating, going round and round the whirlpool at the bottom of the rapid.

The next problem was how to recover the canoe, as she happened to be on the opposite side of the stream. There for more than two hours we watched her going round and round, while we sat on the rocks, absolutely speechless. Eventually we saw her gradually come out of the whirlpool and drift slowly in the *recanto* or backwater on the opposite shore some 400 m. away, revolving slowly around herself.

My men were perplexed. They now said they would all leave me at once and proceed on foot. Under no circumstances whatever would they accompany me any more. They must have their pay and go.

So after a few minutes I paid the salaries of all the men, excepting the man X. To my surprise the men, instead of going, remained seated a little way off.

I had a plan in my head of swimming across the river below the whirlpool, where the water was placid although of great width, but I could not very well place myself in such an awkward position as to leave on the river bank the large sums of money which I carried on my person. I certainly could not swim across such a long distance, and in such a current, with the heavy bags of coin and banknotes round my waist. I feared--in fact, felt certain--that in the mood in which my men were that day, the moment I entered the water and was quite helpless they would fire at me and get away with everything I possessed. I knew that they would never dare to do it unless they could catch me in a helpless condition.

[Illustration: Rapid through which Author took his Canoe.]

I called Antonio--who was an excellent swimmer--and said that I offered a reward of £10 to any men who swam across and recovered the canoe. Antonio reflected deeply for some time, then consented to go if another man went with him. For nearly an hour he confabulated with Filippe the white man, who was also a splendid swimmer. It was with some relief that I saw the two eventually enter the water, after a paddle had been tied with long strings round each of their waists in order that they might be able to bring the canoe back.

At the point where they started the river was 200 m. wide. Although seemingly placid the current was strong. They drifted down some 300 m.--I with my telescope keeping a sharp watch on the canoe, which was still going round and round, and was now once more almost entirely filled with water. No sooner had the men, quite exhausted, reached the opposite bank than the canoe, which had been in that spot for some hours, for some reason or other started out and proceeded to float down stream in the very centre of the river. Filippe the negro and I at once started on a chase on our side of the water, in case she came near enough to seize her. I shouted and signalled to the men on the opposite bank to swim across once more to try and catch her in mid-stream.

As luck would have it, after a chase of several kilometres, over cutting rocks and great banks of sand in which we sank up to our knees--while the naked men with their paddles ran as fast as they could on the opposite bank--the canoe drifted close to the other bank once more, and the men were able to board her. It was a great relief to me when at last the canoe was brought over to our side and we towed her back so as to get the baggage on board and proceed on our journey.

Each of the two men who had rescued the canoe at once received the reward I had offered, and Filippe the negro, who had shown willingness in recovering the boat, also received a handsome present.

The entire day of August 12th had been spent in going those few hundred metres of the rapid. Our camp that evening was but 400 m. from that of the day before.

The minimum temperature of August 12th had been 70° F., whereas during the night of August 13th it was 62° F.

That little adventure had pulled the men together somewhat. I spoke in great praise of the courage that Antonio and Filippe had shown in swimming across the stream.

The river was smooth for a little distance, when we proceeded once more with our navigation; but soon it became narrow--only 40 to 50 m. wide--with strong eddies in its deep channel between rocky sides. Some magnificent sand beaches 15 to 20 ft. high were observed, particularly on the right bank, not far from a tributary 3 m. wide which entered the main river on the left side. Lower down, the river described a sharp turn, and there we met another most dangerous rapid. It was entered by a passage 50 m. wide, after which a circular basin of rock--evidently an ancient crater--100 m. in diameter appeared; then the water flowed out with terrific force by a channel only 30 m. wide. The stream produced prodigious eddies in the circular basin. Waves of great height were dashed to and fro from one side to the other of the narrow channel, between high rocks on either side. The water flowed first in a direction E.S.E. for 500 m., then turned off suddenly to due east for a distance of 400 m. That spot was most difficult for us to go through.

Soon after, the river turned due north and broadened to a width of 120 m. for some 4,000 m. A great basin was crossed, with submerged rocks, forming counter currents of great power and most unpleasant whirlpools. I observed with some concern a stupendous vortex 30 m. in diameter and with a deep central depression. The water revolved with such velocity and force that it formed a series of high-crested white waves running one after another at a terrifying speed around its periphery. The water was raised around the vortex certainly 10 or 12 ft. above the level of the river--owing to the opposition between the rotating water and the current. We gave that vortex as wide a berth as we could; it really frightened one to be near it, although there was no particular danger unless we got right into it.

A charming island was passed soon after, on which, as well as on the left bank, were innumerable rubber trees, but there were none on the right, where *chapada* was to be seen.

We had in front of us a hill range 300 ft. high. As we went farther we were in a channel between high rocks strewn about along both banks in fragments of great size; then we were once again in a circular basin with high vertical rocks--perhaps another extinct crater. We were here in a region of volcanic formation. No sooner had we passed this basin than we came upon another bad rapid, 400 m. long, which divided itself into two channels, after going through a narrow passage not more than 30 m. wide, where we got tossed about in a most alarming manner, being once or twice nearly dashed to pieces against the rocky sides. We had had so much trouble with the rapids that day that by sunset we had only gone 19 kil. 600 m. Since we had come to that volcanic region we had found rocks with great holes in which stagnant water lay. Myriads of insects--regular clouds of them--worried us nearly to death.

[Illustration: Conveying the Canoe by Hand down a Rapid.]

On August 14th we started early, the minimum temperature having been 70° F. during the night. After leaving the rapid we came to a great basin 1,000 m. across. A most beautiful sand beach 300 m. long was to be seen on the left side, below a vertical cliff of great beauty, 200 ft. high. Another great sand beach was to be seen on the right of the river, where it described a sharp turn to 30° b.m. Then the river dashed through a passage of rocks only 80 m. broad, and emerged once more into another great basin with many indentations in its rocky coast.

Some 6 kil. beyond, another basin was found, with more rocks strewn on and near its eastern bank, and a

number of rocky islets. A high hill range with vertical cliffs stood on the west side and ended abruptly at the end of the basin. Low hills ran all along the river on the left side.

The river had an average width here of 250 m., and flowed mostly in directions between north-west and north-east.

We went down all the time on troubled waters, with rocky banks and innumerable obstacles all the way. We went through another terrible and most intricate rapid--the Labyrinth--and passed through a channel only 40 m. wide between high rocky banks. Then, after that, for 9,500 m. we had fair and smooth navigation, with a range of flat-topped hills 300 ft. high, extending from W.S.W. to E.N.E., in front of us to the north-west. Here there was a regular maze of channels, all more or less bad. We did not follow the principal one, which was strewn with rocks, but a smaller one, at the end of which, unfortunately, we found a barrier of rocks which we could not surmount. We had all the trouble of dragging the canoe back up the rapid until we could turn her round into another channel.

We arrived at the waterfall of S. Simão, where we went through numerous channels, following the right bank as much as we could, until we arrived at a gigantic staircase of rock, down which the water divided itself into little channels. We took all the baggage over the rocks on the right bank--a very heavy task, as we had to climb up and down big boulders with sharp edges. We slipped many times with the loads we were carrying, and many, indeed, were the patches of skin we left behind in that particular place. We had a great deal of trouble in finding a place where we could take the canoe down. Eventually we had to go right across the stream over the waterfall and land on an island of rock in the centre of the river, where I had seen with my telescope that we might perhaps find a suitable passage for the canoe.

Crossing the river diagonally just above the fall was risky work, and although we described a big arc up the stream, we only just managed to make the island before we were borne down by the current.

The horseshoe-shaped waterfall was about 300 m. across and some 30 ft. high. When the river is full it must be beautiful, for the east side, which was then absolutely dry, is covered entirely by water, which must form a wonderful series of cascades. When the river is in flood, the waterfall, extending from north-west to south-east, has a total width of 1,000 m. There were some picturesque bits of rugged foliated rock over that great staircase, and huge cracks through which the water gurgled and foamed--those fissures formed not by the erosion of water but by volcanic action, perhaps by an earthquake. The large fall to the north-west, over which the water flows in every season, had on one side of it a steep incline, down which we took the canoe until we came to a drop about 15 ft. high.

We halted for the night just above that high drop, spending a most miserable night, being simply devoured by insects. The minimum temperature during the night of August 15th was 72° F.

My men were in a beastly temper in the morning, when we had to proceed, as on previous occasions, to make an artificial channel by moving innumerable boulders of all sizes. It was a heavy task, for we hardly had any strength left, our meals having been most irregular of late.

A channel was not so easily made in that particular spot, as there were some boulders which we could not possibly move, and the canoe must be made to go over them.

We had only been working for a few minutes, when again there was a riot among my men; again they took to their rifles and said they would leave me and the canoe there. Worse luck, the canoe got stuck hard on a rock, and the men could not move her. I cut down some rollers and some levers of the hardest woods I could find in the forest near there, and when once I had set to work a little more intelligently than they did, I had no difficulty in moving the canoe along. Eventually, with my men swearing at me the whole time, the canoe was safely at the foot of the waterfall.



We were in great luck that day, for we found plenty of wild fruit--very nutritious--and we killed one or two large birds. My men grumbled all the time, saying that they were dying of starvation, no meal being a meal at all in Brazil unless accompanied by a small mountain of *feijão* (black beans). I had a few boxes of sardines left, but I reserved those for extreme occasions which might yet come.

At the bottom of the fall was an immense basin, 1,200 m. wide and 3,000 m. long from north to south. The temperature was stifling that day--96° F. in the shade, and the sky overladen with clouds.

Fourteen kilometres by river below the S. Simão came another waterfall, that of All Saints.

Observations with the hypsometrical apparatus gave an elevation of 772 ft. above the level of the sea.

We halted above the rapid on a beautiful beach. A curious thing happened. Antonio in jumping into the water out of the canoe felt something sharp under his foot. In looking down he saw a magnificent sword. On taking it out of the water we found that it was an old sword of the time of the Emperor Pedro II. A fight must have taken place there between a Brazilian expedition and the Mundurucu Indians, who at that time were to be found, I believe, in that region. Presumably the expedition had been attacked at that spot while trying to land. The sword was in excellent preservation.

[Illustration: Canoe being taken along an Artificial Canal made by Author and his Men.]

**CHAPTER XVI**

At Death's Door--Mundurucu Indians--All Author's Followers poisoned by Wild Fruit--Anxious Moments--Seringueiros--A Dying Jewish Trader--The Mori Brothers--A New Hat--Where the Tres Barras meets the Arinos-Juruena--The Canoe abandoned

WE had a minimum temperature on the night of August 15th of 70° F.

We descended the All Saints rapid and fall, 150 m. in length, with no great difficulty, although with a certain amount of hard work.

A large basin was below it, in the eastern part of which was a charming island. Innumerable rubber trees (*Siphonia elastica*) were to be seen in that region. We found the south-east passage the best in descending that rapid; but, although comparatively easy, we had to use the greatest care, as my canoe was by now falling to pieces, and a hard knock against a rock would be fatal.

At the eastern end of the basin was a narrow channel between high rocks, where the current was extremely strong. A cluster of high vertical columnar rocks was seen. The three channels into which the river had been divided joined again in that basin, and were forced through a passage between high vertical rocky walls not more than 35 m. apart.

The water naturally was much troubled in being forced from different sides through that narrow passage, and I knew that there must be danger. We pulled up the canoe along some rocks 50 or 60 m. from the entrance of the channel, and I instructed two men to land and go and explore, to see what was in the channel. The top rocks in that particular spot formed innumerable little points, quite sharp, and it was painful to walk on them with bare feet.

Antonio and white Filippe, who had been instructed to go and reconnoitre, went a short distance away, where they sat themselves down behind some rocks, comfortably smoking cigarettes. After twenty minutes or so they returned and said they had gone all along the channel, and there was absolutely smooth water and no danger whatever. I was not well satisfied with their answer, but they swore they had inspected the channel thoroughly, and there was no danger. So I ordered them to enter the boat once more, and we started off.

No sooner had we turned the corner round the high rocky cliffs and entered the narrow gorge than we were confronted by a huge central wave some 40 ft. high in the channel. It was formed by the clashing waters, coming from three different directions, meeting at that spot and trying to push through simultaneously. Before we knew where we were the canoe actually flew up in the air, in an almost vertical position, to the top of that enormous wave.

[Illustration: A Moment of Suspense.

Author and his men in their canoe going through a narrow channel between vertical walls of rock. The water forced through from three large arms of the river joining at that point formed a high and dangerous central wave.]

Baggage, men, and dogs slid down in confusion, the canoe gliding back into the water and progressing as swift as an arrow down the channel. The next moment we were on the point of being dashed against the high rocky cliff on our right. To my amazement, and just as I was expecting the impact, the canoe only gracefully shaved the rock, the backwash which took place along the rocks shifting us once more toward the middle of the stream.

Once again the great rush of water shot us up in the air, above the central wave, and this time the canoe bucked and rode down on the other side of that foaming mass of water.

My men were terrified. "Rema! rema! (Row! row!) for Heaven's sake!" I shouted to the perplexed men, as I tried to instil into them a little courage, when within me I really thought we were lost. As I shouted those words I saw to my horror two of the paddles washed away, and as I quickly measured with my eye the length of the channel I perceived that we still had some 200 m. more of that kind of navigation before we should shoot out of that dangerous place.

Up and down we went several times on that high central wave; several times did we again shave the rocks on either side of the narrow channel. We were quite helpless, my men in chorus yelling "We are lost! we are lost!"

Alcides bravely stuck to the helm for some time, but the force of the water was so great that he was knocked down into the canoe and had to let go. When we reached the point where the narrow passage came to an end, the waters looked so diabolical that when my men shouted "We are lost! we are lost!" I could not help saying "Yes, we are!"

I held on to the canoe desperately, as we were banged about for a few seconds in a way that nearly stunned us, the waves striking me in the face with such force that it took me some moments to recover. When I did I found that we were already out of the channel and in the whirlpool, the canoe full of water but fortunately saved.

I lose most things in the world, but I never lose my patience nor my sense of humour. I could not help laughing when I looked at the expression on the faces of my dogs--an expression of terror and astonishment, as they looked first at the place from which we had emerged and then at me, which I am sure would have meant in words: "Good gracious! where in the world are you taking us?"

We had to halt as soon as convenient in order to cut some new paddles. It took my men some hours to recover from the effects of that experience.

As is generally the case after a violent emotion, a great deal of merriment was produced, my men for the rest of the day talking about the incident and reproducing in a realistic way the sounds of the rushing water and the impact of the waves against the canoe.

We found after that a great basin 3,000 m. long, 1,300 m. broad, from west to east, with a lovely sand beach 1,000 m. long on its eastern side.

[Illustration: Conveying the Canoe through the Forest.

(Notice the side of the canoe split and stuffed with pieces of cloth.)]

At last--after all that time without meeting a soul--I came across a small tribe of Mundurucus--six of them all counted. They had their *aldeja*, or village, on the right side of the stream. Their chief rejoiced in the name of João. They were tiny little fellows, the tallest only 5 ft. in height. If you had met them anywhere else than in Central Brazil you would have mistaken them for Japanese, so exactly like them were they in appearance. Their faces were of a very dark yellow, almost black, with perfectly straight hair, just like the Japanese or their near cousins, the Tagalos of the Philippine Islands.

The Mundurucus were mild and gentle, soft-spoken and shy. They had all adopted Brazilian clothes. The hut of the chief was extremely clean and neat inside, the few utensils that were visible being kept in a tidy manner.

João spoke a little Portuguese. From him I was able to buy a quantity of *farinha*, which came in useful to us, although I had to pay an exorbitant price for it--£4 sterling for each 50 litres or thereabouts--that is to say, about 5½ pecks in English measure. The price of *farinha* on the coast would be less than four shillings for that quantity.

What interested me most among the Mundurucus was their strange ornamentations. The angular pattern was a great favourite with them, especially angles side by side, and the cross--which I think had been suggested, however, by their contact with Catholic missionaries farther down the river.

The rudimentary figures which they carved--merely lines for the body, legs and arms, and a dot for the head--were extraordinary because they represented the body and limbs covered with hair, done simply by minor parallel lines. I asked the Mundurucus why they represented human beings with hair, whereas they themselves were hairless on the body and face. They said it was because in ancient times all the people were hairy like monkeys.

I was strongly impressed by the difference in type between those Indians and the Bororos, and also by the great difference in their language. When later on I came in contact with the Apiacars, another tribe of Indians living on the Tapajoz River, and closely allied to the Mundurucus, I discovered that their language bore a certain resemblance, curiously enough, to that of the Maya Indians of Yucatan in Central America.

I had been so busy taking notes of all I had seen in the *aldeja*, that when we started once more down the river I did not at first miss my best dog, Negrino, of whom I had got very fond. We had gone some 4 or 5 kil. down the river when I discovered that my men had given it away to the Indians while I was occupied studying the geological formation of that part of the country. It was impossible to go back all those kilometres against the current to recover the poor dog. Although it gave me a great deal of pain I never for one moment let the men see it, as I knew that it was in order to hurt me that they had disposed of Negrino.

It is never right or useful to take revenge, for if you wait long enough you are always avenged by Providence. That afternoon my men saw some wild chestnuts on a tree, and they insisted on landing to pick them. They knocked down the tree, as usual, to get the chestnuts, although it was fully 3 ft. in diameter. They picked a great many of the wild chestnuts and proceeded to eat them--Alcides, much to my amazement, actually offering me one. I asked them if they knew what they were eating, as I quickly observed when the tree fell down that not a single chestnut had been touched by birds or monkeys.

I have always noticed in equatorial countries that if you never touch fruit that monkeys do not eat you will seldom get poisoned. My men said that they had never seen the fruit before, but as it looked pretty they were going to eat it, and a lot of it. So they stopped some time cracking the nuts and eating them with great delight.

When we got back to the canoe we had only gone a short distance when Filippe the negro was seized with violent pains in his inside. His eyes had become sunken, his lips were quivering, and in a moment he was seized with cramps all over the body--so much so that he collapsed.

We had to halt on a small island of rock, where we took Filippe out and I had him laid flat on his chest, he being just like a corpse. I inserted a leather strap into his throat in order to cause immediate vomiting, then I unpacked some of the castor oil which still remained in my possession--we never seemed to lose the beastly stuff--and gave him a dose powerful enough to kill an ox.

The other men were laughing all the time, saying that they felt no pain at all; but their boast did not last long, for a few moments later, while I was watching poor Filippe, Antonio and the man X threw themselves down on the rocks, rolling over and contorting themselves, evidently in most excruciating pain.

The same treatment was applied to them in turn, and I watched with great concern three men out of the six

spread out helpless, and in such a dreadful condition that I really doubted whether they would be alive in another hour. I considered myself fortunate that the other three had not been poisoned.

Half an hour later--it was impossible to move on with the three men lying helpless on the rocks--Filippe the white man and Benedicto also collapsed. Again the same treatment once more.

Alcides looked at the other men with an air of contempt and said: "They are rotten fellows! They cannot eat anything without getting poisoned. I feel no pain at all; the fruit has done me no harm."

When I turned round to look at his face it had turned a lemon-yellow colour, which I did not quite like, but I did not mention the fact to him, and went about from one dejected man to another to try and bring them back to life again.

Filippe the negro opened his eyes for a moment. "I am dying!" he said. "Good-bye, sir! Please give all my money to my sweetheart in Araguay."

I noted her name and address in my book, for I really thought Filippe was about to expire.

The moans and groans all round me were most funereal, and the odour unbearable, the nuts having formed a chemical combination in their insides which made their breath most offensive. The heat in the sun was oppressive on those volcanic rocks. My bare feet were absolutely scorched as I walked on them.

Not many minutes later Alcides was rolling himself upon the rocks in intense pain. When I rushed to him to apply my favourite method he rebelled, refusing the treatment.

"Very good," I said to him; "will you live or will you die?"

[Illustration: Leading the Empty Canoe down a Dangerous Channel.

(Photographed a few seconds before the rope snapped and canoe escaped.)]

"I prefer to die," said he, and proceeded to moan and groan, and also to dictate the name and address of his sweetheart in Araguay for me to pay to her the money which belonged to him.

In a way I was sorry to see my men suffering so much. I was already thinking of how I could get out of that difficult dilemma. If they had all died it would have been out of the question for me to work the huge canoe alone going down such dangerous rapids.

Some four hours were spent in deepest reflection, a little distance off from my men. I had done my best, and I could do no more for them. I returned every little while to see how they were progressing, but for the first three hours they were in so pitiful a condition that I really thought they could not possibly recover.

When Alcides was almost unconscious I applied to him also the remedy I had used for the other men.

It was only after some five hours or so that Filippe the negro began to feel a little better. Gradually one after another the men, half-dazed, were able to get up, swaying about as if badly intoxicated. They said they saw all the things in front of them moving up and down. Evidently the poison had affected their vision and also their hearing, as they said they could only hear me faintly when I spoke to them.

Late in the evening I persuaded them to get once more into the canoe, as it was not possible to camp on those rocks. We floated down--fortunately for us the river was placid for some 15 kil., and we let the current do most of the work--I steering while all my men lay flat in the bottom of the canoe. We passed along two or

three beautiful islands with quantities of rubber upon them.

My men felt very bad the entire night, but by the next morning they were a little better, although in a most exhausted condition. We had a minimum temperature of 72° F. during the night of August 17th.

We had some luck that evening, for we came to the hut of a *seringueiro*, a negro, and his wife, who had cut down a portion of the forest near their hut and cultivated some *mandioca*. Their amazement at seeing us appear was curious to watch, especially when they looked at our canoe--held together with pieces of rope and stopped up with pieces of our garments.

Those poor people, stranded there without a possibility of getting away, were extremely kind. My men heard with delight that we should find no rapids of great importance from that point down stream, and that we might find a few other *seringueiros* on our way.

I was able to buy from the *seringueiro* a quantity of food, my men being overjoyed at the prospect of eating *feijão* again with their meals. Naturally the expense of taking food so far up the river was very great, and I was glad indeed to pay the exorbitant price which the *seringueiro* asked of £10 sterling for each 50 kilos of *farinha*; *feijão* at 6s. a pound; sugar at 5s. a pound--the prices which the *seringueiros* themselves had to pay for those commodities from the rare trading boats which once a year reached that farthestmost point.

We started down stream once more, passing a tributary stream, 5 m. wide, on the left bank. We had only gone 9 kil. when to our great joy we met two trading-boats owned by a Brazilian Jew, who was on board in a critical condition from malarial fever. Although in a dying state, he had not lost his racial commercial ability. It was most interesting to watch his expiring countenance while trying to strike the best bargain possible. He sold me sixty candles for 60s., eight biscuits for the equivalent of 7s. 6d., and a quantity of dried meat at 5s. a pound.

He looked askance at us, as he could not make out who we were, what we were doing up that river, where we could have come from. At last he signed to me that he had something to whisper in my ear. He asked me if I was a runaway cashier from a bank! I told him that if I had been a runaway cashier I would certainly not come and spend my money on the Arinos-Juruena River.

The sight of human beings again--if that term could be applied indiscriminately to all we had met so far--had greatly excited my men.

Some 13 kil. farther, the river being smooth but swift, we came to a basin 700 m. broad, where the river described a turn toward the north-east. We came upon a large clearing on the hill-side on the left bank. There we saw the remains of two or three huts which had been destroyed by fire. We perceived one or two people, and we landed. We found that it was the shed of an enterprising Peruvian trader who had established himself there in order to collect rubber. Only a few days before we arrived a great fire had taken place, which had destroyed nearly all he possessed; but--fortunately for us--they had saved a few things, and I was able to purchase a quantity of rice, biscuits, dried meat, beans, *farinha*, condensed milk, *banho* (liquid lard in tins), and a number of other things, such as clothes, shirts, rope, nails, axes, etc., which we needed badly.

The Peruvian trader--of the Brothers Mori's firm--must have had a handsome store indeed at that place, a quantity of jewellery, rifles, pistols, etc., all badly injured by the fire, being seen strewn on the ground as we walked about.

The Peruvians are wonderful traders, most remarkable people for exploring unknown regions and carrying on commerce to the most distant points where human beings are found. That particular Peruvian firm had foreseen that that region will some day develop to a great extent, and they had therefore established their store at the most distant point where it was possible to navigate the river without extraordinary dangers.

The prices charged by the Peruvian, even when circumstances might have led him to put a high price on the goods he sold me, were far lower than those of the Jew in his dying moments.

The river was there 1,000 m. wide, and of amazing beauty, flowing to 30° b.m. N.N.E. for 5,000 m. in a direct line.

We had gone 30 kil. that day, and we had had so many things happen to us, we felt so rich and happy with our new purchases and with the prospect that our trials were nearly over, that when night came we had a grand meal, and slept soundly notwithstanding the swarms of mosquitoes which buzzed around us.

[Illustration: The S. Simão Waterfall.]

During the night of August 18th the minimum temperature was 71° F. During the day the temperature of the air was not much warmer--only 78° F. in the shade with a nice breeze, while 113° F. were registered in the sun.

We halted for one day in order to repair the canoe, as it was all we could do to keep her afloat, she was leaking so badly. Poor Benedicto, who had spent the last few weeks baling out the water, swore that the moment he could leave the expedition he certainly would, since he felt he should turn into a fish soon, as he had not been dry one second for the last two months.

The minimum temperature during the night of August 19th was 72° F.

When we proceeded down the river we came upon most beautiful sand beaches, one as much as 500 m. long. Quantities of most delicious tortoise eggs were to be found. Furthermore, we killed some giant tortoises. Altogether we felt that all of a sudden we had dropped from a regular inferno into a heaven on earth.

My men were paddling away with great vigour and were making rapid progress, the river flowing almost all the time northward, with deviations of a few degrees toward the east, in stretches from 2,000 to 6,000 m. in length. We crossed an immense basin 1,500 m. broad with most gorgeous sand beaches. Their formation in small dunes, occasionally with an edge like the teeth of a double comb, was most interesting. Once or twice we came to musical sands such as we had found before. Everywhere on those beaches I noticed the wonderful miniature sand plants, of which I made a complete collection.

As we went down we came to one or two *seringueiros'* huts, and to a store belonging to our friend the dying Jew, who rejoiced in the name of Moses. As he had taken all the stuff with him in the trading boat in order to exchange it for rubber from the collectors, he had left nothing in the store except a cheap straw hat.

As my hat by that time had lost most of its brim, and the top of it had got loose and was moving up and down in the breeze, I thought I would not lose the opportunity of getting new headgear. So the purchase was made there and then, and thus fashionably attired I started once more down stream.

We passed on the way most impressive sand banks and beaches--500, 700, and one 1,500 m. long. The river in some spots was 1,000 m. wide. A great island 4,000 m. in length--Bertino Miranda Island--was then passed, with a beautiful spit of sand 15 ft. high at its southern end. Hillocks were visible first on the left bank, then on the right. Other elongated sand accumulations of great length were found beyond the big island, one a huge tail of sand extending towards the north for 1,000 m. Beyond those accumulations the river was not less than 1500 m. across, and there an immense beach of really extraordinary beauty ran on the right side for a length of 1½ kil.

On that beach we halted for lunch. In the afternoon we continued, between banks on either side of alluvial formation, principally silts and clay, light grey in colour or white. In fact, the soil in the section directly below

the higher terrace of the great central plateau of Matto Grosso, was formed by extensive alluvial accumulations which had made an immense terrace extending right across all Central Brazil from west to east, roughly speaking from the Madeira River to the Araguaya and beyond.

After we had gone some 5 kil. in a straight line from our camp to 10° b.m., we perceived a headland with a hill upon it 200 ft. high. We had been greatly troubled in the afternoon for the last two days by heavy showers of rain and gusts of a north-westerly wind. Once or twice we got entangled in channels among the many islands, and had to retrace our course, but we went on until late in the evening, my men believing firmly that we had now reached civilization again and that the journey would be over in a few days. I did not care to disillusion them.

Late at night we camped on a magnificent beach, 1,000 m. long, at the end of Araujo Island, 1,200 m. in length.

We had gone that day, August 19th, 46 kil. 500 m.

My men hung their hammocks on the edge of the forest. That camp was extremely damp and unhealthy. When we woke up the next morning all my followers were attacked by fever and were shivering with cold.

We left at 7.30 a.m. under a limpid sky of gorgeous cobalt blue. We passed two islands--one 700 m. long (Leda Island), the other 2,000 m. (Leander Island). When we had gone but 11,500 m. we arrived at one of the most beautiful bits of river scenery I have ever gazed upon--the spot where the immense S. Manoel River or Tres Barras or Paranatinga met the Arinos-Juruena. The latter river at that spot described a sharp turn from 20° b.m. to 320° b.m. We perceived a range of hills before us to the north. Close to the bank gradually appeared a large shed with a clearing near it on a high headland some 200 ft. above the level of the river where the stream turned. On the left bank, before we arrived at the meeting-place of those two giant streams, we found a tributary, the Bararati, 30 m. broad.

The S. Manoel River showed in its centre an elongated island stretching in an E.N.E. direction. Where the Arinos-Juruena met the S. Manoel it was 1,000 m. wide, the S. Manoel being 800 m. wide at the point of junction.

No sooner had we turned to 320° b.m. than we perceived on our left the *collectoria* of S. Manoel, with two or three neat buildings. Several astonished people rushed down to the water as they saw the canoe approaching. When I landed the Brazilian official in charge of that place and his assistants embraced me tenderly and took me inside their house. When I told them how we had come down the river, tears streamed down their cheeks, so horrified were they.

"Did you come in that log of wood?" said the collector, pointing to my canoe. I said I had. "Good gracious me!" he exclaimed. "I will not let you go another yard in that dangerous conveyance. I will confiscate it, as I need a trough for my pigs and it will just do for that purpose, and not for navigating a dangerous river like this. If you want to go on by river I will supply you with a good boat."

[Illustration: The Huge Canoe being taken through a Small Artificial Canal made in the Rocks by the Author and his Men.]

That was the last time I put my foot inside my canoe. I removed for good the British flag which had flown daily at her stern, and it gave me quite a *serrement de coeur* when I patted the poor canoe on her nose and said good-bye to her for ever. Notwithstanding her miserable appearance she had done really remarkable work.



## CHAPTER XVII

A Fiscal Agency--Former Atrocities--The Apiacar Indians--Plentiful Rubber--Unexploited Regions--Precious Fossils thrown away by Author's Followers--A Terrific Storm--Author's Canoe dashed to Pieces--The Mount S. Benedicto

THE State of Matto Grosso had recently established a fiscal agency at the junction of the two rivers in order to collect the tax on the rubber exported from that region. The Fiscal Agent, Mr. José Sotero Barretto, and his assistant, Mr. Julio Vieira Nery, were intelligent and polished gentlemen. Their predecessor was not like them. His barbarity, not only to the Apiacar Indians but also to the Brazilians in his employ, was almost incredible. For no reason whatever he killed men right and left, until one day as he was getting out of his canoe one of his men shot him in the back.

So much has been said of late of atrocities in the Putumayo Region that perhaps one may be allowed to say that the Putumayo Region is not the only place where atrocities have occurred. To any one not acquainted with those regions it is difficult to understand why those atrocities take place at all. Curiously enough, they are due to a large extent to medicine. Those regions are all extremely malarial. The people who are ordered there are afraid of being infected long before they start on their journey. They begin taking preventive quinine and arsenic, which renders them most irritable and ill-tempered; the solitude preys upon them, and they add to the poisoning from medicine the evil effects of excessive drinking. Add again to this that few men can manage to be brave for a long period of time, and that the brain gradually becomes unbalanced, and you have the reason why murders are committed wholesale in a stupid effort chiefly to preserve oneself.

The Apiacar Indians, I was told, were formerly much more numerous in that region than at present. Most of them had been killed off, and their women stolen. When Mr. Barretto arrived at the *colectoría* he had great trouble in persuading the Indians to come near him; but he has been so extremely kind to them that now the entire tribe--some twenty people--have established themselves at the *colectoría* itself, where they are given work to do as police, rubber collectors, and agriculturists combined. Mr. Barretto and his assistant were much respected and loved by the natives. Unlike his predecessor, he treated them with the greatest consideration and generosity.

Mr. Barretto furnished me with an interesting table showing the amount of production and export of rubber from that district for the year 1910. From this table it appears that from May 3rd to December 31st 30,356 kil. of the finest quality rubber, 10,153 kil. of *sernamby* (or scrap rubber), 4,858 kil. of *caoutchouc*, and 30,655 kil. of *sernamby caoutchouc*--altogether a total of 76,022 kil.--passed through the *colectoría* on the Matto Grosso side, which does not include the opposite side of the river, belonging to the Province of Para, where another *colectoría* has been established. That quantity of rubber had been collected by some eighty people, all told, including the local Indians.

[Illustration: Mundurucu Indians.]

[Illustration: Mundurucu Indians.]

It was impossible to get labour up that river. The few *seringueiros*, chiefly negroes who were there in absolute slavery, had been led and established by their masters up the river, with no chance of getting away. Their masters came, of course, every year to bring down the rubber that had been collected. Twenty times the quantity could easily be brought down to the coast if labour were obtainable. Not only was the Juruena River itself almost absolutely untouched commercially--as we have seen, we did not meet a soul during the fifty days we navigated it--but even important tributaries close to S. Manoel, such as the Euphrasia, the São Thomé, the São Florencio, the Misericordia, and others, were absolutely desert regions, although the quantity of rubber to be found along those streams must be immense. The difficulty of transport, even on the Tapajoz--from the junction of the two rivers the Juruena took the name of Tapajoz River--was very great,

although the many rapids there encountered were mere child's play in comparison with those we had met with up above. In them, nevertheless, many lives were lost and many valuable cargoes disappeared for ever yearly. The rubber itself was not always lost when boats were wrecked, as rubber floats, and some of it was generally recovered. The expense of a journey up that river was enormous; it took forty to sixty days from the mouth of the Tapajoz to reach the *colectoría* of S. Manoel. Thus, on an average the cost of freight on each kilo (about 2 lb.) of rubber between those two points alone was not less than sevenpence or eightpence.

As the River Tapajoz is extremely tortuous and troublesome, I think that some day, in order to exploit that region fully, it will be found necessary to cut a road through the forest from S. Manoel to one of the tributaries of the Madeira, such as the River Secundury-Canuma, from which the rubber could be taken down to the Amazon in a few days.

From the point of junction of the River Tres Barras or S. Manoel and the Juruena, the river was fairly well known. It was partly in order to ascertain whether the project of the road from S. Manoel to the Madeira were feasible, that I decided to leave the river and cross the forest due west as far as the Madeira River.

I spent two or three most delightful days enjoying the generous hospitality of Mr. Barretto. I was able to purchase from him a quantity of provisions, enough to last us some three months, and consisting of tinned food, rice, beans, *farinha*, sugar, coffee, and dried meat.

Mr. Barretto kindly arranged to send his assistant, Mr. Julio Nery, and three Apiacar Indians in order to help me along during the first two or three days of our journey into the forest.

As I should be travelling on foot from that point across virgin forest, and we should have to carry whatever baggage we had, it was necessary for me to abandon all the things which were not of absolute importance, so as to make the loads as light as possible.

I left behind at S. Manoel a tent, some of my rifles, a quantity of cartridges, etc., the only articles I took along with me besides provisions being my cameras, instruments, the photographic plates already exposed, with some two hundred plates for further work, and the geological and botanical collections, which by that time had got to be valuable.

As I was unpacking the different cases in order to sort out the baggage, I came to the box where I expected to find the precious fossil human skull and the vertebræ I had discovered in Matto Grosso. To my horror the fossils were to be found nowhere. I asked Alcides and the other men, and pressed them for an answer. I received a terrible blow indeed when they confessed that nearly a month before, one night while I was asleep, they had taken the valuable possessions and had flung them into the river. Their excuse was that the loads were heavy enough in carting baggage along the rapids, and they would not be burdened with what they called "stupid stones."

This last bit of infamy turned me so much against my men that I could not bear the sight of them. It will be easily understood that when you go to such great expense and risk as I did in obtaining valuable material, and had obtained it, to be deprived of it through the ignorance and meanness of one's own men, who were treated with the greatest generosity from beginning to end, was certainly most exasperating. In a half-hearted way I packed up all the other things and made ready to continue the journey. The contempt I had for my men from that day, nevertheless, made it quite painful to me to be in their company. At S. Manoel the men gave me no end of trouble. Benedicto refused to go on any longer. The other men wanted to halt there for a month in order to recuperate their strength. Filippe the negro was drunk, and slept all the time we were there.

I know too well that on expeditions it is fatal to halt anywhere; therefore I was anxious to push on at once. The night before our departure Mr. Barretto gave a grand dinner-party in my honour, long speeches being read out by him and his assistant, when we sat down on rough wooden benches and packing-cases to a most

elaborate meal of fried fish, grilled fish, boiled fish, tortoise eggs--quantities of them--stewed pork and roast pork. A whole sucking-pig adorned the table. The greatest happiness reigned that night at table, and I owe a deep debt of gratitude to Mr. Barretto for his exquisite kindness during the two or three days I was his guest. My men were also asked to the banquet, and had a good fill. But I felt extremely sad, quite broken-hearted, over the loss of the fossils, and I could really enjoy nothing notwithstanding outward appearances.

After dinner, when my men had retired, Mr. Barretto and his assistant expressed great surprise at my not having been murdered by my followers before then. They said that in their whole experience they had never come across such impossible creatures. They could not understand how the Governor of Goyaz could possibly let me start in such company. They seemed most anxious for me, as some of my men had evidently, while drunk, spoken at the *collectoria* and said things which had greatly upset and frightened the fiscal agent.

Three days after my arrival in S. Manoel I was ready to depart, having conceived a plan to go some 60 kil. farther by river to a point from where I would strike due west across the forest as far as the Madeira River. I was just about to go on board the boat placed at my disposal by Mr. Barretto, when a terrific storm broke out, with lightning and thunder, and a howling wind which blew with fury, raising high waves in the river--very wide at that point. It was a wonderful spectacle, with the river in commotion and the dazzling flashes of lightning across the inky sky. Amidst it I saw my faithful canoe being dashed mercilessly by the waves time after time against some sharp rocks, until she broke in two and foundered. I was sorry to see her disappear, for she had served me well.

When after a couple of hours the storm cleared, I took my departure, on August 24th. During my stay at S. Manoel I had taken observations for latitude ( $7^{\circ} 16' 9''$  S.), longitude ( $58^{\circ} 34'$  W.), and elevation (601 ft. a.s.l. on the river, 721 ft. at the *collectoria*).

[Illustration: Author taking Astronomical Observations on a Sandy Beach of the River Arinos-Juruena.]

Just across the river, at the mouth of the Tres Barras, was the *collectoria* for the State of Pará. The Pará *seringueiros* worked on the Rio Tres Barras and its tributaries on its right side--that is to say, the Annipirí, the Igarapé Preto, the Cururu, and another (nameless) stream. There were, perhaps, altogether some eighty or a hundred *seringueiros*, all told, working in that immense region on the Pará side. In the year 1910, 90,000 kil. of rubber were collected by those few *seringueiros*, and in the year 1911 a slightly larger amount was sent down the river from that point. The Pará Fiscal Agency was only established there on December 11th, 1910. The *collectoria* was situated in a most beautiful spot on a high point overlooking the mouth of the Tres Barras, and directly facing the Juruena-Arinos. On the Juruena previous to reaching S. Manoel on the left side was a stream in which gold was to be found.

Amid the affectionate farewells of Mr. Barretto I left S. Manoel in a beautiful boat belonging to the fiscal agent. The effects of light on the water were wonderful after the storm. The river, immensely wide, flowed in a N.N.W. direction, then due north in great straight stretches from 2 to 4 kil. in length. As we had left late in the afternoon we were not able to go far. We passed some beautiful islands, one particularly of immense length, with an extensive sandy beach at its southern end. After going some 18 kil. we came to a great barrier of rocks extending across the river from south-west to north-east. Some distance below those rocks a great sand-bank spread half-way across the stream.

We halted for the night at the *fazenda* of Colonel Gregorio, a *seringueiro* from whom I expected to get an Indian who knew the forest well and who could be of some assistance to me in going across it. The house of Col. Gregorio--a mere big shed--was a regular armoury, a great many rifles of all ages, sizes, and shapes adorning the walls; then there were fishing spears and harpoons, vicious-looking knives and axes. In the principal room was a large altar with a carved figure of the Virgin standing with joined hands before lighted candles and a bottle of green peppermint. The latter was not an offering to the sacred image, but it was placed on the revered spot so that none of Gregorio's men should touch it. Enormous balls of rubber filled the greater

portion of the floor, waiting to be taken down the river.

