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Bolivian Exploration, 1913-1914

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but in places even appeared to overhang. This may possibly come under the category of "Faulting slopes" referred to in the latter part of the paper.

"The channel off the mouth of the Congo."

Prof. Gardiner says: "It is quite inconceivable that a river of fresh water flowing into heavier salt water could cut for itself a deep channel below the surface of the sea." This is no doubt correct for almost any other river that could be mentioned, but surely not for the Congo. If you look at the enormous body of water forced through a comparatively narrow entrance it would be astonishing if it did not sweep away any soft material from its path. The fact that the cable, laid across the channel at a considerable distance from the land, was repeatedly broken, probably by the weight of *débris* carried down by the current, would seem to show that the channel has been cut and is kept clear by the river water.

"Hard bottom."

Prof. Gardiner is undoubtedly correct in saying that manganese nodules are responsible for many of the cases of "hard bottom." I found them such a nuisance in the Pacific, and had so many of the ordinary brass tubes damaged by them, that I adopted a heavy steel tube with a cutting edge; this generally sheared off the manganese, and, displacing the nodule, went on into the soft bottom. Dented tubes with manganese on them, in the Pacific at all events, are poor evidence of hard bottom, as is generally found if there is time to repeat the sounding.

"Currents in deep water."

It will be very difficult, if not impossible, to measure, by meter, currents which probably exist at great depths, say those approaching 3000 fathoms. The existence of such currents may, however, be fairly assumed if it can be shown that a difference of temperature takes place from time to time at a given spot; this direct evidence should be possible of attainment. In a paper written for the Royal Geographical Society on an Atlantic sounding expedition in 1889 it is shown that in two parallel lines of soundings, about 60 miles apart, and with an interval of about six weeks, there is a distinct difference of temperature. In the same paper two parallel lines of soundings in the Pacific, by the *Egeria* and the *Penquin*, are also quoted where there is a considerable difference of temperature; there is, however, an interval of eight years between the two sets of soundings. The above, however, is some evidence of the movement of water at these great depths—a subject which above all others deserves to be practically determined by those who have the time and means for the pursuit of oceanographical research.

BOLIVIAN EXPLORATION, 1913-1914.*

By Major P. H. FAWCETT.

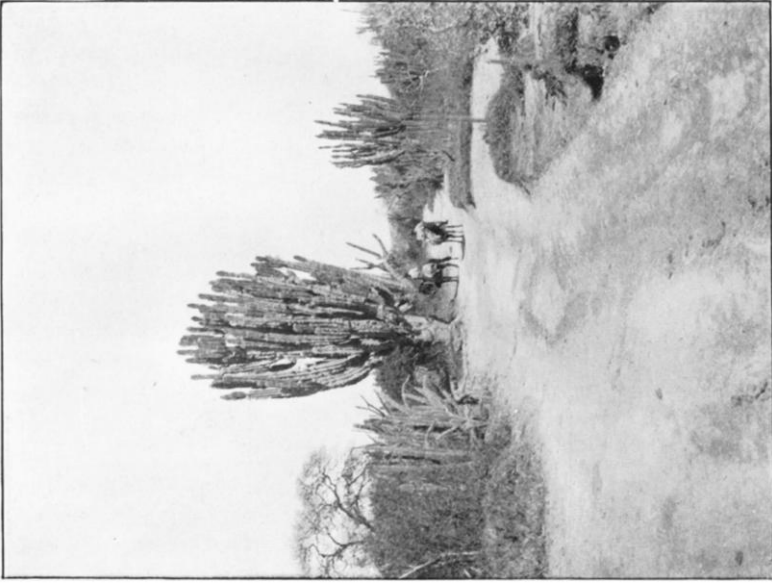
SOME account of the more recent explorations in which I have been engaged in South America has been requested for the *Journal*, and perhaps needs less apology in that three of the small party of four Englishmen are either at or destined for the front, including myself, and the record carries somewhat interesting information. Over certain details I must for the present draw a veil (lifted, however, for the confidential archives of the R.G.S.), because I think there is some probability of the scientific societies combining to prosecute investigations after the war, when, if I or

* Map, p. 272.

