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elements; but if the same should be done in the Akém dialect, it would not sound well." As to the position which the Chwee language holds among the African languages in general, there is no doubt that it belongs to that stock of languages which have been termed "Prefix-pronominal," the principal characteristic of which is the employment of prefixes in the formation, classification, and pluralisation of nouns, and in representing them (before other parts of speech).

For further information on these points let me refer those interested to 'A Grammar of the Asânté and Fânté Language, called Tshi (Chwee), based on the Aquapem Dialect, with reference to the other (Akán and Fânté) Dialects.' By the Rev. J. G. Christaller, of the Basle German Evangelical Mission on the Gold Coast, published at Basle last year (1875).

XI.—*Notes of a Journey from the River St. Francisco to the River Tocantins and to the City of Maranhão.* By JAMES W. WELLS, C.E.

ON the 15th of February, 1873, I started from Rio de Janeiro, in company with other members of a staff of engineers, for the purpose of surveying the ground for the prolongation of the Dom Pedro Segundo Railway by the rivers Parãopeba and St. Francisco as far as the Cachoeira (cataract) of Pirapora, on the last-named river. From this point the navigation of the river St. Francisco is open and uninterrupted as far as the noble waterfall of Paulo Affonso.

On the 5th of January, 1875, the surveys being completed, I bade adieu to my companions at Pirapora, and started on my journey to Cidade da Barra, 740 miles by river from Pirapora. I went by land at first; passing the mouth of the Rio das Velhas, through the villages of Coração de Jesus and Contendas, on the east side of the river, to the city of Januaria, where I crossed the river and proceeded by the river-side road, on the west bank, to the town of Carunhanha. Here, finding the roads very much flooded, I sold the mules and embarked in an *ajoujo* (i.e., two canoes lashed together and planked over): in this crazy concern I proceeded to the Cidade da Barra do Rio Grande, situated on the mouth of the river of that name. I suffered intensely on this river-journey at night from the attacks of mosquitoes. As all the country to this point has been travelled over and described by various travellers, I shall avoid any description, and proceed at once with the sketch of the

by James W. Wells, Civil Engineer.

journey to the Tocantins and thence to the sea. On the 26th of February, 1875, after a 10-days' stay with the hospitable people of Cidade da Barra, I engaged a passage in a barca returning up the Rio Grande. At the same time I engaged a troop of mules to meet me at the mouth of the Rio Preto, 56 miles up the Rio Grande.

The Rio Grande is one of the most important affluents of the St. Francisco—important not only for its size, but for the combination of navigable streams that flow into it. It is navigable for vessels of 3 to 4 feet draught, as far as the town of Campo Largo, 180 miles from its mouth. Its average width is 318 feet, depth 10 feet, and its velocity 2 feet 4 inches per second. All this length is perfectly free from obstacles, and for yet 80 miles between Campo Largo to Limoeiro; but this last length is troublesome on account of the rapids at some bends of the river. Its chief affluents are Rio Preto, Rio Branco, and Rio das Ondas, all more or less navigable.

I entered the barca (a sort of barge with a commodious cabin built on the deck at the stern) and the polemen, four in number, pushed off.

As the river was very full, our progress was slow. At times the polemen could not reach the bottom with their poles, and in an instant we drifted down stream, soon losing an hour's hard work.

Soon after leaving the town the pilot directed the barca into a lagoa, or overflow from the river, in the adjoining low-lands. Here the progress was better, but many and many times a passage had to be cut through the intervening bushes. It was a slow and wearisome progress, but, nevertheless, better than navigating against the strong current and deep water of the main river.

I found the greater part of the adjoining lands to be very low and flat, and covered with a short, arid grass and a scrubby vegetation. In some places the inundations extend for many miles inland. In these lakes are numerous water-fowl, spoon-bills (*Culhereiros*); and a magnificent white crane, 4 feet high, with a white body and black head and neck, locally termed *Jaburu moleque*. There were also many other varieties of the crane family, with two species of wild duck.

At sunset, the barca was hauled alongside the sandy bank and secured for the night. Fires then lighted, and dinner prepared and eaten, in a few moments the tired men were asleep, to be away again with the first light of dawn. The nights, though warm, were not disagreeably so, the thermometer registering 76° to 78°, and 82° to 84° at midday in the shade. The remarkable absence of mosquitoes is a notable fact in this river.

Feb. 28th.—The morning broke bright and clear; our progress was miserably slow, the stream being very deep, and nothing was to be seen of the banks but dense bush. At 11 A.M. we reached Estreita da Serra, a narrow part of the river where it passes through a gap in a range of low hills that intersect the line of the river at this point. Looking out of the cabin window, my eye rested first on the long belt of mauve-coloured water-lilies (*golfoês*) skirting the margin of the stream, then rose to the thick, scrubby bushes of the banks; above which, a little inland, rear up, in graceful prominence, a few Carnahuba palms, their spiral stems and feathery foliage standing out in relief against the sombre forest-clad point of the serra behind. The Carnahuba palm (*Copernicia cerifera*) is one of the most useful trees in Brazil. In these districts it exists only in small numbers, but in the provinces of Ceará and Rio Grande do Norte it grows uncultivated in great luxuriance. Perhaps there is no region of the globe where a tree can be found of such varied uses and so serviceable as this palm. It resists the most severe and longest droughts, keeping always green and flourishing. The roots possess the same medicinal properties as sarsaparilla. From the trunk are extracted strong, light fibres capable of receiving a high polish. The wood is used for props, joists, and other building purposes; as also for stakes and fences, and for musical instruments, tubes and pumps. The inner rind of the young leaf, when fresh, is used as a highly-esteemed and most nutritive food. The tree also affords wine, vinegar, a saccharine substance, and a great quantity of gum like sago, and possessing the same properties and taste. It has often been the only food of the inhabitants of Ceará and Rio Grande do Norte in times of severe drought.