With great trouble the Indian--a man called Miguel--was induced to accompany me; also a young boy, who, at a salary of 15s. a day, agreed to act as carrier.

It was not until late in the afternoon on August 25th that we left the *fazenda* in order to proceed down the stream. We passed the tributary river Roncador on the left side, with its beautiful high waterfall a short distance before it enters the Tapajoz. We came soon afterwards to the island of S. Benedicto, south of which on the left bank was the hill of the Veado, 120 ft. high. Directly in front of the island, also on the left bank, was the Mount of S. Benedicto, where legends say an image of that saint exists carved out by nature in the high rocky cliff.

As we passed under the hill our crew fired several volleys in honour of the saint; then we landed and I climbed up to go and see the wonderful image. Many candles had been burnt on a platform of rock on the cliff side, and the sailors who came up with me brought a new supply of stearine and set them ablaze on that natural altar. The men pointed out to me the figure of the saint, but with all the best intentions in the world I could see no resemblance whatever to a human being.

"There it is! there it is!" they shouted, as I twisted my head one way and the other to see if I could find a point of view from which I could see the saint. The men knelt down and prayed fervently for some minutes, as they believed it was necessary to pay these signs of respect in order to ensure a good journey down the river. Some went as far as to tear off pieces of their garments and leave them on the rocky platform as offerings.

The eastern face of the S. Benedicto Mount was a vertical wall 200 ft. high in horizontal strata of a deep grey colour, and some 300 m. in length along the river.

We had wasted so much time, and the men rowed so badly, that we made poor progress. We only went 21 kil. that day. We halted for the night near a *seringueiro's* hut at the small rapid of Meia Carga, or Half-charge Rapid, because at low water the boats have to be half unloaded in order to get over that spot.

The minimum temperature during the night was 69° F. We slept in the boat, and were simply devoured by mosquitoes. The chief of the Indians who had been lent me by the Fiscal Agent became seriously ill during the night with a severe attack of fever. All my men, with no exception, also became ill, and were shivering with cold, owing to fever. The chief of the police, Luiz Perreira da Silva, who had been placed by Mr. Barretto in charge of the Indians who were to accompany me, in jumping from the boat that night on to the shore hurt his foot, the pain caused by that slight injury giving him also a severe attack of fever. So that of the entire crew there remained only two men in good health--viz. Mr. Julio Nery and myself.

Amid moans and groans we got the boat under way at 6.45 the next morning, the men paddling in a half-hearted manner. As the current was strong we drifted down fairly quickly in a northerly direction, the river there being in a perfectly straight line for some 8,000 m. The width of the river was 1,300 m.

Behind a little island on the left side, and approached through a circle of dangerous rocks, was the hut of a *seringueiro* called Albuquerque, a man in the employ of Colonel Brazil, the greatest rubber trader on the river Tapajoz. We landed at that point and made preparations so that I could start at once on the journey on foot across the virgin forest.

The loads the men were to carry were not heavy--merely from 35 to 40 lb. each--the heaviest load being the one I carried, so as to give a good example to my men. We had ample provisions to last us, with a little economy, three months. When the moment arrived to depart there was not one man who could stand up on his legs; the policeman with his injured foot could not even land from the boat, as it gave him so much pain. The chief of the Indians was so ill with the fever and the medicine he had taken that he really looked as if he might

not survive. The other Indians refused to leave their chief; while the Indian Miguel, whom I had employed subsequently, flatly refused to come along. Much time was wasted talking, Mr. Nery, a fluent speaker, haranguing the men, who lay around helpless, holding their heads between their hands or rolling themselves on the ground.

It is extraordinary how many ailments fright can produce.

[Illustration: Where the Rivers Arinos-Juruena and S. Manoel meet.]

[Illustration: José Maracati, Chief of the Mundurucus, Tapajoz.]

The accounts of the forest which I had heard in the neighbourhood were most conflicting. It was really impossible to tell beforehand what the crossing overland between the Tapajoz and the Madeira River would be like. In order to encourage my own men I had once more increased their pay for the extra hard work I required of them on that occasion, and I promised them each a further present of money if they succeeded in carrying all the loads safely as far as the Madeira River.

They had agreed to do the work, but unfortunately they were the most unpractical men I have ever come across, and insisted on carrying the loads in a way which made it impossible for them to carry them for any long distance. For instance, one man insisted on carrying a heavy wooden packing-case slung on one side of the body just over the hip, in the fashion in which Italians carry barrel-organs in the streets of cities; another man suspended a case on his back by a strap which went round his neck, so that after a few minutes he was absolutely strangled; while Filippe the negro let his load hang so low that it would certainly cause a bad sore on his spine. I tried to teach them, but it was no use, as it only led to a row. Absolutely disgusted with the whole crowd of them, late that afternoon of August 26th I made ready to start on our difficult journey.

**CHAPTER XVIII**

Starting across the Virgin Forest--Cutting the Way incessantly--A Rugged, Rocky Plateau--Author's Men throw away the Supplies of Food--Attacked by Fever--Marching by Compass--Poisoned--Author's Men break down--Author proceeds across Forest endeavouring to reach the Madeira River--A Dramatic Scene

BY three o'clock in the afternoon I had been able to induce the Indian Miguel, his friend the carrier, and three other Apiacar Indians to come along with us for a few days in order to carry the heavier packages as far as possible into the forest, so that I could spare my men.

It was some relief to me--although I saw plainly that we should surely have disaster sooner or later--when one after the other my men took up their loads and started off. I gave them the correct direction with the compass, almost due west; in fact, to make it easier for them I told them that afternoon to travel in the direction of the sun.

With Filippe the negro at the head my own men started off at a rapid pace, the others following, while I was at the tail of the procession in order to see that no stragglers remained behind. For a short distance we found an old *picada* which went practically in the direction we wanted, so my men followed it, only cutting when necessary the vegetation which had grown up here and there.

I had only gone a few hundred metres when I saw the ground a little way off our track covered with some white substance. With my usual curiosity I went to see what it was, and found to my disgust a large quantity of rice which had evidently been scattered about there a few moments before. A few yards farther was another patch of white upon the ground, as if it had snowed. A whole sack of flour had been emptied and scattered about in such a way that it could not be recovered.

I well knew what was happening. My men were throwing away everything in order to make the loads lighter. So relieved of the weight, they had got far ahead, while the Apiacar Indians who had remained behind were behaving in so strange a fashion that I had to stay in charge of them, so that they should not escape with the boxes of instruments and collections which they were carrying for me.

We went that afternoon some 6 kil. through fairly clean forest, barring a few obstacles such as huge, ancient, fallen trees, the insides of which were all rotted away or eaten up by ants. In one of the cavities of those trees I found another quantity of food which had been hidden by my men. Hampered by the Indians, who were giving me no end of trouble as they refused to carry their loads, it took me some little time to catch up with my other men. When I did I found them all seated, smacking their lips. They were filling their mouths as fast as they could with handfuls of sugar. When I reprimanded them there was an unpleasant row. They said they were not beasts of burden, that men were not made to carry, and that therefore they had thrown away all the food. Under no circumstance would they carry loads any farther.

A great deal of tact and persuasion were required. Alcides had discarded nearly all the stuff he carried, and was one of the chief offenders on that occasion.

Matters looked bad. We camped that night near a little streamlet at the point where it had its birth. We still had plenty of food left, notwithstanding what they had thrown away. I warned them that if they threw away any more we should certainly all die of starvation. During the night one of the Indians ran away carrying with him a quantity of our provisions.

On August 27th I once more proceeded on the march westward, this time with no *picada* at all to follow, but cutting our way all the time through the forest. Mr. Julio Nery, who had been sent with me, was an enthusiastic and brave man, but in trying to help made us waste a great deal of energy and time. After marching eight hours we had only gone 10 kil. in the right direction, having made many deviations in order to

find what he called a more suitable way. We travelled occasionally over thickly wooded, slightly undulating country, but generally the land was flat.

[Illustration: Apiacar Boy.]

[Illustration: Apiacar Indian.]

In the afternoon, when we arrived at the foot of a small hill, we were caught in a drenching storm, the foliage letting the water down upon us in profusion. The walking became heavy. In order to make the loads lighter, my men had removed from the packages the waterproof coverings I had made for them from waterproof sheets. The result was that in that storm nearly our entire supply of salt--some 50 lb. of it--was lost. The powdered sugar, too, suffered considerably, and became a solid sticky mass.

We arrived at a stream 10 m. broad flowing from north to south, where we had to halt, as my men said they were absolutely exhausted and could not go another step. The water of that stream was simply delicious. We killed a monkey, which my men ate eagerly for dinner.

On August 28th we left that stream at eight o'clock. We were confronted by a succession of steep hills with vertical rocks of immense size, on the summit of which were great slabs also of rock, not unlike angular roofs of houses. It was most difficult, I confess, for my men to take the loads up and down those giant rocks, especially as there were many fallen trees among them and the rocks themselves were extremely slippery.

It would not do to repeat in these pages the language of my men as they scrambled up and rolled down the numerous rocks--falling so clumsily that they always managed to injure themselves more or less. I was sorry for my loads, especially the instruments, which got knocked about in a pitiful way.

We came across three distinct hill ranges of that type, over which we had to travel, the highest point being some 300 ft. above the level of the Tapajoz River. The last bit in particular of that hilly region was diabolically steep, with loose rocks which gave us no end of trouble. A beautiful little streamlet flowing east descended in cascades among those huge rocks. Eventually we reached the summit of the plateau, a huge flat expanse of dark red volcanic rock. My men were so tired that we had to camp on that elevation. Nothing but a few shrubs grew in the interstices of that great table of rock, which extended for several kilometres to the north. The barrier of rock, a spur of the great central plateau, was very interesting from a geological point of view.

On August 29th we again marched westward, cutting our way through the forest, and found two streamlets--one flowing south, the other north. Late in the afternoon we arrived at a spot where there was another great mass of rock, most troublesome for us. My men were discontented, saying that when they agreed to march through the forest they had not agreed to march over rocks--as if I had placed these there on purpose to annoy them. They were extremely morose. I knew by their manner that I had fresh trouble in store.

In the centre of that second immense table of rock I found a few pools of putrid rain-water in cavities. My men wanted to halt there, but I induced them to march along in hopes of finding a stream at the bottom of the tableland. Unluckily we went on and on until the evening and we found no more water at all. Only a torrential shower came upon us during the night, and we were able to fill our cups with water to quench our thirst. Men and baggage got soaked in that storm. The loads were much heavier to carry the next morning.

On August 30th, when I called the men in order to make a start, two of them were attacked severely by fever, their temperature being 103°. They seemed to be in agony, and had no strength left.

Mr. Julio Nery said that his duties called him back to his post, and he must return with the Indians under his charge. He accompanied me up to lunch-time, when we all together had a hearty meal. After lunch I gave Mr.

Nery and his men ample provisions to return to the river Tapajoz, where the boat was awaiting them. Not only that, but I presented Mr. Nery with a handsome rifle and a watch, in remembrance of his politeness to me. In order that he might have a pleasant journey back I also gave him the few tins of delicacies which I had brought for myself, the only four tins of condensed milk I had been able to obtain in S. Manoel, and a few tins of sardines which had remained from my provisions I had taken over from England, and which he liked very much.

It was a great trial to me to see how my men wasted food all the time. When I examined the loads once more I found that nearly the entire supply of flour, *farinha*, rice, lard, and much of the tinned stuff had been thrown away. We had been marching four and a half days, and out of the three months' provisions we only had food enough left to last us a few days.

With my reduced party of my six original men, the Indian Miguel and his friend the carrier--eight altogether--I started once more in a westerly direction, opening a *picada*--that is to say, cutting our way through the forest.

We crossed two streamlets flowing north. After that we came upon a most troublesome patch of swampy land with high reeds in it, the leaves of which cut our hands like razors when we forced our way through them, struggling in mud and slush up to our knees, sometimes as high as our waists. A streamlet flowing north formed the marsh in that low place. The moment we had got out of the marsh the men threw themselves down and said they could go no farther. I pointed out to them that that spot was most unhealthy, and tried to persuade them to go some distance from that pestilential place. But they would not listen to reason, and there they would stay.

Although I had offered them every possible inducement to come on--their original high pay had been practically trebled as long as the hard work should last--and I had treated them with the greatest consideration, yet they refused to come any farther. They said they had decided to go back.

In examining my loads I found that they had abandoned my sextant and other instruments in the forest, and it was only after a great deal of talking that I could induce the man X to go back with me to recover them, for which service he received an immediate present of one pound sterling.

As luck would have it, that evening my men shot a plump *jaho* (*Crypturus notivagus*) and a large *mutum* (*Crax pinima*), two enormous birds, most excellent to eat.

[Illustration: Apiacar Women.]

[Illustration: Apiacar Women.]

That camp was stifling, the moisture being excessive, and the miasma rising from the putrid water poisoning my men in a disastrous way. The drinking-water, too, from that swamp was full of germs of all sizes, so big that with the naked eye you could see hundreds of them in your cup. We could not boil the water because all our matches had got wet. We wasted hundreds of them in trying to light a fire, but with no success. Flint and steel also proved useless, because the wood was also soaking wet and would not ignite.

August 31st was a painful day for me. Two of the men were badly laid up with fever, the others were most obnoxious. I had endless trouble in making them take up their loads and start once more. The man X said he would take the load which contained my instruments, but he would certainly leave it, as soon as he had an opportunity, concealed in a spot where it could not be found again. I told him in plain words that if he carried out his intention I would shoot him dead, and I would from that moment do the same to any other man who rebelled. I was surprised to find that the lot of them took their loads upon their shoulders and proceeded to march along as quietly as possible.



The Brazilian forest was--unlike the equatorial forest of Africa--comparatively clean underneath, there being very little undergrowth. It was quite easy to cut one's way through if one knew how. There was a great art in cutting one's way through the forest. If you happened to know the way trees grew or liane were suspended, it was easy enough to cut them with one sharp blow of the large knives. But if you did not happen to know the formation of the trees and you struck them the wrong way, you had to hit them many times before you knocked them down. The same thing and worse happened with liane, which could be severed easily with one stroke if it were applied the right way, but which wound round and entangled you in a merciless manner if hit at a wrong angle.

No observant person, however, experiences trouble in marching through the Brazilian forest, and if not hindered by impossible followers it would be quite easy to march long distances daily in any part of the forest without much inconvenience.

This statement only applies to the actual marching, and does not at all mean that you had not to go through severe sufferings and endless trials of other kinds. Unless you were careful where you were sitting, you found yourself spiked by thorns of great length which were strewn all over the forest hidden under the thick carpet of discarded foliage from the trees. Not only that, but the moment you sat down your body was simply invaded by swarms of ants of all sizes and degrees of viciousness, which proceeded to bite you all over with considerable vigour. There were not many mosquitoes where the forest was dense, but there were millions--in fact, millions--of bees, which rendered your life absolutely unbearable, as they clung to your face, hands and clothes. Fortunately, they did not sting, but clinging with their claws upon your skin they produced such an irritation that you were nearly driven mad by it.

Then there were fetid bugs of huge size, the sickening odour of which when they touched you had quite a nauseating effect. They seemed to have a particular fondness for settling upon your lips or entering your mouth. When by mishap you swallowed them, their taste was something too appalling. Once or twice while I was eating I had the misfortune to crack one or two under my teeth. I had the bad taste of them in my mouth for hours after.

When we halted for lunch my men were in a shocking condition. I could not quite understand what had happened. Most of them seemed to suffer from violent internal inflammation accompanied by high fever.

In order to make things as easy as possible for them I once more rearranged the loads that afternoon, abandoning six hundred rifle cartridges, several tins of hyposulphite of soda, other chemicals, all the developing trays, etc., for my photographic work, and a number of valuable trinkets I had collected. Much to my sorrow I had also to abandon the geological collection, which was too heavy to be carried any farther. Then I had to abandon all the books which were necessary for working out my astronomical observations, such as Norrie's *Navigation* and *The Nautical Almanac*, and all possible articles which were not absolutely necessary.

After I had gone to the great trouble of unpacking everything in order to make the loads lighter, I was surprised to discover, a few minutes later, that the men had appropriated most of the stuff and shoved it back in their loads--in order, perhaps, to sell it when they got to Manaos.

I said nothing, as it suited me very well. I should have gladly repurchased the things from them on the way. One man opened a tin of powdered hyposulphite and, believing it to be powdered sugar, proceeded to pour it down his throat. Had I the bad habit of making puns, I should say that I just saved him in time from being "fixed" for good. As it was he swallowed some, and became very ill indeed for some hours.

We luckily killed a big *mutum* and two monkeys before leaving that camp, but my men were so ill that they left them on the ground, saying they had not the strength to carry them so that we might eat them for dinner. Well knowing what was in store for us, I proceeded to carry the huge bird (much larger than a big turkey) and

one of the monkeys (as big as a child three years old) upon my shoulders.

It was all I could do to struggle along under the heavy load, as I already carried upon my person some 24 lb. in weight of gold, silver, other moneys, and instruments, while on my shoulders hung a weight of some 40 lb. Add to that the big bird and the monkey, and altogether the weight was certainly not less than 90 lb. I was simply smothered under it.

We suffered a good deal that day from lack of water and from the intense heat. There seemed to be no air in the forest, and our breathing was heavy. Each time a man fell down and refused to go on I had to put down my load, go to his assistance and persuade him to get up again. It was a most trying experience.

After going some eight hours without finding a drop of water, our throats absolutely parched with thirst, we luckily came upon some *solveira* trees, which, when incised, exuded most excellent milk--only, of course, it dropped down tantalizingly slowly, while we were cruelly thirsty, especially my men in their feverish state. It was curious to see them all clinging to the tree with their mouths applied to the wounds in order to suck the milk.

[Illustration: Mundurucu Women.]

[Illustration: Apiacar Children.]

Some way farther on we came across some rubber trees--which fact made us joyful, as we knew water would then be near. In fact, a kilometre beyond, water of a deep reddish yellow colour was found in a streamlet 10 m. wide, flowing north.

We halted on the western bank. We had been cutting through the forest the entire day. My men were simply exhausted. I, too, was glad when I put down the bird and the monkey--particularly as they had a pungent odour, quite typical of wild animals of Brazil, which affected my nose for some hours afterwards. Also they were covered with parasites, which caused violent itching on my neck and shoulders, on which they had been resting.

I had marched all the time, compass in hand, next to the man who with the large knife opened the way through the forest. We had travelled all day--cutting, cutting all the time--and by the evening we had gone about 10 kil.--that is to say, at the rate of a little over 1 kil. an hour.

The yellow water of the stream--it looked just like strong tea, and tasted of everything in the world except water--had not a beneficial effect upon my men. For some reason of their own the men, who seldom took a bath in the clean rivers, insisted on bathing in those coloured waters, which, I might also add, were just then almost stagnant in that particular section of the stream.

Personally, I had taken out a large cup full of water before they had gone to bathe, and avoided drinking again; but my men drank that water, made dirtier by their immersion and the use of soap--my soap, too!

The next morning all had excruciating headaches. Their legs dangled, and they did not seem to be able to stand on them. Only the Indian--Miguel--seemed to have any strength left. He was a nasty-looking individual, always sulky and pensive as if under some great weight upon his conscience. Miguel and I walked in front, he with a big knife opening the way in the forest for the others to come behind.

Just before leaving camp on September 1st I had gone some distance up the yellow stream in order to get a last drink in case we found no other water that day. The Indian, who was supposed to know the forest well, knew nothing whatever, and always misled me whenever I asked for information.

A few minutes after we had left, I was seized with violent shivers, my teeth chattered, and I felt quite as frozen as if I had suddenly dropped in the Arctic regions. Evidently I had been poisoned by the water. I collapsed under my load, and for some moments I could not get up again. Although I had spent all my time and energy helping everybody else to get up when in difficulty, not one of my men came near me to unfasten the loads from my shoulders or help me to get up on my legs again. They merely squatted a little way off when they saw that I had collapsed, and proceeded to roll up their cigarettes and smoke.

True, I did not let my men suspect that I was very ill. After a few minutes I struggled up once more under my heavy load and asked the men to come along. I had been seized with such a violent attack of fever that my strength seemed to have vanished all of a sudden, my limbs quivering in a most alarming way. I carried a clinical thermometer on my person. My temperature was 104° F. From ten o'clock in the morning until three in the afternoon the attack of fever was so acute that several times I fell down. My men, who were in a pitiable condition that day, collapsed, now one, now another, although their loads were less than half the weight of mine, each man carrying about 40 lb. We marched until four o'clock that afternoon, but only covered a distance of 6 kil. in that entire day. Two of the men had abandoned their loads altogether, as they could not carry them any farther. What vexed me considerably was that they had discarded my valuable things in preference to leaving the great weight of rubbish of their own which they insisted on carrying, such as looking-glasses, combs, brushes, a number of old clothes in shreds, and the heavy hammocks, which weighed not less than 20 lb. each.

We found water in a streamlet which formed a marsh. There my men insisted on making camp. It was a most unhealthy spot. Ill as I was, I endeavoured to induce them to come on a little farther and see if we could improve on that halting-place. Miguel, the Indian, who had slightly scratched his finger, now refused to cut the *picada* any longer, as he said the pain was intense. It was only by giving him a present of money that I had succeeded in leading the man on until we reached the marsh.

Curiously enough, the man X, who was the champion rascal of the crowd, proved himself that day to be the best of the whole lot. He even went back with me to try and recover some of the most important things from the loads which the men had abandoned some 2 kil. before we had made our camp.

As we stumbled along we could not even lean against the trees to have a little rest, as most of them had thousands of horizontal thorns of great length sticking out all around them. Innumerable thorns were upon the ground. Our feet were full of them. I looked all the time where I was putting my feet, but sometimes the thorns were hidden under masses of dried foliage, and they were so long and so strong that they went clean through the sides of my shoes.

The last blow came to me that evening, when my men informed me that we had no food whatever left. All that remained of our three months' provisions were six tins of sardines and one tin of anchovies. That was all. My men made no secret of having thrown away everything as we came along. The sugar, for which they had a perfect craving, they had eaten, consuming in the last two days the entire supply of 30 lb., which had remained until then. It was then that I understood the cause of the internal inflammation from which they all suffered. They were greatly excited, and demanded the balance of their money, not wishing to come on any more; they wanted to fall back on the River Tapajoz and go home. There was a riot. They threatened to shoot me if I insisted on their coming on.

Just then a big black monkey appeared upon a tree, inquisitively watching our doings. The man X shot it. A moment later a big *jaho* was brought down, also by the man X, who was the best shot of the party. My men were never too ill to eat. They immediately proceeded to skin the poor monkey and pluck the feathers from the bird, in order to prepare a hearty meal. But they complained that they had no *feijão*, and no coffee after their dinner. When we started a few days before we had a supply of 40 lb. of coffee.

Feasting on the meat did not seem to be a good remedy for internal inflammation and fever. The next morning

my men were really in a precarious condition. I saw that it was out of the question for them to continue. Personally, I would certainly not go back. I came to an understanding with them that I would leave sufficient ammunition for them to shoot with, as there seemed to be plenty of game in that particular part of the forest. We would divide equally what provisions we had--that is to say, three tins of sardines for each party. I would also give them sufficient money for one of them, or two, to fall back on the river and purchase provisions for the entire party. I made them promise that they should remain in charge of my baggage, most of which I would leave with them at that spot, while I, with two men, would go right across the forest as far as the Madeira River, where I would endeavour to get fresh men and new provisions.

The men agreed to this. As I could not trust any of them, I took the precaution to take along with me all my notebooks and the maps I had made of the entire region we had crossed, four hundred glass negatives which I had taken and developed, a number of unexposed plates, a small camera, my chronometer, one aneroid, a sextant, a prismatic compass, one other compass, and a number of other things which were absolutely necessary. The rest of the baggage I left at that spot. I begged the men to take special care of the packages. All I asked of them was to prop them up on stones so that the termites and ants should not destroy my possessions, and to make a shed with palm leaves so as to protect the packages as much as possible from the rain. The men promised to do all this faithfully. We drew lots as to who were to be the two to accompany me on the difficult errand across the virgin forest. Fate selected Filippe the negro and Benedicto, both terribly ill.

We had no idea whatever what the distance would be between that point and the Madeira River. It might take us a few days to get there; it might take us some months. All the provisions we of the advance party should have to depend upon were the three tins of sardines and the tin of anchovies--the latter had remained in our possession when we tossed up as to which of the two parties should have it. The Indian Miguel was induced at the last moment to come also, and with him came the carrier his friend.

Early on September 2nd I was ready to start, and roused poor Filippe and Benedicto, who were in a shocking state. Without a word of farewell from the men we left behind, and for whom we were about to sacrifice our lives perhaps, we started on our dangerous mission. The Indian Miguel and myself walked in front, cutting the way all the time, while I held my compass in hand so as to keep the correct direction west. Considering all, we marched fairly well.

It was curious to note how difficult it was for men to travel in a straight line while cutting a way through the forest. I noticed that the Indian, when cutting his way through, using the knife in his right hand, would gradually veer to the right, so that if you let him go long enough he would describe a regular circle and come back to his original starting-point. If he cut the way with the left hand, the tendency would be to keep to the left all the time until he had described a circle that way. That was not characteristic of that man only, but of nearly all the men I met in Brazil when making a *picada*. It was therefore necessary to keep constant watch with the compass so that the deviation should be as small as possible during the march.

We had gone but a short distance from camp when we came to a streamlet of the most delicious water. I had suffered a great deal from thirst the day before. We had been so poisoned by the yellow water of the stream that I did not like to try more experiments at the marsh where my men insisted on making camp. So that now I really enjoyed a good drink of the limpid water. That day we found too much water. On going 1 kil. farther, about 4 kil. from camp, we found another wider and equally delicious streamlet, 2 m. wide. All the streams we met flowed in a northerly direction.

We walked and walked the entire day, until 6 p.m., covering a distance of 26 kil. The Indian Miguel worried me the whole day, saying that cutting the *picada* was heavy work and he could not go on, as his finger was hurting him, and the pay he received--£1 sterling a day--was too small for the work he had to do. I had to keep constant watch on him, as he was a man of a slippery nature, and I did not know what he might do from one moment to another. Also he said we were simply committing suicide by trying to go through the virgin forest, as we should meet thousands of Indians who would attack us, and we had no chance of escape. I needed this

man and his companion to carry my sextant and the unexposed photographic plates, some two hundred of them, which were of considerable weight.

That night, when we made camp, Miguel shot a fine *jacú* (*Penelope cristata*), and we had a meal. Soon after a regular downpour came upon us, making us feel most uncomfortable. At about eight o'clock, however, the rain stopped. With a great deal of trouble we were able to light a fire, while the wet leaves of the trees kept on dropping water on us and making a peculiar rustling noise on the carpet of dead foliage on the ground.

By the light of that fire a weird and almost tragic scene took place. Miguel came up to me, and said in a dramatic tone that for the sake of his wife and children I must let him go back, as we were marching to sure death. If I did not let him go back ... here he took his forehead between his hands--"God help me!" he said, and he burst into tears. He said he did not wish for his pay, as he had not fulfilled his contract. Whatever he had on his person he was willing to give me if I would only let him go back. I said I wished him to keep all his possessions, and as he did not wish to go along with me I would certainly let him go back the next morning. He would then also receive the pay according to the time he had been with me. Miguel went back near the fire, where he cried for some time. Accustomed to deal with Brazilians, I perceived that Miguel thought my promises too good to be true.

When leaving the last camp I had improvised for myself a kind of hammock with some straps and a waterproof canvas sheet which I had cut out of one of my tents. I was lying in that hammock thinking, when I saw Miguel get up, and, screening his eyes with his hand, look fixedly my way. I pretended to be asleep.

Miguel--who, by the way, was a Christian--took the dagger from his waist and walking to a large tree scratched a cross upon its bark. Then, sticking the knife with force into the tree, he clasped his hands over its handle, and bent his head over it, muttering some prayers. Twice--perhaps thinking he was being observed--he turned round towards me, and when he did so the expression on his face, lighted by the flickering flame, was really ghastly.

He prayed for some ten minutes, then, with the dagger in his hand, he walked cautiously towards my hammock. He was within 3 metres of me when I jumped up, seizing Filipe's rifle, which I had placed by my side in the hammock. With the butt I struck the Indian a violent blow in the chest.

He stumbled back, dropped his knife and went down on his knees touching my feet with his trembling hands and begging my pardon. Again came more sobs and tears; again more entreaties to be discharged. I got up and confiscated his rifle and all his cartridges, as well as the knife, then sent him to his hammock to sleep. The next morning I would see what I could do.

I saw clearly that it was no use taking on a man like that, who added to my other trials somewhat of a mental strain. The next morning, before sunrise, we were up again. I gave Miguel and his friend their full salaries up to date and sent them back. I handed him his rifle and cartridges, which were his own possessions, but I kept the knife as a memento.

Even when treating men generously in Brazil you had always to beware of treachery. I told Miguel and his friend to walk straight ahead and not turn round. I warned Miguel not to unsling his rifle from his shoulders until he had walked half a league. If he did while still in sight of me I would put a bullet through him. I said it and I meant it.

**CHAPTER XIX**

Benedicto and Filippe show Courage--Confronted with a Mountainous Country--Steep Ravines--No Food--Painful Marches--Starving--Ammunition rendered useless by Moisture--The "pros" and "cons" of Smoking--A Faint Hope--A Forged Tin which should have contained Anchovies--Curious Effects of Starvation upon the Brain--Where Money is of no Avail--Why there was Nothing to eat in the Forest--The Sauba Ants--Sniffed by a Jaguar--Filippe tries to commit Suicide.

THE departure of those two men added much to our troubles. I had to abandon at that spot all the unused photographic plates, my sextant and a large prismatic compass, half the supply of cartridges we had taken with us, a pair of extra shoes, and a number of other things. With our reduced loads we made an early start, Filippe that day behaving very bravely.

"Never mind," said he; "if all the others are afraid, I am not. I will follow you anywhere. After all, nothing can happen to us worse than death. You have always behaved kindly to me, and I will never abandon you."

Both Filippe and Benedicto were still poorly, but the violent exertion of the previous day had done them good and their condition seemed to have slightly improved.

We started once more across the virgin forest, directing our steps due west. Filippe this time undertook to open the *picada*, while I, compass in hand, marched directly behind him, Benedicto following me. Filippe, who was unaccustomed to go through the forest, was even worse than Miguel for keeping the correct direction. If I had let him go, he would have described circle after circle upon himself instead of going in a straight line.

From that point our march across the forest became tragic. Perhaps I can do nothing better than reproduce almost word by word the entries in my diary.

We ate that morning what little there remained of the *mutum* we had shot the previous evening. Little we knew then that we were not to taste fresh meat again for nearly a month from that date.

During September 3rd we made fairly good progress, cutting our way through incessantly. We went that day 20 kil. We had no lunch, and it was only in the evening that we opened the last of the three small boxes of sardines, our entire dinner consisting of three and a half sardines each.

On September 4th we were confronted, soon after our departure, with a mountainous country with deep ravines and furrows, most trying for us owing to their steepness. We went over five ranges of hills from 100 to 300 ft. in height, and we crossed five streamlets in the depressions between those successive ranges.

Filippe was again suffering greatly from an attack of fever, and I had to support him all the time, as he had the greatest difficulty in walking. Benedicto had that day been entrusted with the big knife for cutting the *picada*.

We went some 20 kil. that day, with nothing whatever to eat, as we had already finished the three boxes of sardines, and I was reserving the box of anchovies for the moment when we could stand hunger no longer.

On September 5th we had another very terrible march over broken country, hilly for a good portion of the distance, but quite level in some parts.

The man Benedicto, who was a great eater, now collapsed altogether, saying that he could no longer carry his load and could not go on any farther without food.

The entire day our eyes had roamed in all directions, trying to discover some wild fruit which was edible, or some animal we might shoot, but there was the silence of death all around us. Not a branch, not a leaf was moved by a living thing; no fruit of any kind was to be seen anywhere.

Our appetite was keen, and it certainly had one good effect--it stopped Filippe's fever and, in fact, cured it altogether.

The two men were tormenting me the whole day, saying they had no faith in the compass: how could a brass box--that is what they called it--tell us where we could find *feijão*? It was beyond them to understand it. They bemoaned themselves incessantly, swearing at the day they had been persuaded to come along with me and leave their happy homes in order to die of starvation in the forest with a mad Englishman! And why did we go across the forest at all, where there was no trail, when we could have gone down by the river on a trading boat?

On September 6th it was all I could do to wake up my men. When they did wake, they would not get up, for they said the only object in getting up was to eat, and as there was nothing to eat there was no use in getting up. They wanted to remain there and die.

I had to use a great deal of gentle persuasion, and even told them a big story--that my *agulha* or needle (the compass) was telling me that morning that there was plenty of *feijão* ahead of us.

We struggled on kilometre after kilometre, one or another of us collapsing under our loads every few hundred metres. We went over very hilly country, crossing eight hill ranges that day with steep ravines between. In fact, all that country must once have been a low tableland which had been fissured and then eroded by water, leaving large cracks. At the bottom of each we found brooks and streamlets of delicious water. Of the eight rivulets found that day one only was fairly large. It fell in little cascades over rock. We could see no fish in its waters.

The forest was fairly clean underneath, and we had no great difficulty in getting through, a cut every now and then with the knife being sufficient to make a passage for us. I had by that time entirely given up the idea of opening a regular *picada*, over which I could eventually take the men and baggage I had left behind.

We found that day a palm with a bunch of small nuts which Benedicto called *coco do matto*; he said they were delicious to eat, so we proceeded to cut down the tall palm tree. When we came to split open the small *cocos* our disappointment was great, for they merely contained water. There was nothing whatever to eat inside the hard shells. We spent some two hours that evening cracking the *cocos*--some two hundred of them--each nut about the size of a cherry. They were extremely hard to crack, and our expectant eyes were disappointed two hundred times in succession as we opened every one and found nothing whatever to eat in them.

We were beginning to feel extremely weak, with a continuous feeling of emptiness in our insides. Personally, I felt no actual pain. The mental strain, perhaps, was the most trying thing for me, for I had no idea when we might find food. I was beginning to feel more than ever the responsibility of taking those poor fellows there to suffer for my sake. On their side they certainly never let one moment go by during the day or night without reminding me of the fact.

On September 7th I had the greatest difficulty in getting the men out of their hammocks. They were so exhausted that I could not rouse them. We had had a terrific storm during the night, which had added misery to our other sufferings. Innumerable ants were now causing us a lot of damage. Filippe's coat, which had dropped out of his hammock, was found in the morning entirely destroyed. Those miniature demons also cut the string to which I had suspended my shoes in mid-air, and no sooner had they fallen to the ground than the ants started on their mischievous work. When I woke up in the morning all that remained of my shoes were the two leather soles, the upper part having been completely destroyed.

Going through the forest, where thorns of all sizes were innumerable, another torture was now in store for me. With pieces of string I turned the soles of the shoes into primitive sandals; but when I started on the march I found that they hurt me much more than if I walked barefooted. After marching a couple of kilometres, my renovated foot-gear hurt me so much in going up and down the steep ravines that I took off the sandals altogether and flung them away.

That day we went over eleven successive hill ranges and crossed as many little streamlets between them. My men were terribly downhearted. We had with us a Mauser and two hundred cartridges, but although we did nothing all day long but look for something to kill we never heard a sound of a living animal. Only one day at the beginning of our fast did I see a big *mutum*--larger than a big turkey. The bird had never seen a human being, and sat placidly perched on the branch of a tree, looking at us with curiosity, singing gaily. I tried to fire with the Mauser at the bird, which was only about seven or eight metres away, but cartridge after cartridge missed fire. I certainly spent not less than twenty minutes constantly replenishing the magazine, and not a single cartridge went off. They had evidently absorbed so much moisture on our many accidents in the river and in the heavy rain-storms we had had of late, that they had become useless.

While I was pointing the gun the bird apparently took the greatest interest in my doings, looked at me, stooping down gracefully each time that the rifle missed fire, singing dainty notes almost as if it were laughing at me. The funny part of it all was that we eventually had to go away disappointed, leaving the bird perched on that very same branch.

As the days went by and we could find nothing to eat, my two men lost their courage entirely. They now refused to suffer any longer. They said they had not the strength to go back, so they wanted to lie down and die. Many times a day did I have to lift them up again and persuade them gently to come on another few hundred metres or so. Perhaps then we might find the great river Madeira, where we should certainly meet traders from whom we could get food.

Filippe the negro was a great smoker. He had brought some tobacco with him, and he had so far smoked all the time. He said that as long as he had a cigarette in his mouth he did not feel the pangs of hunger quite so much.

Since my return to civilization I have been constantly told by smokers that if I had been a smoker too I might have suffered less than I did. Now let me tell you what happened to smoker Philippe when his tobacco came to an end on that painful march. Philippe became a raving lunatic, and in a fit of passion was about to stick right through his heart the large knife with which we cut our way through the forest. I had quite a struggle in order to get the knife away from him, and an additional strain was placed upon my mind by keeping a constant watch on the knife so that it could not be used for suicidal purposes.

Poor Benedicto, who was of a less violent nature, from morning to night implored to be killed. The two together moaned and groaned incessantly, and accused me a hundred times a day of taking them there on purpose to die. They certainly made me feel the full and heavy weight of our tragic position. The mental strain of leading along those two poor fellows was indeed much more trying to me than the actual lack of food.

In order to save as much as possible of the baggage we carried, I promised Philippe and Benedicto a considerable present of money if they were able to take the stuff until we reached the Madeira River.

Late in the afternoon of September 7th, as we were on a high point above the last range of hills met that day, a large panorama opened before us, which we could just see between the trees and foliage of the forest.

To obtain a full view of the scenery it was necessary to climb up a tree. I knew well that we could not yet have reached the river we were looking for, but perhaps we were not far from some large tributary of the Madeira, such as the Secundury.



Climbing up trees in the Brazilian forest was easier said than done, even when you possessed your full strength. So many were the ants of all sizes which attacked you with fury the moment you embraced the tree, that it was not easy to get up more than a few feet.

When we drew lots as to whom of us should climb the tree, Benedicto was the one selected by fate. Benedicto was certainly born under an unlucky star; when anything nasty or unpleasant happened to anybody it was always to poor Benedicto. After a lot of pressing he proceeded to go up the tree, uttering piercing yells as every moment great *sauba* ants bit his arms, legs or body. He was brave enough, and slowly continued his way up until he reached a height of some 30 ft. above the ground, from which eminence he gave us the interesting news that there were some high hills standing before us to the west, while to the north-west was a great flat surface covered by dense forest.

No sooner had Benedicto supplied us with this information from his high point of vantage than we heard an agonising yell and saw him spread flat on the ground, having made a record descent.

Filippe and I, although suffering considerably, were in fits of laughter at Benedicto, who did not laugh at all, but pawed himself all over, saying he must have broken some bones. When I proceeded to examine him I found upon his body over a hundred *sauba* ants clinging to his skin with their powerful clippers.

Aching all over, poor Benedicto got up once more. I put the load upon his back and we resumed our journey, making a precipitous descent almost *à pic* down the hill side. Our knees were so weak that we fell many times and rolled down long distances on that steep incline. At last we got to the bottom, rejoicing in our hearts that we had no more hills to climb, as I had made up my mind that I would now march slightly to the north-west, so as to avoid the hilly region which Benedicto had discovered to the west.

My men had an idea that the great river we were looking for must be in that plain. For a few hours they seemed to have regained their courage. We heard some piercing shrieks, and we at once proceeded in their direction, as we knew they came from monkeys. In fact we found an enormously high tree, some 5 ft. in diameter. Up on its summit some beautiful yellow fruit stared us in the face. Four tiny monkeys were busy eating the fruit. Benedicto, who had by that time become very religious, joined his hands and offered prayers to the Virgin that the monkeys might drop some fruit down, but they went on eating while we gazed at them from below. We tried to fire at them with the Mauser, but again not a single cartridge went off. Eventually the monkeys dropped down the empty shells of the fruit they had eaten. With our ravenous appetite we rushed for them and with our teeth scraped off the few grains of sweet substance which remained attached to the inside of the shells. We waited and waited under that tree for a long time, Philippe now joining also in the prayers. Each time a shell dropped our palates rejoiced for a few moments at the infinitesimal taste we got from the discarded shells. It was out of the question to climb up such a big tree or to cut it down, as we had no strength left.