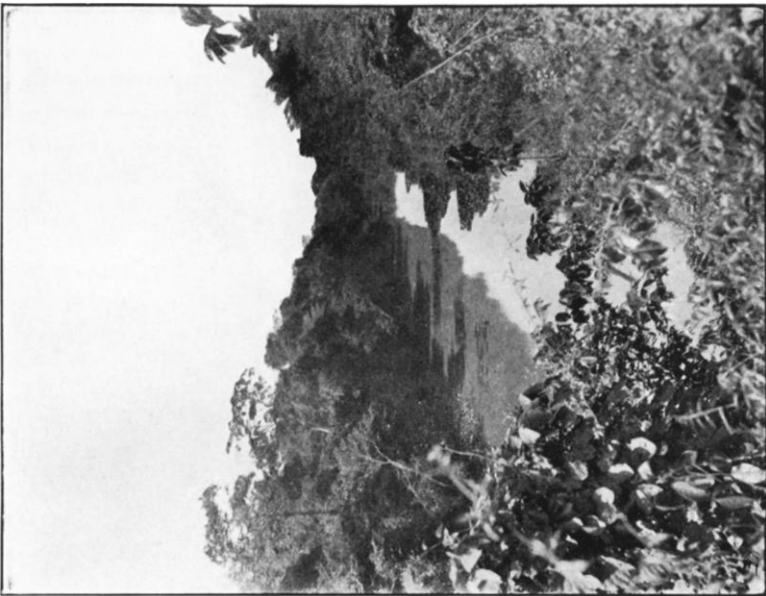
members of the party survive, some very necessary aid may be lent to such a purpose.

The year 1913 in Bolivia was exceptional by reason of the abnormal rainfall, which left an immense area of the country east of the Cordilleras of the Andes inundated and intransitable as late as the usually dry months of July and August—a year as disastrous to cattle ranchers as it was difficult for the freight service of the interior. Incidentally it deflected me from my original purpose, and sent me to complete an investigation of the Middle Caupolican, part of which was executed in 1910 and 1911, and which is now more completely detailed in the accompanying maps. The mountain system and rivers of this section are now fairly complete. Maps do not convey a very good idea of the difficulties inevitable in trackless forest. No part of the Caupolican can be claimed as new country, although much has not been mapped. The quinine bark hunter has pretty thoroughly traversed its hills, even as the rubber hunter has explored all navigable affluents of the Amazon and their tributaries where rubber may be suspected. It has remained for the surveyor only to put records upon paper in these places. The vexed problem of the Madidi river has been settled, however, and its source located, together with details of various minor affluents of the Beni and Tuiche. The Hundumo, shown on the maps as an affluent of the former, is nothing of the sort, but feeds a wide area of swamp lying between the two rivers.

The “Serrania” or hilly region of the Caupolican is excessively accidented, the hills being lofty, rising to between 3000 and 4000 feet from the level of the surrounding country, with sharp hog-backed ridges ending frequently in sheer precipice, making both ascent and descent a wearisome matter with heavy packs. It is chiefly noteworthy for the immense deposits of auriferous gravel, the relic of some far more extensive river system than exists to-day, lying west of the route followed by Dr. Evans in, I think, 1904 or 1905. The party experienced vicissitudes rather too startling to be pleasant, which need not, however, be referred to here. The wild Indians, Guarayos, who populate the high-lying portions of the Madidi and some of its tributaries, have been much exaggerated. A tribe of two or three hundred, which gave us rather a warm time in 1910 during the exploration of the Heath, and who have quite closed that river against Boundary Commissions or any other expedition ever since, are the only strong tribe now existing. The Madidi and its tributaries harbour only five small tribes of not a dozen souls in each, a terrible indictment against the rubber industry, chiefly responsible for their disappearance. For these people were once very numerous; Padre Armentia, the late Bishop of La Paz, himself remembering a population of some fifty thousand between Ixiamas and Covendo, whilst every “altura” or piece of land above inundation-level in the Beni province and Mojos is thick with ancient and broken pottery.