A species of flour, like maizena, is also extracted from it, and a whitish liquor like the liquid contained in coco-nuts. The soft, fibrous substance in the interior of the stalk, and that of the leaves, is a perfect substitute for cork. The pulp of the fruit is agreeable to taste; and the kernel, which is very oily and emulsive, after being roasted and pounded, is used as an excellent substitute for coffee. Of the dried leaves are made mats, hats, baskets, and brooms; and the straw is already sent to Europe in great quantity to be made into fine hats, some of which are sent back to Brazil. From the leaves is extracted a kind of wax, much used for making candles, which are extensively consumed in the northern provinces.

March 3rd.—We arrived at Boquerão, a small collection of houses at the foot of the Serra do Boquerão, near the mouth of the Rio Preto. Here I left the barca, and travelled by land up the Rio Preto (Black River).

The village of Boquerão, consisting of 25 houses, a few of adobe and tiled, but most of them built entirely with materials obtained from the Carnahuba palm, is situated on the east side of the Serra do Boquerão. This serra is a low range of hills branching from the great watershed serra near Paranagua in the north and crossing the River St. Francisco a little below Urubú. It runs almost north and south. It rises between 300 and 400 feet above the neighbouring plains. Its surface is comparatively regular, and thinly covered with forest, but in places its outline is broken by masses of rock—a species of compact gneiss veined with crystal and white quartz.

In its forests are immense numbers of *Caetetés*, a species of peccary (*Dicotyles labiatus*, and *D. torquatus*); also the Guará or red wolf (*Canis jubatus*), the Sucuarana or puma (*Felis concolor*), and many other animals. This village of Boquerão, though now so insignificant, will be in the future unquestionably an important place, when the rich, fertile, and grazing districts of the interior become more populous, and the navigation of the fine rivers Grande, Preto, and others, is opened up.

Entering the valley of the Rio Preto, we found the country very different, consisting of a loose sandy soil, extending to the foot of the Serra do Boquerão, with numerous shallow lakes of water, abounding in ducks and other aquatic birds. The land was only a foot or two above the then level of the river, and the ground covered with a thin, wiry grass, called *Capim agreste*, affording but little nutriment to cattle. In many places were little thickets of Carnahuba and Burity palms, with other trees, giving the country in many places a park-like aspect. The grass extended to the very edge of the river, where grew the Burityrana palm, and a large tree producing seeds like the castor-oil-plant, and from which the natives manufacture a very serviceable oil for their lamps. It grows in great luxuriance, and in vast quantities. Another tree bears a large brown fruit, about the size and appearance of a potato, which is largely used for making soap.

The Rio Preto (Black River) is so called from the dark appearance of the water, owing to its great depth; I never saw clearer water in a river. It is very winding, and its width is generally about 150 to 200 feet broad.

At night we always endeavoured to reach some of the small birdcage-like houses of the cattle-breeders: where, although everything was of the roughest, we were always kindly treated; the men slinging their hammocks from the rafters, and I sleeping on my camp-bed.

The appearance of the valley still continued more or less the same, sometimes gently undulating, but generally the same flat

plain. In places the country was thickly wooded, but the general appearance was that of a grassy plain with pools of water, and picturesque clumps of Carnahubas.

March 7th.—We reached the villa or town of Sta. Rita, built on the north side of the Rio Preto, and about 120 miles from Cidade da Barra do Rio Grande. It contains about 1400 inhabitants.

The journey to this point had been most satisfactory, the direction was excellent, and the river navigable. The great question was as to the best place at which to pass the hills forming the watershed of the St. Francisco and Tocantins. I was informed that a road accompanied the Rio Preto nearly to its source, and continued on to the Cidade da Palma, in the province of Goyaz, but that the descent from the Serra into Goyaz was steep and perilous. Accordingly I determined to explore the Rio Sapão (River of the Big Frog), and see where it sprang from, anticipating that at that point I might find the watershed more easy to pass.

I left Sta. Rita with many kind feelings towards the good people I met there. The weather now appeared to be changing to wet. The country also became vastly different, changing from the flat sand plains of the lower river to hilly country of clay soil and quartz rock, and in the greater part covered with dense forest. These forests are not so magnificent as in many parts of Brazil, the forests of the Serra da Mantiqueira, for instance, where the stately araucaria grows, being much grander. Yet they are invested with a degree of grandeur unknown in our latitudes. The peculiar features of these forests are the Barrigudo and the Gammeleira. The Barrigudo is a tree with a trunk growing sometimes to 80 or 90 feet high, and then branching out into horizontal boughs, half-way up it swells out to sometimes double the circumference of its base. The Gammeleira, a species of wild fig growing to an extraordinary height, is still more peculiar, for jutting out from its base are perfect buttresses, sometimes 10 or 12 feet high, consolidating and giving support to the giant. A kind of cotton is obtained from the Barrigudo; and canoes are often made from the Gammeleira, though it does not make the most durable kinds.

A few palms were also to be observed, peculiar to the forest, such as the Gariroba, Palmito, and Seribá, the young leaves of which form an excellent substitute for cabbage, though it seems most fearful vandalism to destroy such beauties of nature for so mean a purpose. In passing through these forests we frequently smelt a peculiar musky smell. This is very common, and is the peculiarity of a certain shrub, and also of the odour exhaled by snakes.

Very heavy rains now set in, making our progress slow and uncomfortable.