We went on until sunset; my men once more having lost heart. Brazilians lose heart very easily. At the sight of small hills before them, a steep descent, or a deep river to cross, they would lie down and say they wanted to remain there and die. Philippe and Benedicto did not carry more than 20 lb. each of my own baggage, but their hammocks weighed some 20 lb. each, so that their loads weighed altogether about 40 lb.

We went on, crossing five more streamlets that afternoon, of which one, 2 m. wide, had beautifully limpid water. We nevertheless went on, until eventually after sunset we had to camp near a stream of filthy water. We did not mind that so much, because, contrary to the popular idea that while you are starving you require a great deal of water, I found that during those days of starvation both my men and myself hardly ever touched water at all. Personally I am accustomed to drink only with my meals, and as I had no meals at all I never had the slightest wish to drink. My men, however, who while on the river, for instance, when we had plenty of food, drank perhaps twenty times a day from the stream, now that they were starving only seldom touched the water, and when they did, only in very small quantities. I do not suppose that my men during the entire period

of starvation drank on an average more than a wineglass of water a day. Personally I know that I never drank more than half a tumbler or less in the twenty-four hours during that time. Under normal circumstances I drink about a quart of water a day. The water, I may say, was plentiful all the time, and, barring a few occasions, such as on that particular night, most excellent.

As we had now been four entire days without eating anything at all, I thought it was high time to open the valuable tin of anchovies--the only one in our possession. We had a terrible disappointment when I opened the tin. I had purchased it in S. Manoel from Mr. Barretto. To our great distress we discovered that instead of food it contained merely some salt and a piece of slate. This was a great blow to us. The box was a Brazilian counterfeit of a tin of anchovies. How disheartening to discover the fraud at so inopportune a moment! I had reserved the tin until the last as I did not like the look of it from the outside. We kept the salt--which was of the coarsest description.

On September 8th we were slightly more fortunate, as the country was flatter. I was steering a course of 290° b.m. (N.W.). I found that farther south we would have encountered too mountainous a country.

We crossed several streamlets, the largest 3 m. wide, all of which flowed south. We had no particular adventure that day, and considering all things, we marched fairly well--some 20 kil. Towards the evening we camped on a hill. When we got there we were so exhausted that we made our camp on the summit, although there was no water near.

On September 9th, after marching for half an hour we arrived at a stream 15 m. wide, which I took at first to be the river Secundury, a tributary of the Madeira River. Near the banks of that stream we found indications that human beings had visited that spot--perhaps the Indians we had heard so much about. The marks we found, however, were, I estimated, about one year old. Although these signs should have given us a little courage to go on, we were so famished and exhausted that my men sat down on the river bank and would not proceed. By that time we had got accustomed even to the fierce bites of the ants. We had no more strength to defend ourselves. In vain we strained our eyes all the time in search of wild fruit. In the river we saw plenty of fish; we had a fishing-line with us, but no bait whatever that we could use. There are, of course, no worms underground where ants are so numerous. We could not make snares in the river, as it was much too deep. So we sat with covetous eyes, watching the fish go by. It was most tantalising, and made us ten times more hungry than ever to be so near food and not be able to get it.

It is curious how hunger works on your brain. I am not at all a glutton, and never think of food under ordinary circumstances. But while I was starving I could see before me from morning till night, in my imagination, all kinds of delicacies--caviare, Russian soups, macaroni au gratin, all kinds of refreshing ice-creams, and plum pudding. Curiously enough, some days I had a perfect craving for one particular thing, and would have given anything I possessed in the world to obtain a morsel of it. The next day I did not care for that at all, in my imagination, but wanted something else very badly. The three things which I mostly craved for while I was starving were caviare, galantine of chicken, and ice-cream--the latter particularly.

People say that with money you can do anything you like in the world. I had at that time on my person some £6,000 sterling, of which £4,000 was in actual cash. If anybody had placed before me a morsel of any food I would gladly have given the entire sum to have it. But no, indeed; no such luck! How many times during those days did I vividly dream of delightful dinner and supper parties at the Savoy, the Carlton, or the Ritz, in London, Paris, and New York! How many times did I think of the delicious meals I had had when a boy in the home of my dear father and mother! I could reconstruct in my imagination all those meals, and thought what an idiot I was to have come there out of my own free will to suffer like that. My own dreams were constantly interrupted by Benedicto and Filippe, who also had similar dreams of the wonderful meals they had had in their own houses, and the wonderful ways in which their *feijãozinho*--a term of endearment used by them for their beloved beans--had been cooked at home by their sweethearts or their temporary wives.

"Why did we leave our *feijãozinho*"--and here they smacked their lips--"to come and die in this rotten country?"

All day I heard them talk of *feijãozinho*, *feijãozinho*, until I was wearied to distraction by that word--particularly as, even when starving, I had no desire whatever to eat the beastly stuff.

The negro Filippe and Benedicto were really brave in a way. I tried to induce them all the time to march as much as we could, so as to get somewhere; but every few moments they sat or fell down, and much valuable time was wasted.

In a way it was amusing to watch them--poor Benedicto particularly, who every few minutes would take out a little pocket looking-glass to gaze at his countenance.

"Am I not thin?" he would ask me a dozen times a day. "I have never been so thin before. If I had not come with you I should not be so thin. It is all because we have no food that I am so thin.... If I had not met you I would never have been so thin!"--and so on all day.

I reminded him that when we were travelling on the river he had complained of baling the water out of the canoe and preferred to travel overland; now that we were travelling overland he had a new complaint to make. It was quite unreasonable. He was not the only one to get thin; we were all getting thin.

Benedicto greatly objected to carry the 15 lb. weight of glass negatives, but he did not mind at all carrying a lot of useless things of his own, which weighed an extra 20 lb. or so!

Since my return I have been constantly asked why, when we were starving, we did not eat the grass in the forest; why we did not feed on the leaves or roots of the trees? If we could find no fruit, why did not we eat monkeys or birds or other animals? why did not we dig for worms and feed on them?

As I have already stated, there were no worms in the forest because of the ants, which allow no insect to be underground near the surface. As for the grass, it takes no very intelligent person to see that it cannot exist under the trees of the tropical forest. If a few blades of grass are to be found on the edge of streamlets it does not follow that you can eat them. That grass is usually poisonous. The same may be said of the leaves and roots of trees, even admitting that you could reach the former--which is not the case, as the leaves are usually at a great height upon the trees, and when you are starving you have not the strength to climb up. It also follows that where there is no edible fruit there can be no birds or monkeys, as animals generally have enough sense not to settle where there is nothing to eat.

Again, even allowing that some rare trees, the fruit of which was edible, were to be found, it does not do to lose sight of the fact that you may be passing under that tree at the season when it is not bearing fruit, as fruit-trees, even in tropical countries, do not always bear fruit at a time to suit the convenience of the passing traveller.

As I have said, the country we were traversing was there hilly and rocky, and we were cutting across the headwaters of numerous tributaries, first of the Tapajoz River, then of the Madeira River--the tiny watercourses, most of them only a few inches wide, descending in numerous successive small cascades over rocks--therefore no fish was to be found. When we did find it in the big rivers we had no way to catch it.

It then again follows, concerning the country between great rivers, that where there is no fish, no game, no fruit, no vegetables, and no possible way of cultivating the land, there can be no inhabitants. That was why the great Brazilian forest in that region was uninhabited by human beings.

It was rather pathetic, looking back on those days, to think of the small cooking pot I carried during that time

of starvation in hopes that we might find something to cook. Its weight was not great, but it was a cumbersome thing to carry, as it dangled about and caught in all the vegetation.

As the days went by and our strength got less and less every hour, I decided not to cut the forest any more, but to go through without that extra exertion. As I could not trust my men with the big knife, I had to carry it myself, as occasionally it had to be used--especially near streams, where the vegetation was always more or less entangled.

That evening (September 9th) we had halted at sunset--simply dead with fatigue and exhaustion. The *sauba* ants had cut nearly all the strings of Filippe's hammock; while he was resting peacefully on it the remainder of the strings broke, and he had a bad fall. He was so exhausted that he remained lying on the ground, swarming all over with ants and moaning the whole time, having no strength to repair the hammock.

When Filippe eventually fell into a sound slumber I had a curious experience in the middle of the night. I was sleeping in my improvised hammock, when I felt two paws resting on my body and something sniffing in my face. When I opened my eyes I found a jaguar, standing up on its hind paws, staring me straight in the face. The moment I moved, the astonished animal, which had evidently never seen a human being before, leapt away and disappeared.

I find that people have strange ideas about wild animals. It is far from true that wild beasts are vicious. I have always found them as gentle as possible. Although I have seen nearly every wild beast that it is possible for man to see in the world, I have never once been attacked by them, although on dozens of occasions I have come into close contact with them. I invariably found all wild animals--except the African buffalo--quite timid and almost gentle, unless, of course, they have been worried or wounded. These remarks do not apply to wild animals in captivity.

On September 10th--that was the seventh day of our involuntary fast--we had another dreary march, again without a morsel of food. My men were so downhearted that I really thought they would not last much longer. Hunger was playing on them in a curious way. They said that they could hear voices all round them and people firing rifles. I could hear nothing at all. I well knew that their minds were beginning to go, and that it was a pure hallucination. Benedicto and Filippe, who originally were both atheists of an advanced type, had now become extremely religious, and were muttering fervent prayers all the time. They made a vow that if we escaped alive they would each give £5 sterling out of their pay to have a big mass celebrated in the first church they saw.

They spoke in a disconnected way, and looked about in a dazed condition, alternating hysterical laughter with abundant tears. After Filippe's tobacco had come to an end he had become most dejected, all the time wishing to commit suicide.

"What is the use of more suffering?" he exclaimed fifty times a day. "Let me die quickly, as I can stand the pain no more!" Then all of a sudden his eyes would shine, he would prick up his ears, crying: "We are near people!--we are near people! I can hear voices! Let us fire three shots" (the signal all over Central Brazil of an approaching stranger or of help required), "so that people can come to our assistance!"

That was much easier said than done, because none of our cartridges would go off. We had one box of matches left. We had taken several boxes of them, but Filippe had used them all in lighting his cigarettes, and we had only one left, which I guarded with much care. To please my men we lighted a big fire, and in it we placed a number of cartridges so that they should explode. In fact some of them actually did explode, and my men strained their ears in order to discover responding sounds. But no sounds came, although they imagined they could hear all kinds of noises.

At this place I abandoned the few cartridges we had, as they were absolutely useless. They were Mauser

cartridges which I had bought in Rio de Janeiro, and it is quite possible that they were counterfeits.

Taking things all round, my men behaved very well, but these were moments of the greatest anxiety for me, and I myself was praying fervently to God to get us out of that difficulty. My strength was failing more and more daily, and although I was suffering no actual pain, yet the weakness was simply appalling. It was all I could do to stand up on my legs. What was worse for me was that my head was still in good working order, and I fully realised our position all the time.

The country we were travelling over was fairly hilly, up and down most of the time, over no great elevations. We passed two large tributaries of the main stream we had found before, and a number of minor ones. The main stream was strewn with fallen trees, and was not navigable during the dry season. The erosion of the banks by the water had caused so many trees to fall down across it that no canoe could possibly go through.

I noticed in one or two places along the river traces of human beings having been there some years before.

In the afternoon we again wasted much energy in knocking down two palm-trees on the summit of which were great bunches of *coco do matto*. Again we had a bitter disappointment. One after the other we split the nuts open, but they merely contained water inside shells that were much harder to crack than wood. My craving for food was such that in despair I took two or three *sauba* ants and proceeded to eat them. When I ground them under my teeth their taste was so acidly bitter that it made me quite ill. Not only that, but one *sauba* bit my tongue so badly that it swelled up to a great size, and remained like that for several days. The entire genus of the *Sauba* (*Oecodonia cephalotes*) ant is typical of tropical South America. The largest *Sauba* is about an inch long, and possesses powerful scissor-like clippers, with which it can destroy any material, such as leather, cloth, paper or leaves, in a very short time. Their method of work is to cut up everything into circles. I remember one day dropping on the ground a pair of thick gloves. When I went to pick them up I found them reduced to a heap of innumerable little discs--each as large as a sixpenny coin. It is with those powerful clippers that the *Saubas*, having climbed in swarms up a tree, proceed to despoil it of its foliage. The work is done in a systematic way, each ant quickly severing one leaf and carrying it down, banner-like, vertically above its head, tightly held between its strong mandibles.

It is this habit of the *Saubas* which has brought upon them the Brazilian name of *Carregadores*, or carriers. One sees everywhere in that country long processions of those destructive insects, each individual marching along quickly with its green vegetable banner, sometimes eight or ten times its own size and weight. In many cases the *Saubas* working aloft cut the leaves and drop them on the ground, where other carriers are waiting to convey them away. So numerous are the *Saubas* that in the forest one can hear distinctly the incessant rustling sound of their clippers at work. The *Saubas* use the leaves in order to construct thatched waterproof roofs over the domes and turrets at the entrances of their extensive subterranean galleries, which would otherwise become flooded during the torrential rains prevalent in those latitudes. The roofs are constructed with wonderful skill, each leaf being held in its place by granules of earth. The galleries, of immense length and much ramified, are often as much as 10 to 15 cm. in diameter. The entrances to them are usually kept blocked, and are only opened when necessary. Above ground the *Saubas* make wonderful wide roads, thousands of which can be seen everywhere in the forest, and upon which endless processions go by day and night. The workers of the *Saubas* can be divided into three orders not very clearly defined, as units of intermediate grades are constantly met. The largest of those workers possess extraordinarily massive, double-humped heads, highly polished in the case of members which are visible on the surface, and dull and hairy in the giant fellows which spend their lives within the subterranean passages. These hairy *Saubas* display a single frontal eye--not found in any of the other *Saubas*, and, as far as I know, in no other kind of ant. They never come to the surface except when attacks are made upon the galleries. Great excitement is shown in the colonies when the winged ants, of extra large size--especially the females--start out on their errand of propagating the race.

The workers with polished heads--fierce-looking brutes--do very little actual work, but seem to be the superiors and protectors of the smaller workers. In every case the body of all orders of *Saubas* is solidly built,

with the thorax and head protected by spikes.

Much as I disliked the Saubas for the endless trouble and suffering they inflicted upon me, I could not help admiring their marvellous industry and energy. No agriculture is possible where the Saubas are to be found, and even where they do not exist in Central Brazil, if agriculture were started they would soon invade the territory and destroy everything in a short time. Foreign plants do not escape. No way has been found yet of extirpating them.

**CHAPTER XX**

Benedicto and the Honey--Constantly collapsing from Exhaustion--A Strange Accident--Finding a River--People's Mistaken Ideas--Sixteen Days of Starvation--An Abandoned Hut--Repairing a Broken-down Canoe--Canoe founders--A Raft constructed of Glass

ON September 11th we had another terrible march, the forest being very dense and much entangled along the stream. We had great trouble in getting through, as there were many palms and ferns, and we had no more strength to cut down our way. We came to a big tree, which was hollow inside up to a great height, and round which were millions of bees.

Benedicto, who was a great connoisseur in such matters, said that high up inside the tree there must be honey. The bees round that tree were unfortunately stinging bees. We drew lots as to who should go inside the tree to get the honey. It fell to Benedicto. We took off most of our clothes and wrapped up his head and legs so that he might proceed to the attack. The job was not an easy one, for in the first reconnaissance he made with his head inside the tree he discovered that the honey must be not less than 20 ft. above the ground, and it was necessary to climb up to that height inside the tree before he could get it. In order to hasten matters--as Benedicto was reluctant in carrying out the job--I tried my hand at it, but I was stung badly by hundreds of bees behind my head, on my eyelids, on my arms and legs. When I came out of the tree I was simply covered with angry bees, which stung me all over. So I told Benedicto that, as Fate had called upon him to do the work, he had better do it.

Benedicto was certainly very plucky that day. All of a sudden he dashed inside the tree and proceeded to climb up. We heard wild screams for some minutes; evidently the bees were protecting their home well. While Filippe and I were seated outside, smiling faintly at poor Benedicto's plight, he reappeared. We hardly recognized him when he emerged from the tree, so badly stung and swollen was his face, notwithstanding the protection he had over it. All he brought back was a small piece of the honeycomb about as large as a florin. What little honey there was inside was quite putrid, but we divided it into three equal parts and devoured it ravenously, bees and all. A moment later all three of us were seized with vomiting, so that the meagre meal was worse than nothing to us.

We were then in a region of innumerable liane, which hung from the trees and caught our feet and heads, and wound themselves round us when we tried to shift them from their position. Nearly all the trees in that part had long and powerful spikes. Then near water there were huge palms close together, the sharp-edged leaves of which cut our hands, faces and legs as we pushed our way through.

A violent storm broke out in the afternoon. The rain was torrential, making our march extremely difficult. It was just like marching under a heavy shower-bath. The rain lasted for some three hours. We crossed one large stream flowing west into the Secundury, and also two other good-sized streamlets.

We had a miserable night, drenched as we were and unable to light a fire, the box of matches having got wet and the entire forest being soaked by the torrential storm. During the night another storm arrived and poured regular buckets of water upon us.

On September 12th we drowsily got up from our hammocks in a dejected state. By that time we had lost all hope of finding food, and no longer took the trouble to look round for anything to eat. We went on a few hundred metres at a time, now Benedicto fainting from exhaustion, then Filippe, then myself. While one or another was unconscious much time was wasted. Marching under those conditions was horrible, as either one or other of us collapsed every few hundred metres.

Another violent storm broke out, and we all lay on the ground helpless, the skin of our hands and feet getting shrivelled up with the moisture.

My feet were much swollen owing to the innumerable thorns which had got into them while walking barefooted. It was most painful to march, as I was not accustomed to walk without shoes.

We went only ten kilometres on September 12th. We crossed two small rivers and one large, flowing west and south, evidently into the Secundury.

On September 13th we had another painful march, my men struggling along, stumbling and falling every little while. They were dreadfully depressed. Towards the evening we came to a big tree, at the foot of which we found some discarded shells, such as we had once seen before, of fruit eaten by monkeys. My men and I tried to scrape with our teeth some of the sweet substance which still adhered to the shells. We saw some of the fruit, which was fit to eat, at a great height upon the tree, but we had not the strength to climb up or cut down that enormous tree.

All the visions of good meals which I had had until then had now vanished altogether on that tenth day of fasting, and I experienced a sickly feeling in my inside which gave me an absolute dislike for food of any kind. My head was beginning to sway, and I had difficulty in collecting my ideas. My memory seemed to be gone all of a sudden. I could no longer remember in what country I was travelling, nor could I remember anything distinctly. Only some lucid intervals came every now and then, in which I realised our tragic position; but those did not last long, all I could remember being that I must go to the west. I could not remember why nor where I intended to come out.

Everything seemed to be against us. We were there during the height of the rainy season. Towards sunset rain came down once more in bucketfuls and lasted the entire night, the water dripping from our hammocks as it would from a small cascade. We were soaked, and shivering, although the temperature was not low. I had my maximum and minimum thermometers with me, but my exhaustion was such that I had not the strength to unpack them every night and morning and set them.

We crossed two streamlets flowing west. Benedicto and Filippe were in such a bad way that it was breaking my heart to look at them. Every time they fell down in a faint I never knew whether it was for the last time that they had closed their eyes. When I felt their hearts with my hand they beat so faintly that once or twice I really thought they were dead. That day I myself fainted, and fell with the left side of my face resting on the ground. When I recovered consciousness some time later, I touched my face, which was hurting me, and found that nearly the whole skin of my cheek had been eaten up by small ants, the lower lid of the eye having suffered particularly. A nasty sore remained on my face for some two months after that experience, the bites of those ants being very poisonous.

Bad as they were, there is no doubt that to a great extent we owed our salvation to those terrible ants. Had it not been for them and the incessant torture they inflicted on us when we fell down upon the ground, we should have perhaps lain there and never got up again.

I offered Benedicto and Filippe a large reward if they continued marching without abandoning the precious loads. Brazilians have a great greed for money, and for it they will do many things which they would not do otherwise.

On September 14th we made another most painful march of 20 kil., again up and down high hills, some as much as 300 ft. above the level land of that country, and all with steep, indeed, almost vertical, sides, extremely difficult for us to climb in our exhausted condition. We saw several streamlets flowing west. When evening came we had before us a high hill, which we ascended. When we reached the top we just lay upon the ground like so many corpses, and, ants, or no ants biting us, we had not the energy to get up again. Once more did the rain come down in torrents that night, and to a certain extent washed the ants from our bodies.

My surprise was really great the next morning when I woke up. I felt myself fading away fast. Every time I



closed my eyes I expected never to open them again.

On September 15th we made another trying march, collapsing under our loads every few hundred metres. My men were constantly looking for something to eat in all directions, but could find nothing. Benedicto and Filippe were now all the time contemplating suicide. The mental strain of perpetually keeping an eye on them was great.

We were sitting down, too tired to get up, when Filippe amazed me considerably by the following words, which he spoke in a kind of reverie:

"It would be very easy," he said, "now that you have no more strength yourself, for us two to get the big knife and cut your throat. We know that you have a big, big sum of money upon you, and if we robbed you we would be rich for ever. But we do not want to do it. It would not be much use to us, as we could not get out of the forest alone. I believe we shall all die together, and all that money will go to waste."

Filippe said this in quite a good-natured manner. The two poor fellows were so depressed that one had to forgive them for anything they said.

As the river seemed to describe a big loop, I had left it three days before, seeing plainly by the conformation of the country that we should strike it again sooner or later. We were marching once more by compass. My men, who had no faith whatever in the magnetic needle, were again almost paralysed with fear that we might not encounter the stream again. A thousand times a day they accused me of foolishness in leaving the river, as they said it would have been better to follow its tortuous course--notwithstanding the trouble we had in following it, owing to the dense vegetation near the water--rather than strike once more across country. They were beginning to lose heart altogether, when I told them I could see by the vegetation that we were once more near the water. Anybody accustomed as I am to marching through the forest could tell easily by the appearance of the vegetation some miles before actually getting to a stream.

I reassured my companions, saying that within a few hours we should certainly meet the "big water" again. In fact, not more than half an hour afterwards we suddenly found ourselves once more on the large stream--at that point 70 metres wide.

My men were so amazed and delighted that they embraced me and sobbed over my shoulders for some time. From that moment their admiration for the compass was unbounded; they expected me to find anything with it.

With gladdened hearts we followed the stream again, Benedicto and Filippe shouting at the top of their voices for help in case anybody were near. But they called and called in vain. We listened, but not a sound could be heard, except perhaps that of a crashing tree in the forest--a sound very familiar when marching across Brazil.

The right bank of the Secundury river was high, not less than from 30 to 40 ft., and extremely steep, formed of alluvial deposits with a thick surface layer of decayed vegetation, making a soft carpet. Two small tributary streams had cut deep grooves in the soft earth. In our weak condition we had the greatest trouble in going down the almost vertical banks and climbing up again on the other side.

On September 16th we followed the river once more, crossing three tributaries, the largest of which was 4 m. wide. The forest was beautifully clean underneath, just like a well-kept park. The stems of the trees were as clean as possible up to a great height, the foliage forming a regular roof over us through which little light and only exhausted air penetrated.

Although we could find nothing whatever to eat, my men were not so depressed that day, as they expected to find some living people sooner or later. I did not like to disappoint them, although the fact that we could find

no signs of human creatures having recently gone through that region showed me plainly that we were yet far away from salvation.

Another formidable rainstorm came down upon us in the morning, the water descending in regular sheets. We were so exhausted that we did not care for anything any more. Whether we got wet or dry was quite immaterial to us.

I was so conscious of my utmost exhaustion that I felt I could not now last much longer under that heavy strain. Every fifty or a hundred metres I collapsed under my load, and had the greatest struggle to get up on my feet again. Those marches were most tragic, my men being, if possible, in a worse condition than me, they, too, collapsing every few steps. Thus in a day we each collapsed dozens of times. That was the thirteenth day we had had no food whatever, barring perhaps a grain of salt from the fraudulent anchovy tin, which I had preserved in a piece of paper.

I felt no actual pain, only great emptiness in my inside, and a curious feeling of nausea, with no wish whatever to eat or to drink. Although water was plentiful we hardly touched it at all--only a few drops to moisten our feverish lips. That fact interested me greatly, as it was absolutely contrary to people's notions of what happens when you are starving. All I experienced was indescribable exhaustion. I felt myself gradually extinguishing like a burnt-out lamp.

Benedicto and Filippe had dreadful nightmares during the night, and occasionally gave frantic yells. That night Filippe all of a sudden startled us crying out for help; a moment later he collapsed in a faint. When he recovered I asked him what was the matter; he said in a dazed way that there were people all round us bringing plenty of food to us--an hallucination which was soon dispelled when he returned to his senses.

On September 17th we had another painful march without finding a grain of food to eat. Again we started our day with a severe thunderstorm, the water coming down upon us in bucketfuls. Benedicto and Filippe were fervently praying the Almighty to strike them down by lightning so as to end the daily torture.

The strain of leading those fellows on was getting almost too much for me. The greatest gentleness had to be employed, as an angry word would have finished them altogether, and they would have laid down to die.

The rain came down in such torrents that day, and we were so soaked, that we had to halt, we three huddling together to try and protect ourselves under the waterproof sheet which I used at night as a hammock. When we went on I noticed a cut in a tree which had been made some years before. I soon discovered the tracks which had been followed by the person who had made that cut, and soon after I discovered another mark of a knife upon another rubber tree. Evidently somebody had been there prospecting. We followed the ancient track for some distance in a most winding way--those marks, I judged, having been made about four years before.

My men were depressed to the utmost degree when, on following the track of the stranger, we discovered the spot on the river where he had evidently once more got into his canoe and gone. One more hope of salvation shattered!

Curiously enough, upon that fourteenth day of starving my strength got up again to a certain extent, although I still had no wish whatever to eat; but my head began to swim with a strange sensation as if the trees of the forest were tumbling down upon me. The impression was so vivid that several times I fell in trying to avoid what I thought was a tree falling upon me.

The swaying of my head seemed to get worse and worse all that day, until the unpleasant sensation of the forest closing in and overwhelming me became intolerable.

In the evening we came in for another storm, the rain being torrential through nearly the entire night. During

the day I had had the optical illusion of trees falling upon me. During the night I had the real thing. The upper part of the tree to which I had tied my hammock came down with a terrific crash during a heavy gust of wind, and just missed my head by a few inches. As it was it tore down my hammock with me inside it, and I received a bump that I shall not forget in a hurry.

We certainly seemed to have no luck whatever on that fateful expedition! Aching all over, soaked right through, water dripping down my hands, nose and hair like so many little fountains, I proceeded to tie my hammock to another tree, while poor Filippe and Benedicto, who had been caught in the foliage and branches of the falling tree, were trying to disentangle themselves from their unpleasant position. The tree had fallen because it had been eaten up internally by ants. When it came down upon us they simply swarmed over us, and bit us all over for all they were worth. I have no wish whatever to have another such miserable night.

On September 18th we lost the whole morning owing to the torrential rain which continued. We had not the strength to go on.

Now that Filippe and Benedicto had absolute faith in my compass, I had again left the river where it described a big turn toward the south-west, and it was not until two o'clock that afternoon that I struck the big stream once more and we followed its right bank.

To our great delight we came to a small clearing where some years before *mandioca* had been cultivated. We threw down our loads at once and proceeded to search for roots. To our great joy we found one small root, about as big as a small carrot. We made a fire. Oh! the anxiety in lighting up that fire, as we only had eight matches left, and they had got damp.

Filippe, who was the expert in striking matches, was entrusted with the job. Alas! he struck and struck time after time the first match against the box until its head was worn off altogether, and no flame was produced. With some anxiety we watched the second match having a similar fate.

The men said that the root we had found was of wild *mandioca*, and if we ate it raw we should certainly all die, but if roasted properly over a flame it lost some of its poisonous qualities. We all had our eyes fixed on that root, and felt the happiest of mortals, as if the most expensive banquet had all of a sudden been placed before us. It was a great relief when Filippe struck the third match and it actually produced a flame. We lighted a fire, roasting the valuable root upon it.

Benedicto, who was the culinary expert, roasted the root until it was nearly carbonized, and by the time he took it out of the flame we had each of us left for our share a section of its fibrous core not larger than a well-smoked cigarette stump.

We devoured that luxurious meal in haste. It tasted as bitter as aloes. No sooner had I eaten it than I felt extremely ill, my men also experiencing a similar sensation. Benedicto was the first one to vomit painfully and cough violently; then came my turn, then Filippe's. So our first meal was not much of a success.

The little strength we had seemed now to have disappeared altogether. We lay helpless upon the bank of the river, unable to move. Once or twice Filippe shouted for help, thinking that our voices might be heard, but no answer ever came to our cries.

Eventually we proceeded once more along the right bank of the river, when we perceived on the opposite bank an abandoned hut. The river at that point was 70 m. wide, from 4 to 5 ft. deep, with a fairly strong current. We decided to cross over and see if perhaps by chance some food had been abandoned in the hut. It was already evening, and we were so exhausted that we did not dare to cross the stream, especially as Filippe and Benedicto could not swim.

The next day, September 19th, we proceeded to ford the stream, having scarcely the strength to keep erect, especially in the middle of the river with the water up to our necks. We were carrying our loads on our heads, so that they should not get wetter than possible. My negatives were fortunately in air-tight cases, or else they certainly would have been destroyed altogether on that disastrous march across the forest.

We got safely to the other side. The bank was very high. A broken-down canoe had been left on the shore. We worked many hours trying to mend her so that we could proceed down the river. But we wasted the entire day, working feverishly for six or seven hours, trying to stop up great holes as big as my fist, one sleeve of my coat being used for the purpose, and replacing a plank at her stern which was missing.

When we at length summoned our last atom of strength to launch her, she immediately filled with water and went to the bottom like a piece of lead. That was the end of the canoe. We had not the strength to float her again.

Building a raft was impossible, as no wood was found that floated. In reconnoitring round the hut, to our great joy we discovered some *caju* and some *guyaba* trees; also some more roots of *mandioca* now become wild.

That was our sixteenth day of fasting, and it can well be imagined how quickly we devoured what little unripe fruit was hanging from the trees. Once more we tried the experiment of cooking the *mandioca* roots. We had now only five matches left. It was curious to note with what care we prepared dried wood and leaves so that no chance would be lost in getting a flame. Fortunately the first match struck did its work well, and we soon had a big fire inside the hut, on which we roasted the *mandioca*.

As I have explained elsewhere, the fruit of the *caju* has an outward nut which has highly caustic properties, and is deadly poisonous to eat uncooked but quite edible when roasted. After eating all the fruit we kept those nuts and put them on the fire; in the evening we sat down to what seemed to us a luxuriant meal.

We had not patience to wait for the *caju* nuts to be properly roasted. When I ate them my nose, lips, tongue and fingers became badly burned by their caustic juice. No sooner had we eaten that meal than we all became violently ill. I dropped down unconscious, rejecting everything and quantities of blood besides. I must have been unconscious many hours, after which I slept soundly till the sun was well up in the sky, when I found myself resting on the ground with a pool of blood by my side. Poor Philippe and Benedicto were also in a bad way.

On the front of that hut on a piece of board was written "El Paraiso" (Paradise), the name of that place. It was not exactly my idea of Heaven.

Our first meals were worse than no meals at all. We felt in such a plight that we lay helpless upon the floor of the hut, quite unable to move, so exhausted were we. In turning my head around I discovered ten large demijohns, some 2½ ft. high and about 2 ft. in diameter, of thick green glass. They were the usual demijohns--*garaffons*, as they are called--used all over Brazil for "fire-water." I at once conceived the idea of using them as floats in the construction of a raft.

My men grinned contemptuously at the idea when I mentioned it to them. They said that all was over. It was no use trying to get away. The Almighty wanted us to die, and we must only lie there and await our end, which was not far off. Benedicto struggled to his knees and prayed to the Almighty and the Virgin, sobbing bitterly all the time.

I struggled up on my feet and proceeded to carry the big vessels to the river bank, where I intended to construct the raft. The effort to take each heavy bottle those few metres seemed almost beyond me in my exhausted state. At last I proceeded to strip the floor of the hut, which had been made with split *assahy* palms (*Euterpe oleracea* L.), in order that I might make a frame to which I could fasten the bottles. With a great deal

of persuasion I got Filippe and Benedicto to help me. The long pieces of *assahy* were too heavy for our purpose, and we had the additional trouble of splitting each piece into four. It was most trying work in our worn-out condition. Then we had to go into the forest and collect some small liane, so that we could tie the pieces together, as we had no nails and no rope.

On September 20th, again without food--for we had eaten up all the fruit the previous day--we worked from morning till night in building the raft. Unfortunately, Benedicto stumbled against one of the bottles, which was on the edge of the river; it rolled down the steep bank and floated quickly down stream, and we saw it disappear, unable to go and recover it. So only nine bottles were left.

[Illustration: Raft constructed by the Author in order to navigate the Canuma River with his Two Companions of Starvation.]

I made the raft of a triangular shape, with two parallel diagonal rows of three bottles each at a distance of 3 ft. apart; then one set of two bottles. One single *garaffon* formed the bow of the raft. Naturally I stopped up the necks of the bottles, so that no water should get inside.

While I was constructing the raft I was all the time wondering whether it would have a sufficient floating capacity to carry us three men and our baggage.

When the raft was finished we placed two parallel pieces of *assahy* from one end to the other, on which we could sit astride, with our legs dangling in the water.

The lassitude with which we did our work and tore down part of the hut in order to build that raft, our only way of salvation, was too pitiful to watch. We absolutely had no strength at all. When we pulled the liane to fasten together the different pieces of palm wood we were more exhausted than if we had lifted a weight of 200 lb. As it was, we could not fasten the pieces of wood properly, and when the raft was finished it was indeed a shaky affair.

By sunset on September 20th the raft--strengthened by sundry knots all over--was ready to be launched. I was more proud of her than if I had built a Dreadnought. There we all sat by the side of her, my men looking at her in a sceptical way, saying that it was just as well, perhaps, to try and die drowned instead of dying of starvation.

We took a last glance around to see if we could discover some other fruit or something to eat, but we found nothing. We postponed the launching of our vessel--which I named the *Victory*--until the next morning, as had she perchance had an accident that night--accidents at night seem so much worse than in the daytime--it would have been too severe a blow for us, from which we never could have recovered.

My feet were in such a terrible condition--so full of thorns, so swollen with numberless *jiggers* which had bored channels under my nails and under the soles--that I really felt I could not walk another step. If that raft did not float I knew that we were lost for good.

The entire night I could not sleep, speculating on whether the raft would float or not. As far as I could judge, she seemed to me to have just capacity enough to keep afloat with all of us on board.

**CHAPTER XXI**

The Launching of the Glass Raft--Accidents--The Raft sinking--Saved--Our First Solid Meal--Its Consequences--The Canuma and Secundury Rivers--Marching Back across the Forest to the Relief of the Men left behind--A Strange Mishap--A Curious Case of Telepathy

ON September 21st my men had a great discussion. Their courage failed altogether, as they said they had never before seen a boat of that kind, made of glass bottles, and that, even allowing that she would float at all, if we struck a rock where should we be? They declared that, tired as they were, they preferred to go on struggling on foot through the forest rather than get drowned. With his peculiar reasoning, Benedicto said that it was bad enough to die of starvation, but to die of starvation and get drowned as well was too much for him!

It was decided that we should first of all try whether the raft would bear our weight or not. If she did, we would sail in her. If she did not, I would navigate her and they might go on foot.

It was a moment of great excitement and suspense when we launched the *Victory*. You should have seen the faces of Benedicto and Filippe when she floated on the water as gracefully as a duck. I got on her, and with a punting pole went half-way across the river and back again.

Filippe and Benedicto, who had hardly recovered from their astonishment, professed that it was the cleverest thing they had ever seen, and no Brazilian ever would have had such a brilliant idea. They were now anxious to get on board.

First Filippe came and sat himself in front of me, and I saw with some concern the raft sink down considerably into the water. When Benedicto also entered, the framework of our vessel absolutely disappeared under water and only the short necks of the bottles showed above the surface. As we sat astride on the narrow longitudinal platform we were knee-deep in water. We took another small trip in mid-stream, and then decided that we would put the baggage on board and start at once on our journey down the river.

I went back for the baggage and rolled it all up in the waterproof hammock, then fastened it with pieces of liane to the stern of the raft. Filippe and Benedicto fastened their own things also. Having made ourselves some primitive-looking paddles with the bottom of a small empty barrel we had found, which we attached to two sticks, we made ready to start.

[Illustration: Canoe made of the Bark of the Burity Palm.]

[Illustration: Indians of the Madeira River.]

Filippe and I had already got on board, when Benedicto appeared with a huge punting pole he had cut himself in case we might need it. He was excited over the prospect of having no more walking to do. When he got near he jumped on board so clumsily that the already too heavily laden raft turned over and we were all flung into the water--there 7 ft. deep. When I came to the surface again I just managed to pull the craft ashore and then proceeded to save Benedicto and Filippe, who were struggling in the water, which was too deep for them.

This mishap was unfortunate. My chronometer got full of water and stopped; the aneroids, the camera, all were injured beyond repair. Much to my distress, I also discovered that the watertight cases, which had been knocked about so much of late, had let the water through before I had time to turn the raft the right way up and pull out of the water the baggage which was fastened to it. The four hundred developed negatives had all got soaked. My note-books, too, were drenched through.

Another heavy task was before me now, in order to save all that valuable material. It was to spread everything to dry thoroughly in the wind before it could be packed again.

Filippe and Benedicto were so scared that on no account, they said, would they go on board that raft again. The accident occurred at about nine o'clock in the morning; by one or two o'clock in the afternoon everything was dry and carefully repacked.

We decided to make a fresh start. My feet were so swollen, and with hardly a patch of skin left on them, that I could walk no more. It was agreed that Filippo and Benedicto should go on walking along the left bank as much as possible, while I alone, with the baggage, navigated the river. We would keep in touch by occasional shouts.

I got along pretty well, floating down with the current; but paddling and punting were most difficult, the raft being almost impossible to steer. On several occasions I had narrow escapes, just avoiding striking dangerous rocks--particularly going down a small *corrideira*.

After I had gone about two kilometres I was so exhausted that I called to Filippo to come on board again. Eventually--and I must say that I admired his courage--he came on board, and the two of us proceeded quite well down the stream, one paddling, the other punting.

We got into a small rapid, where the current was strong. We were unfortunately thrown violently against some rocks, the central bottles of our raft receiving a hard knock. One of them cracked badly. I was quite perplexed when my eye caught sight of the radiations in the glass caused by the impact. Then my ear began to notice the sound of the trickling of water getting inside the bottle. With positive concern, as the *garaffon* was gradually filling, I saw the raft getting a bad list to port.

The broken *garaffon* was behind Filippo's back, and he could not see it. He was constantly asking me whether something had gone wrong, as he seemed to feel the water getting higher and higher up his body.

"Is the ship not sinking?" he asked every two minutes. "I now have water up to my waist."

"No, no, Filippo! Go on. It is all right!" were the words with which I kept on urging him.

The cracked bottle had got almost entirely filled with water, and we had such a bad list that the steering became most difficult. Two or three times again we were thrown by the current against other rocks, and another bottle had a similar fate.

"We are sinking, are we not?" shouted Filippo.

"No, no!" said I. "Go on!"

As I said those words it suddenly seemed to me that I heard voices in the distance. Was it Benedicto calling to us? Filippo and I listened. Surely there was somebody singing! We fancied we heard several voices. Had Benedicto met somebody in the forest?

"Benedicto! Benedicto!" we shouted out to him. "Have you found men?"

"No!" came the answer from Benedicto.

All of a sudden Filippo, whose eyes had been scanning the river in front of him, gave a violent jerk which nearly capsized the raft, exclaiming:

"Look! look! There is a canoe!"

"It is a rock," said I, as I screened my eye to look on the dazzling water, upon which the sun glittered so that it

was almost impossible to perceive anything. But, sure enough, as I strained my eyes a second time, I saw something move, and a moment later I heard voices quite distinctly.

Filippe's joy and mine was intense when we perceived that not only one boat, but two--three canoes were approaching.

We had already travelled some eight kilometres on our raft when we came close to the boats we had observed. Their crews stood up in them, rifles in hand, as we floated down. I shouted that we were friends. Eventually they came to our help, their amazement being curious to watch as they got near us--they being unable to understand how we could float down the river merely by sitting on the surface. By that time the raft was almost altogether submerged. When they took us on board, and a portion of the raft came to the surface again, the amusement of those crews was intense.