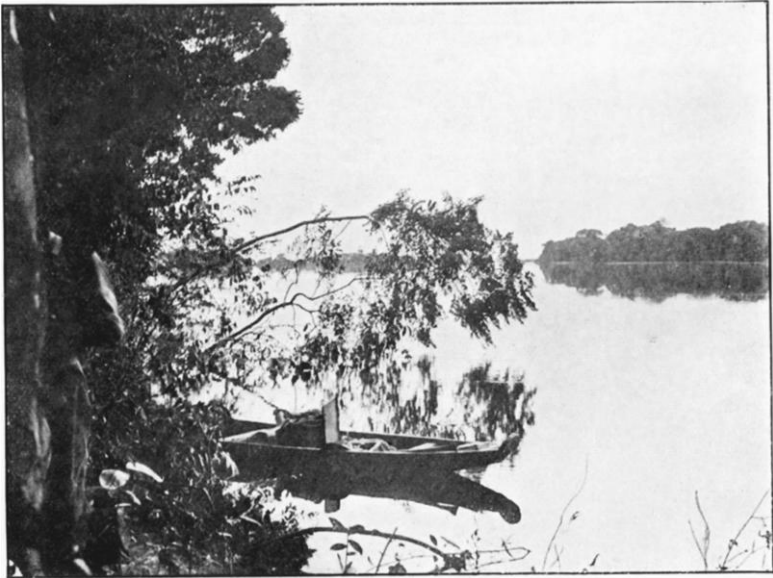
GIANT CACTUS OF BOLIVIA, NEAR SANTA CRUZ.



ON THE WAY TO THE SAVAGES.



FROM THE MOUNTAINS TO MAPIRI.



RIVER NAVIGATION.

After joining up the survey with that of 1911, already in the possession of the Society, we returned across country by the existing trail from Apolo to Rurenabaque.

The work of 1914 concerned a different region and was accompanied by very remarkable discoveries. Suffice it to say, regarding locality, that it concerns a very large area of forest country, so far as is known, unentered by any civilized man living or dead. Neither local knowledge nor history preserve any such record. The reason for this is not very far to seek. It is exceptionally difficult to reach, owing to the necessity of passing through a wide belt of low and swampy forest, in cutting through which carried food supplies are rapidly exhausted. Like all blank spaces, it had been credited with large populations of cannibal savages. Peons, or carriers, were, I may say, totally out of the question for carrying supplies. These people are not obtainable for journeys off trails and rivers. Moreover, they are unable to carry three weeks' food supplies for themselves alone, and are nervous and cowardly in the face of really bad Indians.

For journeys such as that of Colonel Roosevelt, where transport difficulties over roads and down rivers need not occur, they are useful and readily obtained, but it is always better to have white men accustomed to handle cargo animals or paddles. The man who cannot acquire these simple accomplishments and cook his own food is better left at home.

For three weeks after we said good-bye to the last outpost of what is locally known as civilization, and which the local people considered the limits of human possibility, we encountered no trace of a savage. We crossed and recrossed rivers by flimsy bridges of fallen trees to avoid entanglements of thorny undergrowth upon which "machetes" made scarcely any impression; we threaded on all fours mazes of creepers and tangled roots; we waded through swamps and fought the depression of a monotonously slow progress. Then we reached higher ground and ran up against an enormous rubber-tree showing signs of unskilled tapping—of the savages, as it turned out. Next day we struck a fine open trail. The trail led us into the middle of a large tribe, one of whose "malocas" (Portuguese for village) we most fortuitously entered at a moment when every man was out working in the plantation, and only women and children at home. Indeed, the first "savage" was a fat little kiddy, who toddled out of the small entrance of a huge communal dwelling, stone axe in hand, bent on cracking a nut.