March 13th.—Reached the village of “Formosa” in a fearful storm of rain. In a short time I managed to procure an empty house, belonging to the sub-delegado, or police-agent. Within half-an-hour the house was crowded by my curious neighbours, to inquire what I wanted, who I was, if I had anything to sell, or wanted anything to buy. Their astonishment was great when they found I was one of the far-famed “Ingleses;” greater still when I told them I was only travelling to see the country; and unbounded when I told them I intended exploring the Rio Sapão. Fearful and many were the dangers and difficulties I was told I should encounter; but, as no one of them had ever been there, I put no faith in their representations. Not so, unfortunately, the men I had brought with me; they immediately took fright, and refused to proceed further. Moreover, the rains had now set in; and I was informed they would last till the end of the month, and that the country beyond would soon be flooded, effectually barring all progress. I decided, therefore, most unwillingly, to await the cessation of the rain. The event proved that I was fortunate in doing so, for it rained day and night continuously until the end of the month, as had been predicted. Formosa is merely a collection of some sixty squalid huts and houses, picturesquely built in the midst of a wealth of vegetation. Trees and bush grow in every unfrequented space. In many places the weeds were so high in the street as effectually to prevent a view of the houses on the opposite side. The climate is warm and moist, but healthy, and the soil is of the richest; and the inhabitants, after the rudest fashion, and with little labour, rear crops of maize, beans, rice, sugar-cane, castor-oil plant, and mandioca, the surplus of which they send down the river in rafts, made of the dried stems of the leaves of the Burity palm, to Sta. Rita and Cidade da Barra. Truly this district is a wonder of vegetable wealth. Intermittent fevers, so common in similar districts, are here very slight; and what there is of them is, I believe, only owing to the bad living and filthy habits of the inhabitants.

Game is not prolific in this district, having, I believe, been hunted down by the people, who are all fond of this occupation, and kill everything eatable indiscriminately at all seasons, consequently soon clearing the district of its game.

To prove what a man can do in such a country who likes to work, I will take the case of Senhor Jose Moreira da Cunha e Souza, the sub-delegado; now a hale, hearty, ruddy-faced man of sixty. He came here twenty years ago with only two slaves, and immediately set to work in clearing land which he called

his own, and which, as no one can show a better title, remains his. He is now comparatively rich in money, and has extensive tracts of sugar-cane, mandioca, beans, and rice. He has a mill, though certainly of the rudest construction; and he is now making a handsome income, to the intense disgust and jealousy of his less active neighbours.

At the end of the month the rain, as prognosticated, ceased, and we prepared for continuing the journey. I was advised to hire two mules to carry corn, as hunters who knew the kind of country I was about to enter said that it would be utterly impossible to obtain pasturage for the animals. Moreover, I was further induced to take an escort of four natives, making with my men, whom I had shamed into going on, eight in number. All were armed with the most old-fashioned of arms, Portuguese muskets and carbines, all flint-locks, that looked likely to prove more dangerous behind than in front. I induced these men to go with me, in consideration of paying them a large sum of money. They were all dressed in tanned deer-skin; hat, coat, vest, trousers, and boots. Two of the men I thought were an acquisition. One called Antonio da Lapa, a hunter, had spent his life in the chase, and had fought with, been captured by, and escaped from, the Indians. He was a tall, meagre, broad-shouldered man of fifty. The other was a half-civilised Indian, of the tribe of Cherentes, called José Tracuhyn. Whilst at Formosa I found the climate most delightful; the temperature by day 76° to 78°, by night 72° to 74° Fahr.

April 4th.—At last we started. Every one assembled to see us off, and kind wishes of "God speed" were interspersed with the most dismal forebodings; the friends of the men I took with me bidding them farewell, as though they never expected to see them again. Three of the men travelled on foot, including the Indian, who carried his bows and arrows. The distance was 32 miles to the mouth of the Rio Sapão, which we reached without incident. Here there is a collection of seven or eight houses, called Sta. Maria. It being on the Indian frontier, they are fortified after a rude fashion. This place, even in late years, has been the scene of many a fight with the Indians. The inhabitants relate story and anecdote enough to fill a volume. The place had also another interest, as it was here that Gardner, the botanist, passed on his way to Goyaz, by the road up the Rio Preto. But he made a mistake in saying that the Rio Preto flows into the Rio St. Francisco a little below Villa da Barra, and probably obtained this idea from the old maps, which erroneously show it so.

Up to this point I have found no serious difficulty or obstruction to the navigation of the Rio Preto by a small light-draught steamer. The only troubles are:—

Atoleiro	55 kilometres below Formosa.
Porto Raso	37 " "
Marimbondo	21 " "
Iatoba	12 " "
Raposa	7 " "
Vão de Batalha	16 " above Formosa.
" Angico	19 " "
" Capivara	21 " "
" Brejo Grande . .	31 " "

These are all strong currents of water at various bends of the river, but not worthy of being called rapids. Of these Porto Raso is the shallowest, but I am told that even in the dry season it has 4 feet of water in its channel. A small steamer could pass all these obstacles with a good pilot, but any expense in removing rock, &c., would, of course, diminish the risk.

April 6th.—This morning we safely passed the mouth of the Rio Sapão, by swimming the animals, and passing the baggage in a canoe, and then proceeded on our journey by the south-western side of the river. We travelled only 10 miles this day, as we started very late, and made our camp by the side of a stream at the foot of a serra.

The River Sapão I found to be a very deep stream, flowing sluggishly through marshy land, but too narrow to be of any service as a navigable stream. Its banks throughout are densely lined, either with magnificent belts of forests, or thick groves of the Burity palms. The low undulating lands on each side, extending from 2 to 5 miles away from the river, are covered with the vegetation peculiar to the Campos Geraes of Brazil, ground palms, small bushes, stunted trees, and a thin, hard, coarse grass. Sometimes many miles were covered principally with the extraordinary-looking *Canella d'Elma* (*Vellozia*), with its beautiful lily-like flowers. Beyond these low-lands the land suddenly rises up almost perpendicularly, and becomes a vast arid table-land, but abounding in most of the kinds of game found in Brazil; such as the Porco do Matto, a true wild boar, rarely found anywhere else, and not to be confounded with the Caetetú or peccary; deer of several kinds—the Galheiro and the Campeira, the buck and doe of the Campos, and the stately Sussu-apara, the largest deer in Brazil, but whose flesh is not eatable. There is also the ounce or jaguar; the *Suguarana* (puma), the black ounce, and the Guará; and near the river we saw numerous tracks of Capivara (water-hog), Paças, and

tapirs in extraordinary number. Red and blue, red and gold, and purple macaws, and green parrots, continuously flew by us, making the hill-sides echo with their discordant screeches.