I explained who we were. The strangers could not do enough for us. In a moment they unloaded the baggage from our craft and put it on board their boats. They halted near the right bank, and on hearing of our pitiful plight immediately proceeded to cook a meal for us.

The people belonged to the rubber-collecting expedition of a trader named Dom Pedro Nunes, who went only once every year with a fleet of boats up to the headwaters of that river in order to bring back rubber. The expedition--the only one that ever went up that river at all--took eight or ten months on the journey there and back. It was really an amazing bit of luck that we should owe our salvation to meeting that expedition in an almost miraculous way, brought about by an extraordinary series of fortunate coincidences.

Had we not constructed that raft--had we not been on board at that moment--we should have missed the expedition and certainly should have died. Had we been following the bank of the river on foot, we never could have seen the boats nor heard them, as the banks were extremely high, and it was never possible to keep close to the stream when marching in the forest; we always had to keep some hundred metres or so from the water in order to avoid the thick vegetation on the edge of the stream. In fact, Benedicto, who was walking in the forest along the stream, had gone past the boats and had neither heard nor seen them. When we shouted out to him he was already a long distance off, a boat sent out to him by Dom Pedro Nunes having to travel nearly 800 m. before it could get up to him and bring him back.

The trader and his men treated us with tender care. We were practically naked when they met us, my attire consisting of the leather belt with the bags of money round my waist, and a small portion of the sleeveless coat, all torn to pieces. Dom Pedro Nunes immediately gave me some clothes, while his men gave garments to Filippe and Benedicto.

Several men rushed about collecting wood, and in a moment a large flame was blazing. The sight of proper food brought back our appetites as by magic. Our ravenous eyes gazed on several big pieces of *anta* (*Tapirus americanus*) meat, through which a stick had been passed, being broiled over the flame. We three starving men did not take our eyes off that meat for a second until the man who was cooking it removed the stick and said the meat was ready. We pounced upon it like so many famished tigers. The meat was so hot that, as we tore away at the large pieces with our teeth, our lips, noses, and fingers were absolutely burned by the broiling fat.

Dom Pedro Nunes gently put his hand in front of me, saying "Do not eat so quickly; it is bad for you." But I pushed him away with what vigour I had left. I could have killed anybody who had stood between that piece of meat and me. I tore at it lustily with my teeth, until there was nothing left of it.

By that time a large bag of *farinha* had been spread before us. We grabbed handfuls of it, shoving them into our mouths as fast as we could.



The sensation of eating--normal food--after such a long fast was a delightful one. But only for a few moments. Pedro Nunes was just handing me a cup of coffee when I dropped down unconscious, rejecting everything with a quantity of blood besides.

When I recovered consciousness, Pedro Nunes said I had been unconscious for a long time. They all thought I was dead. I felt almost unbearable pain in my inside, and a lassitude as if life were about to be extinguished altogether.

It was evidently the reaction, after eating too quickly--and I should like to meet the healthy man who would not eat quickly under those circumstances--and also the relaxation from the inconceivable strain of so many weeks of mental worry.

I well remember how Pedro Nunes and his men, when standing around us just as we began eating that first solid meal, had tears streaming down their cheeks while watching us in our dreadful plight. Once more Pedro Nunes--one of the most kindly men I have ever met--sobbed bitterly when he asked me to take off my clothes and change them for the newer ones he had given me. I removed from my pocket the contents: my chronometer, a notebook, and a number of *caju* seeds which I had collected, and which, caustic or not caustic, would have been our only food until we should have certainly perished.

We heard from Pedro Nunes that it would have taken us at least six or seven days' steady walking before we could get to the first house of rubber collectors. In our exhausted condition we could have never got there. As for the damaged raft, it could not have floated more than a few hours longer--perhaps not so long.

From the spot where I met Pedro Nunes--quite close to the junction of the Canuma River with the Madeira River--going down by river it would have been possible to reach Manaus in two or three days. Dom Pedro Nunes, however, with his expedition, could not return, nor sell me a boat, nor lend me men; so that I thought my best plan was to go back with him up the River Canuma and then the Secundury River, especially when I heard from the trader that the latter river came from the south-east--which made me think that perhaps I might find a spot at its most south-easterly point where the distance would not be great to travel once more across the forest, back to my men whom I had left near the Tapajoz.

Pedro Nunes declined to receive payment for the clothes he had given me and my men, so I presented him with the Mauser I possessed, which he greatly appreciated; while I gave the crew which had rescued us a present of £20 sterling in Brazilian money.

It was most touching to see how some of the rubber collectors employed by Pedro Nunes deprived themselves of tins of jam to present them to us, and also of other articles which were useful to them in order to make us a little more comfortable.

I purchased from Pedro Nunes a quantity of provisions--all of an inferior kind, but they were the best I could get. Among them were six tins of condensed milk, all he possessed, for which I paid at the rate of ten shillings each--the regular price in that neighbourhood. Those tins of milk were a great joy to Benedicto, Filipe and myself.

Although the pain was violent when we ate anything, the craving for food was now quite insatiable, and we could not resist the temptation of eating whatever came under our hands.

Late in the afternoon of that same day we started up the river with Pedro Nunes and his fleet of boats. In the evening, when we camped, the kindness of the trader and his men towards us was most pathetic. Drenching rain fell during the night.

On September 22nd we made an early start. Pedro Nunes went away in a small boat, as he wanted to go and

explore a small tributary of the Secundury. The expedition travelled up the main stream at a great pace, with the many men who were rowing and punting.

Filippe, Benedicto and I suffered horrible internal pains that day owing to our careless eating the previous afternoon.

[Illustration: Caripuna Indians.]

[Illustration: Indian Idols of the Putumayo District.]

I was greatly worried by the man who had been left in charge of the expedition--a man of extreme kindness, but an incessant talker. He spoke so loudly, repeating the same things over and over again, that in my weak state, and accustomed as we were to the deathly silence of the forest, it tired me inexpressibly. His conversation consisted entirely of accusing everybody he knew of being robbers and assassins, and in long descriptions, with numberless figures, to show how he had been robbed of small sums of money by various people he had met in his lifetime.

I presented him with £10 sterling, hoping that he would keep quiet, as that seemed to be the entire sum of which he had been robbed by his relatives and friends; also because on seeing our wretched condition, he had presented me with an enormous pair of shoes, about six sizes too large for me. When I walked in them, especially up and down the steep banks, I lost now one shoe, now the other, so big were they. But I was grateful to him, as he would not take payment for them, and they saved my feet to a certain extent--when I could keep them on--from the thorns, which were numerous in that region.

The prolonged immersion in the water the day before, while we were navigating the raft, and the subsequent rest, had caused my feet to swell enormously, my ankles being about three times their normal size, so swollen were they. I experienced an unbearable pain in my heart, with continuous heart-burning and sudden throbbings, succeeded by spells of exhaustion. Giddiness in my head was constant, and I was so weak that it was all I could do to move. Even the exertion of shifting from one side to the other of the boat on which I was travelling was enough to make me almost collapse with fatigue.

We travelled great distances, going on all day and the greater part of the night, with relays of men, on September 22nd and 23rd.

The Secundury was a stream with an average width of 60 m. and in many places quite deep. It had a great many little springs and streamlets flowing into it between steep cuts in its high embankments, which were of alluvial formation mingled with decayed vegetation. The banks almost all along were from 40 to 50 ft. high. We came across a large tributary on the right side of the river. It was evidently the stream to which we had first come on our disastrous march across the forest, and which I had mistaken for the Secundury. Beyond this river we came across some small rapids, of no importance and quite easy to negotiate by the large boats, although in one or two cases tow-ropes had to be used by the men who had landed in order to pull the boats through.

On September 23rd we passed some easy *corrideiras*. I had slept almost that entire day on the roof of the boat, in the sun. It did me good. Late in the evening, at about seven o'clock, we arrived at a trader's hut, called São José, which was in the charge of a squinting mulatto--a most peculiar fellow.

On September 24th I stayed at the trader's house, spending the whole day drying thoroughly in the sun my notebooks and negatives and repacking them, so that I could leave them at that spot until I could fetch them again. My idea was to walk from that place across the forest once more back to our original point of departure near the Tapajoz River, where I had left the remainder of my party and the main part of my baggage.

A runaway *seringueiro* was induced to accompany me on that errand, while another man remained with faithful Filippe in charge of my valuable possessions. I left with them supplies for three months, which I had purchased from Pedro Nunes' expedition.

On September 25th I went a short distance farther up the river to its most south-easterly point. From there, with two men and provisions for thirty days, bidding goodbye to the men who had saved our lives, we started, still in a weak and exhausted condition, on our march back to the men we had left behind.

We only carried food supplies with us. I had left everything else on the Secundury River. Marching was indeed painful, as I had absolutely no strength, and was in a high fever. I stumbled along in excruciating pain, now losing one shoe, now the other, when they caught in some liana. There were a great many fallen trees in that part of the forest, which gave us no end of trouble, when, exhausted as Benedicto and I were, we had to climb over them or else squeeze under.

So great was my anxiety, however, to get back that, notwithstanding the pain, I marched along, following the new man, who was in good condition. We went 20 kil. that day.

The forest near the Secundury River was at first overgrown with dense vegetation, which gave us a good deal of work and extra exertion; but after that, when we got some distance from the water, the forest was fairly clean, except of course for the fallen trees. We found troublesome ravines of great height where streamlets had cut their way through.

In going down one of those difficult ravines I had an accident which might have been fatal. The ravine, the sides of which were almost vertical, was very narrow--only about 10 m. across. We let ourselves down, holding on to liane. When we reached the bottom we found a tiny brook winding its way between great round boulders, and leaving a space about 2 ft. wide for the water. I proceeded up on the other side, and I had got up to a height of some 30 ft. In order to go up this steep incline I had placed one foot against a small tree while I was pulling myself up by a liana. Unluckily, the liana suddenly gave way. The weight of the load which I had on my shoulders made me lose my balance, so that my body described an entire semicircle. I dropped down head first from that height on the rocks below.

[Illustration: Trading Boats landing Balls of Rubber, River Tapajoz.]

Providence once more looked after me on that occasion. On the flight down I already imagined myself dead; but no--my head entered the cavity between the two rocks against which my shoulders and the load became jammed, while my legs were struggling up in mid-air. I was forced so hard against the two side rocks that I could not possibly extricate myself. It was only when Benedicto and the new man came to my help and pulled me out that we were able to resume our journey--I much shaken and somewhat aching, but otherwise none the worse for that unpleasant fall.

On September 26th my two men were already complaining of their loads. They said they could not go on any more--the man in good health and full of strength rebelling more than poor Benedicto, who was in a weak condition. So that we might march quickly I decided to abandon one bag of flour and eight tins of salt butter. With the lighter loads we marched comparatively well, and went 22 kil. that day with no particular experience worth noticing.

On September 27th we started once more quite early, after a hearty breakfast--notwithstanding the pain which I always had whenever I ate, especially a stabbing pain in my heart which was almost unbearable at times. We crossed several streamlets, one fairly large, all of which flowed into the Secundury. Rain, which came down in torrents, greatly interfered with our march that day, the new man I had employed worrying me all the time, saying that he did not like to march in wet clothes. Benedicto and I could not help laughing at him, as we had not been dry one moment since the beginning of July, and we were now at the end of September. Wet or not

wet, I made the man come along. Finding the forest comparatively clean, we covered another 20 kil. that day. We had a most miserable night, rain coming down in sheets upon us. I was suffering from high fever, chiefly from exhaustion and the effects of over-eating, most injurious to my internal arrangements, which had got dried up during the long sixteen days' fast. I shivered with cold the entire night.

When we got up the next morning, dripping all over, with water still pouring down in bucketfuls upon us from above, Benedicto said that if it went on much longer like that he should surely turn into a fish. He looked comical, with water streaming down from his hair, his ears, nose and coat.

The trousers which our friend Pedro Nunes had given me were made of cheap calico, printed in little checks. They were of the kind that was usually sold to the *seringueiros*, and looked pretty when they were new. But they were a little too small, and had evidently not been shrunk before they were made. With the great moisture that night they shrank so badly all of a sudden that they split in four or five different places. I had no way of mending them.

As we went on--on September 28th--we encountered a great deal of entangled vegetation, many liane and thorns, which completely finished up my lower garments. My coat also, which was of similar material, was beginning to give signs of wear and tear, the sewing of the sleeves and at the back having burst everywhere.

We were going over almost level ground that day, across forest sparsely wooded and with much undergrowth of palms and ferns. We had drenching rain the entire day. My trousers were in shreds, dangling and catching in everything. When we had gone some eight or ten kilometres they were such a trouble to me that I discarded them altogether. The coat, too, was getting to be more of a nuisance than a protection. Owing to the incessant rain we were only able to march 14 kil. that day.

On September 29th we again started off, marching due east. We had slightly better weather, and were fortunate enough to shoot two monkeys, a *coati*, and a *jacú*, the new man possessing a rifle of his own, for which I had bought 200 cartridges from our friend Pedro Nunes. We had, therefore, that day, a good meal of meat; but what terrible pain we felt when we devoured the tough pieces of those animals, which we had broiled over a big flame! Notwithstanding the pain, however, we had an irresistible and insatiable craving for food.

That day we made a good march of 24 kil.

On September 30th the marching was comparatively easy, through fairly clean forest, so that we had to use our knife very little in order to open our way. We crossed a small *campo* with a good deal of rock upon it, and as our strength was gradually coming back we struggled along, covering a distance of 34 kil. between seven o'clock in the morning and seven in the evening. I was anxious to push on as fast as we possibly could, notwithstanding the grumblings of my men, for now that we had abandoned half of our supplies of food I did not want to have, if I could help it, another experience of starvation.

On October 1st we had more trouble cutting our way through, as we again found great ferns and palms, especially near streamlets of water, and quantities of fallen trees, which made us continually deviate from our direction. The forest was indeed dirty and much entangled in that section, and thus made our march painful, liane catching my feet and head all the time, tearing my ears and nose--especially when the man who walked in front of me let them go suddenly and they swung right in my face. Thorns dug big grooves into my legs, arms and hands. To make matters worse, the high fever seemed to exhaust me terribly. Worse luck, a huge boil, as big as an egg, developed under my left knee, while another of equal size appeared on my right ankle, already much swollen and aching. The huge shoes given me by the trader--of the cheapest manufacture--had already fallen to pieces. I had turned the soles of them into sandals, held up by numerous bits of string, which cut my toes and ankles very badly every time I knocked my feet against a tree or stone. My feet were full of thorns, so numerous that I had not the energy to remove them. The left leg was absolutely stiff with the big

boil, and I could not bend it.

Limping along, stumbling all the time in intense pain--the boils being prevented from coming to maturity owing to the constant cold moisture--I really had as painful a time as one could imagine on those long marches back.

On October 2nd we had to cut our way through all the time, still marching due east. We encountered two high hill ranges, which gave us a lot to do as in our weak condition we proceeded to climb them. We had eaten more food than we should have done, and the result was that we now had none left, except a tin of *guyabada* (sweet cheese). I had become almost as improvident as the Brazilians when it came to food, as I could not resist the temptation, and instead of the usual three meals a day we were munching food all the time.

[Illustration: Itaituba.]

The strong fever was wearing me out. The dissatisfaction of my men because we had no more food--it was their own fault, for they had insisted on leaving most of it behind--and their constant grumbling were tiring me to death. We killed a small bird in the evening. By the time we had broiled it over a flame it satisfied but little our ravenous appetites.

On October 3rd we reached quantities of boulders and rocks, which showed me that we were once more approaching the extensive rocky table-land I had seen on our outward journey. As we climbed up higher and higher we came to an elevated streamlet of limpid water running in a channel carved out of the solid rock. It took us over two hours' steady marching, going perhaps some 2½ miles an hour, to cross the summit of that high rocky tableland. Then we descended through *chapada* and found ourselves among a lot of ravines, on the slope of one of which we halted for the night. There we killed two large monkeys, which we proceeded to broil and eat. I never liked the idea of eating monkeys, as I could not get over the feeling that I was eating a child, they looked so human. The hands and arms particularly, after they had been roasted over the fire, looked too human for words.

On October 4th we climbed a steep and rocky hill, crossing on its summit another section of the rocky plateau, a regular dome of grey volcanic rock. Then, descending from this second tableland on its eastern side, we had to struggle and stumble through most rugged country, where I found an extinct circular crater some 50 ft. in diameter and 50 ft. deep, with a vent at an angle in its bottom going apparently to a great depth. Near that spot was also a strange giant natural gateway of rock.

The descent was steep, and most trying for us among the great boulders over which we had to climb on our hands and feet. When we got to the bottom of this elevated country, the forest we found had quite a different aspect, which suggested to me the approach of the big river. We found there plenty of wild fruit, particularly some small black berries--called in Brazilian *pattaõa*--quite good to eat; also some most palatable tiny red cherries. We wasted a good deal of time picking up the fruit instead of marching, my men complaining all day long of an empty stomach. They would not take my advice to march quickly, so that we might then get plenty of food on the river. During the last few days, as I knew we must have been near the camp where I had left my men in charge of my baggage, we had constantly been firing sets of three shots--the agreed signal--in order to locate the exact spot where they were. But we had received no answer. Failing that, it was impossible to locate them exactly in the virgin forest, unless we had plenty of time and strength at our disposal.

I made sure, by the appearance of the forest, that we were now not far off from the stream. In fact, on October 5th, when we had marched some distance, much to my delight as I walked ahead of my men, who were busy picking up berries as they struggled along, I recognized a little streamlet on which I had made my camp the first night I had started out on our disastrous journey across the forest.

My men, when I mentioned the fact, were sceptical and said it could not possibly be, as we must still be a long

distance from the Tapajoz. But we had only gone a few hundred metres farther when I came upon my old camp. There an empty sardine-tin of a special mark which I carried was lying on the ground.

I think that that spoke pretty well for the accuracy with which I could march across the forest by compass. I knew that at that spot we were only 6 kil. from the river. We indulged there in the last tin of the sweet *guyabada*, which I had kept for an emergency. After that we metaphorically flew through the forest, so fast did we march--if stumbling along constantly and even occasionally falling can be called flying. Even at that last moment, when our hearts were rejoiced, our progress was impeded by a thunderstorm, which broke out with such force that we had to halt for nearly two hours until it slightly abated. The wind howled among the trees, which shook and waved to and fro, some crashing down, so that, with the thunder and lightning and the rush of the water, it seemed a regular pandemonium.

"The devil is angry with us," said Benedicto the philosopher. "He does not want us to get back."

My impatience to get quickly to the river was so great that I could not wait for the storm to be over. In the drenching rain we continued our tramp. My sandals had given way altogether in the quick march that day, and I was once more walking with bare feet. Marching so quickly, one did not always have time to detect thorns. That day my feet were indeed in a pitiable condition.

The last trial of all was yet to be added, when we had come to within 300 m. of the river. The *seringueiro*, from whose hut we had started on our way out, had evidently since our departure set the forest on fire in order to make a *roça* so as to cultivate the land. Hundreds of carbonized trees had fallen down in all directions; others had been cut down. So that for those last two or three hundred metres we had to get over or under those burned trees and struggle through their blackened boughs, the stumps of which drove holes into and scratched big patches of skin from my legs, arms and face. Where the skin was not taken off altogether it was smeared all over with the black from the burnt trees. We did not look unlike nigger minstrels, with the exception that we were also bleeding all over.

[Illustration: A Trading Boat on the Tapajoz River.]

[Illustration: The S.S. "Commandante Macedo."]

What had remained of my poor coat had been torn to shreds, so that all I possessed now in the way of clothing was a shirt. As the *seringueiro* had a wife I could not well appear in that condition before her when we had reached the hut. Hiding behind a tree, we shouted for the *seringueiro* to come to our assistance. Benedicto, who was not so bashful, and whose costume was not much better than mine, proceeded to the house.

A few minutes later, as I peeped from behind my tree, I had a moment of great joy. I had been wondering during the last few days whether my men had died in the forest, or what could have become of them, as we had not received an answer to our signals. There I saw Alcides rush out of the house and run toward me. His cheeks streamed with tears. "Senhor! Senhor!" he sobbed, embracing me.

Antonio, who followed behind, came up and shook hands, merely saying "Good morning!"

"Where is white Filippe? Where is the man X?" I hastily inquired, in order to make sure that they were still alive.

"They are fishing on the river." Alcides called out to them: "Come quickly! 'El Senhor' has returned!"

White Filippe immediately ran up, but the man X shouted back that he was busy fishing; he would come up later.

Alcides was much upset on seeing my plight. He ran immediately into the hut and got me some clothes from the *seringueiro*, which I put on before entering the house. The *seringueiro* was kindness itself to me, most thoughtful and hospitable. He prepared some food for us at once. That was a day of joy and sadness combined. I found that all my men were safe, but that they had abandoned all my baggage and all my collections in the forest. They believed that I had been assassinated by Indians or that I had died of starvation.

Alcides cried like a child for some time. He and the others were ill with fever. Those men I had left in charge of my baggage at the camp in the forest had remained at that camp for seven days after my departure. Believing that I was never coming back, three of them had abandoned everything there, and even their companion Antonio, who was in a dying condition and was unable to walk. They had proceeded quickly to the Tapajoz, where they had found plenty to eat. Two or three days later Antonio had become better; he had shot some monkeys and birds, and had been able to keep alive. Had it not been for the kind-hearted *seringueiro*, Albuquerque, who had started out to rescue Antonio, the poor devil would have certainly died there, abandoned by everybody.

I heard stories that day which pained me a great deal. When my men believed that I was lost in the forest the man X had proposed to his companions to follow the *picada* I had cut in order to find my body and rob me of all the money which he knew I carried.

"If he is alive," he had said to his companions, "we will cut his throat once for all, and we will divide the money amongst ourselves."

It was with some difficulty that Alcides had prevented him from smashing all my baggage open, as he wished to divide the contents with his companions. Alcides was an honest man. He had stood up against that rascal. After a severe fight it had been decided that the baggage should be left intact in the forest until such authorities as could be sent up from the Fiscal Agency could visit the spot and take charge of my things.

It was then that I understood why the man X was now ashamed to face me, and did not come to greet me after I had nearly sacrificed my life to save him and his companions.

Albuquerque, the *seringueiro*, had also been considerate enough to lift my baggage upon stones and then cover it up with palm leaves, so that it should be preserved as much as possible from moisture and ants. During the month they had been back on the Tapajoz the man X had once taken a journey alone to the spot where the baggage and Antonio had been left, hoping to find his companion dead and so rob him of the money which he knew he had in his possession--the pay he had received from me.

Here is another charming incident. Nearly dead with fatigue, I lay helpless in a hammock which the *seringueiro* had hung for me. He and his wife had gone out to look after their new plantation, and only my men remained loafing about.

The river was some 60 m. from the hut, and one had to go down a steep bank to reach the water. My throat was parched from the high fever, so I called Antonio, who was near me, to give me a glass of water. Antonio never budged, but called to white Filippe, some way off, to bring the water. Filippe called to the man X, repeating my order to him. The man X continued fishing without taking the slightest notice.

So that, exhausted as I was, I had to struggle down to the river myself, as those men, for whom I had almost died, reciprocated my sacrifice in so graceful a fashion.

I think that I might as well mention here a curious case of telepathy which occurred during those terrible days of starvation.

Naturally, when one has before one the prospect of leaving this world at any moment, and one is working

under a severe mental strain, one generally thinks deeply of one's beloved parents and relatives. Thus my father, mother and sister were before me all the time in my imagination. Sometimes when I was half-dazed I could see them so vividly that I could almost believe they were so close that I could touch them. I never thought that I should see them again, in reality, although I never actually lost hope of doing so; but I was thinking incessantly of them, and of the anxiety I was causing them, as I had had no possible way of communicating with them for months and months.

There would be nothing extraordinary in that, but the amazing part of it all was that my parents and my sister--who had no idea whatever that I was exploring, as I always take the greatest care not to let them know--actually during that time of starvation saw me in their imagination lying unconscious in the forest, dying of hunger, swarming all over with ants and surrounded by crocodiles.

When I reached Rio de Janeiro in April of the following year I found there a number of letters which had been written to me by my parents and my sister during the month of September, in which they told me of those constant visions repeating themselves daily, especially between the dates of September 8th and September 24th. Those letters were written long before anybody knew that I had ever suffered from starvation in the forest. It is quite remarkable that, except the crocodiles--which, of course, were not to be found in the forest--they reproduced the conditions with wonderful faithfulness, the telepathic connection having in that case been established vividly at a distance of several thousand miles.

[Illustration: Colonel R. P. Brazil and his Charming Wife.]



**CHAPTER XXII**

Baggage saved--The Journey down the Tapajoz River--Colonel Brazil--Wrecked--From Itaituba to the Amazon--Benedicto and the Man X are discharged

OCTOBER 6th and 7th I spent inside a hammock. I was in such a high fever and so absolutely exhausted that I believed I should never be able to pull through. Albuquerque and his wife were kindness itself to me, and looked after me most tenderly. While I had been away a trading boat had passed. That boat would be on its way down the river again in a few days. I thought I would take advantage of this to go down as far as the mouth of the Tapajoz on the Amazon in her.

On the evening of October 7th, Benedicto, who was a great glutton, prepared a huge bowl of the *mamão* fruit stewed and sweetened with quantities of sugar. I had obtained from Albuquerque some tins of shrimps, lobster and salmon, butter and jam--all condemned stuff from some ship--and I gave all my men a feast. Benedicto brought me some of the sweet he had prepared, and it looked so tempting that, ill as I was, I ate a quantity of it. After dinner I persuaded my men to go back to the forest to recover the baggage they had abandoned there. Tempted by a present of money I offered them if they would bring it back safely, they all agreed to go.

On October 8th, however, when the men were to start, the man X had a severe colic. He rolled himself on the ground in great pain, and refused to go.

The strong fever had finished me to such an extent that I did not think I should last many hours longer. Albuquerque and his wife stood by my hammock watching me, Albuquerque shaking his head compassionately, asking me if I wanted to write a last word to my family, which he would send down by the trading boat when she arrived. I well remember hearing his voice faintly, as I was in a half-dazed condition. I had not the strength to answer. As he walked out of the room he said to his wife: "Poor fellow! he will not be alive in another hour!"

Albuquerque was a most thoughtful Brazilian, intelligent and well-educated, quite superior for the position he occupied there.

I was still alive on October 9th, much to the surprise of everybody, and feeling much better. There was a great slaughter of chickens, Albuquerque saying that I needed chicken broth badly; in fact, that day I drank cup after cup, and it seemed to give me a little strength. Although those chickens had a local value of about £1 sterling each, Albuquerque would not hear of my paying for them. I knew what inconvenience it would be for him to slaughter them in that fashion, as he could not replace them perhaps for several months.

Good news came that day, when Albuquerque's wife entered the room saying that some trading boats were coming up the river--she could see them a long way off, just getting over the Capueras Falls. I decided to go up in one of those boats as far as the Fiscal Agency at S. Manoel, where I could obtain fresh clothes and provisions. Remaining still inside a house I felt was killing me.

The boats did not arrive that evening. The next day, October 10th, rain came down in sheets, so that we could not see more than a few metres in front of us, and the wind was howling with fury.

On October 11th, when the boats approached, Albuquerque took me up in a small canoe to them on the other side of the wide stream. It was the trading fleet of Don Eulogio Mori, a Peruvian trader, who at once offered all possible assistance and undertook to convey me up stream with pleasure.

Mr. Mori, a most enterprising man, who was in charge of the expedition, was a frank, open and jolly gentleman, most charmingly thoughtful and civil. He and his brother had the second largest rubber-trading business on the upper Tapajoz River.

He was amazed when I got on board and told him who I was, as the news had already spread down the river that I had been murdered by my own men in the forest. In fact, during my absence, when Alcides had travelled up to the Fiscal Agency to inform them of what was happening, he had been detained there for some days and accused with his companions of having murdered me.

As we went up the stream once more we passed Mount S. Benedicto, with its foliated rock in grey and red strata. Volleys were fired in honour of the saint; more candles were deposited on the platform of rock.

When we halted for lunch, one of the crew died of yellow fever. After lunch a grave was dug and the corpse duly deposited in it.

We had not gone far when the trading boats of Colonel Brazil, under the care of Mr. João Pinto, came in sight on their way down the river. Therefore I abandoned the idea of going up to S. Manoel, as, had I not taken the opportunity of going down with Mr. Pinto, I might have had to wait up the river some two or three months before I had another opportunity.

Again I met with the greatest kindness on the part of Mr. Pinto when I transhipped from the Peruvian boats.

In a few hours, travelling rapidly down stream, I was once more at Albuquerque's hut, where Mr. Pinto most kindly offered to halt one day in order that I might wait for the men who had gone in search of my baggage in the forest.

[Illustration: Where the Madeira-Mamore Railway begins.]

[Illustration: Madeira-Mamore Railway, showing Cut through Tropical Forest.]

Next day, October 16th, as I was in great suspense lest the men should not arrive in time--Mr. Pinto being pressed to get quickly down the river with some thousands of kilos of rubber he had purchased--my men eventually arrived with part of the baggage. They had abandoned the rest in the forest, including my valuable botanical collection, which had taken me so many months of careful labour. Alcides said that the termites had played havoc with all my things. The wooden boxes had been almost entirely destroyed, as well as most of the contents. I was glad, nevertheless, to get back what I did, the man Benedicto on that occasion behaving splendidly--even going back to the spot where the tragic scene had taken place with the Indian Miguel on our outward journey and recovering some of my instruments which I had abandoned there.

In the afternoon of October 16th I bade goodbye to Albuquerque, and gave him a present of £20 sterling, as he would not accept payment for the hospitality he had offered me.

With a powerful crew of men we sped down the river quickly. In a couple of hours we had already arrived at the rapids of the Capueras. After passing the island of Pombas before entering the rapids, we encountered the first rapid of Sirgar Torta; then the second rapid of Baunilla--named after the vanilla plant. The third rapid of the Capueras group was called Chafaris; then the fourth was the Campinho.

We went along the banks of the beautiful island of Antas, after which we halted at the house of José Maracati, a Mundurucu chieftain, with thirty Indians under him. A delegate of the Para Province in charge of the Indians--a man of strong Malay characteristics and evidently of Indian parentage--received us, and gave me much information about the local rubber industry. He told me that the best rubber found in that region was the kind locally called *seringa preta*, a black rubber which was coagulated with the smoke of the *coco de palmeira*. He calculated that 150 rubber trees gave about 14 kilos of rubber a day. The *seringa preta* exuded latex all the year round, even during the rainy season.

There was in that region also another kind of rubber tree--the *itauba*--but it was of inferior quality, as the latex

was too liquid, like reddish milk, quite weak, and with little elasticity.

A few trees of the *castanha do Para* were also found in that region, producing the well-known nut which has rendered Brazil famous in England.

*Solveira* trees were also plentiful all over that district, and gave latex which was good to drink; while another tree, called the *amapá*, exuded latex somewhat thinner than that of the *solveira*, which was supposed to be beneficial in cases of consumption or tuberculosis.

Very interesting were the different liane in the forest there, particularly the *cepa de agua*, which when cut gave most delicious fresh water to drink. The *titica* was a smaller liana, which was most troublesome when you went through the forest, as it generally caught you and twisted round your feet as it lay for long distances along the ground.

Another wild fruit which was abundant there was the *pajurá*, dark in colour, soft-skinned, most palatable and quite nourishing, but which gave an insatiable thirst after you had eaten it.

We resumed our journey among a lot of islands, traversing the Cabeceira de Piquarana. The main rapid was formidable enough, although nothing in comparison with the rapids we had gone over on the Arinos-Juruena river. There was a barrier of rock extending from W.S.W. to E.N.E. across the river, which was there 1,500 metres broad and of great beauty, with hillocks on either side and some small islets in mid-stream.

Soon afterwards we came to another barrier of rock, extending from north to south. It was called the Bigua. There was an island of the same name, the name being taken from an aquatic bird which is plentiful there.

The traders talked a great deal of the dangers of those rapids, and they were certainly dangerous because of the innumerable submerged rocks; but after the fierceness of those we had encountered before they seemed child's play to us.

The river there followed a direction of b.m. 60°.

We spent the night of October 16th-17th at the *seringueiro's* farm of Boa Vista, most beautifully situated where the river described a big curve. In its crudeness the hospitality of those exiles was quite charming. They hardly ever spoke; they just laid things before you--all they possessed--and were overcome with surprise when you thanked them for it or when you offered payment.

There was a project of constructing a cart-road for some 20 kil. along the bank, in order to avoid the rapids which occurred there in the river. Although those rapids were not impressive to look at, they were strewn with submerged rocks just under the surface, which were very dangerous for the large trading boats. If that road were constructed a great deal of time would be saved, especially in ascending the river, when sometimes the trading boats took as long as a week or ten days to get over that particular rapid.

The first rapid we saw after we left Boa Vista was the Vira Sebo rapid, slightly worse than the following ones. I was getting a little better, living on the roof of the trading boat, thoughtfully looked after by Mr. João Pinto and the other employés of Col. Brazil. I was able to drink quantities of condensed milk, and my strength seemed to be slowly coming back.

[Illustration: Bolivian Rubber at Abuna Station on the Madeira-Mamore Railway.]

[Illustration: The Inauguration Train on the Madeira-Mamore Railway.]

The river had many islets as we proceeded on our journey, with wooded hillocks some 100 to 150 ft. high in

long successive undulations along the river banks. The coast-line was generally of rocky volcanic formation, with accumulations of boulders in many places right across the stream.

After passing the rapids we were travelling through a region of extensive and beautiful sand-beaches, with hardly any rock showing through anywhere. The country on each side was almost altogether flat, merely an occasional hill being visible here and there.

On October 19th we came in for a howling storm of wind and rain, waves being produced in the river as high as those that occur in the sea. We tossed about considerably and shipped a lot of water. More immense sand-beaches were passed, and then we came to a region of domed rocks showing along the river bank. At all the *baracões*, or trading sheds where the *seringueiros* bought their supplies, the same rubbish was for sale: condemned, quite uneatable ship biscuits sold at 5s. a kilo; Epsom salts at the rate of £2 sterling a kilo; putrid tinned meat at the rate of 10s. a tin; 1-lb. tins of the commonest French salt butter fetched the price of 10s. each. The conversation at all those halting-places where the trading boats stopped was dull beyond words, the local scandal--there was plenty of it always--having little interest for me.

At one place we were met by a charming girl dressed up in all her finery, singing harmonious songs to the accompaniment of her guitar. So great was her desire to be heard that she kept on the music incessantly during the whole time we stopped--some three hours--although nobody paid the slightest attention to it after the first song or two.

Farther down the river, there 800 m. wide, hills and undulations were to be seen on each side. At sunset that day we arrived at S. Isabel or Castanho, where I had the pleasure of meeting the greatest man upon that river--Col. R. E. Brazil, a man of immense strength of will and enterprise. He went under the name, which he well deserved, of the "King of the Tapajoz"; for it was he who indeed held the key of that river, nearly the entire commerce on that great waterway being, directly or indirectly, in his hands.

October 20th was spent at S. Isabel, where a great fleet of boats was waiting to be loaded with thousands upon thousands of kilos of magnificent rubber.

Both Col. Brazil and his employés treated me with great deference, and made preparations to get a boat ready at once for me to continue my journey down the stream. In fact, Col. Brazil, who would not hear of my paying for being conveyed down stream, insisted upon my being his guest, and declared that he himself would take me to a point where I might be able to get a steamer.

When all the boats were ready, at 4 p.m. on October 20th, we proceeded on our journey down the Tapajoz by a small channel on the right side of the river, in order to visit some of the trading sheds belonging to Col. Brazil, especially those at the mouth of the Crepore River, which was 100 m. wide where it entered the Tapajoz on the right side. The scenery was beautiful, the hills getting higher as we proceeded north, some of the islands we passed also being of great height and forming picturesque scenes, especially against the gorgeous tints of the sky at sunset.

I was interested in observing the wonderful regularity of the sky-line along the forest. It looked as if the trees had been trimmed artificially in a perfectly straight line. The fleet which Col. Brazil was taking down the river consisted of eight large boats. I was much impressed by the force of mind of Col. Brazil, together with his great charm and thoughtfulness when not at work. His men were in mortal fear of him, and trembled all over when he spoke to them.

No serious obstacle to navigation was encountered as we proceeded on our journey, although rocks were plentiful, great red domes and boulders galore showing through the water and along the coast-line. Whitish vertical cliffs were noticeable along the higher hills. The most impressive things I saw in that part of the river were the extensive beaches of beautiful reddish sand extending for hundreds and hundreds of metres at a time.

Those beaches were often 10 to 20 ft. high.

The river was most interesting, especially near the beach of Curassá, with Crato in the distance; then the great meadow of "Mission Nova" extending in a north-westerly direction on the left bank, along the tributary of the same name. In the same direction extended also the rocky barrier at the beginning of the Mangabel rapid. The rapid was formed by a rocky barrier extending from north-west to south-east. We had hilly and undulating country all the way along, and the river wound about a great deal.

Col. Brazil was steering the first boat of the fleet carefully as we went through the tortuous channel, the entire fleet following us in good order. Picturesque islands of truly tropical appearance were to be seen, covered with tall burly palms, 30 to 40 ft. high, with narrow channels between.

The heavy clouds which had collected to the north suggested an approaching storm, but, as luck would have it, the sky cleared at sunset. As we wound our way among the many rocks reflected in the now still waters of that vast river, the scene was really beautiful.

The channel through which Col. Brazil navigated his boat was only 10 m. wide, with dangerous submerged rocks. Mangabel, taken as a whole, was an immense basin, 1,000 to 1,500 m. broad from west to east, interspersed with elongated, rounded and flattened rocks. It was indeed a most picturesque sight, especially when all the trading boats were winding their way at sunset descending the various rapids.

After going through a great channel, we went along a large fissure from south-east to north-west, still in the Mangabel rapid. The rock of that region was highly ferruginous. That fissure was of great depth, and absolutely free from rocks in the channel itself.

When we emerged from the fissure we were confronted to the east on the right bank by two enormous hemispherical domes 100 ft. high, grassy but absolutely without a tree.

The rocky formation of the hills was apparent a little farther down stream, when going along the great eastern channel of the river. On the left bank we had hills with *campos* on their summit. All the hills I noticed in that region had rounded backs.

I greatly admired the bearing of Col. Brazil as we dashed down at a terrific speed through the most intricate channel in the rapid, strewn with sharp rocks. Had we touched one of those rocks it would have meant the destruction of the boat, the loss of all the valuable cargo and most of the crew, as the majority of them could not swim.

There were three passages there, called respectively the Casson, near the left bank; the Dos Ananas, in the centre; and the channel da Terra Preta, which we followed, on the right. At Lua Nova, the end of the Mangabel rapid, the river turned in a sweeping curve to the north, the rocks getting fewer and fewer until eventually the river became quite clear of them, with only high hills along both banks. Lua Nova was a little settlement of five houses and a shed, some of them whitewashed, with doors and windows painted green. A small plantation of Indian corn, sugar-cane, and *mandioca* had been made, the soil being extremely fertile at that spot. We enjoyed a magnificent view to the west and north-north-west, the river there forming an elbow.

[Illustration: Wreck of the "Mamoria" in the Calderão of the Solimões River.]

[Illustration: Indians of the Putumayo District.

(Dr. Rey de Castro, Peruvian Consul at Manaus, in the centre of photograph.)]

Close by, on leaving that place, we found on our right Lage's Point, where the rocky formation suddenly

ended, and with it the dangers of the Mangabel rapids. Here there was a basin 1,500 m. wide, with extensive sand-beaches of great beauty. After passing the last row of rocks, extending from west to east, the entire river bottom was of clean yellow sand, so that the water appeared as limpid as crystal, while a few moments before it looked of a dirty yellow--not because it was really dirty, but because of the reflection from the rocky river bottom.

From Praia Formosa, which we then saw on our left side, the river was once more strewn with rocks, but not in such quantities as at Mangabel. High hills could be seen all along, which seemed as if they had been formed by alluvial deposits left there when the drainage from the high Matto Grosso plateau proceeded down toward the north in a disorderly fashion, until it found its way into the great fissures in the earth's crust which now form the beds of those great arteries, the Xingu, the Tapajoz, and the Madeira rivers.

I noticed that all the hills and undulations ran from south to north or from north-west to south-east, the southern slope being generally more elongated. After passing on our left the trading sheds of Sobradinho and S. Vicente, with their corrugated iron roofs--looking to us the most civilized things we had ever seen--we approached the Montanha, where another rapid had to be negotiated.