I whistled. The child gave a screech and bolted, and the "maloca" was instantly in a tumult. We did not know, of course, that the men were away until afterwards, and had to prepare for emergency. It reads, I know, a small thing to visit these places in the security of a well-ordered country. But it is impossible to know if savages are going to be hostile or not, and the uncertainty involves exposure. One needs rather steady nerves, as a matter of fact.

These communal dwellings are very dark inside, partly because the people inside have a decided advantage in the case of attack, and partly because the ever-present and insatiable insect pest is thereby discouraged. We were therefore a very good mark outside in the brilliant sunshine for people we could not see inside, particularly as, in order to inspire confidence, we dropped our packs and sat on them. Eventually, however, I slipped into the house, to see, when my eyes grew accustomed to the darkness, only two women and a final contingent escaping by an opposite doorway. The women were engaged in brewing "chicha," or, in their own language, "averu," a sort of maize beer, and it says volumes for their pluck that they would not abandon it. Their fear, however, was pathetic. In the mean time, however, the alarm had been given, and the men would soon be back. I at once made signs for food, for we were very hungry, and received a quantity of boiled maize and a mixture of yuca, sweet potato, and monkey nuts. Probably none of us had ever tasted anything so good. We were engaged in eating when the warriors returned, surrounded the "maloca," and slipped one by one inside, arrows to bows. I went over to them and gave some small present to one or two; but what saved us from trouble was in reality the food: hospitality here, too, being the proof of amity.

We were taken subsequently from "maloca" to "maloca" over a perfect network of good trails. These "malocas" consist of one up to five communal dwellings, each of the latter measuring about 100 feet in diameter by 70 feet in height, conical in form and surmounted by a long sharp pole. The houses have a framework of wood thatched from the spire to the ground with palm leaf. Around the inside circumference live some twenty or more families, each with their own fire. Over them, around the dwelling, is a platform, about 8 feet from the ground, carrying the family share of the annual harvest. Around the thick central pole of the building are large earthenware urns used to store the "chicha." This particular tribe, whose name has been confidentially communicated, together with the record of the language, to the R.G.S., occupied apparently some fifty odd "malocas." As each house contains from fifty to one hundred souls, an estimate of three thousand souls to the tribe is not excessive. They are surrounded in the immediate vicinity by tribes whose names are duly recorded, numbering another five thousand at a reserved estimate. Within 30 miles square of us, therefore, were at least eight thousand savages, all cannibals, divided into four tribes, all at war with one another. Of those we met obviously not a man had seen a white man. Indeed, they were aware of no civilization beyond the surrounding tribes more or less akin to themselves. Our skins, clothes, arms, and equipment were objects of intense curiosity. Heralds preceded us to each "maloca," and invariably several other savages accompanied us.

The "maloca" was always entered in a rather ominous silence, all the warriors assembled, arrow to bow. The "maloca" chief received reports

from the escort and observed us carefully. Then he came over to the open space where we had been instructed to sit down, squatted down in front of me, stroked my hands, repeated the word "tabo" (welcome) several times, and ordered a woman to bring up a calabash of monkey nuts. We ate a few together, and then some of the others joined in and friendly relations were established. I don't think we stood much chance had there been any trouble. As a people these savages differ in language, customs, and appearance from any previously known. They are not tall, but are sufficiently well proportioned to carry that appearance. They have fine intelligent faces with very good features. Their colour is that of burnished copper. The people of each "maloca" have a singular family resemblance which suggests intermarriage within the "maloca." One boy had hair of a brilliant red, but the rest of the men have long, wavy black hair to the shoulders. A small horizontal tube of wood is worn through the partition of the nostrils, blocking the latter, and a thin spike, 2 or 3 inches in length, sticks upwards and outwards from the centre of the upper lip and downwards from the centre of the lower lip, something like a very waxed up-ended moustache. Bands of rubber, tinted red by the berry of the "urucu," are worn on the wrist and below the knee, and the leg below the knee is usually coloured by the same berry. The men wear necklaces of seeds, or of small perforated circular sections laboriously worked on stones out of hard black wood of the "chunta" palm, or the shell of the river mussel. The women wear the hair short and have no adornments. The lips, however, are painted black; but in spite of this some are very good looking. Feather adornment is not practised, nor is clothing of any sort worn. All smoke tobacco, which is freely grown in plantations. The brown leaf only is picked, dried over the fire, and rolled up in a strip of maize leaf to form a cigarette. It has an excellent flavour. It is varied by the use of snuff taken through a long tube with a small bowl at one end, the latter being placed in the nostril.