The weather was glorious, and I never breathed a more exhilarating or healthy atmosphere than this of the valley of the Sapão. We travelled by the foot of the slopes of the table-land, thereby avoiding crossing the many streams and swamps that would have intersected our path nearer the river. One night the animals suffered fearfully from vampire bats, and some of the men were bitten. The animals presented a ghastly appearance; on one I counted seven punctures.

Pedestrians have to keep a sharp look out for the Cabeça de Frade, a curious ground-cactus, growing to about one foot in diameter, and only an inch or so above the surface of the ground; it is covered with long sharp spines, which cause a fearful wound to any unhappy person who treads on them. Every night the whole conversation turned upon the Porcos de Matto, and the men seemed to dread a visit from them more than from the Indians. Though I had seen a few tracks of them, I thought their fears exaggerated, and did not place much faith in their representations. But on the 11th of April, as we were rounding the sources of a swamp, to which I gave the name of Nove Gaihos (nine branches), from that number of streams that we counted leading into it, we saw the ground furrowed and rooted up in all directions by the pigs; but though the pools of water had been very recently disturbed, we did not meet with a single pig. The men were very excited, expecting to be attacked. It would, indeed, have been awkward had we encountered the animals here, for the ground was covered with hard matted grass 6 feet high, and obstructed by dense masses of trees and bush, with huge boulders of stone scattered about.

We made haste to get away; and late in the afternoon, when we encamped, we had placed 4 or 5 miles between the dreaded locality and our camp. But old Antonio, one of our men, said they would be sure to follow us. Accordingly we made every preparation, by placing the pack-saddles and baggage in the form of a hollow square, making a breastwork 3 or 4 feet high. Those who had hammocks, slung them high up in the adjoining trees; the men were too sure of a visit to sleep for a long time, tired as they were. However, late at night, we posted two sentinels, and turned in. An hour or so before daylight I was awakened by the alarm of pigs. The men who had no hammocks hurriedly scrambled in behind the baggage. In an instant the pigs were on us by hundreds, gnashing their teeth in a most unpleasant manner, making a sound like the breaking of thousands of hard

dry sticks, while the stench from their bodies was most revolting. As every man had cartridges ready and arms loaded, they soon received a volley, and retreated, but charged again immediately; the men behind the baggage had then to fight with their long knives. Myself and the men in the hammocks were all safe, and made every one of our shots tell on the black seething mass of bodies. At first it was an anxious time, but the pigs gradually drew off to a more respectful distance, and, as we remained perfectly quiet, at daybreak they went away. Our baggage, though, had suffered terribly. The raw hide coverings of the pack-saddles were slit as though by an axe, and one of the men was badly hurt in the wrist. We found seven pigs dead, and four badly wounded, but numbers of the wounded must have got away. The men would not go for the mules until near mid-day, and then found them a long way off. These animals are true wild boars, with long projecting tusks, and thick black bristles on their backs.

April 14th.—Came on to a huge flat plain, 2 or 3 miles wide and 4 or 5 long, the centre forming a large swamp, with groves of Burity palms. Wherever we looked we saw no vegetation but the tall rank grass. This plain is situated in a valley surrounded by fortress-looking mountains, sloping steeply at their bases and almost perpendicular near the top. Their summits were flat, and appeared to be all on the same level. I conjectured this to be the high land forming the watershed, and that on the other side of the big swamp I should find water flowing westwardly.

I ascended one of the range of hills, and the sight that then met my view well paid me for the exertion. Looking westwardly, far as I could see, was one vast extent of undulating grass-land, brown with age. In the bottoms and valleys grew Burity palms, showing the presence of streams or morass, generally the latter. In the far distance were several ranges of hills and isolated heights. Some of the streams were lined with thick forest, indicating a rich soil. In a north-west direction I fancied I saw green grass, which would indicate the presence of man, as unless this *Capim agreste* is fired, its growth is continual for ages, and always presenting the same burnt-up appearance. I descended, and rounded the big swamp, and my conjecture proved to be right, for there we found water flowing westwardly. We found the descent on the west side considerably steeper than on the east; *this is a peculiarity I have noticed in all the mountain ranges in Brazil, running north and south.* We were several days wandering in these wilds. Although it is easy to decide on a line of route, it is altogether another thing to travel by it in an unknown country. Our

difficulties were the immense numbers of streams and swamps, and the frequent belts of forest.

These lands teem with game of various kinds. We killed a number of wild boar and deer, the latter remarkably tame. I also had to shoot a fine *Tamandua bandeira*, or anteater, to save my dog. We saw the tracks of numbers of tapirs, pacas, capivaras, onças, and suçuaranas. The perdice, or Brazilian partridge, existed in great quantities.

After a most wearisome journey of several days, our animals became utterly exhausted for want of proper forage. The corn I had brought had been finished some days, and the mules only had the dry hard grass to eat. Their gums were cut and swollen with the unpalatable stuff. Their chests and forelegs were denuded of hair, through forcing a way through the grass. Fortunately we always found plenty of water. As I knew we must be near the green grass I saw from the hills, I made a camp, and with two men on foot we started in search of habitations. We crossed streams, and forest, and swamp, making a bee-line towards where I wanted to go. After a few hours' fatiguing work, we emerged on to green grass-land. The men told me it had been burnt the last year. We plodded on, and ascended a height, where we saw smoke a mile or two away. We cautiously made towards it, and discovered it to be really a human habitation. Upon entering the house, the proprietor, a man and his wife, and six powerful bronzed sons, were speechless with astonishment. A few words explained all, and we were treated with the greatest kindness. I found that the streams I had been tracing were really affluents of the Rio do Somno, that flows into the Tocantins. My worthy host I found to be an immigrant from the neighbouring district of Paranagua, in Piauhys; he told me that a few miles further west was the village of Espirito Santo, formed during the past few years. I engaged him as a guide for several days in exploring the country. I found the high lands to be entirely covered with grass, the valleys full of thick forests, and the ground was not too marshy; there nothing but the Buriti grew.