During the night I was sleeping inside the cabin of the boat, which Col. Brazil had placed at my disposal, and where I had all the baggage which I had saved from the forest. In the middle of the night all of a sudden the boat sank in 5 or 6 ft. of water. It was all I could do to scramble out of the cabin. The boat had sprung a great leak as big as a man's hand, which had been stopped up, and which had suddenly opened--hence the misfortune.

This sudden immersion in cold water gave me another bad attack of fever, as I had to sit the entire night in wet pyjamas while the crews of all the other boats were summoned in order to raise the boat once more, a work which lasted several hours.

Next morning when we departed Col. Brazil lent me some of his clothes, while all my things were spread on the roofs of the various boats to dry in the sun, I never shall forget Col. Brazil's amusement and that of his men when I unpacked some of the boxes, which had once been watertight, and pulled out a dress-suit, frock-coat, and other such stylish garments, now all wet and muddy, and some twenty pairs of shoes, all in a terrible condition, mildewed and soaked with the moisture they had absorbed in the forest and during the last immersion.

Near the tributary Montanha, on the left side of the main stream, were two small rapids. A rich rubber-producing land was situated a day and a half's journey along that tributary. The best way to reach it was from a place called El Frances, one of the most charming spots I saw on the lower Tapajoz River. The central hill at Montanha was 300 ft. high, the hills around it from 200 to 300 ft. high.

Farther down we came to the Rio Jamanchin, a tributary on the right side of the Tapajoz, which entered the river where great sand-shallows occupied nearly half the width of the stream.

Col. Brazil was the happy possessor of immense concessions on that tributary stream--in fact as far as the Tocantins River, a tributary on the left side of the Jamanchin. He had already made a mule trail across that region in order to get over the difficulty of the troublesome rapids which are to be found there, such as those of Portão, Cahy, and Apuhy. The mineral wealth was also considerable, according to the accounts I heard; while undoubtedly the production of rubber could not be better.

This was the spot at which the river Tapajoz came nearest to its eastern neighbour the river Xingu. The *seringueiros* on the latter river constantly cross over, following the Jamanchin in order to go down to the Amazon by the Tapajoz. Rubber collectors have found their way high up on the Xingu River--much farther up than on the river Tapajoz.

On October 25th we went down first the Limão rapid, and then the Burbure rapid. The river was beautiful all along, with low hills on both sides. We eventually arrived at Pimental, a fiendishly hot, steamy, unhealthy place, where across a streamlet was a station for the transshipment of rubber. The place was on low ground, which became inundated at high water. Another station was built some 200 m. off on high ground, which was used as a winter station. The second station was at the beginning of an excellent mule track which Col. Brazil had cut as far as a place lower down the river called Bella Vista, a distance of some 20 kil. He had imported at much expense a number of mules for the service. All the rubber was conveyed from that spot on mule-back, as between Pimental and Bella Vista was a dangerous rapid, on which many boats had been lost.

In the company of Col. Brazil I rode over that distance, in intense pain owing to the weak state in which I was. When we came to the river again, over great deposits of sand we saw a number of crocodiles basking in the sun.

Bella Vista consisted of four neat double-storied grey houses, two large white buildings, and some temporary constructions of mud with palm-leaf roofs, all of them situated on a high bank. The place was at the entrance of a wide channel, dry and sandy. When this was filled by the stream at high water a long island was formed.

Bella Vista was a great point for us, for there we should meet steam navigation again, Col. Brazil having purchased a handsome steamer which performed the service between that place and Belem (Para).

[Illustration: A Street in Iquitos.]

[Illustration: The Launch "Rimac" on the Ucayalli River.]

I broke down altogether while there, and was nursed with the tenderest care by the family of Mr. Lage, who was in charge of that trading station. It is difficult to imagine more kind-hearted, generous people than these exiles in those deadly regions. All the employés at the station were in a pitiable condition, suffering from malarial fever.

When the steamer *Commandante Macedo* arrived--she only came once a month in order to bring down the rubber--I went in her to the first town we had seen since leaving Diamantino, a place called Itaituba. It seemed to us as if we had dropped into London or Paris again, although the place merely consisted of a few red-roofed houses, the walls of which were gaily coloured, bright yellow, green, or white. Palm trees of great size showed here and there beyond the row of buildings as we approached the place on its high site.

Prominent along the river front were magnificently vigorous mango trees, with luxuriant foliage. A brick and stone church, unfinished, was visible, with a great pile of bricks in front waiting in vain for money and labour to complete it. The grand square, with its pretty *Intendencia* coloured bright blue, formed the end, on the west, of that most important "town" on the Tapajoz. In the centre of the square was a well-executed bust of Correa.

The most prominent feature of the place, however, was the elevated landing-stage, some 30 ft. above the level of the river at low water, erected there for loading and unloading when the river rose. The town was divided by three longitudinal avenues, the central one also with rows of magnificent mango trees, which indeed seemed to flourish at that place. I was particularly struck by the wonderful tidiness and cleanliness, the good drainage of the streets, and the upkeep of the different houses, of which the people seemed proud. Everybody was well off, owing to the rubber industry, which had brought much wealth to the place. Col. Brazil and his family have dedicated much time and energy to embellishing the town, and no doubt some day, when Itaituba is connected with proper telegraphic and postal services, it will become an important city, being the key, as it were, of the Tapajoz River.

On November 5th I bade good-bye to my good friend Col. Brazil, whose guest I had been since leaving the forest, and for whose thoughtful hospitality I feel deeply grateful. I presented him with my best rifle, a very

handsome weapon, which had accompanied me on several previous journeys, and which was the only valuable thing remaining in my possession.

It was a new sensation for me to be steaming down comfortably on a beautifully-kept steamer, as spick-and-span as a private yacht. Her captain and co-proprietor with Col. Brazil was Captain Macedo, a man who had spent much time in Europe, and was one of the most polished gentlemen I met in Brazil.

Now that my work was practically over, it was a great relief to me to be basking in a cane chair upon the deck, looking at the wonderful scenery opening up before me as we went on. We passed a lovely sand-beach, Capitary, then the immense bay of Boin, and farther on the great rocks of Surucuá. Then came in sight the headland called Punta de Cururu, with the Serra of the same name upon it. Once or twice the ship stopped at different sheds in order to take up merchandise, but we only halted long enough to get the cargo on board, and once more we proceeded gaily down stream. It was wonderful how one appreciated civilized ways of locomotion after travelling for months and months, as we had done, in the manner of prehistoric man.

In the evening, while we were sitting at dinner, there was a big bump. We had run aground somewhat heavily on a sand-dune. The captain rather frightened me as he said that on a previous occasion they had stuck on a sand-bank for several days before they could get off. As luck would have it that night, partly by the aid of a steel cable several hundred metres long, which had been fastened to a number of big trees on the shore, partly by her own power, we were able to back out and get her free. Only six hours were wasted. The tide, which reaches a long way up the Tapajoz River when the latter is low, helped us a great deal. At high tide the level of the water is raised more than one foot. It seemed amazing that the tide of the ocean could extend its influence by forcing the water back so far up the Amazon and its tributaries.

Although the steamer on which I was did not draw much water, being built specially for river navigation, careful soundings had to be taken continually. I well recollect the cries of the man at the lead. When the man cried out "*Una braça!*" (one fathom), there was great excitement on board, and we had to slow down to half speed or dead slow. In the distance on the left bank in the haze could be distinguished high hills, at the foot of which white ribbon-like streaks were visible along the water.

The Barros do Tapayuna, a sand and mud bar, extremely shallow, extended from the elongated island of the same name right across the stream, there about 5 kil. wide. That spot was also called the *garganta*, or throat of the Tapajoz, because at low water it was impossible to get through, and it was necessary to unload the steamer, the navigation being extremely difficult.

"*Dos braças!*" (two fathoms) cried the lead man. "One and a half fathom!" he cried next, as we went over the shallowest part of that sand-bar.

Although shallow, that part of the river was not dangerous, because the bottom was of soft mud; not so, however, farther on, where the shallow channel was strewn with plentiful rocks. Captain Macedo had sensibly placed buoys and marks all over the most dangerous places, so as to minimize the dangers of navigation.

The river was magnificent farther down, where we passed a great quadrangular rock of deep Indian red, looking exactly like an immense square tower. Then vertical rocks were to be seen all along the right bank; while on the left bank, when we crossed over to the other side of the river, were immense beaches of beautiful sand. Above them were great stretches of the most wonderful grass, upon which thousands of cattle could graze--but not one animal was to be seen.

[Illustration: A Trail in the Andes.]

It was rather interesting to note that the formation of the right bank was exactly the same as that of the Paredão Grande we had seen in Matto Grosso. Vertical sides in great rectangles were noticeable, intersected



by passages--regular cañons--where small huts could be seen at the foot of the picturesque rocks, especially at places where small streamlets entered the Tapajoz. I was told that little lakes had formed beyond those frontal rocky masses, the entrances to which were blocked at low water by sand-bars. Beyond that row of vertical red rocks was a more or less confused mass of hills, some dome-like, others of a more elongated form, but still with a well-rounded sky-line. The water of the stream had now changed colour altogether, and had become of a deep green. Islets could be seen far, far away to the left side of the river, mere white dots and lines along the water-line, most of them having white sand-beaches around them; while on the right bank the great red walls in sections continued for many miles. As we neared the mouth of the Tapajoz, the river had the immense width of 14 kil. On the right, after going through the Passagem dos Surucué, we passed the mountain of Jaguarary, which stood prominent along a flat elevation on the right bank.

We halted in the afternoon at a picturesque little place called Prainha--prettier than any I had seen so far, because of its frontage battlement, with its numerous staircases to allow the people of the various houses to go down to the water. A tiny church stood farther back on a prominence.

Late at night we arrived at Santarem, at the junction of the Tapajoz River with the Amazon. At that spot the man X and poor Benedicto insisted on leaving me, so they received their full pay, and Benedicto a very handsome present of money; after which they disembarked. As the sum I paid Benedicto was a considerable one, so that he might be well off for the rest of his days, I warned him not to waste it in buying all kinds of absurd things.

We halted at Santarem for several hours. What was not my astonishment, just before we departed, to find that Benedicto had gone into a store and had spent over £25 sterling in buying innumerable tins of jam--in fact, he had bought up the entire supply which was in the store! When I asked him what he did that for, he said he was very fond of jam. With his friends and a number of people he had quickly collected round him, they opened tin after tin, ravenously devouring the contents, so that within a short time he would have none left.

Brazilians of all classes are hopelessly improvident.

**CHAPTER XXIII**

Santarem to Belem (Pará)--The Amazon--From Belem to Manaus--The Madeira-Mamore Railway

SANTAREM was an old settlement of no great interest. It had a few relatively fine ancient buildings and many ugly new ones.

Early on November 6th the steamer proceeded on her way to Belem (Pará). On leaving Santarem we first emerged into the great Amazon River, a regular sea of fresh water, where we tossed about in a strong north-easterly gale. Unless one knew, one never could have imagined oneself on a river, as the stream was so wide at that point that the opposite bank could not be seen at all.

Things were a little better when we entered the channel of Monte Alegre. On that channel was the little town of the same name, half of the buildings being along the water's edge, the other half on the summit of a low hill near by. There is a sulphur spring there with wonderful medicinal properties, and coal is also said to be found.

A colony of Spaniards had been imported to work, but they were dissatisfied and had left. Tobacco, made up into fusiform sticks 6 ft. long and tied into bundles, was exported from that place in considerable quantities; the inhabitants were also engaged in breeding cattle, growing Indian corn, and drying fish--the *pirarucú* (*Vastres gigas*), a salmonoid vulgarly called the cod-fish of the Amazon. A big trade was done in that dried fish all over that region.

In the full moon of a glorious night we could discern to the north a mountain region with elevations of over 3,000 ft. Between those mountains--the Serra de Almerin--and ourselves, lay a long flat island, the vegetation on which was, for that particular region, comparatively sparse. That island of mud had formed during the last fifteen or twenty years, and was at the time of my visit several kilometres in length. It was called the Pesqueiro. Islands have a way of forming in a very short time in the Amazon, while others change their shape or disappear altogether.

On November 7th we were facing the principal outlet of the Amazon to the north-east. That main estuary is, however, not as navigable as the one south of it, through which most of the big ships pass. An archipelago had formed at that spot. The fortress of Matapa, very ancient, stood on the largest outlet.

We went through the channel called the Itoquara. Another, the Tajapurozinho, was to the south, forming a boundary on that side of the large island, which we skirted to the north in the Itoquara channel. The beautiful island of Uruttahi was now in sight, to the north of the largest outlet. Like all other islands in that neighbourhood, it was flat and of alluvial formation.

In order to avoid the open waters, where the small ship upon which I was tossed about considerably, we kept to the smaller channels between the islands, going first through the channel of Limão and after that through the Tajapuru. It was practically the same course as the Itoquara, which was called by different names in different parts. It was narrow and tortuous, and required great skill in the navigation of it; but it was extraordinarily deep--so deep that all the big ocean steamers entering the Amazon followed this channel in preference to the main outlet of the river, which is not navigable owing to many sandbanks.

We were there in a regular maze of islands, composed mostly of mud and of recent formation, not more than one or two feet above the water. For Brazil, they were fairly thickly inhabited, miserable huts being visible every few hundred metres or so.

On our right as we went through we had a luxuriant growth of *mirichi* palms, some of great height and close together--a regular forest of them. At the first glance as you looked at those islands, it seemed as if all along the coast-line a low palisade had been erected. It was indeed a natural palisade of *aninga*, an aquatic plant

growing in profusion on the edge of mud-banks. The *aninga* is said to contain a powerful poison, the touch of which produces violent itching.

All the houses and huts on those islands necessarily had to be built on high piles, as the country was constantly inundated, the tide rising and falling some three feet in that particular channel.

[Illustration: Campas Indian Children.]

As we neared the mouth of the river, with Para as our objective, we first saw the lighthouse of Buyussu in the immense bay which takes its name from the little town of Coralhina. Both this town and that of Boa Vista were on the left side of us, on the great island of Marajo. On the right the island of Oya was visible, and the island of Araras. Between the light of Buyussu and the island of Oya opened the great bay of Melgasso.

Considering the amount of navigation that went through, it was amazing to see how badly lighted that river was--the two lights, such as the one at Buyussu, and the one at Mandy, at the entrance of the bay of Marajo, being no bigger than and not so brilliant as the ordinary street oil-lamp in an English or French village. I understand that all ships navigating the Amazon have to pay a large tax on each journey for the maintenance of the lighthouses on that immense waterway. It is quite criminal that no proper lights are constructed in order to protect the safety of the passengers and the valuable cargoes which go by that important water route.

More picturesque than most of the scenery I had so far witnessed on the Amazon was the narrow Foro da Jararaca. From the lamp-post--it cannot in all honesty be called a lighthouse--of Mandy, we made for the other lamp-post of Capin; and from this for the third lamp-post of Arrozal, navigation being most difficult in that part. From there we steered direct for the Farol de Cutijuba, a light somewhat more respectable than the others at the entrance of the Barra of Pará.

After going through the bay of Coralhina we did not follow the great channel that was before us, but skirted the island of Conceção to the left, passing between it and Paketta Island. After that island we found ourselves in the bay of Jappelin, so named after a bird of that region, which builds an elongated nest.

Having passed the Cutijuba Island, and then the Taxipa Island on our left, in the early morning we entered between the islands of Arabiranga and Jararakinha. The larger vessels generally follow a course outside on the east of this island before entering the large bay of Marajo.

We could plainly see that we were approaching a large city, for quantities of little sailing boats were now visible on the water. Signs of civilization were beginning to appear on the island of Arabiranga. A brick and tile kiln, which supplied Belem (Pará) with most of its building materials, had been established there. Alongside the island could be seen a lot of steamers belonging to the Amazon River Company. Beyond was the bay of Guajara, with the city and many ocean steamers looming in the distance.

On November 18th we steamed into the bay, and there stood the city of Belem (Pará) before us, while the noise of the town began to get louder and louder as we approached the dock. That sound was welcome to me in a way, and at the same time worrying, after the dead silence I had been accustomed to for the last many months.

A swarm of robber-porters invaded the steamer the moment we came alongside the pier. The bustle, the loud shouting, the pushing, seemed most irritating. Ill as I was, for a few moments I almost contemplated the idea of turning back toward the virgin forest. The heat was oppressive, the bells of the tramways jangled all the time, the rattle of the mediæval carriages on the cobble-stones of the pavement was distressing.

Things were not pleasanter when I put up in the best hotel, where the best room I could get was not unlike a coal-cellar. We will not speak of the food.

Those aspiring efforts at semi-civilization were to my mind ten times worse than no civilization at all. Had it not been for the extreme kindness of my friend Commandante Macedo, of Mr. Ross, the manager of the London and Brazilian Bank, and of the British Consul, I would have left the place that same day.

At Belem I dismissed Alcides, Antonio, and white Filippe, paying their full passage by sea and railway and full wages up to the day of their arrival at their respective homes. They had certainly many faults, and had not behaved well to me; but I am given to weigh matters justly, and there was no doubt that those men had endured terrific hardships and, willingly or unwillingly, had carried through quite a herculean task. I therefore not only paid them the high wages upon which I had agreed, but I gave each a handsome present of money.

The three men duly signed receipts and unsolicited certificates, in which they declared that during the entire journey they had been treated by me in a generous manner and with every possible thoughtfulness and consideration.

As they had not been able to spend a single penny since we had left Diamantino they had accumulated a considerable sum of cash. I warned them, as I had done with Benedicto, to be careful and not waste their money. They went out for a walk. Some hours later they returned, dressed up in wonderful costumes with fancy silk ties, patent leather shoes, gold chains and watches, and gaudy scarf-pins. In a few hours they had wasted away nearly the entire sum I had paid out to them. Everything was extremely expensive in Pará--certainly three or four times the price which things would fetch in London or New York.

Two days later white Filippe and Antonio embarked for Rio de Janeiro, with hardly a word of farewell to me. Alcides refused to travel on the same steamer with his companions, and left by a later one.

The city of Pará is much too well known for me to enter into a long description of it. Since its discovery in the year 1500, when Vincente Yanes Pinzon cast anchor in the Marañon or Amazon, Belem has become a beautiful city. As everybody knows, it is the capital of the Pará province, which has an area of 1,149,712 sq. kil. Geographically, Belem could not be situated in a better position, and is bound some day to become the most flourishing city of the Brazilian Republic. It is undoubtedly the key to the great Amazon River, although it is not actually at the mouth of the Amazon, but 138 kil. from the ocean. Through it is bound to pass the trade not only of that riverine portion of Brazil, but also of Peru and Bolivia.

[Illustration: Campas Old Woman and her Son.]

Belem (Pará) is mostly known to Europeans as the nest of yellow fever. During the last few years it has been freed absolutely from that scourge, the cases of yellow fever being now few and far between, owing to the wonderful progress made by hygiene and the praiseworthy efforts made by the Province to keep the city in a healthy condition.

The population of Pará is 192,230 inhabitants. Many spacious and handsome edifices, such as the Government buildings and the professional Institutes, do great credit to the city; while the Peace Theatre is one of the finest in Brazil. Many private mansions are of some architectural beauty, and some of the new avenues and the municipal gardens are handsome. The slaughter-house, the iron market, etc., are quite up to date, and the city even boasts of a crematorium.

My object in coming to Belem (Pará) was merely to see my men safely on board on their return to the Minas Geraes and Goyaz Provinces; also to buy some new cameras and instruments, so that I could start on the second part of my expedition, following the entire course of the Amazon almost up to its source, then cross over the Andes and reach the Pacific Ocean.

My English friends in Pará tried to dissuade me from attempting the journey, as I was in a pitiful condition. What was worse, civilization, instead of making me feel better, was smashing me up altogether. Every day I

was getting weaker and weaker, and more exhausted. I had hardly strength to walk about, less still to go up or down stairs. Beri-beri commenced to develop in my right foot, and added to my other trials.

The English consul told me it was absolute folly to try and proceed on such a long journey in such an exhausted state.

Having bought fresh clothes and cameras for my new expedition, I left Pará on November 12th at noon on the excellent ship *Anthony* of the Booth line, on my way up the Amazon to Manaos.

I will not attempt here to give a description of that amazing river the Amazon--amazing because it is very big and not because it is beautiful, for indeed I do not believe that in all my travels I have ever seen a river quite so ugly and uninteresting as the Amazon.

First of all, it is so big that you seldom see both sides of the river at a time; its waters are muddy and filthy; its climate is damp, oppressive and unhealthy; its vegetation, when you are near enough the banks to see it, is entangled, half-rotted, and smelly. All along one's nostrils are offended by the fetid odour of mud and decayed vegetable matter.

People in Europe seem imbued with the idea that, as you go along the Amazon, you must be attracted by the great number of birds of beautiful plumage, insects and butterflies of all sizes and amazing colours. Occasionally, especially in the early morning and at sunset, one does notice perhaps a flock of green paroquets with yellow foreheads, notable for their peculiar, clumsy, rapid wing-flapping flight and their harsh shrieks when settling on the trees. Occasionally, too, one may see a family of larger parrots dashing across the sky; but, indeed, birds in the lower Amazon are not plentiful by any means, nor, indeed, is their plumage particularly attractive, most birds, except the parrots, being small and very soberly tinted.

As for the melodious songs of birds which civilized people always imagine in the equatorial forest--the song that will set you dreaming while you are basking under palm trees--the actual traveller will find the greatest disappointment of all in that respect. With one or two exceptions, such as the *Troglodytes fuscus*, a small brown wren which emits sweet musical notes, most birds of the Amazon have grating voices and harsh piercing whistles, or monotonous deep repetitions of two or three funereal notes which are more apt to drive you insane than to fascinate you. Among the most unmusical singers of the lower Amazon may be counted the several families of finches and fly-catchers, and the local thrushes, which feed on ants.

Similar disappointment awaits one in regard to the vegetation. People imagine Brazil a land of beautiful flowers, the forest made up of immense trees with luxuriant foliage, overladen with parasitic orchids--eternally in bloom, of course, in the dreamy minds of the untravelled, and just waiting to be picked and to be placed in one's buttonhole. The sky, naturally, over such a forest, could only be swarming with birds of all sizes, with plumage of the richest colours and hues; and what else could such a luxuriant country have in the way of butterflies and insects than some which resemble precious gems in the iridescent tones of their wings and bodies?

That is what people imagine. The following is what you really see.

The trees, overcrowded everywhere, far from being gigantic, are, instead, mean-looking and anæmic--not unlike the pallid, overgrown youth of the over-populated slums of a great city. Orchids? Yes, there are plenty of orchids about, but you never see them unless you go on a special search for them with a high ladder or some other such means of climbing high trees. In any case, you would not detect them unless you had the eye of an expert. It is well not to forget that in tropical climates, as in temperate zones, plants are not always in bloom when you happen to be passing. As for the butterflies, you seldom see any at all in the actual forest.

Perhaps one of the most common birds of the Amazon is a kind of grey-eyed, noisy, mimicking magpie,

locally called *guache* or *japim* or *jappelin* (*Cassicus icteranotus*), quite amusing with its energetic movements, its observant habits, its familiar interest in everything and everybody, and its facility for reproducing correctly enough sounds which momentarily attract its attention. The wonderful activity of its slender body, clothed in velvety black, neatly-groomed yellow feathers, and its charming wickedness make it, perhaps, one of the most attractive birds near towns and settlements on the river. It builds elongated nests which are 20 to 30 in. in length, the entrance to which is in the lower portion. They are suspended from the branches of trees. As I have said, the large bay near the mouth of the Amazon has been named in honour of this bird.

[Illustration: Campas Indian Woman.]

Another bird of great interest is the *araruna* (or *Macrocerus hyacinthinus*), a magnificent macaw of great size, which is perhaps the rarest and most beautiful found in the interior of Brazil from the northern end of the central plateau as far as the Amazon River. Its feathers are of a soft, metallic, dark greyish-blue, almost black, except round the eyes, where the uncovered white skin shows through. I have seen these birds in flight on four or five different occasions on the Tapajoz River, and tried in vain to secure a specimen. I generally saw them in couples, flying at a great height and speed. These birds are extremely intelligent, and become most affectionate and faithful companions to a considerate master. In fact, they will attack any one endeavouring to get near their owners. Their beaks are extremely strong. When in captivity they are disastrous to one's belongings, as they seem to possess an irresistible desire to crush and tear anything they see. They can chip off pieces of furniture made of the hardest wood with considerable ease. This is easily understood when you can see them crush into fragments the extremely hard nuts of the *Acrocomia lasiopatha*, on which they principally live.

Sir Roger Casement, of Putumayo atrocities fame, whom I had the pleasure of meeting at Manaus, possessed a most beautiful specimen of the *Macrocerus hyacinthinus*. It was most touching to see the pathetic devotion which existed between master and bird and *vice versa*. Only the people of the hotel where we both stayed did not appreciate the magnificent blue-black visitor, for when its master was out it spent all its time chipping off pieces from tables and chairs, and took the greatest pride and delight in flinging forks, knives and spoons off the dining-room tables, and tearing the menus to strips. The Brazilian waiters, in their caution to maintain their own anatomy intact, did not dare go near it; for the bird, even on hearing remarks made on its behaviour, would let itself down the sides of chairs and defiantly proceed to attack the intruders.

Similar but larger and more beautiful than this macaw is the *ararama*, extremely rare and perfectly black. The natives say that it is impossible to keep it in captivity as it is quite untameable. I saw a couple of these birds. They were really magnificent--certainly 3 ft. in length from the tip of the beak to the end of the tail.

When the steamer was close enough to the banks or an island we occasionally saw small groups of *assahy* palms (*Euterpe oleracea*) 20 to 30 ft. high, with smooth stems and feather-like foliage. Other palms, equally graceful, with stems like polished columns and delicately-cut fronds aloft, were also to be seen; but otherwise most of the vegetation was entangled and untidy.

From the trees hung liane in festoons or suspended like cords. Creepers of all kinds smothered the trunks and branches of the trees, which seemed to struggle for a little life and air; while, when we had an opportunity of examining the branches of the trees a little closer, we could see absolute swarms of parasites covering every bough.

Near some of the houses could be seen the *Musa paradisiaca*, the most common kind of banana palm in that region, with its green leaves ten to twelve feet long reflecting beautiful shades like silk velvet when caressed by the wind. I saw one or two specimens of the bread-fruit tree, with its digitated foliage, and several kinds of pine-apple plants (*Bromelia*)--some with leaves toothed along their edges, others shaped more like the blade of a long knife.

I was in great pain, and could not observe much. Also, most of the time we were at a great distance from the banks, and the river was so wide that it was almost like being in mid-ocean.

On November 14th we passed Obidos, at the mouth of the Rio Trombetas, the narrowest point, where the river went through a channel only 2,000 m. broad, but of extreme depth. The channel was formed by a depression between two hillocks 250 ft. high or so. The settlement of Obidos consisted of two long white buildings near the water, and a series of stores. To the left of the village as we looked at it was a high cliff extending for some 2,000 m. up stream over a beautiful beach. The cliff showed patches of red and yellow rock of a brilliant colour, the lower strata being of a deep red and clearly defined, the upper ones of a raw sienna colour, the dividing-line between the two colours being somewhat undulating. There was dense forest on the summit of the cliff. A good deal of vegetation had crept down and was clinging to the side of the cliff.

A little white church with a pointed spire stood on the highest point of the cliff, close to the town. Behind the cliff rose a hill of some height, upon which the better houses, with red-tiled roofs, were situated. A wide road led up to them.

The water of the stream was of a dirty yellow, and very turbulent owing to the strong wind that was blowing and the violent current. Proceeding up stream, we then came to a hill 300 ft. high on the right, which ended abruptly in an almost vertical red and yellow cliff plunging into the water. On the opposite side of the river, along the narrow neck, were lowlands, quite open and scantily wooded, over which rose great columns of black smoke, caused by the natives burning down the forest in order to prepare the land for their plantations. It was at this point that the entire volume of the Amazon could be gauged at a glance. As you looked up stream a long bluish line of low forest could be perceived over the gradually expanding deep yellow river. Dozens upon dozens of columns of smoke were visible. When night came the effects of those forest fires, with the reflection of the light upon the low clouds and in the water, were very weird and beautiful.

Greetings were occasionally exchanged upon the river as a big ocean steamer went by, or an over-enthusiastic captain let off rockets, which brought all the passengers from the dinner-table to the port-holes. Farther on we came to a pretty plantation on the left with innumerable banana palms crowded together, and some cocoa trees. At one time the exportation of cocoa from that section of the Amazon between Obidos and Santarem was considerable--some 8,000 kilos yearly. I was told that that industry has now gone down a great deal, and not more than 4,000 kilos were exported in 1911.

[Illustration: Campas Woman.]

[Illustration: Campas Man, Woman and Child.]

As we went farther up stream we passed alluvial banks of comparatively recent formation, in some places only one foot above the water and liable to constant inundation--in other places 10 or 12 ft. above the stream, and exposing an abrupt crumbling section of grey clay on a lower stratum with a narrow band of raw sienna colour. This yellow band rarely exceeded a thickness of 1 ft. We had an object-lesson here, where the banks were eroded by water and were gradually crumbling away, of the reason why the trees were so anæmic and generally died. The roots, instead of burrowing deep into the ground, spread out laterally in a horizontal position quite close to the surface of the ground. That night we had a beautiful effect of rain and smoke and the reflection from the fires, a wonderful study of reds and yellows and dark blues which would have fascinated the immortal painter Turner.

Farther on we passed an island 6 ft. above the water with beautiful green grass upon it, wonderful grazing land, and no trees whatever. On both sides of the channel we followed, in fact, we had fine open country all around, which seemed excellent for grazing purposes.

More interesting to me than the river itself were the wonderful effects of the ever-changing light in the sky. I

saw no more the wonderful radiations which had given me so much pleasure in Matto Grosso, but we beheld here a great haze of delicate tones up to a great height and a light blue sky above it. The clouds seemed to possess no well-defined form, but were more like masses of mist, the edges blending gradually with the blue of the sky. Only to the west was there an attempt at globular formation in the clouds. The clouds of heavy smoke which rose and rolled about over the landscape helped to render the otherwise monotonous scene a little more picturesque.

Farther up stream we reached on the right a long island almost absolutely free from trees, except at its western end, where a miserable growth of sickly trees covered its point. Beyond was a beautiful spit of red sand some 2,000 m. long.

On November 15th we reached Itaquatiara, where the banks of the river were much higher than usual on the right side. I was much struck by the sight of a lot of fallen timber lying about on the slopes of the high bank, and by that of innumerable logs of wood floating on the water, quite an unusual sight in Brazilian waters. Itaquatiara was placed geographically on a most convenient site, opposite the mouth of the great Madeira River. Now that the Madeira-Mamore railway is completed, bringing down the trade of Bolivia and of the Acre territory, there is no doubt that it will become a most important trading centre. To my mind it is bound to supplant Manaus, which is very inconveniently situated, not on the Amazon River itself but on the tributary Rio Negro.

All the rubber which goes down the Madeira River has so far been conveyed to Manaus by a great detour, involving much expense and time. In the future, I think, when Itaquatiara has developed into a big city, and proper arrangements are made for landing and storing cargoes, it is certain to become a most important centre of commerce. Land is already going up in value tremendously, although Manaus has waged war against the growth of a town at that spot, which will be inimical to her own interests.

[Illustration: The Ucayalli River.]

[Illustration: The Launch on which Author travelled almost to the Foot of the Andes.]

As is well known, the Madeira-Mamore railway was built from Porto Velho, on the Madeira River, around and along a series of rapids and waterfalls which rendered navigation most difficult, as far as Guajara Merim, on the river Mamore, a mere continuation of the Madeira River. The construction of the railway had long been contemplated by the Brazilian and Bolivian Governments, but it was a difficult matter owing to the dense forest and the unhealthy climate, which equals, if it does not even surpass, the deadliness of Panama in the time of the French. The works of the railway were begun as long ago as 1878 by Collings Brothers, who were then contractors, but nothing effectively was done until the Brazilian Government, fully realizing the necessity of opening up that rich country, especially after the purchase from Bolivia of the Acre Territory, perhaps one of the richest regions on earth as far as rubber is concerned, entered into a contract with a Brazilian engineer named Catambry, to build the railway. The Brazilian engineer transferred the contract to Mr. Percival Farquhar, who, in his turn, organized the Madeira-Mamore Company, entrusting the actual construction of the railway to Messrs. May, Jeckill & Randolph.

They started work in July, 1907, with preliminary engineering, the actual construction not beginning until January 1908. Work began with one engine, a Baldwin locomotive rebuilt, which had been there since 1878. Gradually the number of engines--all Baldwin locomotives--was increased to twelve. During the construction six tugs and eleven lighters were used on the Madeira River for handling the material. The contractors took into Brazil during the four and a half years occupied in the construction from 43,000 to 45,000 men, although they never had more than 5,000 men working at any one time. Many, indeed, were the deaths registered, and the steamers were constantly bringing back men laid up with fever. The supplies for those men had all to be brought from Europe and America, except sugar and coffee, as nothing could be obtained in the country itself. The four chief engineers were all Americans, Mr. Randolph and Mr. Jeckill, who were at the head of the



entire concern, spending all their time on the line in progress or at their head office in Manaus, which was mostly in charge of Mr. May. One chief surgeon, Dr. Carl Lovelace, handled all the hospital work, with the assistance of fifteen physicians; but innumerable were the lives lost from yellow fever and beri-beri, the two most prevalent diseases in that fatal country.

[Illustration: Campas Family wading across a Stream.]

[Illustration: A Farmhouse on the Andes.]

Before the railway was built it was necessary to unload the *battellãos* or trading boats thirty-eight times during the journey at the thirty-eight different rapids and falls on the way. The journey over the rapids took not less than forty days. I shall not speak of the constant danger to boats, their crews and merchandise. Now by the railway the entire journey occupies from eight to ten hours. The length of the completed railway, now in full working order, is 364 kil. The last rail was laid on April 30th, 1912, when Mrs. Jeckill drove the last and golden spike--an honour which no other white woman, I believe, has ever had in so inhospitable a country.

**CHAPTER XXIV**

Attacked by Beri-beri--A Journey up the Madeira River to the Relief of Filippe the Negro and Recovery of Valuable Baggage left with him--Filippe paid off--A Journey up the River Solimeões--IQUITOS

I ARRIVED in Manaus in the evening of November 15th. I was very ill indeed, my right foot so swollen that I could hardly stand on it, and so painful that I could not put on a shoe or even a slipper, so that I had to hop about with only a sock over it. The doctor on board had told me that I was suffering from beri-beri, and although I tried not to believe him I was gradually forced to the conclusion that he was right. In fact, atrophy set in by degrees--one of the characteristics of beri-beri being that after a time you feel no pain at all. You can dig a pin into the affected part, or pluck off all the hairs without feeling the slightest pain. I was in a bad way, although I never laid up for an entire day. From the moment I arrived I "got busy," to use an American expression, in order to go to the rescue of Filippe the negro and another man I had left in charge of my valuable baggage near the mouth of the Canuma River, a tributary of the Madeira. It was necessary for me to borrow or charter a steam launch for one or two days, so that I could save men and baggage. I applied to the Governor of the Amazonas, who had received telegraphic instructions from the Central Government to give me every possible assistance. When I called upon him he said he was not the "black servant" of the President of the Republic; that he was practically an independent ruler, and would obey nobody's orders or instructions, especially from the Central Government.

[Illustration: an Elevated Trail overlooking a Foaming Torrent.

(See arch cut in the rock.)]

I told him that the work I had done was principally for the good of Brazil; that all I asked him was to help me to save the lives of two Brazilian citizens, and the maps, photographs, etc., which would be useful chiefly to Brazilians, whatever their political views were. I would gladly pay out of my own pocket, within reasonable bounds, all expenses in connection with the trip. If I had applied to him it was only because I had found it impossible at Manaus to charter a steam launch.

I spread out before the Governor a map of South America, showing the journey I had taken from Rio de Janeiro to Manaus marked in red. The Governor, who had evidently never seen a map before, turned it upside down, mistook the entire map of South America for a map of his own Province, and seemed to be under the impression that the Amazon had its birth close to Rio de Janeiro.

A bitter enemy of all foreigners, especially Englishmen, the Governor was detested by everybody, and was at open war with the Commandante of the Federal troops in the town. All the money which should have been spent in embellishing or improving the town, was mis-spent in keeping a large army of police--over 2,000 men, I believe--for his personal protection.

My audience with the Governor did not last long, and I paid him back in his own coin. He immediately turned round then, with great courtesy begging me to stay and talk matters over, and said that he would be delighted to be of use to me in showing me around the city. I merely turned my back upon him, as I would on any nonentity, and limped out of the palace. Several messages were sent to me afterwards, which I treated with the contempt they deserved.

As nearly all the launches in the place belonged to the Government, I had then to apply to the Commandante of the flotilla of the Government boats. It will be easily understood that my anxiety was great to go and rescue my men; so that on leaving the palace I immediately proceeded to the private house of this gentleman--a great friend of the Governor, I learned afterwards. On sending in my card at five o'clock in the afternoon I was kept waiting a little time, then there appeared a yellow-faced individual in his pyjamas, muttering words which I should not like to repeat.

"What do you want?" he said to me. "Do you not know that I sleep from twelve to six every afternoon? What do you mean by disturbing me? I am sure you would not disturb officers of your own Navy in this way!"

I very politely answered that the officers of my Navy were well known for being wide awake at all times, and not for sleeping the whole day as well as the entire night. When I explained to him, and presented the order from the Minister of Marine requesting any officer of the Brazilian Navy to give every possible assistance, he told me that none of his boats were in a condition to move out; furthermore they were needed, as great political trouble was expected in the city.

I was beginning to feel anxious, as in my weak state it would have been a serious matter for me to undertake the river journey in a small rowing-boat, which journey would have occupied several weeks, when I could have done the whole thing in two or three days at the most in a steam launch. Even a rowing-boat was not obtainable unless you purchased it outright, and if you obtained the boat you could not obtain the men to row it.

It is extraordinary how many things in the world depend on absolute chance. When I returned, sadly disappointed, to the hotel, I met a Swiss gentleman, Dr. Alberto Maso, who was in the employ of the Brazilian Government as delegate of the Minister of Agriculture for the Territory of the Acre. I had met him in Rio de Janeiro a year before. I told him what had happened that day with the Governor and the Commandante of the Flotilla. Dr. Maso immediately took the matter in hand.

That same evening there was a meeting of the Associação Commercial do Amazonas, a most useful society in Manaus composed of the cleverest and soundest business men of that place. I was presented to the President, Mr. J. G. Araujo, and to Dr. Bertino Miranda, the honorary secretary--the latter a man of letters of great distinction, well known not only in his own country but in Latin countries all over Europe as well.

I was received by these gentlemen and the other members of the Association with the greatest consideration, and before I left that evening they assured me that they would procure a launch for me with which to go and rescue my men.

The next morning, in fact, I was taken to call on the Commandante of the Federal troops, who willingly and most courteously placed at my disposal his steam launch. A delay of several days took place, as unfortunately the steam launch had lost her propeller and it was necessary to make a new one. Also the engine had to be repaired, and a crew had to be engaged--a task which gave all those concerned a considerable amount of trouble.

I had, of course, to pay for the maintenance of the crew during the journey, and it cost me nearly a hundred pounds to fit her out with all the plates, knives, cooking utensils, and other paraphernalia necessary for her crew of sixteen men. In any other country three men would have been more than sufficient to run a launch of that size.

I also had to employ at my own expense a pilot--no steamboat was allowed to go without one--whom I had to pay at the rate of £7 15s. sterling a day. A cook had to be employed for the crew, as none of the sailors could be induced to condescend to be the chef. Two applicants were eventually found. One who was willing to do the cooking at a salary of £3 10s. a day, his chief ability, said he, consisting in boiling rice and fish. Another fellow eventually undertook the job at a salary of £1 10s. a day, he being willing to do the cooking at such a small salary as he said he had never in his life cooked before, and he did not know whether we should care for his cooking or not. It must not for one moment be believed that these men were trying to cheat me, and putting on prices, for indeed these are the current rates for everybody who wishes to travel in those regions. The cost of commodities of any kind in Manaus was excessive, and went beyond even the limits of robbery. I went into a chemist's shop to purchase a small bottle of quinine tablets, worth in England perhaps eightpence or a shilling. The price charged there was £2 10s.