20th.—To-day we arrived at the little isolated village of Espirito Santo, consisting of some twenty houses. The whole village is entirely self-supporting, being too far from any market either to buy or sell. The people only make long journeys to Paranagua, and thence to Sta. Rita and Formosa, to exchange hides for salt. My exploration will prove a great boon to these people, as showing them a better road by the way I came, and one which will save them several days' journey.

Near Espirito Santo is a small river called the Rio Somninho. This stream, when it joins the Rio Preto of Goyaz, becomes the Rio do Somno (River of Sleep). At its junction is a magnificent waterfall of 80 feet in one drop.

Leaving Espirito Santo, we found the country gradually changing to a more rugged and wooded district, but everywhere intersected by boggy low-lands. In these morasses exist immense numbers of the water-boia (*Sucurihu*), which sometimes attains the enormous length of 40 feet. I have been told that they attain 60 feet, but that I cannot vouch for.

During the next few days we passed a few isolated farms, and on the 23rd we reached Porto Franco, on the Rio do Somno, the last habitation. Here I was told the river was navigable; accordingly I dismissed my men and troop, and constructed a raft by tying into five long bundles, 10 feet long, the dry stems of Burity palms, and with three men and my baggage embarked on board the crazy affair. From this point to the mouth of the river it took us eight days to float down with the current. During this journey we were wrecked by dashing on to a submerged rock, and I suffered an irreparable loss of more than two hundred sketches, several valuable specimens of minerals, and other objects of necessity and interest. This Rio Somno is certainly the most picturesque river I have yet seen. The upper part flows between perpendicular walls of many-coloured rock, sometimes 100 or more feet high. Innumerable cascades of water trickle from the heights above; palms, and ferns, and flowers grow in every crack and crevice and shelf of the rock, presenting a most enchanting appearance. Often, on the surface of the rocks, I observed the huge nests of the Shupé bee, sometimes 20 feet long. They produce large quantities of wax and good honey. The lower part of the Rio do Somno flows through a much lower and more regular country. Here the river is bordered by forests of great luxuriance and vegetable wealth. The varieties of palms were very numerous, and most of them new to me, as the Najá, Bacabá, Marajá, and Piti. Here I also saw wild bananas. The Bacabá is a handsome palm, growing on a long, slender stem to a great height, the huge leaves forming at the top a fan, invariably facing the east and west.

In these forests we saw innumerable monkeys, marmosets, macaws, parrots, and other birds. Tapirs, capivaras, and alligators we constantly observed on the banks. A little away from the river the country is still the Campos Geraes, or grass-land, extending to the Rio Tocantins.

The river at Porto Franco is 200 feet wide, but at some of the bends it is 300 or 400 feet wide. Only in a few shallows is

the current at all strong, and then it is more of the nature of broken water than a rapid, the water rising into waves 3 or 4 feet high. These are locally termed "pancadas," or blows, and many a swamping they gave us; unfortunately we did not always manage to navigate our unwieldy craft so as to avoid the submerged rocks, and it was on one of these that our wreck occurred. But beyond these there are two serious impediments to navigation. They are the "Funil" and "Apertada Hora." The "Funil" is an obstruction caused by two huge masses of ironstone, about 80 feet long and 50 feet apart. Through this narrow channel the whole body of water of the river passes in a rushing, seething mass of whirlpools. The chief dangers are the strong eddies; nevertheless, I believe a small steamer could steam up against the current. The "Apertada Hora" is a much more serious affair. Above it the bed of the river is full of large boulders of rock, in amongst which the water rushes with surprising force. The only passage is by a tortuous channel on the north side, which is, however, highly perilous from the quantity of rocks on either side. After passing the rocks, the banks of the river suddenly narrow to within 25 or 30 feet, and the previously strong current of water, in this narrow strait, becomes hardly perceptible. This at first sight appears strange, but a plumb-line dropped into the water does not strike the bottom at 40 feet; it shows, however, a strong undercurrent. I am thus led to believe that the bank on the left or south side of this strait is merely a projecting ledge of rock, under which the great body of the water must flow. It is composed of a hard, compact stone. This narrow channel extends about 100 or 130 yards, and then making a sharp bend to the left, it widens to its usual width. The Apertada Hora is the great obstacle to navigation; but in the dry season, when the rocks are high out of the water, a good channel could be made by removing some of them, and by widening the narrow strait. There are numerous other places, such as the "Funil" and many strong currents over the shallows where any labour expended on removing rock, would greatly diminish the risk; but there are none which present such an almost impassable barrier as the Apertada Hora, and they might remain as they are, dangerous but passable. After passing the Apertada Hora, we found for the next few miles a little broken water from submerged rocks, and then the river became a deep, wide, and placidly-flowing stream to its junction with the Tocantins. We passed successively the mouths of the Rio das Balsas and the Rio Perdida, both large bodies of water; they are unexplored, but the Indians say they are navigable.

During this journey on the Rio do Sommo I noticed the

strange absence of mosquitoes, or other torturing insects; in fact, the whole district from the St. Francisco to the Tocantins is singularly free from insect pests, including even carapatos (ticks), the greatest misery to travellers in Brazil.