Principally owing to the Booth Line Steamship Company and the allied companies, Manaus has become a good-sized place. The Harbour Works and the works made by the Manaus Improvements, Ltd., have been a great boon to that place, and have made it almost as civilized as a third-class European city. But obstacles have been placed in the way of honest foreign companies carrying on their work successfully, the unscrupulous behaviour of the Governor and the attitude of the mob having proved serious drawbacks to the development of the place.

[Illustration: La Mercedes.]

[Illustration: The Avenue of Eucalypti near the Town of Tarma (Andes).]

Large sums of money have been wasted in building a strawberry-coloured theatre of immense size and of appalling architectural lines, on the top of which has been erected a tiled dome of gigantic proportions over an immense water-tank in order to protect the theatre against fire. The water-tank was calculated to let down a great cascade of water, a regular Niagara, on the flames--as well as on the spectators, I presume. After it had been built it was discovered that if water were let into the tank, its weight would be enough to bring down the entire upper part of the theatre; so that it could never be filled at all.

Except for one or two short avenues, which reminded one of the suburbs of new North American cities, there was nothing worth seeing in Manaus. The shops were almost entirely those of jewellers, gunsmiths, sweet-sellers, and chemists. It was in this place that the poor *seringueiros*, on their return from rubber collecting, were in a few hours robbed of all the money they had made during several months' hard work. There was only one redeeming feature in Manaus: the British and American business men in the place were most charming and hospitable in every possible way.

It was on December 3rd, 1911, that everything was ready. The hour of departure had been fixed for ten o'clock in the evening. I went on board at the appointed time, but the captain of the launch and the crew refused to put out of the anchorage, as they said they would not go unless some extra men were employed. One of the pipes of the engine had been wilfully damaged, so that delay was caused, and we could not possibly start until it had been repaired. The captain of the launch had worried me for several days. He was in a constant state of intoxication.

\* \* \* \* \*

On December 4th, at 11 p.m., I was actually able to make my departure from Manaus on the launch *Amazonas*. I took in tow a rowing-boat which had been lent me by the representative of the Minister of Agriculture in Manaus.

By 8.30 in the morning of December 5th we entered the mouth of the Madeira River. I was surprised at the sudden change in the appearance of the two rivers. We saw in the Madeira high, gently sloping banks, covered with verdant grass and neat trees and palms along the top of them; whereas along the Amazon the trees stood almost in the water on the recently formed islands and banks. The left bank of the Madeira was of grey and reddish clay (grey below, red above), cut vertically, sometimes actually in steps. Blocks of a rectangular shape, in getting dried up, split and fell over, leaving the banks vertical. The right bank, on the contrary, was gently sloping, descending with a beautiful carpet of green grass into the stream. The islands were charming, with lovely lawns all round. Blackish and deep red rock, vertical and fluted, and with innumerable perforations, could be seen here and there, covered over with a padding of earth from ten to twenty feet deep.

The journey up the Madeira River had no great interest. By seven o'clock in the evening we arrived at the mouth of the Canuma River--or rather at a channel connecting the Madeira River with the river Canuma, which river actually has its proper mouth about half-way between Itaquatiara and Santarem, at a place called Parintins. By way of the connecting channel the two rivers were only a short distance apart, but that channel

was not always navigable. The steam launch, which drew little water, would have difficulty in going through, even at that time, when the water was fairly high.

[Illustration: On the Andes.]

[Illustration: A Street of Tarma.]

We therefore thought we would stay for the night at the mouth of the channel, and start on our journey by that difficult passage in broad daylight the next day. There was a house on the right-hand side of the mouth of the channel. While we made preparations to make ourselves comfortable for the night on the launch, the pilot went up to the house in order to get an expert at that place to take us through the dangerous channel.

I was just in the middle of my dinner when the pilot sent down a message for me to go up to the house at once, as my presence was required immediately. I struggled up the steep incline, not knowing what was up. Much to my amazement, on reaching the house, I saw before me my man Filippe the negro, who rushed at me and embraced me tenderly, and the other man I had left with him in charge of the baggage. The two men had been picked up by a boat two days up the river Canuma, where I had left them with my baggage, and they had come down expecting to meet me in Manaos. They had got stranded at that place, and although they had hailed one or two steamers which had gone down the river, no one had paid any attention to them, and there they had remained.

"Have you saved the photographs and the baggage, Filippe?" I immediately asked, when I had made certain that both men were in good condition.

"Yes," said Filippe. "I have everything with me. I have taken the greatest care of everything."

That was for me a happy moment, after all the vicissitudes we had had of late. The most important part of my baggage was saved. I had taken all my men back alive--if perhaps not very much alive--after so fateful an expedition. I felt happy beyond words.

The man who owned the house was the trader who had taken Filippe and the other man down the river in his boat, so I gave him a present of money and also a lot of provisions which I had on board and which we should not now need any more, as we should return at once to Manaos.

[Illustration: The Market Place, Tarma.]

Next morning, all as happy as possible, we steamed down full speed on our way back to Manaos. We came in for dirty weather all the time, which obliged us to halt for several hours and put into Itaquiara for shelter. A few hours later we were once more in the capital of the Amazonas, in the city of jewellers' shops and filthy food. On landing I found Maxim guns and artillery on one side of the principal square, with police troops in charge of them ready to fire; while on the other side were the Federal troops, also with their artillery ready for battle. It was with some concern that I found myself obliged to pass between those warlike bodies in order to enter the hotel. I was not so anxious for myself as I was for my photographic negatives and note-books, after I had taken all that trouble to save them.

However, the Governor at the last moment became scared, and went personally to call on the Commandante of the Federal troops in order to assure him of his friendship and affection, so that after all no battle took place that day.

Only a short time previously the flotilla had bombarded the town. The people of Manaos had got so accustomed to those little excitements that they thought nothing of them. There were occasionally a few people killed, but that was all.

It will be remembered that the *idée fixe* of Filippe the negro was to buy himself a *malletinha* (a little trunk). The first thing he had asked me after I had rescued him was if I had seen any good *malletinhas* in Manaos. So after landing we at once proceeded to buy a tin *malletinha* with a strong lock. Then I paid him off and gave him an ample reward, as he had been the pluckiest and most faithful of all my men. He was certainly the man who had given me the least trouble of the entire lot.

Filippe had tears in his eyes when he received his pay and present. He embraced me and thanked me a million times for having made him a rich man.

"After all," said he, "we have suffered a great deal, but now I shall be happy for ever. I shall marry the girl who is waiting for me at home."

"If ever I come out on another journey, Filippe, will you go with me again?" I asked him.

Filippe pondered for a moment. "Yes," he said with determination. "I have proved to you that I am afraid of nothing. You only have to order me, and I will go with you. Even if we are to suffer again as we have suffered on this journey!"

Filippe was a good fellow.

The other man when paid off received his money and his reward silently. He went out into the street, and returned four hours later without one single penny. He had purchased an expensive suit of clothes, a number of silk neckties, a gold chain, watch, etc.

The next morning there was a steamer sailing for Rio de Janeiro, so I packed off the jubilant Filippe, paying a second-class passage for him on the steamer and a first-class on the railway, as I had done for the other men, with wages up to the day of his arrival in Araguary, his native town.

Thus I saw the last of that plucky man--the only one who had remained of the six who had originally started with me.

On December 16th I left Manaos for good on my way to Peru, escorted to the good Booth Line steamer *Atahualpa* by the Commandante of the Federal troops, the representatives of the Associação Commercial, Dr. Maso, and some of my English and American friends.

It was with the greatest delight that I saw Manaos vanish away from sight as we descended the Rio Negro. Rounding the point at its mouth, steaming towards the west, we entered the Solemões River. This river is navigable by fairly good-sized boats as far as Iquitos, in the province of Loreto in Peru.

[Illustration: The Highest Point where Author crossed the Andes before reaching the Railway at Oroya.]

I was badly in need of rest, and expected to get it on those few days of navigation up the river, having dreamt of how I could lie on deck and do nothing, as that part was well known and there was no work for me to do. But, indeed, on that journey none of my dreams were realized, for, worse luck, the steamer, which had only accommodation for ten, carried not less than seventy or eighty passengers, fifty of them forming part of a Spanish theatrical company which was on its way to Iquitos. The deck of the ship had been turned into a kind of theatre, where rehearsals went on day and night. When the rehearsals were not going on, the men and women, following the usual habits of theatrical people, sang and practised flights of notes--which was a little trying after the dead silence of the forest.

However, thanks to the great civility of the managers of the Booth Line at Manaos, and to the extreme thoughtfulness of the captain of the *Atahualpa*, I was made quite comfortable in the chart-room of the ship,

which was as far away as possible from the noise. We were most of the time in mid-stream. The river was so wide that we could not see anything on either side. We steamed up day after day, occasionally passing islands of some beauty rising above the muddy waters of the Solimões. Navigation of that river was difficult, as the navigable channels were constantly changing, islands disappearing and new islands forming all the time. Elich Island, in the Timbuctuba group, was fast disappearing, while another island was forming just below it.

We passed the mouth of the Putumayo River at sunset one day, a most wonderful effect of clouds being produced over a brilliant cadmium yellow and vermilion sky, shining with great brightness above the dark green trees upon a high reddish cliff.

In a drenching morning at five o'clock we reached Esperança, the Brazilian frontier post, which consisted of half a dozen one-storied houses with red-tiled roofs, situated on a grassy expanse. Grassy hills of no great height rose at the mouth of the Javari River, a southern tributary of the Solimões River, forming there the boundary between Brazil and Peru. Dark green foliage perched high up on asparagus-like stems of trees formed a background to that wretchedly miserable place.

Tabatinga, on the left side of the stream, was the Brazilian military post on the frontier. A neatly-built, loopholed, square blockhouse, painted white, was situated some fifty feet above the level of the river on the summit of the bank. It was reached by a long flight of white cement steps. The Brazilian flag flew gaily upon a flagstaff at this most westerly point of the great Brazilian Republic on the Amazon (Solimões) River.

A few soldiers dressed in khaki stood, with their legs wide apart, watching the arrival of the steamer, while their officers in speckless white clothes hastily descended the long flight of steps and came on board, bringing bouquets of flowers to the captain.

There was a pretty garden near the blockhouse. Three mountain guns pointed viciously at the river from the most exposed position in Tabatinga at the top of the staircase. According to the account of a non-commissioned officer, there was a force there of 240 soldiers "*escondido no matto*"--that is to say, kept hidden in the forest!

After we had passed the frontier on the north side of the river, a tiny tributary brook, almost hidden by the vegetation and only identified by a white-barked tree on the left bank and huts on either side, the scenery made a change for the better.

Leticia was the name of the Peruvian frontier post, which consisted of two or three brick sheds with corrugated iron roofs.

We arrived at Iquitos on December 23rd, at 8.30 a.m., having employed seven days and twenty hours on our run from Manaos.

**CHAPTER XXV**

From Iquitos to the Foot of the Andes up the Rivers Ucayalli, Pachitea and Pichis--The Cashibos or "Vampire Indians"

THE change in the characteristics of the people the moment you were in Peru was considerable, and striking was the neatness of the buildings. Iquitos was a pleasant little city, the streets of which needed paving badly, but were otherwise well aligned and tidy. There were numbers of foreigners there, including a small English colony made up of employés of the Booth Line and the representatives of a few commercial houses. It is difficult to realize how pleasant Englishmen can be when they live in those out-of-the-way places.

After the Putumayo atrocities a proper English Consulate, in charge of Mr. Mitchell, formerly our vice-consul in Paris, had been established there. Yellow fever was rampant at that time in Iquitos, and reaped many victims daily.

Although Iquitos was 2,300 kil. farther up the river than Manaos, the price of all commodities in that country was less than half those in Manaos, and the quality of the articles twice as good. That is what comes of having free trade instead of a high tariff.

I spent a pleasant Christmas in Iquitos, all the English residents there showing me the greatest kindness. From Iquitos the river was no longer navigable for ocean-going steamers, and it was necessary to travel by small launches. There was no regular service, but there were a number of trading launches which went a certain distance up the river in order to trade with the different houses on the banks of the stream. The travelling was not particularly rapid, as one stopped ten or twenty times a day, and wasted endless time while the people came on board to buy beer or rum, or cotton goods, looking-glasses, etc., etc. Rubber and aigrettes, as well as money, were given in exchange for the goods received.

I left Iquitos on December 29th, on the launch *Rimac*, belonging to the Swiss firm of Messikommer. I was told that she would be ready to start at 9 a.m. sharp on December 28th, and at that time I got on board. The actual time of our departure was at 6.30 in the afternoon of December 29th. That was, of course, Iquitos punctuality.

The Prefect of the Province of Loreto had shown me much civility, and had telegraphed, by the wireless installation which had been established between Iquitos and Lima, making every possible arrangement for me to travel quickly. Thus, although in a terrible condition of health, I was able to make a record journey between Iquitos and Lima, the capital of Peru.

[Illustration: Oroya.]

[Illustration: Oroya, the Highest Railway Station in the World.]

Once started in the launch *Rimac*, we went through interesting channels, outlets of the main stream being often noticeable on either bank, cutting wide passages through the forest and forming one or more shallow lakelets, with innumerable aquatic plants on the surface of the water. As we went farther it became easy to understand how islands were constantly forming in the river. Quantities of large and small logs of wood were continually floating down the stream; the banks were gradually being eaten away by the current. Whole trees fell down with their immense branches and polypi-like roots, and formed a barrier arresting the progress of the floating wood. Particles of earth deposited by wind and by water saturated with impurities settled there. Soon grass would begin to grow on those deposits, which quickly collected more deposits of flying and floating particles. The soft bottom of the river, disturbed by the deviated current, piled up mud against the submerged branches resting on the river-bed. Quickly an island was then formed; more wood accumulated, more grass, more mud; the base of the islands would increase rapidly, and in the space of a few years islands several



kilometres in length rose above the water.

We had reached a point where the two great rivers Marañon and Ucayalli--both descending from the Andes--joined and formed the river Solimões, which we had so far navigated. We followed the Ucayalli.

On December 31st we entered a small arm on the left side of the river and we reached no less a place than New York--very dissimilar, I can assure you, from its namesake of the United States of North America. Far from seeing skyscrapers, brilliantly illuminated streets, and ferry-boats and steamers galore, there were only half a dozen thatched huts with *bona*-palm walls and floors. In the water floated two or three small canoes; that was all. The place was chiefly remarkable for the number and the fierceness of its mosquitoes--regular clouds of them. Only one thing New York of Ucayalli seemed to have in common with New York of the United States--the people seemed to be able to stand a lot of drink. They purchased from the *Rimac* a number of boxes of beer.

We proceeded. In a way it was amusing to travel on a trading boat. Every time we approached a hut the steamer blew her whistle; the people got up, at any time of the night, to come on board and see what there was for sale. I slept on deck, and from my bed could see what was going on all the time.

St. Helena came next, with its depot and farmhouse. A few cows could be seen grazing on the poorest kind of grass. We could often get good fruit at those farmhouses, principally bananas, pineapples, and *mamão*. Then we stopped at Requeña, on the left bank of the river, where a wireless telegraphic station of the Telefunken system was established. It was quite a nice little place, with a few houses, built of unbaked clay and roofed with zinc.

[Illustration: In the Andes at 16,000 Feet above the Sea Level.]

[Illustration: the Galera Tunnel.]

It was entertaining to watch the pride of the local gentlemen when they showed me their houses--mere sheds of the humblest description, but in their eyes far superior to any palace of Europe. An imported chair or an antiquated desk would supply them with conversation to last hours. The wives of those settlers were generally eccentric persons who looked suspiciously at us. One of them at Requeña made me feel most uncomfortable by the annoying way in which she looked at my only shoe--as I was unable to put a shoe on the other much swollen foot. She never took her eyes off that shoe, and stooped down many times to examine it closer.

A short distance from Requeña, still on the left side of the river, was the mouth of the Tapiche River, a tributary of the Ucayalli. On the right bank of this river was California, and then Avispa--a pretty spot. Two new red-roofed houses with large verandas stood prominent on a green grassy hill about 120 ft. high, while on the ridge in continuation of the hill itself could be seen a number of small houses, some with zinc roofs, others with *bona* roofs and walls.

The Ucayalli was a rich stream. It was interesting to notice how many trading launches were to be seen on that river, and the amazing part of it was that they could all exist. Hardly a day went by that we did not meet two or three launches. We were also constantly meeting canoes, generally hollowed out of tree-trunks, and larger boats of a more solid construction.

The population was entirely composed of a mixture of Spanish and Indian types and of pure Indians. Some of the latter had Mongolian characteristics; others were more of the Malay and Papuan types.

After the first day or two the voyage on the launch was tedious. One got tired of the endless conversation and of listening to the bargaining. The perpetual drinking which had to be witnessed was of little interest to a teetotaller. One seldom saw money change hands, all being done by barter, the merchandise we had on board

being exchanged chiefly for rubber. Even so far up the river civilization had well set in, and great caution was needed in buying balls of rubber. It was advisable to split them in two before purchase, as they generally contained all kinds of rubbish instead of pure coagulated latex.

After Brazil, however, the villages and houses of Peru looked clean and neat.

The prices of food were somewhat high, chickens fetching 4s. each, whereas in Iquitos they fetched from 8s. to 10s.; eggs sold for 6d. each, and were generally bad, the good ones being eaten by the people themselves.

We went up the Tapiche River, a tributary on the right bank, and visited the estate newly bought by an American company. In fact, we were there at midnight of December 31st, and drank in the New Year with Mr. Anzelius, the director, and his Polish and Italian assistants.

On January 2nd, 1912, we saw a great many Indians along the banks of the river, who ran away when they saw the camera pointed at them.

The people on that river were fond of giving high-sounding names to their houses. We passed a place called Philadelphia, where a large farm with lean cattle, ducks and fowls, could be seen, looking as miserable as possible; also plenty of banana palms and sugar-cane.

Some way off, after passing the large saw-mills of Cumaseba and Tamanco, where an interesting collection of animals and Indian weapons had been made by the proprietor, we came in the evening to the farm of Buenos Aires.

[Illustration: The Oroya Railway.

(A great spring emerging from the mountain-side.)]

[Illustration: Beautiful Scenery on the Peruvian Corporation Railway to Cuzco, Peru.]

Early on January 3rd we passed San Roque, and then Condorcanqui, a fine plantation of bananas along the river bank, and also a plantation of *yuta* (jute) and some bread trees. Clouds of aigrette storks could be seen in the evening circling about, thousands and thousands of them. They produced a most curious effect in the distance against the heavy black clouds of the sky.

We entered the Yanna Yakka stream, the water of which was almost absolutely stagnant and as black as ink, full of snakes, fish, and crocodiles. Yanna Yakka in the local Indian language means "black water." We steamed for two hours up that river as far as Porto Central, the river being quite narrow--only 150 m. wide. We eventually arrived at the prettiest spot I had so far seen on the river, called Porto Principal. On an elongated island not more than 80 m. wide were to be seen four large buildings of *bona* palm, with spacious verandas and corrugated iron roofs. The buildings were connected by high bridges. All those structures were built on piles 12 ft. high. Many *chapaha* palms of great height were to be seen there.

I heard at that place an extraordinary account of how a dirigible balloon, with nobody on board, had some few years before passed over the house. The balloon--which my informant, in his ignorant language, called a "huge square globe"--flew, according to him, a flag, the stars and stripes, and had an anchor dangling down. The balloon was travelling in a westerly direction. It flew a little higher than the trees, and caused a great scare among the natives. My informant told me that there was no one in the car at all, but they waved their hands at him (*sic*) when they passed over his house! He then told me that the air-ship had passed in the daytime and had quickly disappeared, but that it was beautifully lighted with coloured lights at night. So that it would be difficult from that truthful account to place much reliance on what the man said or on what he had seen at all. It is quite possible--after discarding all the indisputable embroidery from the story--that a balloon

actually went over that place, and it may probably have been Wellman's abandoned balloon with which he had tried to go across the Atlantic.

On January 3rd and 4th we had no great excitement. We stopped at numberless places. Nearly all the houses in that district were made in three sections, the two end rooms enclosed in *bona*-palm walls, while the central and larger room had two open sides. All the houses were perched up on piles, owing to the frequent inundations. Sewing-machines and gramophones were to be found in nearly every house. All the women wore, rather becomingly over such ugly countenances, the valuable hats which generally go under the name of "Panamas." The river was getting beautiful as we went farther up, immense grassy stretches being visible where the country was not inundated, and low shrubs emerging from the water in the many channels that were formed everywhere.

[Illustration: A. B. Leguia, the President of the Peruvian Republic.]

On January 5th we arrived at Terra Blanca, where a lakelet had been formed by an outlet of the river on the left bank. A place called Pernambuco was situated at the entrance of this lake. The water of the lake was beautifully clear and of a wonderful greenish colour. Beautiful white and yellow sand deposits were to be found around it. Five hundred people lived at Pernambuco. The *Rimac* did a brisk trade, over a hundred pounds sterling worth of goods being sold in an hour at that place.

On January 6th I saw the first hills of importance we had seen since leaving the lower Amazon. Those were the hills of Petronilla, where a mass of volcanic rocks and some interesting hot springs were to be found. A ridge ran from south-east to north-west in symmetrical undulations up to 1,000 ft. from Petronilla to Cancha Huayo. It rose quite abruptly from the flat alluvial land. Where a land-slide had occurred it showed an upper stratum of grey alluvial deposit 10 ft. thick, with soft yellow volcanic rock underneath, in a stratum of 30 ft. thick. It seemed as if that hill had been lifted up by volcanic pressure from underneath, as a lot of white and yellow sand had been brought to the surface, which evidently formed a substratum in the Ucayalli region.

We found strong whirlpools where the channel of the river formed an elbow at the foot of the mountain. The steam launch made poor progress against the strong current.

On January 7th we arrived at the large settlement of Condamano, a sub-Prefecture in the big province of Loreto. There were two parallel streets, clean and well kept, with others intersecting at right angles. On the main street along the water front were many large commercial houses, handsome buildings of *caña* walls and zinc roofs. The place had been built on a flat high land about 30 ft. above the river, and had some 1,500 to 2,000 inhabitants. One of the peculiarities of Condamano was that during the rubber-collecting season the population consisted almost entirely of women, as the men were in the forest collecting the latex.

We arrived there on a feast day--they have more feast days than working days in the week in that country--and the streets were alive with monks and soldiers, the only men who do not go collecting rubber. Women and girls, in flesh-coloured stockings and lace mantillas, flocked out of the church, each carrying a small carpet which they used to prevent spoiling their finery when kneeling down.

On leaving Condamano we came to the north-westerly end of the range we had seen the day before. It ended abruptly in almost vertical walls of yellow sandstone of various shades. The range was thickly wooded on its summit. The opposite bank of the river was absolutely flat.

That evening we came in for a heavy storm, which compelled us to halt from 6 o'clock until 2.10 a.m. Black clouds had accumulated overhead to the west. A boisterous gust of wind suddenly caught us, which swept off our chicken-coop, buckets, and other loose things which were on the roof of the launch. We were tossed about in a most alarming way, and were just able to tie up under shelter and make fast to some trees. The wind increased in fury, and the launch tore up her moorings, bringing down a big tree on the top of us with a

tremendous crash.

[Illustration: The American Observatory, Arequipa, and Mount Misti, Peru.]

[Illustration: On the Peruvian Corporation Railway on the way to Cuzco.]

There was a stampede on board, as everybody thought we had been struck by lightning. Some of the people were just able to jump on shore, while other Peruvians, men and women, scared to death by the diabolic clashing of thunder and the vivid lightning, knelt on the decks and prayed fervently that we might escape unhurt.

I had a narrow escape, a lighted petroleum lamp which swung above getting off its hook and falling on my head, upsetting all the petroleum over me. Fortunately it went out as it fell on me. In the middle of the night we had a great deal of trouble to make the boat fast once more, the waves in the river being of great height. The rattle of all the merchandise and broken crockery on board, the moans of the scared Peruvians, with the howling of the wind, made a regular pandemonium.

When we proceeded up the river next morning we came upon more interesting islands in course of formation. We saw quantities of *caña baraba*, wild cane, with its fan-disposed, elongated leaves. The natives used the reeds for walling their houses. Being absolutely straight, they are well adapted for that purpose.

On January 9th we passed several villages. Along the banks we saw many Indians, all dressed up in bright costumes, principally red shawls. We entered a tiny channel on the right bank and went as far as a place called San Jeronimo, a fairly large settlement. This small channel was, as late as 1895, the main stream, which has since been diverted by the formation of a low island. At sunset we perceived to the west what appeared at first a mass of low clouds revolving in a circle at a great speed. On closer inspection we found it to be millions of *garças* or aigrette storks flying in a circle.

I arrived in the evening of January 10th at Masisea, where another wireless telegraph station had been established by the Peruvian Government. At this place I left the launch *Rimac*, and found the Government launch *Esploradora*, which had been detained there by the Prefect of Loreto for two days, awaiting my arrival. Having transhipped at once, I was able to proceed on January 11th on the latter. She was to take me as far as possible toward the foot of the Andes.

As we proceeded up the river we saw extensive farms surrounded by clearings of good land, with lots of cattle and horses, especially on the left bank of the river. We purchased an ox, so as to have fresh meat on board.

The small launch was, unfortunately, packed with a great many Peruvian travellers. There were no cabins, and one had to sleep on the roof of the launch. Everybody was most civil, and with the new camp-bed I had purchased in Manaos I was able to make myself as comfortable as was possible under the circumstances.

Beautiful specimens of *cataua* trees of great height were constantly to be seen in the forest along the banks. The resin from these trees is extremely poisonous, and is much used by the local Indians for killing fish. We halted for five hours that day in order to take on board sufficient wood for the engines to last us the entire journey. At 6.30 that afternoon we left the Ucayalli river and entered the tributary Pachitea, on the left side, the Ucayalli describing a big curve where the Pachitea enters it. Just before reaching the mouth of the Pachitea, the Ucayalli had first a big arm deviating from the main stream on the left bank, then soon after another great arm also on the left side. The navigation of those rivers was now getting difficult, and we had to halt at night.

On January 12th we started up the Pachitea River, a stream much smaller than the Ucayalli, but more interesting. Soon after departing we could perceive in the distance before us a high hill range. Crocodiles and

white storks were innumerable, while fallen trees impeded navigation constantly. Once or twice we banged with such force against immense floating logs of wood that it made the launch quiver in a most alarming way. In the dirty water of the stream it was not always possible to detect the floating logs, which sometimes were just under the surface of the water. Immense quantities of *caña baraba* were to be seen on the banks, and great numbers of delicately-tinted violet flowers which enlivened the landscape. The *caña* had light violet-coloured *panaches*, which were much used by the Indians in the manufacture of their arrows. The banks were of alluvial formation. Islets of grey sand mixed with volcanic ashes could be seen. The current was strong.

We saw large families of *ciancias*--beautiful birds with velvety black bodies speckled with white, and fan tails of rich brown colour, feathers of the same colour being also on the outer half of the wings. They possessed slender, most elegant necks, small brown-crested heads, and light yellow chests. Seen at a distance they were not, in shape, unlike pheasants. Twenty or thirty together at a time could be seen playing among the lower branches of the trees along the edge of the river. Then there were small birds of a beautiful metallic blue-black, with very long tails; these latter were innumerable near the water.

[Illustration: A Beautiful Example of Ancient Spanish Wood-carving, Peru.]

The rainy season was in full swing. In the morning we generally had white mist rising among the trees, while during the day rain was usually plentiful and rendered travelling somewhat monotonous, as we could not see much. We saw many specimens of the *tagua* or *yarina*, a small palm, the leaves of which were used in that region for roofing houses. At last we came to the first rocks I had seen in the river since leaving the Tapajoz River. They were at the double whirlpool of Naittavo. At the island of Errera was a narrow channel only 30 to 40 m. wide, where the current was extremely strong, and just deep enough for our launch, which drew 5 ft. of water. The upstream end of the island was strewn with logs of wood, forming a kind of barrage, the water of the dividing stream being thrown with great force against it. It was here that we got the first sight of high mountains--a great change after the immense stretches of flat land we had encountered all along the Amazon, Solimões and Ucayalli. I saw some beautiful specimens of the idle or sleepy monkey, the *preguya*, a nocturnal animal with wonderful fur. The small launch was swung about with great force from one side to the other by the strong current and whirlpools. We saw a number of *Cashibos* (Carapaches and Callisecas) on the right bank of the river. They are said to be cannibals, but personally I rather doubt it. If they have occasionally eaten a missionary or two, I believe that it must have been rather as a religious superstition than because of the actual craving for human flesh. Also it is possible that, as is the case with many African tribes, the Cashibos may believe that eating an enemy gives strength and courage, and may have indulged in this practice purely on that account. So that I do not think that it is fair to call those Indians cannibals in the true sense of the word, any more than it would be fair to call a teetotaller a drunkard because he took a drink or two of brandy for medicinal purposes.

The word "Cashibo" in the Pana language means vampire. Those Indians are great fighters, and are in a constant state of hostility with all their neighbours. They are good hunters and fishermen. Their weapons are well made, and consist of bow and arrows, spears and war-clubs. The Callisecas and Carapaches are very light in colour, with a yellowish skin, not darker than that of the average Spaniard. They are fine-looking people, fairly hairy on the face and body. The men grow long beards. Men and women generally go about naked, but some of the Indians near the river have adopted long shawls in which they wrap themselves. After marriage the women wear a loin-cloth, but nothing at all before marriage. The girls when young are attractive, with luminous, expressive, dark brown eyes. These Cashibos are supposed to be the "white race" of the Amazon. They are nevertheless not white at all, but belong to a yellow race, although they are, as I have said, of a light yellow colour. Many yellow races have come under my observation in the islands of the Pacific Ocean, who were just as light as the Cashibos, such as the Bilans and Manobos, and some who were even whiter than they are, such as the Mansakas of the Mindanao Island. The Cashibos are wild people, and the settlers in the neighbourhood are much afraid of them.

On January 13th, when we were three days out from Masisea, we were travelling between high rocky hills

with almost vertical sides. Their section showed in the lower portion narrow bands of violet-coloured rock and white light stone in a horizontal stratum. Above that had accumulated a deep layer from 30 to 100 ft. thick of red earth.

We went across a dangerous whirlpool. The launch hardly had enough strength to pull through at full speed. The water all around us formed great circles with deep central hollows, and, as we went through, rose before us like a wall. It had quite an impressive effect. That particular whirlpool was called Sheboya. Soon afterwards we obtained a beautiful view of the high range--the Sira mountains.

[Illustration: Wonderful Example of Old Spanish Wood-Carving, Peru.]

On January 14th we went over the whirlpool of Marques, a most picturesque sight. On the banks of the river was plenty of rubber, *hevea*, but not of quite such good quality as that found in Brazil. Some of the trees exuded white and some yellow latex, the coloration being probably due to the quality of the soil. There were few habitations along the banks of the Pachitea River. There were tribes of the Campas (or Antis) and Cashibos Indians, the members of both races having marked Malay characteristics. Occasionally one met extraordinary people in those out-of-the-way regions. When we halted for wood, which we used instead of coal for our engine, a man some six feet four inches in height came on board--quite an extraordinary-looking person. To my amazement, when I spoke to him, he turned out to be a man of refined taste and quite highly educated. He was a Hungarian count and an officer in the Austrian army, who, having got into trouble in his own country, had gone to settle there.

From a place called Cahaubanas, at the confluence of the river Pichis with the Pachitea, it was possible to cross over on foot to the Mayro, a stream which flowed into the Palcazu, and in two more days' walking (about 75 kil.), the German colony of Potzuzu could be reached at the meeting-place of the Potzuzu River with the Uancabamba. From the German colony 158 kil. more would bring you to Uanuco, and 138 kil. farther on was Serra de Pasco, whence the railway went to Lima.

Another trail from Cahaubanas proceeded to Chuchura, about 50 kil. higher up the Mayro river. From there it was possible to cross the Yanachag Mountains and reach the settlement of Uancabamba. The distance from Cahaubanas to Chuchura was one and a half day's walking--some 40 kil. of heavy climbing, that from Chuchura to Uancabamba two days' marching. From Uancabamba one was able to get mules in order to go over the high pass of Culebra Marca and reach Serra de Pasco.

It was possible by that trail to reach Lima in a few days on foot. It was out of the question for me to attempt such a journey, the attack of beri-beri in my right leg making it almost impossible for me to stand up. I decided to go as far up the stream as I could on the launch and by canoe.

At Cahaubanas were a monastery and a great many Indians. After halting for the night at that place we continued our journey up the Pachitea with a strange medley of passengers on board. We had the Hungarian count, an Italian farmer, who was a remarkable musician and played the accordion beautifully; we had some Peruvians, a Spanish emigrant, a small Indian boy aged ten who acted as steward, and a young fellow of German origin.

The cook on the launch was a lunatic, who was under the impression that he was the Saviour. It was too pathetic, and occasionally quite alarming, to see the poor man leaving the cooking stove whenever we passed any Indians on the banks, when he raised his arms up in the air and, stretching them forward, gave his benediction to the people he saw, instead of looking after the boiling rice. His benedictions cost him frequent kicks and shakings by the neck on the part of the captain of the launch. He was absorbed in fervent praying during the night. He seldom condescended to speak to any of us on board, as he said that he was not living on this earth, but would come back some day to bring peace and happiness to the whole world. Words of that kind were uttered whilst he was holding a saucepan in one hand and a ladle in the other. It was pathetic.

[Illustration: On the way to Cuzco.

Railway bridges partly carried away by swollen river.]

In pouring rain we left again on January 16th between the high rocky banks of the river, well padded with earth and with dense vegetation. Extensive beaches of grey sand and coarse gravel were passed, until we arrived at Port Bermudez, situated at the confluence of the Pichis with the Chibbis, a tributary on the left bank. Here we found the last of the chain of wireless stations which had three iron towers. From that place a telephone and telegraph wire have been installed right over the Andes and down to Lima.

The passage on the Government launch from Masisea to Bermudez cost £7 10s. I heard there that, thanks to the arrangements which had been made by the Prefect of the Loreto Province, the number of mules I required in order to cross the Andes was duly waiting for me at the foot of that great chain of mountains.

I therefore lost no time, and on January 17th, having left the launch *Esploradora*, proceeded in a canoe with all my baggage intending to navigate as far as possible the river Pichis, a tributary of the Pachitea, formed by the united Nazaratec and Asupizu rivers.

The landscape was getting very beautiful, the Sungaro Paro Mountains rising to a great height on the south-west. Immense *lubuna* trees, not unlike pines in shape, were the largest trees in that region--from 5 to 6 ft. in diameter. The current was so strong that we were unable to reach the spot where the mules were awaiting me, and I had to spend the night on a gravel beach.

The next morning, however, January 18th, after passing two small rapids, where my men had to go into the water in order to pull the canoe through, I arrived at Yessup, where my mules were awaiting me, and where there was a *tambo* or rest-house, kept beautifully clean.

[Illustration: Great Sand Dunes along the Peruvian Corporation Railway to Cuzco.]

[Illustration: Inca Bath or Fountain.]

The distance by water from Iquitos to Masisea was 980 kil.; from Masisea to Puerto Bermudez 520 kil.; from Puerto Bermudez to Yessup 40 kil.

**CHAPTER XXVI**

## Across the Andes--The End of the Trans-continental Journey

I WAS fortunate in obtaining some excellent Peruvian muleteers to accompany me on the expedition over the Andes. The trip might have been a rough one for the ordinary traveller, but for me it was a real holiday excursion, after the horrible time I had experienced in Brazil. This notwithstanding the disagreeable weather I encountered during the fourteen days' rough riding which I employed in reaching the Pacific Ocean.

I started at once with my pack animals on the trail which has been cut by the Peruvian Government over the mountains. Rain came down in torrents. Most of the country was swampy, the mules sinking chest-deep in mud. The travelling was not exactly what you would call pleasant. Your legs dangled all the time in water and slush. As that trail was used by caravans, the mules had cut regular transverse grooves in the ground all along, in which successively they all placed their hoofs. Each groove was filled with slushy water, and was separated from the next by a mud wall from one to three feet high. The mules were constantly stumbling and falling. After you had travelled a short distance you were in a filthy condition, the torrential rain washing down the splashes of mud and spreading them all over you.

After leaving Yessup we crossed first the Sinchhuaqui river, then the Aguachini. We began to ascend two kilometres after we had left Yessup, and marched steadily the entire day among gigantic *aguaso* trees and wonderful ferns of great height, until we reached the Miriatiriami *tambo*, 27 kil. from Yessup.

On January 19th we followed the River Azupizu along a narrow trail from 300 to 400 ft. above the level of the river, with an almost vertical drop by the side of us. Huge palms and ferns of indescribable beauty were to be seen all along, while waterfalls and streamlets constantly crossed the trail.

We encountered that day deep mud all the way, the mules sinking up to their bellies in the slush. The trail along the mountain side was cut in the soft earth, and actually formed a deep groove only about two feet wide, the mud and slush being held by the solid transverse barriers which succeeded one another at short intervals.

[Illustration: Cuzco.]

[Illustration: Llamas in foreground.]

At Piriatingalini and Puchalini we found light cable suspension bridges, very shaky, which swung to and fro as you rode over them. Most of them were not more than four feet wide and had no parapet at all. I cannot say that I felt particularly happy when my mule--sure-footed, I grant--took me across, the bridge swinging, quivering, and squeaking with our weight on it, especially when we were in the middle. The rivers were extremely picturesque, with high mountains on either side, among which they wound their way in a snake-like fashion over a rocky bed, forming a series of cascades. We went that day 25 kil., and arrived at the *tambo* of Azupizu, which was in charge of a deserter from the French navy. He was an extraordinary character. He had forgotten French, and had neither learnt Spanish nor the local language of the Campas Indians.

A tribe of those Indians was to be found near there--very handsome people, the men solidly built and muscular, with intelligent but brutal faces, with the yellowish-brown skin and slanting eyes of the Malay races. The eyes showed a great discoloration in the upper part of the iris. They possessed straight hair, slightly inclined to curl at the end. The nose was flattened at the root. They wore a few ornaments of feathers on the head. Their clothing consisted of a loose gown not unlike a Roman toga. The women were good-looking when very young.

The Campas claimed to be the direct descendants of the Incas. There is no doubt that the Campas were practically the same tribe as the Antis, once a most powerful tribe which inhabited an extensive territory to the



north and east of Cuzco. In fact, the eastern portion of the Inca country was once called Anti-Suya. The Campas, or Antis, were formerly ferocious. They are now quite tame, but still retain their cruel countenances, resembling closely those of Polynesians and Malays.

We left that place on January 20th in drenching rain. The river was much swollen, and formed a whirlpool of great magnitude just over some bad rapids. We crossed from mountain-side to mountain-side, some 400 ft. above the stream, in a sling car running along a wire rope. The car consisted of two planks suspended on four pieces of telegraph wire. As the sling had been badly constructed it did not run smoothly along the cable. I had an unpleasant experience--everybody had who used that conveyance--as I was going across from one side to the other of the stream, a distance of some 200 metres or more. The ropes which were used for pulling the car along got badly entangled when I had reached the middle of the passage. The Indians and the Frenchman pulled with violent jerks in order to disentangle them, and caused the car to swing and bump to such an extent that it was all I could do to hold on and not be flung out of it. Having been swung to and fro for the best part of an hour on that primitive arrangement, I was able to proceed on the other side of the stream. Fortunately we had taken the precaution of making the animals cross over the river the previous evening, before it was in flood, or else we should have been held up there for several days. Leaving the Azupizu river, we followed the river Kintoliani, which joined the Azupizu and formed with it a most formidable stream.

[Illustration: A Famous Inca Wall, Cuzco.

The various rocks fit so perfectly that no mortar was used to keep them in place.]

The trail was at a great height, some 600 ft. above the water. In two or three places where it had been cut into the rock it was most dangerous, as the rocks were slippery with the wet, so that the mules had great difficulty in keeping their feet. The vegetation was wonderful, with trees of enormous height and beautiful giant palms. Waterfalls over rocky walls were plentiful, while the effects of clouds were marvellous among those mountains--although my enthusiasm was damped a good deal that day by the torrential rain, which came down in bucketfuls upon us, and filtered through even my heavy waterproof coat.

The zigzag ascent was extremely heavy, the first part being over rocky ground, while the rest of that day's journey was along a swampy trail on which the mules stumbled and fell many times. One of my men had a narrow escape from being precipitated down the chasm. So bad, indeed, was the trail that we only went 15 kil., halting at the *tambo* of Pampas S. Nicolas.