May 2nd.—We arrived at the village of Pedro Affonso, on the south side of the mouth of the Rio do Somno. Until within the last four years it was an Indian village of the tribe of Cherentes. In 1848 the Italian Jesuit missionary, Fre Rafael, arrived in this savage wilderness, and amongst the then cannibal Indians; with patience and perseverance, he has subdued their unruly natures, and has induced them to forego their old nomadic lives, and to settle down to the cultivation of this vast wilderness. A few years after his arrival a few traders came, gradually elbowing out the native inhabitants. It is now a Brazilian village of some 400 or 500 souls. The Indians have removed to the mouth of the Rio Ipiabunha, 72 miles to the south. I remained at Pedro Affonso three days, having arrived unfortunately a few days too late to catch the last trading-boat descending the river to Pará. As it was, I engaged an *igaritê*, a wide, shallow boat, with three oarsmen and a pilot, to take me to Carolina, a town, or rather city, 185 miles down the Tocantins.

Pedro Affonso is a very straggling village, situated in the midst of grass-land, with scattered clumps of trees. The ground is high above any flood that is likely to come down the river, and the situation altogether showed the wisdom of the natives in choosing this for a settlement. I see that in old maps there is a place called São Laurenço, marked on the west bank of the Rio Tocantins, opposite the mouth of the Rio do Somno. As I could see no trace of it whilst at Pedro Affonso, I made inquiries of the oldest inhabitant, who told me that he had never heard of the name.

In going down this "Upper Tocantins" I must confess to being disappointed in the insignificant appearance of the forests bordering its banks; though, of course, tropical in character, they had neither grandeur nor beauty. Perhaps the long reaches and great width of the river tended to make everything else appear insignificant. The reaches of the river sometimes extended 8 or 10 miles, making the horizon of sky and water.

I was also very much surprised to find such a number of habitations on the river-banks: we rarely passed 3 or 4 miles without seeing a little hut and its small plantation. But the class of people dwelling here are of no benefit whatever to such a country as Brazil: they exist and vegetate, as the trees and animals around them; they are surly, proud, and independent. Here nature is so generous, that their trifling necessities of life are obtained almost without trouble. The river abounds in fish, and

the forest with game; and a few roots of mandioca, put in the ground, supply them with their bread; their clothes they prepare from the tanned hides of deer, &c. In descending the river, I frequently saw the fresh-water dolphin rise to the surface, and with a deep sigh send a cloud of spray into the air: a large quantity of oil can be obtained from this fish, but it is not utilised.

The journey on the Tocantins was rather enjoyable than otherwise, for it being one of the cool months, the heat of the sun, though great, was tempered by a delightfully fresh breeze up channel. The thermometer daily registered 82° to 84° at mid-day. We generally passed the nights at some river-side hut, where the men slung their hammocks; I preferred for myself a hide on the ground by the side of the fire, to the mosquitoes and filth of the houses.

Near the mouth of the River Manoel Alves, a few miles to the south of the city of Carolina, a range of hills of most fantastic forms, isolated and in groups, crosses the line of the River Tocantins: they are a branch of the great watershed range of the Tocantins and St. Francisco rivers, and after traversing the Tocantins, run into the range of mountains forming the watershed of the Rivers Tocantins and Araguaya. These mountains are reported to be rich in gold, several specimens having been found; but they have never been worked or explored properly, the districts being in Indian territory.

About 30 miles to the north of the mouth of the Rio do Somno is the site of a recent village of the Coroados Indians, who have removed, with their Italian Jesuit missionary, Fre Antonio, to the head-waters of the Rio do Manoel Alves. They still retain their habits and customs, but are now friendly disposed to the Christians, as the Brazilians are termed by them. The Rio do Manoel Alves forms the southern boundary between the province of Maranhão and Goyaz.

May 11th.—Landed at the city of Carolina and proceeded to the house of the Judge of the district, Dr. Benedito Barros e Vasconcellos, by whom I was most hospitably received, though I was a perfect stranger to him, and carried no letters of introduction. He advised me strongly not to entertain the idea of descending the river to Para, as at that time of the year the river below was fearfully unhealthy, and the rapids impassable through insufficiency of water. Moreover, small-pox was then making terrible ravages below the mouth of the Araguaya. I accepted his advice; but it was sixteen days before I could get horses to proceed on my journey.

Carolina is an old settlement, formerly an Indian village. It ranks as a cidade or city, but it is a small insignificant place of

about 1500 inhabitants, like all the other Brazilian towns and villages, a square with a whitewashed church, and houses of adobe, tiled or thatched. During my stay I was very much pleased to see the kind and friendly feeling that existed in this little place. Usually these out-of-the-way towns are in a perpetual state of ferment from politics, jealousy, or intrigues.

Carolina itself is built on a sandy plateau of grass land, high above any river-floods that may chance to come; but the immediate neighbourhood is very rough and mountainous, some of the hills being of very fantastic forms. The temperature I found to be usually about 84° Fahrenheit.

May 27th.—I left Carolina to return now to the sea-coast across the province of Maranhão. My troop was a very sorry-looking one, both men and horses, compared to the active Mineiros of Minas Geraes, and the excellent mules of São Paulo. Apparently every province has its system of packing a mule and of travelling; but the farther north we go, where animals get scarcer, the muleteer becomes far less expert, and men, animals, and pack-saddles are clumsier. A large party of the Carolinenses accompanied me a few miles, and as the country is the open Campos Geraes, my friends showed their expert horsemanship by chasing the grazing cattle, when they would dash alongside a runaway bullock, seize him by the tail and turn the astonished animal upside down.

The first night we passed at a herdsman's hut, at the foot of a considerable hill of lime and sandstone, called Morro do Chapeo (Hat Hill), and a prominent mark for an immense distance around. The next day we travelled through a pass in the range of hills surrounding Carolina: it was a fearful road, a bridle-path obstructed by hugh boulders, winding round the steep side of a hill; on one side the hill became a precipice, densely clothed with forest. One horse slipped and fell over, but the trees caught him feet uppermost. He was none the worse for it.