On January 21st we made a long and tedious march, rising all the time among slippery rocks along precipices, or sinking in swampy mud on the narrow trail. Picturesque waterfalls of great height were visible in volcanic vents, some square, others crescent-shaped, on the face of the mountain. The torrents, swollen by the heavy rains, were difficult to cross, my mules on several occasions being nearly swept away by the foaming current. We sank in deep red slush and in deep holes filled with water, but continued all the time to ascend a gentle but continuous incline. We travelled that day from six o'clock in the morning until six o'clock in the evening, rain pouring down upon us all the time. We were simply smothered in mud from head to foot.

We found a large *tambo* at Camp 93, with a telephone and telegraph station. At those *tambos* it was always possible to obtain rice, chickens and eggs at reasonable prices, fixed by the Government. In many of the *tambos* were also rough wooden bedsteads, with a more or less comfortable mattress. I generally preferred to use my own camp-bed. As there were never more than one or two rooms in the *tambo*, you had to sleep in the same room with other people, unless you preferred to sleep outside, as I did.

For the privilege of sleeping at any *tambo*, in or out of doors, one paid the small sum of one shilling. A dinner or lunch seldom cost more than two shillings, and breakfast eightpence to one shilling. The food for the animals could be reckoned at one shilling for each mule, the price being higher at the Yessup end of the journey and getting gradually lower as one got nearer the capital.

Of course one could not call travelling over the Andes in any way luxurious. The tablecloths at the *tambos* showed all round the table the marks of the dirty lips of previous travellers, and plentiful stains of soup, coffee and tea. The illumination consisted usually of a candle placed in the mouth of a bottle, which was used as a candlestick.

I saw more Campas Indians there. They were singing songs strongly resembling Malay melodies, to the accompaniment of Spanish guitars. Other songs influenced by Spanish airs, but still delivered in a typically Malay fashion, were also given that evening. They interested me greatly.

[Illustration: Inca Three-Walled Fortress of Sacsayhuaman, Cuzco.]

On January 22nd we left Camp 93. I was struck everywhere at those *tambos* by the great honesty of the Peruvians. I was often touched by the extreme kindness of the people and their considerate manner--although perhaps it was more particularly striking to me after my experience of the brutal behaviour of the lower-class Brazilians. The gentle way of speaking, the more harmonious language--Spanish instead of Portuguese--and the charming civility of the people, made travelling, even under those unpleasant circumstances, quite agreeable.

It was cold, especially at night. Nearly all my instruments had been badly damaged in our many accidents in Brazil, and I was unable to replace them either in Pará or Manaos. Owing, therefore, to the lack of self-registering thermometers, I could not keep an accurate daily record of the maximum and minimum temperatures. After leaving Camp 93, we went over a really fearful trail, my mules being all the time chest-deep in mud. It was extremely hard work for the animals to get along. As is well known to any traveller, all animals of a caravan when on a narrow path step in the footprints of their predecessors, so that on that trail they had sunk a long series of deep holes in the soft clay, which were constantly being filled by water sliding from the mountain-side. In that particular part the mud had highly caustic qualities, which burnt the skin and caused irritation each time you were splashed. The muleteers who were walking had their feet badly burnt by it, one man suffering agony from his blistered feet.

Magnificent mountain scenery covered with luxuriant forest surrounded us as the trail wound its way along the high point on the top of the mountain range. We went only 21 kil. that day from Pampas, having occupied seven hours to cover the distance, owing to the difficulties of the march.

In the afternoon we were enveloped in dense fog which lasted the whole night, the cold being quite severe, and the more perceptible because of the humidity in the air. The trail here described a wide detour, which could have easily been avoided had another trail that went direct to New Bermudez been followed at the bottom of the valley. The journey by that lower trail could be accomplished in one day and a half. The elevation by hypsometrical apparatus of this camp (N.71) was 5,663 ft.

On January 23rd we descended rapidly through beautiful forest from Camp 71, where we had halted for the night, to a large *tambo* called Eneñas, in charge of an Italian. The place was situated in a beautiful valley intersected by a streamlet saturated with lime. It looked exactly like milk, and hurt your gums considerably when you drank it. The excellent mule I was riding had unfortunately hurt one of its legs while we were crossing a swollen torrent, where the mule and myself were nearly swept away in the foaming current. Riding on the lame animal, which was all the time stumbling and falling down on its knees, was unpleasant. In the narrow trail it was not possible to unload another animal and change the saddle, and it was out of the question for me to walk.

[Illustration: The Inca Temple of the Sun, with Spanish Superstructure.]

[Illustration: Inca Doorway, Cuzco.]

I arrived at the *tambo* with a ravenous appetite, but unfortunately nobody had telephoned from the previous *tambo* that I was coming, so that it was impossible to get lunch, and I had to wait two or three hours before I could get anything to eat at all. The men in charge of the various *tambos* were rather negligent in telephoning and making arrangements with the next *tambo*, as the kind of travellers they had on that trail was not of the highest type and could not always be relied upon for payment. The people in charge of the *tambos* were poor devils, half *abrutis*, to use a most appropriate French expression, by the life they had to lead in that forlorn country.

On January 24th we continued our journey over horrible deep mud-holes, which made the trail extremely dangerous. On that particular day we were travelling over sticky soil, so that when the mules trod in the deep holes they stuck with their hoofs and fell over, immediately struggling wildly to free themselves. One of my men was nearly thrown down a precipice that day, and all of us, as well as all the pack animals, had many unpleasant falls during that march. Swampy places like that were encountered for hundreds of metres at a time. In one place that day we had two kilometres of continuous swampy mud. In the afternoon I had a nasty fall, the mule rolling right on the top of me and nearly breaking my right leg. The animal in falling had sunk its head in the sticky mud, and was struggling madly to release itself. The animals were then marching chest-deep in mud. In my helpless condition I tried to get off when the animal fell, but sank up to my waist and stuck fast with my legs in the mud. When the mule rolled over, it knocked me down on the edge of the precipice, my leg remaining caught under the animal. Had not one of my muleteers been by my side at the moment and rushed to my rescue, I should have fared badly indeed.

We had a slippery descent after Tambo 33, where we had a lunch composed of putrid tinned salmon and "invisible" eggs--the latter dish being a speciality of that place. The *tambo* man insisted that I had eaten six eggs, whereas I had not even seen them except on the bill. He told me that I was wrong, showing me a napkin on which two yellow streaks were to be seen--though not left there by me, but by the lips of some traveller who had passed perhaps a month before.

We made a long march that day, having left at seven o'clock in the morning, and arriving at our halting-place at four o'clock in the afternoon.

The next day, January 25th, we had a trying march. Several land-slides had taken place, bringing down great patches of forest. Numberless trees had fallen over, making it difficult for the animals to be taken across. In one place all of them had to be unloaded, and they sank so deeply in the slush and soft earth that we had three or four hours' extremely hard work to cover a distance of about 50 m. The animals became so scared that they would not go on at all. The men who pushed and led them along that dangerous passage with a deep precipice on one side were in constant danger.

The rain, which had been torrential during the night, continued during the entire day, swelling the streams and making them most difficult to cross. In one stream my mule and I were swept away altogether. I had water right up to my waist while riding, and the mule showed only its head above the water. We were thrown with great force against some rocks, where, fortunately, my muleteers came to our help and got us out again.

[Illustration: Inca Steps carved in a Dome of Rock, Cuzco.

Fortress noticeable in the distance.]

The trail--about half a metre wide--wound its way up to a great height above the foaming river. There were beautiful ferns of immense height, some of which had finely ribbed, gigantic leaves. Graceful yellow flowers, or sometimes beautiful red ones, were to be seen on tall trees with white, clean stems. We passed a coffee plantation, owned by English people, near a charming settlement of whitewashed houses on the opposite side of the river. When we came to cross the Rio Las Palmas--heavily swollen--we were once more nearly swept away in riding across with water up to our chests. The baggage naturally suffered a good deal in those

constant immersions. This was, unfortunately, the wrong season for crossing the Andes; but I could not help that, as I was anxious to get through, and could not wait for the fine weather to come.

Farther on we crossed the river Paucartambo near the Pueblo Pardo. We next followed the Rio Chanchamayo, which afterwards became the Rio Perene, along which extensive English farms had been established. We were now getting near to civilization. I felt that my work was entirely finished, as the country hereabouts was well known.

We came to the Colorado river, a tributary of the Chanchamayo, and passed S. Luiz de Shuaro, a charming little village of whitewashed houses. The scenery was beautiful on nearing La Merced. The river basin showed luxuriant grassy slopes and immense sugar plantations.

La Merced was situated on the left bank of the Rio Chanchamayo, formed by the meeting of the Rio Tulumayo and the Rio Tarma, which joined near the village of S. Ramon. It had two modest hotels and various commercial houses. In a way I was sorry to get to a town again, because in those places you had all the trumpery illusion of civilization without any of its real advantages. One met, however, with the greatest civility from everybody, and, indeed, with the greatest honesty. So that travelling in those regions was quite a pleasure.

To my amazement that evening a burly Italian came into the hotel. Who was he?--Garibaldi's grandson, the son of General Canzio and Garibaldi's daughter. He was interested in some mines in the district, and had lived there for some years trying to make a fortune.

What impressed one most in the settlements on the Andes were the great neatness and cleanliness of all the buildings, and the charming manners of all the people one met. Everybody, without exception, saluted you politely as you approached; everybody was anxious to be of assistance or offer you hospitality. There was, nevertheless, nothing of great interest in those high-placed villages.

On January 26th I went on in a drenching rain, having changed my animals at that place for another lot of excellent mules. The hire of animals was somewhat high, but after the prices one had to pay in Brazil, everything seemed, by comparison, dirt-cheap in Peru. I also said good-bye to the Peruvians who had accompanied me so far, and employed Indians to take charge of my animals.

From La Merced there was a trail from one to three metres wide, cut out in the solid rock and skirting all along the foaming river, which flowed in the opposite direction from that in which we were travelling. In several places narrow tunnels had been excavated in the rock, through which the trail proceeded. These tunnels were dangerous when you encountered caravans of pack animals coming through from the opposite direction. The animals often got jammed in the middle of the tunnel, tearing their loads to pieces in their attempts to disentangle themselves. Once I got jammed myself, and came out minus a patch of skin several inches long from my left shin and knee.

Between La Merced and S. Ramon, a distance of some 10 kil., one had to cross the shaky suspension bridges of La Herreria and S. Ramon. The oscillations of those bridges were so great that it was always a marvel to me that the animals and riders were not precipitated into the river below. The planks of the bridges were in many places so rotten that it was not uncommon for the animals to put their legs right through them. Only one animal at a time could go across, as the bridges were not strong enough to support more.

Farther on we arrived at two more bridges--the Puntayacu and the Rio Seco, one a suspension bridge, the other built of masonry. One met hundreds of Indians upon the trail, in costumes resembling those of the Calabrese of Italy. The men wore heavy woollen hand-knitted stockings up to their knees, or else over their trousers, white leggings left open behind as far down as the knee. Round felt hats were worn by the women, who were garbed in bright blue or red petticoats, very full and much pleated, but quite short. Red was the

favourite colour for the shawl which they threw round the body and over the shoulders.

When we proceeded the next morning the heat in the low valley was stifling. The scenery continued to be beautiful, with magnificent waterfalls and torrents flowing down at a steep angle among rocks.

I stopped for the night at the charming little hotel of Huacapistana, situated at a lower level than the road in a most picturesque narrow valley, on the right bank of the Tarma River. The distance between La Merced and Huacapistana was about 35 kil.

Between Huacapistana and Tarma the track was excellent. We went through the Carpapata tunnel, 184 m. long--very dark and narrow, and extremely dangerous if you happened to meet pack animals in the middle. The scenery was enchanting and the vegetation wonderful until, 20 kil. farther, I entered, by a magnificent avenue of eucalyptus trees, the most picturesque town of the higher Andes, Tarma. The narrow, neat streets were paved with cobble-stones. All the houses were painted white, and had red-tiled roofs. The streets swarmed with quaintly attired Indians and tidily dressed Peruvians. There were many Italians and Spaniards in Tarma. Two or three hotels existed here--a capital one, actually lighted by electric light, being kept by a most honest Italian. The elevation of Tarma, taken by the hypsometrical apparatus, was 10,034 ft.

[Illustration: The "Round Table" of the Incas.]

[Illustration: Entrance to Inca Subterranean Passages.]

I left Tarma on January 29th, following a well-cultivated valley, fairly thickly inhabited. We were travelling over a good mule-track, swarming with Indians, donkeys, mules, and horses. The mud houses and land on either side were enclosed by hedges of cacti, or by walls. We were between barren mountains of a brownish colour, against which the quaint, brightly-coloured costumes of the many people on the road were thrown out in vivid contrast. Most of the houses were constructed of large mud bricks, sun-dried. The crops seemed to consist chiefly of Indian corn. As we went farther, among dark brown rocks and limestone, we came to grottoes and rock habitations. At some remote period there must have been a great upheaval in that country--at least, judging by the sedimentary foliated rock, the strata of which were from one to three feet thick, and which had originally been deposited horizontally by water. These accumulations or sediments now stood up at an angle of 45°. We were now in a region where llamas were plentiful--most delightful animals, with their pointed ears pricked up, their luxuriant coats, and stumpy curled tails.

We came to a steep ascent over a high pass, where the cold wind was fierce. On reaching the pass I found myself on a grassy plateau in which were to be seen two circles of stones by the side of each other.

The partition of the waters flowing into the River Mantaro and the River Tarma took place at the point called Ricran, not far from the high pass we had crossed. It was always advisable when taking the journey between Tarma and Oroya to start early in the morning, so as to be on that pass before noon. In the afternoon the wind was intensely cold and frequently accompanied by violent storms of hail and rain.

I arrived in the evening at Oroya, the distance from Tarma being 30 kil. 236 m. The journey between the two places could be accomplished on a good mule in five or six hours. Oroya was an important point for me, as it was there that I saw the first railway since leaving Araguay in Brazil nearly a year before.

Oroya is perhaps one of the highest railway stations in the world, its accurate elevation by boiling-point thermometers being 12,156 ft.

The town, like all termini of railway lines, was not an attractive place. There were two or three hotels, all extremely bad. One began to feel the effects of civilization in the dishonesty of the people.

Early the next morning, thanks to arrangements made by Mr. D. T. Lee, I was allowed to take the journey to Lima in a "gravity car," in the company of the engineer, Mr. Beverley R. Mayer, instead of by the usual train, which ran twice a week. Of course it was only possible to go by "gravity car" from the highest point of the railway, which is not at Oroya, but at the tunnel of Galera, 5,356 m. (17,572 ft.) above the sea-level as measured by the railway surveyors.

[Illustration: a Toboggan Slide of Rock.]

[Illustration: An Inca Grave, Bolivia.]

The scenery was magnificent on that railway. Having gone through the Galera tunnel, Mr. Mayer and I got on the small "gravity car," keeping all the time just in front of the train. It was quite an exciting journey, the incline being so great that we soon acquired a vertiginous speed--in fact, too much, because our brakes would not act any more. With the snow and rain the rails had become so slippery that we went sliding down at the most alarming pace. Nor did I feel particularly happy at having the train only a few hundred metres behind us. Whenever we got to a station, we had to get off quickly and get our car off the rails to give room to the incoming train. The cold was intense.

The geological formation of the Andes in that particular region was remarkable, and more remarkable still was the British engineering triumph of constructing a railway from the sea to so high an elevation. In one or two places there were iron bridges of great height and ingenious construction. You felt a curious sensation as you flew over those bridges on the tiny car, and you saw between the rails the chasm underneath you; nor did you feel extraordinarily comfortable when, hundreds of feet down, down below, at the bottom of one chasm, you saw a railway engine which had leapt the rails and lay upside down in the middle of a foaming torrent.

Naturally, in building a mountain railway of that type, a great many curves and zigzags were necessary, many of those curves taking place inside tunnels. Along the railway rivers have been switched off through tunnels within the mountain, and produced picturesque cascades where they came out again.

The geological surprises were continual. Next to mountains with perfectly horizontal strata you saw other mountains with strata in a vertical position, especially in the limestone formation. Farther down immense superposed terraces were to be noticed upon the mountain side, evidently made by the ancient dwellers of that country for the cultivation of their inhospitable land.

This interested me greatly. I had seen among the Igorrotes or head-hunters of the island of Luzon, in the Philippine Archipelago, that same method of irrigation, by collecting the water from a high point on the mountain side in order to irrigate consecutively the series of terraces. Not only was I struck by the fact of finding so unusual a method of cultivation at two points of the globe so far apart, but I was even more impressed by the wonderful resemblance in type between the local natives and the inhabitants of the northern island of the Philippines. Undoubtedly these people came from the same stock.

Where we stopped at the different stations there was always something interesting to observe--now the hundreds of llamas which had conveyed goods to the railway; at one place the numberless sacks of ore waiting to be taken to the coast; at another the tall active chimneys of the smelters, which suggested industry on a large scale. I took a number of photographs under difficulties on that journey down the Andes.

At 7.30 p.m. on January 30th, 1912, I arrived safely at Lima, a distance of 222 kil. from Oroya. The total distance from Iquitos to Lima over the Andes was 2,079 kil., which distance I had performed in the record time of one month, the time generally occupied by the usual travellers being from fifty to seventy days.

[Illustration: Inca Remains near Cuzco.]

From Lima I proceeded early the next morning to Callao, the port for Lima, a few kilometres farther, where at La Punta I touched the Pacific Ocean, thus ending my trans-continental journey from Rio de Janeiro, with its zigzags and deviations, 22,000 kil. in length, or 13,750 miles.

I was already in better health when I reached Lima. The violent changes of climate from the hot valley of the Amazon to the snows of the Andes, and from there to the sea-coast, had had a beneficial effect upon me. The attack of beri-beri from which I had been suffering was gradually passing away, my right foot, by the time I reached Lima, having slowly got back almost to its normal size, although my toes were still atrophied. It is well known that there is no better cure for beri-beri than sea air.

**CHAPTER XXVII**

The Peruvian Corporation Railway--The Land of the Incas--Lake Titicaca--Bolivia--Chile--The Argentine--A Last Narrow Escape--Back in England

LIMA is a beautiful city, as everybody knows. Its wonderful churches, its clean streets, its commerce, the great charm of the people--indeed, the Peruvians are the most cultivated and polished people in South America, and the women the most beautiful--make it one of the most attractive cities I visited on that continent.

I was, nevertheless, anxious to return quickly to Europe. I had no strength left. The mental strain on that long journey had been so great that I had lost my memory altogether.

Owing to the great kindness of the British Minister, Mr. C. des Graz, and of Mr. Mockill, the chief of the Peruvian Corporation at Lima, arrangements were made for me to travel in luxurious comfort through the country of the Incas--so that, although terribly exhausted, I decided to take a further journey in the interior of Peru, Bolivia, and Chile.

[Illustration: Where a Stone Fight took place in the Inca Country.

(Notice the innumerable rocks which have been thrown down the hill from the high Inca structure.)]

[Illustration: Entrance to Inca Subterranean Passages.]

I left Lima five days after my arrival, on February 5th, going by steamer to the port of Mollendo, where I arrived on February 7th. There I met the railway line of the Peruvian Corporation from the sea coast to Arequipa and Cuzco. A magnificent private car had been placed at my disposal by the Peruvian Corporation, in which I was able to make myself comfortable for the several days which the journey lasted. Not only so, but the Peruvian Corporation kindly looked after my welfare in a most thoughtful way during the whole time I travelled on their line, for which I am indeed extremely grateful, as the travelling in that country would have otherwise been less pleasant.

The railroad from Mollendo went along the coast among curious eroded rocks of great interest; then gradually left the sea among sand-dunes and mounds upon the wide beach.

As the railway began to get higher and higher upon the steep gradient the scenery became more and more beautiful. Presently we found ourselves overlooking a wonderful flat valley between two high hill ranges in lovely green patches, cut with geometrical precision, and well cultivated. Giant cacti of the candelabrum type were plentiful. Farther on we got upon an elevated plateau with a white surface of pumice-stone, followed by red volcanic sand--an immense stretch of country surrounded by low hills of grey tufa and red volcanic rock.

Beyond that we came to a most interesting region of sand-dunes of extraordinary shapes, where the under soil was of a brilliant red, while the sand accumulations were of a grey colour. Some of the dunes were crescent-shaped. They stood usually in sets or rows extending from north-west to south-east. Then there were high mounds, also of sand, and dunes of all kinds, some with a double crescent, or with the inside of the crescent much indented, others with multiple concave curves. The concavity of all those dunes was on the north-east side.

I had seen a similar formation of dunes in the Salt Desert of Persia; also in the south-western desert of Afghanistan and in the northern desert of Beluchistan; but I do not remember ever having seen such a perfect formation of dunes as that to be seen in this part of Peru.



Beyond that sandy zone we had before us a red plateau with fluted sides. Great mounds of blackened volcanic sand were quite frequent, the railway winding its way around immense basins formed by depressions in the land. Then we entered a beautiful green narrow valley along a streamlet intersecting the plateau.

From Mollendo the railway gradually rose to an elevation of 2,301 m. (7,549 ft.) at Arequipa, where I remained for the night.

[Illustration: The Great Inca Ruins of Viracocha, in Tinta (Cuzco).]

Arequipa was an interesting city with its picturesque arcades, its magnificent church of Spanish architecture with marvellous ancient wood carvings, and its prettily-laid-out gardens. I visited the astronomical observatory of Harvard College, a few miles from the town, where excellent work is being done in star photography from that eminently suitable spot for the study of the sky. The observatory was situated at an elevation of 8,060 ft. It worked in conjunction with the Harvard observatory in North America. By having thus one station north and another south of the equator, the observations made by that institution included the stars in all parts of the sky from the North to the South Pole. A 24-inch Bruce photographic telescope, a 13-inch Boyden telescope, an 8-inch Bache telescope, and a 4-inch meridian photometer were the principal instruments used at the Arequipa station.

I left Arequipa on the morning of February 9th, going through country of volcanic tufa and red sand, with immense furrows quite devoid of vegetation. Occasionally we came upon great masses of boulders cast by some volcanic force upon the surface of tufa and sand. Then the railway gracefully climbed in great curves over a plateau nearly 14,000 ft. high, where tufts of grass could be seen, giving a greenish appearance to the landscape.

We travelled along that great table-land, occasionally seeing a herd of llamas stampede away at the approach of the train, now and then observing circular stone walls erected by shepherds as shelters. A gable-roofed hut was occasionally seen. Picturesque natives in their *ponchos* and red or yellow scarves gazed, astonished, at the train throbbing along slowly upon the steep gradient of that elevated barren country. The cold seemed intense after the tropical heat of Lima. It was snowing hard. In the daytime I generally travelled seated in front of the engine, in order to have a better view of the landscape. In the train everybody suffered from *soroche* or mountain-sickness, which attacked most people when brought up quickly by the railway from the sea to such high elevations. I was driven away from the front of the engine by the cold rain and sleet beating with great force into my face, and obscuring the landscape to such an extent that I could see nothing at all.

When it cleared up we were travelling in a region of marshes and pools in the lowest point of depressions, then along a magnificent lake with green and brown fantastically-shaped mountains and hills in the foreground, and a high snowy range in the background. The effects of light when the storm was raging over the lake, with its conical and semi-spherical islands dotting the water, were intensely picturesque.

After that the plateau became less interesting. We descended gradually some 400 m. (1,312 ft.) to the junction of Juliaca, 3,825 m. (12,550 ft.) above the sea level.

At that place the luxurious car which had taken me there had to be switched off from the Puno Line to the Cuzco Line.

I had dinner in the hotel, and again was impressed by the great honesty of the Peruvian people in the interior, and their considerate manners. It was somewhat curious to see the Indian waiter--most clumsy, dressed up in uncomfortable and ill-fitting European clothes--waiting on a medley of strange passengers, such as red-faced Spanish priests, tidy, smooth, oily-haired Peruvians, and talkative commercial travellers. But all--whether fat or lean, rich or poor, Indian or Peruvian--were the essence of politeness and thoughtfulness.

Being able to sleep in the luxurious car, where I had two good bedrooms, my own kitchen, and a sitting-room, I was indeed extremely comfortable.

I left again on February 10th over a great flat grassy tableland, with hills terraced up for cultivation. We passed an old church with a wonderful dome, and behind it snow-capped blue mountains.

The women wore peculiar hats with flapping edges in order to protect their faces from the wind. A black cloth was generally worn over the women's heads under the hat, while over their shoulders hung dark green or purple *ponchos*.

The Indians of that region showed remarkably strong Malay features.

The train steamed through the wide grassy valley, once crossing a fairly large stream. High snowy peaks loomed against the sky on our right, while we were travelling all the time at elevations varying from 3,531 m. (11,584 ft.) at Sicuani to 4,313 m. (14,150 ft.) at La Raya. The cold seemed intense. I got quite frozen sitting on the engine.

Quantities of llamas and sheep grazing were now to be seen on the land, foot-passengers and horsemen crossing the valley in all directions. At the stations large crowds of picturesque women squatted down selling pottery and fruit.

The farther we got into the interior the more picturesque the hats became. The women there wore hats with rectangular gold-braided brims, and with white, red or blue curtains at the sides. The men had pointed woollen caps with ear-flaps. The women were garbed in ample pleated skirts. Curiously enough, while the head and body were so well protected, most of them had bare legs and feet, the skirts reaching only just below the knee.

Near villages one saw neat patches of land turned, with trouble, into vegetable gardens. Stone enclosures were used by the natives as shelters for the animals during storms and to pen them up at night. The people themselves lived in stone huts.

The country reminded me forcibly of Tibet, and so, in a way, did the people--short and stumpy and smothered in clothes. I frequently noticed cairns of stones like the *obos* typical of Tibet and of the Himahlyas. There, too, as in Tibet, it seemed the fashion for passers-by to place a white stone on those cairns in order to bring good luck.

The men were curiously garbed in short, wide white woollen trouserettes, reaching just below the knees and split behind just over the calf. Under those they wore another pair of trousers, slightly longer. Their coats were short and tight, resembling Eton jackets. They wore wide and much embroidered belts, red and blue being their favourite colours.

An accident had happened to a bridge. It had collapsed, so that the trains could not proceed. Thanks to the great thoughtfulness of Mr. Mockill and his inspector of the line, Mr. Blaisdell, another private car, equally comfortable, had been sent down from Cuzco to the bridge. My baggage was transferred on men's backs to the opposite side of the stream. With the delay of only an hour or so I was able to proceed on another train to Cuzco, where I arrived that same evening.

[Illustration: Inca Pottery, Weapons and Ornaments of Gold and Copper.]

The city of Cuzco is situated at an elevation of 11,062 ft. above the sea level. In its vicinity the most important remains of Inca civilization have been found. The city itself was most interesting. Its handsome Spanish cathedral had a façade of beautifully designed columns and a fine central doorway. The great bell in one of the towers contained a large quantity of gold in the bronze, giving wonderful resonance to its vibrating notes. A

solid silver altar of great height was to be admired in the interior of the cathedral, while the chancel was of marvellously carved wood. So was a supplementary altar which had been stored away behind the silver one.

The principal square of Cuzco had recently been paved with cement, on which none of the natives could be induced to walk, as they were afraid of slipping, accustomed as they were to the roughest cobble-stone paving of their streets. Only the gentry of the city could be seen treading with great care on the polished pavement, and were looked upon with much admiration by the lower natives, who stared aghast from the porticoes around the square. In the centre of the square was a cheap terra-cotta statue of the Indian hero Atahualpa surmounting a fountain painted of a ghastly green. The gardens were nicely laid out with pretty lawns. Another beautiful church rose in the *plaza*, the doorway of which was also handsome, but not comparable in beauty with that of the cathedral. The stone carvings of its façade were nevertheless remarkable. There were arcades on three sides of the *plaza*, the houses being generally only one storey high above them. The buildings were painted light blue, pink, green, or bright yellow, the columns of beautifully cut stone being also covered with hideous paint to match.

Thanks to the kindness of the President of the Republic, Mr. B. B. Legujia, a telegram had been sent asking the Prefect of Cuzco to give me every possible assistance in visiting the Inca ruins in the neighbourhood. The Prefect, Mr. J. J. V. Cuñer, kindly placed at my disposal three excellent horses and an orderly.

It is seldom one can visit a place where the people have more primitive habits than in the city of Cuzco. The streets, so wonderfully picturesque, were not fit to walk upon. The people threw into them all that can be thrown out of the houses, which possess no sanitary arrangements of any kind. Much of the pleasure of looking at the magnificent Inca walls--constructed of great blocks of stone so well fitted that no cement was necessary to hold them together--was really lost through being absolutely stifled by the suffocating odour which was everywhere prevalent in Cuzco.

The photographs that are reproduced in the illustrations of this book will give an idea of the grandeur of the Inca works better than any description. As I intend to produce at a later date a special work on that country, I am unable here to go fully into the history of the marvellous civilization of that race.

A photograph will be seen in one of the illustrations showing the immensity of the three-walled fortress of Sacsayhuaman. Another photograph will show with what accuracy the Incas could carve stone--which, mind you, in those days must have been much softer than it is now, and not unlike the sandstone that is used in England for building purposes.

Many curious subterranean passages were to be found on the mountains near Cuzco, the entrances to which were among picturesque rocks. The Incas seemed to have a regular mania for carving steps and angular channels in rocks. Not far from the fortress could be found the place of recreation of the Incas--the Rodadeiro--over which the Incas tobogganed, perhaps sitting on hides. Thousands and thousands of people must have gone in for the sport, as the solid rock was deeply grooved by the friction of the persons who have slid on it.

The remains of ancient altars for the worship of the sun and an Inca throne, where the king of the Incas must have sat while battles were taking place, were indeed most interesting to examine.

More interesting than any other to me was the particular spot on the mountain side where a kind of throne existed carved out of a huge block of rock, and where a battle of the Incas against their enemies could be reconstructed. Mounds of ammunition, consisting of round stones as big as a lawn-tennis ball, had been accumulated above and near the throne. Just below that high spot I found scattered upon the mountain side quantities of ammunition which had evidently been thrown by the Incas at the attacking foes.

Farther on was the "round table" where the Incas had their feasts--a huge circular table of rock situated near a

conical boulder of immense size.

Interesting fountains with carved figure-heads; an Inca bath of graceful lines; and, some kilometres beyond Cuzco, the marvellous ruins of Viracocha at Tinta, where gigantic walls of a palace were to be seen standing, and ruins of other fortresses filled one with amazement.

On the mountain side near the town were the strange gateways of Choquechaca, which in their lines resembled ancient Egyptian buildings. Not far off were the blocks of rock to which the Incas fastened their prisoners by their legs, arms and heads, and exposed them to the ridicule of the populace.

Many were the wonderful things which had been found in digging near Cuzco; but most interesting of all to me were the deformed crania--some flattened to almost an incredible extent on the top, others elongated backward to an amazing degree, others still with the central part of the skull deeply depressed, so as to form two globular swellings at the sides. Others, again, had been squeezed so as to form an angular ridge longitudinally on the summit. One skull particularly interested me, which had a pronounced elongation backward, and a dent just above the forehead which must have been caused by tying the cranium while young and still in a soft condition. Most of the skulls were of gigantic size when compared with those of modern times. The lower part was under-developed. Many of them possessed magnificent teeth.

Several of the skulls had been trephined, evidently while the person was still alive, some of the perforations in the brain-case being circular in shape, others quadrangular--most of the trephinations having been made in the forehead, others on the top of the skull. I saw one skull with as many as eleven apertures thus made. The operation had evidently been performed by a very able surgeon, for the little cap of bone removed fitted beautifully into the opening that had been made.

[Illustration: Inca Towers of Sillistayni, Puño (Lake Titicaca).]

[Illustration: An Inca Statue, Bolivia.]

The Incas were great architects. They had an absolute craving for carving rock. They made models of their fortresses and palaces in blocks of hard stone, some of these being of remarkable perfection in their detail.

The pottery, red earthen vessels with geometrical designs upon them, was most interesting, especially the large jars which must have been used for fermenting wine. Those jars of a typical shape must have rested on a pedestal of wood, as they ended in a point at the bottom, which prevented their standing up on a flat surface. Two handles were attached to the lower part of those jars, and also to the great bottles in which they kept wine.

The Incas used tumblers, enamelled in red and green, and of most graceful shape.

They were fond of ornamenting their bottles and vessels with representations of human heads, reproduced with considerable artistic fidelity. Other bottles represented strange gnawing faces, with expanded eyes and a fierce moustache.

Judging from the representations of figures on their jars, the people in those days wore their hair in little plaits round the head. Heads of llamas sculptured in stone or else modelled in earthenware were used as vessels.

The Incas made serviceable mortars for grinding grain, of polished hard rock, mostly of a circular shape, seldom more than two feet in diameter.

The matrimonial stone was interesting enough. It was a double vessel carved out of a solid stone, a perforation being made in the partition between the two vessels. It seems, when marriages were performed, that the Incas

placed a red liquid in one vessel and some water in the other, the perforation in the central partition being stopped up until the ceremony took place, when the liquids were allowed to mingle in emblem of the union of the two lives. Curious, too, was the pipe-like arrangement, called the *kenko*, ornamented with a carved jaguar head, also used at their marriage ceremonies.

[Illustration: Lake Titicaca.]

[Illustration: Guaqui, the Port for La Paz on Lake Titicaca.]

Their stone axes and other implements were of extraordinary interest--their rectangularly-shaped stone knives, the star- and cross-shaped heads for their war clubs, as well as the star-shaped weights which they used for offensive purposes, attached, perhaps, to a sling. Many were the weapons of offence made of stone which have been found near Cuzco, some of which were used by holding in the hand, others attached to sticks.

The Incas were fairly good sculptors, not only in stone but also in moulding human figures and animals in silver and gold. Llamas, deer, long-nosed human-faced idols were represented by them with fidelity of detail, although perhaps not so much accuracy in the general proportions. At a later date the Incas used metal implements, such as small rakes and chisels for smoothing rock. They made hair-pins and ear-rings, chiefly of a mixture of gold, silver, lead and copper.

I saw at Cuzco a stone arrangement which was used by the Incas for washing and milling gold. Many ornaments of silex, agate and emerald, and also of coral, which had evidently been brought there from the coast, have also been found near Cuzco.

The spoons and knives which the Incas used were generally made of gold, with representations of heads attached to them. The average length of these articles was from two to four inches.

I left the city on Friday, February 16th, going back the way I had come as far as the junction of Juliaca.

The Cuzco railway, to my mind, crosses the most beautiful and most interesting scenery of any railway I have ever seen. It is a pity that more English people do not travel by it. The great elevation makes people suffer from mountain-sickness, and that perhaps deters many travellers from attempting the journey. The railway has to contend with great natural difficulties--land-slides, which often stop traffic for days at a time, being frequent.

From Cuzco I went direct to Lake Titicaca, where more Inca ruins, such as the cylindrical towers of Sillistayni, existed at Puno. Lake Titicaca is a heavenly sheet of water, situated at an elevation by hypsometrical apparatus of 12,202 ft. With its magnificent background of snowy peaks, the lake looked indeed too impressive for words, as I steamed across it in the excellent steamer of the Peruvian Corporation.

Early in the morning of February 17th, having travelled the entire night in order to cross the lake from north to south, we arrived at Guaqui, the port for La Paz, the capital of Bolivia. Although I travelled in the most luxurious comfort, owing to the kindness of the Peruvian Corporation, the journey by rail and the going about examining the ruins at Cuzco had tired me considerably. My brain was so exhausted that it would really take in no more.

Worse luck, when I reached La Paz it was during carnival time, when it was impossible to go out of the hotel without being smothered in cornflour or chalk, and sprinkled with aniline dyed water. Even bottles of ink were emptied on one's head from the windows. So that, although I crossed Bolivia from one end to the other in its longest part, I was unable to do any further work. I tried to get down to the coast as quickly as possible in order to return home.

La Paz was a beautiful city, extremely neat, with bright red-tiled roofs and white buildings. It was situated in a deep hollow surrounded by a great barrier of mountains. So deep and sudden was the hollow that within a few metres of its upper edge one would never suppose a town to be at hand. Bolivia is a go-ahead country in which English people are greatly interested. We have in our Minister there, Mr. Gosling, a very able representative of British interests.

Bolivians have shown great enterprise in building railways in all directions in order properly to develop their enormously wealthy country. Many important lines are in construction; others are projected--of which, perhaps, the most interesting will be the one from Santa Cruz to Corumba on the Brazilian boundary.

The day will come when the port of Arica on the Pacific Ocean will be joined to Oruro, on the Antofagasta line, the well-known junction in Bolivia, and eventually to Santa Cruz. The present plan is to build a line from the already existing railway at Cochabamba to Porto Velarde on the Rio Grande (Rio Mamore), then to Santa Cruz. The Brazilians on their side will eventually connect São Paulo with Cuyaba and Corumba. It will then be possible to travel by rail right across the South American continent in its richest part.

There is also a project of connecting Santa Cruz with Embarcacion and Campo Santo, in the Argentine Republic, and eventually with the Trans-Andine Railway.

Other smaller lines projected are those between Potosí and Sucre, and one from the Chilian boundary at La Quiada to Tarija. That system of railways will greatly develop the entire southern portion of Bolivia. A small railway is also proposed in the most northern part of the Republic, between Riberalta on the River Madre de Dios and Guajara Merim on the Madeira-Mamore railway, a district of immense wealth for the production of rubber.

The exact elevation of La Paz by hypsometrical apparatus was 12,129 ft.

I left La Paz on February 21st, and travelled through flat, alluvial, uninteresting country--only a huge flock of llamas or vicuñas enlivening the landscape here and there, or a group of Indians in their picturesque costumes. The women, with their green, violet or red shawls and much-pleated short skirts, generally blue, afforded particularly gay patches of colour.

I saw a beautiful effect of mirage near the lake in the vicinity of Oruro, as I was on the railway to Antofagasta. We were going through flat country most of the time. It had all the appearance of having once been a lake bottom. Perhaps that great Titicaca Lake formerly extended as far south as Lake Poopo, which is connected with Lake Titicaca by the River Desaguadero. In fact, if I am not far wrong, the two lakes formed part, in days gone by, of one single immense lake. The mountains on our right as we went southwards towards Oruro showed evidence that the level of the then united lakes must have reached, in days gone by, some 150 ft. higher than the plain on which we were travelling. The low undulations on our left had evidently been formed under water in the lake bottom.

The junction of Oruro, from which the Cochabamba railway branches, was quite a large place, of 8,000 inhabitants, but with no particularly striking buildings. Tin and silver mining was carried on in the surrounding mountains.

From Oruro I continued the journey to Antofagasta via Uyuni. Immense deposits of borax were to be seen all along the line from the station of Ulaca; then we came to a most beautiful sight--the volcano of Ollagüe, 12,123 ft. above the sea level. It looked like a giant dome, snow-capped, and smoking on its southern side. Its slopes were fairly regular, and of most brilliant colouring, red and blue. Near the volcano were mounds of mud and shattered rock. Ollagüe stood on the boundary between Bolivia and Chile.

[Illustration: On the Andes.]

After passing San Martin, the first station on the Chilian side, the railway skirted the bed of an ancient lake, an immense circular flat stretch with deposits of sand and borax, in which could be seen occasional pools of stagnant water. On the west side stood a high three-peaked mountain covered with snow, while at the southern end of that plain was a charming lakelet. We had no sooner left this beautiful view than we had before us to the south-west an immense conical mountain, flat-topped. It looked just like the well-known Fujiyama of Japan, only more regular in its sloping lines.

We passed the works of a Borax Company, which were between the stations of Sebollar and Ascotan. There was to be seen another immense lake of borax, some 40 kil. (24 miles) long.

I arrived that evening at Antofagasta, and was fortunate enough to get on board one of the Pacific Mail Line steamers the next morning on my way to Valparaiso. We were now in the height of civilization again--very hot, very uncomfortable, very ambitious, very dirty, the hotels abominable. Had it not been for the kindness of friends I should have fared badly indeed in Valparaiso, for the place was invaded by a swarm of American tourists, who had just landed from an excursion steamer and rendered the place unbearable.

From Valparaiso, as soon as it was possible to obtain accommodation, I travelled across the Andes and as far as Buenos Aires by the Trans-Andine railway. The scenery on this line was most disappointing to any one who has seen the Andes in their real grandeur farther north; but for the average traveller the journey may prove interesting enough, although hot, dull, dusty, and not particularly comfortable.

While I was travelling on the railway between Mendoza and Buenos Aires there was a serious strike of railway employés. The railway had been attacked at many different points. Amateur engineers and attendants ran the trains. We were only two hours from Buenos Aires. The heat and dust were intense as we crossed the great pampas. The shaking of the train had tired me to such an extent that I placed a pillow on the ledge of the open window, and was fast asleep with my head half outside the carriage, when I woke up startled by the sound of an explosion. I found myself covered with quantities of débris of rock. A huge stone, as big as a man's head or bigger, had been thrown with great force at the passing train by the strikers, and had hit the side of my window only about three inches above my head, smashing the woodwork and tearing off the metal frame of the window. Had it struck a little lower it would have certainly ended my journey for good.

[Illustration: Llamas in Bolivia.]

[Illustration: Borax Deposits, Bolivia.]

As it was I arrived in Buenos Aires safely. A few days later I was on my way to Rio de Janeiro, by the excellent steamer *Aragon*. Shortly after, by the equally good vessel *Araguaya*, of the Royal Mail Steamship Company, I returned to England, where I arrived in broken health on April 20th, 1912. It was a relief to me to land at Southampton, with all my notes, the eight hundred photographs I had taken, and the maps which I had made of the regions traversed.

## APPENDIX

### SOME OF THE PRINCIPAL PLANTS OF BRAZIL

(C.) = Colouring and Tanning. (C.W.) = Woods good for Construction. (M.) = Medicinal. (F.) = Fibrous. (R.) = Resinous. (P.) = Palms. (L.) = Lactiferous. (O.) = Oliferous. (S.) = Starchy. (T.) = Tanning.

*Alocasia macrorhiza* Schott Inhame (S.) *Anchietea salutaris* St. Hil. Cipo suma (M.) *Andira spectabilis* Sald. Angelim Pedra (C.W.) *Andira vermifuga* Angelim amargoso (C.W.) *Apuleia præcox* M. Grapiapunha (F.) *Arachis hypogoea* L. Amendoim (O.) *Araucaria Brasiliiana* Lamb Pinho do Paraná (C.W.) *Aristoiiochia* (various kinds) Jarrinha (M.) *Asclepia curassavica* L. Official da sala (M.) *Aspidosperma dasycarpon* A.D.C.

Peroba rosa (C.W.) " *eburneum* Fr. All. Pequia marfim " " *leucomelum* Waring. Peroba parda " "  
*macrocarpum* M. Guatambú " " *polyneuron* M. Arg. Peroba amarella " " *sessiliflorum* Fr. All. Pequia amarello  
 " " *sp.* Peroba revessa " *Astronium fraxinifolium* Schott Gonçalo Alves " *Attalea funifera* M. Piassava (P.)  
*Bertholletia excelsa* H.B.K. Castanha do Pará (O.) *Bignoniaceas* (various kinds) Caroba (M.) *Bixa orellana* L.  
 Urucú (C.) *Boerhavia hirsuta* Willd. Herva-tostão (M.) *Bromelia* (various kinds) Caragoatá (F.) (S.)  
*Brunfelsia Hopeana* Benth. Manacá (M.) *Byrsonima* (various kinds) Muricy (C.) *Cabranea cangerana* Sald.  
 Cangerana (C.W.) *Caesalpinia echinata* Lam. Pao Brasil " *Caesalpinia ferrea* M. Pao Ferro (C.W.)  
*Calophyllum brasiliense* C. Guanandy (R.) *Capaifera* (various kinds) Copahyba (O.) *Cassia* (two kinds)  
 Canafistula (F.) *Cayaponia* (various kinds) Cayapó (M.) *Cecropia* (various kinds) Embauba (F.) *Cedreia*  
*fissilis* Vell. Cedro vermelho (C.W.) *Centrolobium robustum* M. Arariba amarello " " *tomentosum* Benth. "  
 rosa " *Chiococca anguifuga* M. Cipo cruz (M.) *Chrysophyllum glycyphloeum* Cazar Buranhen (C.W.) " " "  
 Monesia (M.) *Cissampelos* (various kinds) Abútua (M.) *Ciusta criuva* Cambess Manguerana (F.) *Cocos*  
*nucifera* L. Coqueiro Bahia (P.) *Coffea arabica* L. Caféeiro *Copaifera guaianensis* Desf. Copahyba (C.W.)  
*Copernicia cerifera* M. Carnahubeira (C.W.) (P.) *Cordia alliodora* Cham. Louro (C.W.) *Couratari*  
*estrellensis* Raddi Jequitiba Vermelho (C.W.) *Coutarea hexandra* Schum Quina-quina (M.) *Cuscuta* (various  
 kinds) Cipo chumbo (M.) *Dalbergia nigra* Fr. All. Jacarandá cabiuna (C.W.) *Dioscoreas batatas* D.C. Cará  
 (S.) *Drimys granatensis* Mutis Casca d'anta (M.) *Echyrosperum Balthazarii* Fr. All. Vinhatico amarello  
 (C.W.) *Eloeis guineensis* L. Dendé (P.) *Erythrina corallodendron* L. Mulungú (M.) *Esenbeckia febrifuga* M.  
 Laran do Matto (M.) " *leiocarpa* Guarantan (C.W.) *Eugenia durissima* Ubatinga (C.W.) *Euterpe edulis* M.  
 Palmito (P.) " *oleracea* L. Assahy (P.) *Favillea deltoidea* Cogu Fava de S. Ignacio (O.) *Ficus* (various  
 species) Figueiras (L.) *Genipa Americana* L. Genipapo (C.) *Gesnera alagophylla* M. Batata do campo (M.)  
*Gossipum* (various kinds) Algodoeiro *Harnicornia speciosa* M. Mangabeira (L.) *Hedychium coron-koen* Lyrio  
 do brejo (S.) *Hymenoclea courbaril* L. Jatahy (C.W.) (R.) *Ilex paraguayensis* St. Hil. Maté (M.) *Inga edulis* M.  
 Inga-assú (C.W.) *Ipomoea jalapa* Pursh. Jalapa (M.) *Jatropha curcas* L. Pinhão de purga (O.) *Johannesia*  
*princeps* Vell. Anda-assú (O.) *Lafoensia* (various kinds) Pacuri (C.) *Laguncularia rac.* Gaertu. Mangue  
 branco (F.) *Landolphia* (various kinds) Pacouri (L.) *Lecythis grandiflora* Berg. Sapucaia comun (C.W.) "  
*ollaria* Piso " -assú " " *ovata* Cambess " mirim " *Lisianthus pendulus* M. Genciana Brazil (M.) *Machærium*  
*Alemanni* Benth. Jacarandá violeta (C.W.) " *incorruptibile* Fr. All. " rosa " " *leucopterum* Vog. " tan "  
*Maclura* (two kinds) Tajuba (C.) " *affinis* Mig. " (C.W.) *Malvaceas* (various kinds) Guaxima (F.) *Manicaria*  
*saccifera* G. Ubussú (P.) *Manihot* (two kinds) Mandioca (S.) " Maniçoba (L.) *Mauritia vinifera* M. Burity (P.)  
*Melanoxylon brauna* Schott Guarauna (C.W.) *Mespilodaphne sassafras* Meissn. Canella sassafras (C.W.)  
*Mikania* (various kinds) Guaco (M.) *Mimusops* (various kinds) Massaranduba (L.) " *elata* Er. All. " Grande  
 (C.W.) *Moldenhaueria floribunda* Schrad Grossahy azeite (C.W.) *Moquilea tomentosa* Benth. Oity " *Musa*  
 (various kinds) Bananeira *Myracrodouon urundeuva* Fr. All. Urindueva (C.W.) *Myristica* (two kinds) Bucu  
 huba (O.) *Myrocarpus erythroxylo* Fr. All. Oleo vermelho (C.W.) " *frondosus* " pardo (C.W.) *Myrsine* and  
*Rapanea* (various kinds) Copororoca (F.) *Nectandra amara* Meissn. Canella parda (C.W.) " *mollis* Meissn. "  
 preta " " *myriantha* Meissn. " capitão-mor " *Nicotina tabacum* L. (various kinds) Fumo *Operculina*  
*convolvulus* M. Batata de purga (M.) *Oreodaphne Hookeriana* Meissn. Itauba preta (C.W.) *Paullinia sorbilis*  
 M. Guaraná (M.) *Pilocarpus pinnatifolius* Jaborandy (M.) *Piper umbellatum* L. Pariparoba (M.) *Piptadenia*  
*rigida* Benth Angico (C.W.) (F.) *Protium* (various kinds) Almecega (R.) *Psidium acutangulum* M. Araça  
 pyranga (C.W.) *Psychotria ipec.* M.A. Poaya legitima (M.) *Pterodon pubescens* Faveiro (C.W.) *Renealmia*  
*occident.* P. and E. Capitiú (M.) *Rhizophora Mangle* L. Mangue verm. (F.) *Rhopala Gardnerii* Meissn.  
 Carvalho Vermelho (C.W.) *Ricinus communis* L. Mamoneira (O.) *Saccharum officin.* L. (various kinds)  
 Cana de assucar *Sanseria* (two kinds) Espada (F.) *Schinus terebenthifolius* Raddi Aroeira (C.W.) (R.)  
*Silvia navalium* Fr. All. Tapinhoã (C.W.) *Siphonia elastica* (Hevea) (various kinds) Seringueira (L.) *Smilax*  
 (various kinds) Japacanga (M.) *Solanum* (various kinds) Jurubeba (M.) *Strychnos macroacanthos* P. Quassia  
 (M.) *Stryphnodendron barbatimão* M. Barbatimão (C.W.) (T.) *Styracaceas* (various kinds) Estoraqueiro (R.)  
*Syphonia globulifera* L.F. Anany (R.) *Tecoma araliacea* P.D.C. Ipé una (C.W.) " *pedicellata* Bur. and K. Sch.  
 Ipé tabaco " *Terminalia acuminata* Fr. All. Guarajuba " *Theobroma cacao* L. Cacaoeiro *Tournefortia* (various  
 kinds) Herva de Lagarto (M.) *Vanilla* (three kinds) Baunilha (M.) *Vitex Montevidensis* Cham. Taruman  
 (C.W.) *Vouacapoua Americana* Aubl. Acapú (C.W.) *Xanthosoma sagit.* Schott Tayoba (S.) *Xylopia* (various  
 kinds) Embira (F.)



## MAMMALS

*Atele paniscus* Coatá *Balsena australis* Baleia austral *Bradypus tridactylus* Preguiça *Callithrix scicuria* Saymiri do Pará *Canis brasiliensis* Aguarachaim " *jubatus* Guará *Cavia cobaya* Cobaya *Cebus appella* Macaco chorão *Cercolabos prehensilis* Coandú *Cervus dama* Gamo " *elaphus* Veado " *rufus* Guazú-Pita *Coelogenys pacca* Pacca *Dasyprocta aguti* Cotia *Dasyprocta novemcinctus* Tatú de cauda comprida *Delphinus amazonicus* Golfinho *Dicotyles labiatus* Porco queixada branco " *torquatus* Caetité canella ruiva *Didelphis azuræ* Gambà " *marsupialis* Philandra *Felis concolor* Sussuarana " *onça* Jaguar " *pardalis* Jaguatirica *Gallictis barbara* Irara *Hapale jacchus* Ouistití or mico *Hydrochoerus capibara* Capivara *Lepus brasiliensis* Coelho *Lutra brasiliensis* Ariranha *Manatus australis* Peixe-boi do Pará *Mephitis suffocans* Jacarecaguá *Myrmecophaga jutaba* Tamanduá bandeira *Nasua socialis* Caotí de bando " *solitaria* " " *mundeo* *Phyllostoma spectrum* Vampiro *Procyon concolor* Guaxinim *Sciurus aestuans* Caxinguelê *Tapirus americanus* Anta *Vespertilio auritus* Morcego orelhudo " *murinus* " *commun*

## BIRDS

*Ajaja* Colhereiro *Alauda arvensis* Cotovia *Amazona amazonica* Curiça *Amazona brasiliensis* Papagaio *Ampelis atropurpurea* Cotinga vermelha do Pará *Anumbius anumbi* Cochicho *Ara ararauna* Arara azul " *macao* " *piranga* " *nobilis* Maracanã *Aramides saracura* Saracura *Aramus scolopaceus* Carão *Ardea Socoi* João Grande *Ateleodacus speciosa* Sahi *Belonopterus cayannensis* Quero-quero *Brotogeris tirica* Periquito *Cacicus cela* Checheo *Cairina moschata* Pato do matto *Calospiza pretiosa* Sahira *Calospiza toraxica* Sahira verde *Caprimulgus cericeocaudalus* Curiango *Cathartes atratus* Urubú " *Papa* " *roi* *Ceryle amazona* Martim pescador *Charadrius dominicus* Tarambola *Chasmorhynchus nudicolis* Araçonga *Chauna cristata* Tachan *Chiromachæris gutturosus* Corrupião *Colaptes campestris* Pica-pão *Columba domestica* Pombo domestico " *turtur* Rõla *Conurus jendaya* Nandaya *Corvus corax* Corvo *Crax alector* Hocco do Pará " *pinima* Mutum *Creciscus exilis* Frango d'agua verde *Crypturus japura* Macucan " *notivagus* Jahó " *rufescens* Tinamú ruivo " *scolopax* Juó " *soui* Turury " *variegatus* Inhambú anhangá *Dacnis cayana* Sahi azul *Dendrocygna fulva* Marreca peba " *viduata* Irerê *Donacobius articapillus* Japacamin *Eudocimus ruber* Guará *Euphonia aurea* Gaturamo amarello *Eurypyga helias* Pavão do Pará *Falco destructor* Harpya " *haliaetus* Águia " *sparverius* Falcão *Fringilla carduelis* Pintasilgo *Fulica armillata* Carqueja *Furnarius rufus* João de barro *Gallinago delicata* Narceja " *gigantea* Gallinhola *Grotophaga ani* Anú *Glaucidium brasilianum* Caburé *Heterospizias meridionalis* Gavião caboclo *Hycter americanus* Can-can *Ibis rubra* Ibis escarlate *Jacamaralcyon tridactyla* Beija flor bicudo *Jonornis martinica* Frango d'agua azul *Lauru macubipennis* Gaiivota *Leptotila rufaxilla* Juruty *Loxia cardinalis* Cardeal *Meleagris gallopavo* Perú *Microdactylus cristatus* Seriema *Minus lividus* Sabiá da praia *Milvago chimachim* Caracará " *chimango* Chimango *Molothrus bonariensis* Vira-bosta *Molybdophanes coeruleus* Maçarico real *Morinella interpres* Batuíra *Mucivora tyrannus* Tesoura *Myopsitta monachus* Catorrita *Myothera rex* Myothera real *Nomomyx dominicus* Can-can *Nothura maculosa* Codorna *Nyctidromus albicollis derbyanus* Bacuraú *Odontophorus capueira* Urú *Opisthocomus cristatus* Cigana *Oriolus brasiliensis* Sapú *Oryzoborus angolensis* Avinhado " *crassirostris* Bicudo *Ostinops decumanus* Yapú *Otalis katraca* Aracuan *Parra jacana* Jacaná *Pavo cristatus* Pavão *Penelope cristata* Jacú *Phasianus colchicus* Faisão *Piaya cayana* Alma de gato *Picus Martius* Picanço negro *Pionus menstruns* Maitaca *Pipra strigilata* Manequim variegado *Piroderus scutatus* Pavó *Pisorhin choliba* Coruja *Pitherodius pileatus* Garça real *Podiceps americanus* Mergulhão *Polyborus tharus* Carancho *Psittacus passerinus* Tuim *Psophius crepitans* Agami *Rhamphastos discolorus* Tucano *Rhea americana* Avestruz, *Ema* *Rupicola* Gallo do Pará *Siconea mycteria* Jaburú *Stephanophorus leucocephalus* Azulão *Sterna hirundinacea* Trinta reis *Sula leucogastra* Mergulhão *Syrigma sibilatrix* Socó assobiador *Tanagra citrinella* Tanagra de cabeça amarela *Tantalus americanus* Tuyuyu *Tinamus tao* Macuco *Tricharia cyanogaster* Sabia-cica *Turdus rufiventris* Sabia larangeira *Volatinia jacarini* Serrador *Xanthormis pyrrhopterus* Encontro

## FISH

*Acanthurus bahianus* Acanthuro Bahiano *Caranx pisquelus* Solteira *Chromis acara* Acará *Cichla brasiliensis*

Nhacundá *Coryphoena* Dourado *Curimatus laticeps* Curimatá *Cybiium regale* Sororóca *Cymnotus electricus* Poraqué *Eugraulis Brossnii* Anchova " *encausicholus* Sardinha *Leporinus* Piaú *Macrodon trahira* Trahira *Merlangus vulgaris* Pescada *Muroena anguilla* Enguia dos rios *Petromyzom marinum* Lampreia do mar *Platystoma Lima* Surubim *Primelodé Pirinambú* Pirinambú *Prochilodus argenteus* Pacú *Rhinobates batis* Raia lisa *Scomber scombrus* Cavalla *Serrasalmo piranha* Piranha *Silurus bagrus* Bagre *Solea vulgaris* Linguado *Squalus carcharias* Tuburão *Tristis antiquorum* Espadarte *Vastres gigas* Pirarucú

## REPTILES

## CROCODILES AND LIZARDS

*Caiman fissipes* Jacaré *Enyalius bilimeatus* Camaleão listrado *Teus monitor* Teyú

## SNAKES.

*Boa constrictor* Giboia constringente *Bothrops indolens* Jararaca preguiçosa *Ciclagras gigas* Boipevaussú *Coluber poecilosoma* Caninana *Crotalus durissus* Cobra de cascavel commun " *horridus* " " " hor. " *mutus* Sururucú " *terrificus* Boicinga, Cascavel *Drimobius bifossatus* Cobra nova *Elaps corallinus* Boi coral " " Cobra coral " *frontalis* Boi coral *Erythrolamprus æsculapii* Cobra coral *Eunectes murinus* Sucuriú *Helicops modestus* *Herpetodryas carinatus* " *sexcarinatus* Copra-cipó *Hyla faber* Pereréca ferreiro *Lachesis alternatus* Urutú, cotiara, cruzeiro, etc. " *atrox* Jararaca, jararacucu " *bilineatus* Surucucú patioba " *castelnaudi* " *itapetingæ* Cotiarinha, boipeva, furta-côr " *jararacucu* Jararacucu, surucucú, tapête " *lanceolatus* Jararaca, jararacucu " *Lansbergii* " *mutus* Sururucú, surucutinga " *neuwiedii* Urutú, jaraca do rabo branco *Liophis almadensis* Jararaquinha do campo " *poecilogyrus* *Oxirhopus trigeminus* Cobra coral, boi coral *Philodryas serra* *Pipa curcurucú* Entanha *Phrynonax sulphureus* Canninana *Radinoea Merremii* Cobra d'agua " *undulata* *Rhachidelus Brazili* Mussurana *Thamnodynastes nattereri* *Xenedon merremii* Boipeva

## TORTOISES

*Chelys fimbriata* Mata-matá *Emys amazonica* Jurara-assú " *tracaxa* Tracajá *Testudo tabulata* Jabuti

## VOCABULARIES

## BORORO--APIACAR--MUNDURUCU--CAMPAS OR ANTIS

-----+-----+-----+-----+----- ENGLISH. | BORORO. | APIACAR.  
|MUNDURUCU. |CAMPAS OR ANTIS.

-----+-----+-----+-----+----- Anger ||| Inokatzmatahtzeh Angry ||  
|sapecoreh | Ant ||| |cachpigache Anta (Tapir) || |biuh | Ariranha || |lauareh | Arm || |lueiba | Inoshempa Arm (1st  
pers.) |lakkanna |zizuhbáh || " (2nd " ) |lakkanna ||| " (3rd " ) |lkanna ||| " (elbow to |||| shoulder) | |zizubah  
puha || " (elbow to |||| wrist) |littaddagara |zizubah |ziahppural | (1st pers.) |||| " (2nd " ) |lakkeddagan ||| "  
(3rd " ) |lakkagara ||| |Armllet (ribbon) |canagadje geo |tahttùh |ahsa |||| (metal bracelet) ||| |zih |pahürahna |||  
|(fibre bracelet) || |Arrow ||| |tchokkopi Arrow-head |tugh otto |luübuffah || |Arrow feathers |lattahga |luübappah |  
| |Arrows |tuhga |luüba |lubipah | Ashes |djoroguddo |tahnimbuga |lkaburi || |tanimbo || |Attack (to) |lbakkuredda  
|ahre |mohmahíh || |Aureole of |||| |feathers |parikko |lahkahntarah || |Axe || |luah |

Bad ||| |lkahmáhri Bag ||| |nottaratti Bands (ankle) |lburere |paro |tah |pakkurah || |lgadje geo ||| Bands  
(knee) |buregadje geo |tah |pakkurah || |Barter (to) |lahmazohppuhru || |Baskets (for |||| bones of ||||  
deceased) |lkoddo |mbuhah || |Beans || |ladianrap |macha |||| |Beard |lnogua |buh |ltennovohava |lerapirap  
|Inoshpatonna Beautiful || |lrip | Bees || |leit | Belly |lbutto |leuk |lnomucha Belt (for |coggu |mahté |pikku ||  
women) || |ahsa || |Belt ||| |lnuata |quero Big |lkurireo |lguh or hun |berehiubuh |lniroikki Bird |lkiyeggeh |lühráh  
|luassehm |ltzmehdi Black || |linucat |lpotztaghi ||| |ltakarontz Blind |lyoko |bokkua |ldai |há || |Blood |læruí | |lirantz

Blue || libitacobush ltahmaroli Born (to be) lcuri butto lohñh || Bow lbaiga lühwürrappara lirarek lpiamen " (1st pers.) linaiga ||| " (2nd " ) lanaiga ||| " (3rd " ) lbaiga ||| Bow-string lbaighikko lübühra ||| pahama || Boy lmédrogo ||| " (plural) lneh ghe lazzih van ||| kogureh | vohsáh || Bracelet ||| lmarentz Break (to) lrettegaddo, lahmoppéhn ||| tuo ||| Breathe lakke lippottuh hém || Brother || luagnuh lyegue " eldest lihmanna lzikkubuhra luamuh | " (1st pers.) ||| " (2nd " ) lahmanna ||| " (3rd " ) luhmanna ||| " (general) ltchemanna | || " (1st p. p.) lpahmanna ||| " (2nd " ) ltahmanna ||| " (3rd " ) lettuhmanna ||| " younger lzihrukkiera locutoh | " (1st pers.) lihvieh ||| " (2nd " ) lahvieh ||| " (3rd " ) luhvieh ||| " (general) ltchevieh ||| " (1st p. p.) lpahvieh ||| " (2nd " ) ltahvieh ||| " (3rd " ) lettuvieh ||| Butterfly || lorebereg lkittandaro

Canoe likka lühara | lpitotzu Caress (to) lkera amudda luhvaippiáhr ||| appo ||| Charcoal ldjoradde ltattah pühn || Chest (man's) limmorora lzipassiah luei cameah lnotto piné (1st pers.) ||| " (2nd " ) lammorore ||| " (3rd " ) lmorora ||| " (woman's ) limmukkuro lizi kahma luei came lciuccioni lammukkuro ||| lmukkuro ||| Child ||| lentzih Chin (1st pers.) linogura lzirenuvah lhueniepaeh | " (2nd " ) lakogura ||| " (3rd " ) lokkura ||| Cloak (worn by ||| lkittahreutz Campas) ||| Cloud || lcrehreate | Clouds lboettugo livagon | lmenkori Cold lbiakko lirhossahn || Comet lcujedje kigareu ||| Courage lpaguddah bokua lihmandarahih || Crocodile || labatchiri | Cry laraguddu loh zaïyóh | lniraatcha

Dance lerehru lahniuaréh || Dark lboetcho lpuhtunhaïba | lstiniri taki Daughter || laraichih lnessintcho Day lmeriji lkoeïn || Dead || labeh | Deaf lbia bokkua ldiahppuhai || Deer || larapisehm | Design (to ltugo lohkuazzihat || ornament) ||| Die (to) lbi lahmonnoh || Dog larigao lahwaráh lyacurité lotziti Drink (to) lkuddo luhükkuhr | lnerachi nerativo ||| riratzi Drunk || licanuh lnoshinghitatcha Dumb lbattaru bokkua lnogni enghih ||

Ears | lzinambí lnainebui lnoyembitta " (1st pers.) liviyah ||| " (2nd " ) laviyah ||| " (3rd " ) lbiyah ||| Earth lmotto lwuhra || Earthquake lmottumagaddo ||| Eat lko lanimaüvuttáh linenetieh lnoatcha, ||| com combih | Egg || ltupissa | Enemy | lzih ruhwahsahra || Eyebrows | lzirapezavah | lnotta makku " (1st pers.) liyerera ||| " (2nd " ) laerira ||| " (3rd " ) ldjerira ||| Eyelashes ||| lnoshumpigokki Eyes ||| " (1st pers.) lyokko lziarakkuara || lokki " (2nd " ) laekko ||| " (3rd " ) ldyokko |||

Fat lkavaddo lhih hä | luannanowata Father lpao lzihruwa lutahbah lahppah " (1st pers.) liyuohka ||| " (2nd " ) lao ||| " (3rd " ) luho ||| " (plur., our) ltcheo ||| " (your) ltao ||| " (their) lettuo ||| Feathers ||| " (of wings) likkoddo lürapeppoh || " (of tail) layaga lmehruazah || Fight ||| lnogempi Find (to) ljordure gí luèppiahr || Finger or thumb likkera kurireo lziffah | lnotta pakki Finger (first) lboya gaisso ||| " (second) lboya taddao lziffah mottehra || " (third) lmekkijio lziffah inha || " (small) lbiagareo lziffah inha | Fire ldjoro ltahttáh leraitcha lpah mahri Fish lkahre lpihráh lashiman lña denga ||| laite shumma Five || lbrancogeh | Fling arrows ||| with a bow lkiddogoddu loh üvahn || Fly (to) lkoddu lahvevéh | lharatzu Foot | lzihppuha libuih lnumaronca ||| nocunta noetzi " (1st pers.) liyure ||| " (2nd " ) laure ||| " (3rd " ) lbure ||| " (sole of) ||| lnoetzi or ||| nuitche Forehead ||| lnohpanka ||| lnopanka Forest littura lkahueh ||| lkauru khuh || " (thick) liguro kurireo ||| Four || libaribrip | Fowl ||| lataripa Friend || lubeshi | Fright lpaguddah lohkkriheéh | lnottaruatzo

Give (to) | makko | ahmandáh || (I give him) | makkai ||| Girl | ahredrogo | ahwah vohsáh ||| " (plural) | naguareh ||| kogureh ||| God ||| Tuhpene | (*Sun*) pahua Good ||| tchipat | kahméhta Good afternoon || ené mahrukka || " day || ené cohéma || " night || nehppi tuhna ||| kattuh || Give me water ||| bina ina Gourds | bappo ||| (rattling ||| gourds used ||| by Bororos) ||| Grandfather || zihra magna || " (1st pers.) yeddaga | || " (2nd " ) aeddoga ||| " (3rd " ) iyeddoga ||| Grandmother || zihza ruza || " (1st pers.) mugapega ||| " | imaruga ||| " (2nd " ) atcharuga ||| " (3rd " ) itcharuga ||| Grass ||| tuarish Green ||| natchari Guayaba (fruit) ||| comassique Gums of teeth ||| nohtapu Gun ||| natziarh

Hair || ziava | kahp | noeshi " (1st pers.) ittao ||| nuisse " (2nd " ) akkao ||| " (3rd " ) ao ||| Hand || zippoa | ibuih | nakku " (1st pers.) ikkera ||| " (2nd " ) akkera ||| " (3rd " ) ijera ||| Happy | jakkare | horrüm || Hatred | okki | naimia roi || Head || ziakkan || noppolo " (1st pers.) ittaura ||| " (2nd " ) akkaura ||| " (3rd " )

aura ||| Head band ||| nahmattery (worn by Campas) ||| Hear (to) ||| nokkie ||| makimpi Hearing |  
merudduo | ziahppuh[ə]h | Heart ||| Inasangani Heat | lhai | Heel ||| Itsungueche Hippopotamus laidje |||  
Honey ||| leit attuh | Hunt (to) ||| litieh urepp Inomarma wai Husband lohreddo lzihméhna ||| tazú | lacuimibaeh |  
Inueme " (plural) | tcheddoreddo ||| | pagoreddo ||| | lettoreddo ||| Hut ||| lanioca | mengotcha ||| | pangotzu

I do not want ||| | erocaticondaca, ||| | fenotchiro ||| | eroka I want you ||| | noni chempe ||| | naka ||| | cogoddu  
likkaruhara | Inohmahrtzi Illness | jorubbu | zihkkáh ruhara ||| Ill-treat (to) | lutchebai, | lhuàùàr ||| | erugoddo  
kigoddol ||| Indian corn ||| | lsagre ssengue ||| | lfamadole " Infuriated | kurigoddo | zih manarahíh ||| (to be) |||  
Iron ||| | kirieh tonghi Island ||| | tiahueruh |

Jump | karettá | lappóll | | lnuhme atcha

Kill (to) | bittó | lahzukkah | Inoautziri Knee | lippoh | godaoh | lzinuppuhá | lyon-ah | lloyeretto ||| | yerito Knuckles |||  
| nouaviro

Lake | kuruga | lüppiah ||| Large | kuri | lhih hái | landavue | Laugh | Inoguari | lahpukkàh | Inoshontatchu Leaf |||  
| kahrashi | Lean ||| | tlonghnizi Leg | | lzirito mahk loira-oh | Inoh pori " (1st pers.) | lippogora | khana ||| " (2nd " )  
| lappogora ||| " (3rd " ) | | pogora ||| Let us go ||| | lfame ate Light | | djorugo | luhüga | | (lamp) purika Light a fire  
| | jaro guddo | tahttàh | induh ||| (to) | | djoruggo ||| Lightning | | baigahbe | | tapan veravah | | pureka | | tupasseeo ||| Lip  
(lower) ||| | Inohtchare " (upper) ||| | Inohpanti Lips ||| | | tchara Little ||| | | capichenni Lose (to) | lokkua  
| lohkkagnüh ||| Love | laiddu | lahmán oron | | Inohnindatzimbi Lunacy | | lneh wuhruh |||

Man | Imehddo | lahziabah | laniocat | | shambari (plural) | lihme ||| (old) ||| | liabut | Milky way | | lcujedje doghe | laniang  
puku | | kabieureh | | lehro guddo | | zahwara | | tpuih | Monkey ||| | Itaueh | | loshetto Moon | lahri | | zahir | | kahshi " (during  
a) ||| | | kachi | Morning ||| | | kabi | | aason | | kittaittidih Mosquito ||| | | caame | Mother | | | zihuba | | lanhih | | Inanná " my  
| | lihmuga (1st p.) ||| " thy | | lache (2nd p.) ||| " his | | lutche (3rd p.) ||| " | | tchedge ||| (general) ||| " our | | | padge  
(1st ||| pers. plural) ||| " yours | | | tadge (2nd p.) ||| " theirs | | | lettudge (3rd) ||| Mountain | | | liuitir lotioah  
| | chahtoshi Mountains | | | toreakkari | | lühwüttura ||| " (range of) | | | toreakkari | " ||| doghe ||| Moustache |||  
| Inoshpatonna Mouth ||| | | lueibi | | Inottaramash Mule ||| | | Imanno mari

Nails (of | | | lueimba | | rahn | | Inosha takki fingers) ||| | | tchamoro Neck ||| " (front of) | | | liruho | | | zisuhra ||| " (1st  
pers.) ||| " (2nd p" ) | | | laruho ||| " (3rd " ) | | | lruho ||| " (back of) | | | | zikupeah ||| " (1st pers.) | | | likiddoro ||| " (2nd " )  
		lakkiddoro			" (3rd " )			littoro			Necklace					Inighitzki Night			batchioji			kaáhrúh			latchiman					puitun			ahieuh
	No		lboro, carega			Inapohttahri			cahmah			boekkimo					kah (suffix)					bokkua			Nose			zissignah					
	Inokkirimash " (1st pers.)			likkenno			" (2nd " )			lakkennno			" (3rd " )			lkenno																	

Oar ||| | | kumarontzu Old ||| | | kinkiuari Onça (jaguar) ||| | | lhuira | One ||| | | pan |

Parrot ||| | | laruh | Perspire (to) | | | caroh | | | zihruhá | | | Inama savitache Pig ||| | | | pihratz Pottery (for | | | tahpe quazzihar | |  
cooking) ||| | | Pot (large) | | | lariya ||| " (small) | | | lruobo | | | lgnáéh | | | peppóh ||| " (very small) | | | | pohri ||| " " | | | pohri (gabo)  
||| " " | | | | pohrero ||| Present | | | makkakai | | | lahmbehunteh |

Rain | | buh | | buttu | | lahmanná | | | Inonbaht | | | Ingagni | | | (boe) | | | buttu | | | laman ||| Rainbow ||| | | lohyié Rapid (cataract) | | | lituihi |||  
Receive | | | makinai | | | lahmbohul ||| | | (I received) ||| Red ||| | | | patpecat | | | | kitchongahri Reward | | | | mohri ||| Rise (to)  
| | | Iracodje | | | lehppóhan ||| River | | | | poba | | | | parana | | | lgnah " (large) | | | | poba | | | kurireo | | | | parana | | | hun ||| " (small) | | | | pahga | | | | parana  
hin ||| Rock | | | | tori | | | littahih(n) ||| " (large) | | | | tori | | | kurireo | | | littahuh(n) ||| Rocks ||| | | | mappih Run | | | | reh | | | loh | | | gnama |  
| | | | | preteten ||| | | | spayieni " (to) ||| | | Inoshatchah Run away (to) | | | | larekoddo | | | | zihppohséh |||

Sad | | | kierigoddo | | | lahnimombü | | | áh ||| Salt ||| | | caotah | Same ||| | | lfcatche | | | cuanta ||| | | nana Scratch | | | | kiggori | | | logni | |  
||| Sea ||| | | | (unknown) Search (to) | | | | wogai | | | léhekkahr ||| See (to) ||| | | Inogna akuripi Shame | | | | poguruh | | | lah(g)ni  
nossin ||| Shin | | | | liraetta ||| Shiver | | | | magoddo | | | | zihrahúh ||| Shooting stars | | | | laroí | | | koddo | | | zahir | | | ta | | | tai | | | wai ||| Sight  
| | | | | laiyooh | | | | lueppiáh | | | | pottahr ||| | | | djohruddoh ||| Silver ||| | | | kiriekki Sing | | | | lamaracaib ||| Sing (to) | | | | lroya, | | | | mahrakahi

lhuamame | larage ||| " (and dance) ||| Inowishtiaccia Sister | lgarikie letchih | Itchogue | lzihreüsa || Sister ||| " (1st pers.) | littuiyeh ||| " (2nd " ) | lattuiyeh ||| " (3rd " ) | luttuiyeh ||| " (general) | Itchedduiyeh ||| " (1st p. p.) | lpahduiyeh ||| " (2nd " ) | Itahduiyeh ||| " (3rd " ) | lettuhduiyeh ||| " (younger) | lzihkuppuhera | Sit (to) | Imogudda loh ahppúh | Inosseiki Sky | lbaru lüvahga | lkabi | livagh | Sleep ||| lahmawayeh Sleep (to) | Inuddoh lokkiéht | Small | lbiagattigé | lshuhin | lentzit | lbiagareu | | lgliagnini | lpikkiriri rogo | | l|apchoquin Smell (sense of) | likkenomeruddo | luéttóhn ||| (*nose hears*) ||| Smoke | ldjereddudde | Itahttahssin ||| " (to) | lcoquatta medji lohppéh | támbúh ||| (*eat smoke*) ||| Snake | | lpuibui | " (large) | | lpushiribeh | Son | | lipot | Inientzteh ||| Inochumi Speak ||| Inona guayte Speak (to) | lbattaru logni éh | Inugniáni Spit ||| Inotchôrah Star | lcujedje | lzahir ta tai | lkasupta | Stars | lcujedje doghe | | lbogro Steel ||| | lcoshintzi Stone | | litai | Streamlet ||| | l|gnahtinka Strong ||| | l|niroite katzuini Strong sun ||| | l|minchare pahua Sun | lmehri lahra | lhuatchi | lpah hua | | l|cuaracu | | Sunrise | lmehri rutto lahra | nikki uh ||| | appoha | | Sunset | lmehri re rotto lahra | nikki hoh ||| " butto ||| Swim | lkuhru loh ütapp | | l|nahmatatzu

Tail (of an loh | behruaza | | animal) ||| Tall | lkuritchiga | lih | zuh | hàh | | l|riririteh | laritchodo ||| Tattoo | | l|zihzuppohra ||| (*on chin*) ||| | lzihra | pegnana ||| (*on forehead* ||| | *land eyebrows*) | | Teeth | | lziragna | lerahi | Inaikki " (1st pers.) | littah ||| " (2nd " ) | lakkoh ||| " (3rd " ) | loh ||| Ten | | lohehssuat | Thank you | *unknown* | lto all ||| Then | ltohare ||| Thigh | limmomonna | lzihuwa | | lippoghahdde ||| Thin | lrakkiggiarogogo | lah | sihnnin | | Thirst | | lbipehrehp | Three | | Itchibapehng | Throat | | lhuenie ||| | combira | Throw (to) | lbarigo | lahmenbott | | Thumb ||| | Inotta | pakki | Thunder | lboejaruru | l|tupah | | Itakkirisse | | laman | tsiuic | | Tired | | lyahboroeh | Inomautache ||| (*I am tired*) | Toes | lbure | bahppe | lzihppuhán | | Inoetzi | tapaki | Tongue ||| | Inonnenni | Tortoise | | l|kanianiareh | Touch | lkerajettudji | lahmahppuh | | Tree | lippo | lüba | leip | " (trunk of) | lippo | lüba | poh | luhtchattu " (branch of) | lippo | ittura | lübakkan | | Trees ||| | l|chatto | Trumpet | | l|niumbiháh | | Two | | Itchepitchepeh

Ugly | | l|guereh | Umbilicus ||| | Inohmoetto Uncle | | Itzi | | Inatchalene

Village | | l|amonabuh | Vomit (to) | Itowari | goddo | lzirivipposüh | | Inokkamarangatzu

Wait (to) | lto | gudduguddu | leh | ohnroh ||| | giao ||| Wake (to) | lyettado | lehmma | èh | | Walk | lmehru | loh | attáh | | latteh | otzki | Warm | lboero | lhakkuh | | Water | lpoba | lüha | l|iribbi | | l|gnah | Waterfall | lpobbore | lüttuh (*fall*) | | lopparengnahtazzi | | lühppohsuh ||| | (*rapid*) | | Way ||| | laboche Weak ||| | Itshintztéh West, East, ||| | North, South | | (*unknown to all*) | What is this in | Inno | ba | boi | lgar | te | zih | | the ... | lyiere? | Méhrennoih? | | language? ||| | White | | liretiat | lkittamorori | Wife | lohredduje | lkuhnia | lotachi | lnuena | Wife (plural) ||| " (1st pers.) | Itchevireh ||| " (2nd " ) | lpavireh ||| " (3rd " ) | lettuvireh ||| | Itcheddoreddo ||| | (*abbrev. of*) ||| | Itcheddoredduje ||| Wild beasts | lbahregghe | lzahwahra | | Wind | | liuituh | lkabihru | l|tampeah | Woman | lahreddo | lahvah | l|tanian | lcoya (plural) | lahrehme | | laiatiah |

Yellow ||| | Itchengotz Yes | luh | lapohttáh | libehéh | Yuka (jute) ||| | l|cagniri

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2. Printing/spelling errors which have been corrected are:

Volume 1: Page 43, "Butataes" changed to "Batataes" Page 44, "Batateas" changed to "Batataes" Page 58, "Schoor" changed to "Schnoor"

Volume 2: Page viii, "Solimo[~e]s" changed to "Solimões" Page 7, "0·25 c" changed to "0·25 m" Page 14, "Jurnena" changed to "Juruena" Page 316, "expect" changed to "except" Page 497, "Jappalin" changed to "Jappelin" Page 498, "Cepo" changed to "Cepa" "Cryptorus" changed to "Crypturus" Page 500, "Naïr" changed to "Nair" Page 501, "Mayu" changed to "Maya" Page 502, "Ollaguë" changed to "Ollagüe" "Reinha" changed to "Rainha" Page 503, "Crepury" changed to "Crepore" "Jamachin" changed to "Jamanchin" "Peixeto" changed to "Peixoto" Page 504, "Transandine" changed to "Trans-Andine" "Vastris" changed to "Vastres"

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