The second night we passed at a small farm, called Angelino, 28 miles from Carolina. Here is another example of what can be done by a hard-working man in Brazil. The owner, a negro, was in his youth a slave; but obtaining his freedom, he and his wife set earnestly to work. He has now a rough mill for grinding sugar-cane, another for mandioca, a neat house, numerous sheds, large tracts of land, fenced in and under cultivation, and a herd of 1200 cattle; and his only assistants are his two sons and his wife.

After passing these hills the land became more regular, sometimes long flats of sandy wastes, thinly covered with grass, and a few trees; or in the lower parts boggy land, densely covered with

matted grass and bush, through which we went with great difficulty. By the side of the principal streams we always found belts of woodland, in which grew an immense variety of palms, many new to me, such as the pati and the junçerera—and a beautiful tree, with a tall straight trunk, a bright yellow ochre in colour, the leaves a most brilliant green, and thickly covered with a crimson flower: it is locally termed “Moleque.” Another tree I saw, new to me, and peculiar, I believe, to this province; it is termed the “Merim.” It is a large, widely-spreading tree, with a rugged rough bark. Upon gashing the tree, a volatile inflammable fluid oozes out, at first smelling like kerozene, but on exposure to the air its odour changes to the delicate perfume of violets. I am told that it yields an immense quantity of oil, but is not applied to any use. This tree is but little known, even where it grows.

May 30th.—We arrived at the Serra da Cinta, a range of hills dividing the waters of the Grajahu and Pinaré from the Tocantins: it comes from the highlands of Piauhý and runs northerly. After passing this serra the road became very rugged, crossing spurs of the hills, where horses and men had to climb up steep ascents and over huge boulders of rock. The soil, where not stony, was a stiff clay; the land generally was thickly wooded. The neighbourhood here is reported to be rich in minerals, gold and copper having been found, the latter in vast quantities, but as yet it has not been worked. From one of the heights we crossed we obtained a magnificent view of the country we had passed—extensive undulating tracts of grass-lands, with here and there isolated hills rising up in curious forms: one I observed, called Morro de Castello, is a tall round rock, with perpendicular sides, in shape like a martello tower. The horizon was bounded by distant blue serras a long way off, but the air was so clear that we could distinguish their configuration and valleys.

The last day or two of this journey was over a table-land country; the rivers passing through valleys 200 or 300 feet below the adjoining plain of grass-land, the descents to the streams were most precipitous, and the valleys were densely wooded.

June 3rd.—Arrived at the villa or town of Chapada, on the Rio Grajahu. Here terminated my journeys by land. It was high time that I arrived here, for the men who had travelled on foot were terribly exhausted, and three of the horses I had to leave on the road, for which I was only enabled to get one in exchange. It was the deep, heavy, sandy roads that were so fatiguing; on some occasions we travelled for three or four hours over sand where the horses sank to their fetlocks. The

country from Carolina to the Grajahú is all more or less populated, thinly of course, the houses being distant from each other sometimes 30 miles. It is a very healthy district, and in many parts there are tracts of rich land; the greater part, however, is barren sand or stony wastes. I believe it to be immensely rich in minerals.

As the class of inhabitants in this district is very low and ignorant, we were but indifferently received at some of the farms; but at others we were kindly treated. Upon my arrival at Chapada, the District Judge, Dr. Candido Pereira de Lemos, kindly offered me the hospitality of his house, which I willingly accepted, and remained there three days, whilst getting ready a boat to descend the Rio Grajahú.

The Villa de Chapada is an old settlement, situated on the east side of the river. The little praça or square occupies the summit of a hill; the rest of the town is scattered around the base of the hill, and on the banks of the river. On the west bank is the village of Trezedellas. A thriving trade is carried on here with the surrounding country, the traders taking down the river raw hides, and returning with cotton goods, salt, and hardware. The soil is a thin stratum of clay, covering a substratum of stratified rock. This rock, which extends for many miles, is rich in copper, many rich specimens of which I saw. The distance by road from Carolina I estimate to be 188 miles.

At this place I saw an Indian girl of the tribe of Anambeios, from the River Tocantins, below the mouth of the River Araguaia. She was almost a white, with very good features and brown eyes. I should never have thought she was an Indian had I not been told so. I was assured that all her race are as pale as she, being known as the White Indians. Several other Indians from the neighbourhood I saw—the Guajajaras and Gammellas—men short in stature, very deep-chested and powerful in build, light-brown in colour, and in physiognomy decidedly of the Mongolian type.

June 6th.—Embarked in a boat with four oarsmen, pilot, and servant, and started on my voyage down the Grajahú. The river at the town is 109 feet wide and 3 to 6 feet deep; but it is now almost the driest season. The banks are high and rocky, and densely covered with forest. In many cases the branches of the trees interlaced overhead from the opposite banks, forming a most delightful scene. The upper part of the river, where the land is very hilly, is thinly inhabited; but a day or two down the river all habitations cease, as the country then becomes a vast virgin forest, extending to the Tocantins and Para. In this forest-district reside many tribes of Indians, some hostile and some friendly to the whites. Almost every day we met a trading

boat returning to Chapada, the crew often composed of young Indians, generally in a state of nudity. It is fearfully laborious work poling these heavy craft up against the strong current.

This journey on the Grajahú proved to be the most unpleasant I have made in Brazil; for after we had quitted the highlands we passed through a vast extent of lowland and morass, through which the river flowed in the most circuitous manner. Here by day the heat was terrific, and the sand-flies (*pihuyn*) in dense clouds, with their irritating bites, soon brought us to fever-heat. At night mosquitoes, in myriads, effectually killed all thoughts of sleep, with their tantalising humming and stinging. The men, tired out, slept through it all; but with the pilot and myself it was hard times.

One day, whilst the men were preparing dinner, I strolled into the forest. These virgin forests are different from anything of the kind I have seen before; for a little way from the river the ground, covered deep with the decaying leaves of centuries, is perfectly free from bush, and I could sometimes see so far into the forest that the distant trees looked blue with the distance; but overhead, branches and foliage were interlaced together in one entangled mass of creeper and vine: from the branches the creepers dropped their air-roots like ropes, to take fresh life from the ground. These forests abound in *jôô*, or quail, whose melancholy notes alone disturb the solemn silence of the woods.

In the river we caught several excellent fish; but the prevalence, in immense shoals, of the ferocious piranhas, similar to the piranhas of the Rio St. Francisco, effectually prevented any bathing. On one occasion I was shown an electric eel, *tremê-tremê*, or *peixe-d'anguia*, or *poraqué*, as it is variously termed.

June 12th.—This morning we passed a village of the Itambeira Indians, but unfortunately they were away collecting oil of copaiba: we saw their encampment a few days afterwards. The banks of the river are very picturesque, bordered as they are by all the beauties and wealth of a tropical vegetation—palms of several kinds, tree-ferns and graceful bamboos, and trees festooned in flowers; amongst which gamboled several varieties of monkeys and marmosets. Macaws, parrots, toucans, and other birds, flashed their gaudy plumage everywhere; long-necked white herons and other aquatic birds flew ahead, almost skimming the water.

As we were favoured with a bright moon, we took advantage of its light to continue our journey until late into the night. The only danger one is exposed to by this travelling at night is the snags, or submerged fallen trees; we ran on to several, and one occasion had to cut up the tree with axes before we could get free: however, no serious accident occurred. It is unfortu-

nate that this river is so very winding, as it almost trebles the actual distance. A road has lately been cut through the forest from Chapada to Victoria on the Mearim; but as a good part of it is through land subject to inundation, and the traffic is almost *nil*, in a very short time it will be all grown over and useless. It was intended as a means of bringing down cattle from the grazing plains near Chapada; but one or two men tried it and found that it did not answer their purpose, as they lost 80 per cent. of the cattle on the march, through insects, starvation, poisonous plants, and boggy land. Near the mouth of the Grajahú the water of the river assumed a tint like weak coffee, owing to the overflow of the neighbouring lakes and swamps; we had to travel for two days and nights continuously, as we could find no dry land anywhere—all the adjoining land of the Grajahú and of the River Mearim being under water. From this point to the coast we saw no more forests worthy of the name, the whole of the land being a low plain, the greater part subject to inundations. We travelled down the River Mearim almost to the town or villa of Victoria, before we saw dry land.

June 17th.—Landed at Victoria, a town of about 2000 souls, on the north bank of the Rio Mearim. It carries on a considerable trade with the coast and the interior; it is built on slightly rising ground, but the country around is very low and flat, so much so that in the rains, it becomes a series of lakes connected by channels, enabling people to cross from the Rio Mearim to the Rio Pinaré in canoes. Intermittent fevers and agues are not so prevalent as one would be inclined to think, on looking at this vast extent of stagnant water in a tropical climate. The climate is warm and moist, and not unhealthy. I proceeded the same day on to Arary, a village a few miles down the river: here I waited a few days, and on the 20th of June I took a passage in a sailing vessel, loaded with oranges, bananas, fowls, &c., for the capital.

Steamers now ply between the coast and ascend the Rio Mearim as far as Corda, an eight days' journey. Another line ascends the Rio Pinaré. A small tug-steamer on the Rio Grajahú might pay well.

Soon after passing the confluence of the Pinaré with the Mearim, the river widened out to a mile or more in breadth. Here we had to await every change of tide, as at low-water the greater part of the bed of the river is exposed in long shoals of soft black mud. We had to wait here amidst myriads of mosquitoes and a burning sun. The scenery was most melancholy; the banks were of mud, like London clay, topped by the weird roots of mangroves, amongst which flocks of red flamingoes

disported themselves. On this river, at the commencement of the flow of the tide, a huge tidal wave, 6 to 10 feet high, comes rolling along, and woe to the boatman who has not placed his vessel in safety. Even where we were, generally at the mouth of some creek or behind a bank, the commotion of the water was very great, and the water returned with the force of a mill-race.

On the 25th of June I landed at Maranhão, and the same day embarked on a coast-steamer for Bahia. The change was very great, and at sea I gave in at last to a severe attack of fever.

XII.—*Journey of Exploration from South to Western Australia, in 1875.* By ERNEST GILES.*

ON arriving at Youldé, a point which we reached after a troublesome and difficult march from Beltana, the main body of the expedition remained in depôt, whilst I visited Fowler's Bay to the south, at the same time despatching my two officers, Mr. Tietkens and Mr. Young, with my black boy Tommy, to endeavour to discover a new depôt to the north, at or as near to the 29th parallel of latitude as possible. When I returned from Fowler's Bay they also had returned from the north, having discovered two native wells, a small native dam, and some claypans, each having water in, and at different places. This was exceedingly good news, and I wasted no time before I departed from Youldé, giving my letters to Richard Dorey, who had accompanied me back from Fowler's Bay. I will now give a condensation of Mr. Tietkens's report of his journey with Mr. Young.

On leaving Youldé, which is situated in lat. 30° 24' 10", and long. 131° 46', they went first to a small rock waterhole I had visited when here previously in the summer; it was 15 miles away, and lay about N. 74° W., and called Paring. The black boy Tommy followed my old horsetracks to it, but on reaching it they found it dry. The following day they travelled north, and passed through a country of heavy sandhills and thick scrubs, with occasional open patches with limestone, and camped at 24 miles. Continuing their journey the next day, they went over better country and more open, and made 24 or 25 miles of nothing. Some more good country was seen the following day, but no water, though they saw native huts and native tracks. On the following day they sighted two small flat-topped hills, and

* Being the substance of a Report furnished by Mr. Giles to the Hon. Thomas Elder, of Adelaide, who fitted out the Expedition.