Low curved stools, cut with four legs out of solid wood with the assistance of stone axes only, are invariably employed for sitting upon, for this savage, in advance of his civilized prototype, never sits on the ground. Their bows of "chunta" palm are well fashioned and the arrows artistically finished, pointed with the sting of the sting ray, broad splinters of bamboo, or with fine "chuuta," decorated usually with barbs of large thorns. One or two of the "malocas" had blowpipes, and presumably poisoned arrows, but this arm is not commonly used. Stone axes are employed for general purposes and for felling trees. The handles are formed of vine bent around the stone and bound below it, the stone being held in place by a liberal application of the wax of the brown aggressive forest bee. The stones of these axes are brought from some distance, and the savages are very chary of parting with them, as their acquisition involves a passage through the territory of hostile tribes. Metal in any form is unknown. Knives were therefore a great curiosity.

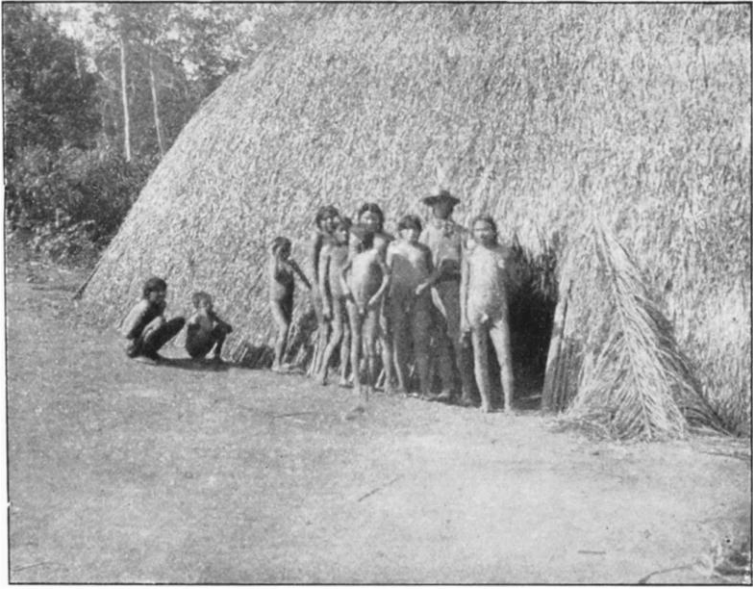
The men sleep in hammocks made of netting of palm-fibre. Clothing of bark or any kind is unknown. Cotton is used, however, for binding arrows.

Although in this paper it is not possible to go into exhaustive details, certain remarkable points merit attention. The women are more or less on an equality with the men, relations being very affectionate. The tribe is also exceedingly musical. They have apparently no musical instruments, but sing a great deal. Every morning, about 3 a.m. or 4 a.m., one or two men of the "malocas" seated themselves outside and sang very melodiously to the rising sun. The chant was too long and complicated to record, although certain others have been noted. They are also sufficiently advanced to have perceived the difference between stars and planets, the prefix "pakari" being applied to the latter. "Pakari Newt'n," for instance, is Venus, and "Pakari Kapu" the moon. The sun is "Tajó," the "j" being the Spanish "hota." A star is "Vira-Vira," singularly suggestive of the deity "Vira-cocha" of the Incas. Records of the language were taken. Except in one or two words, it resembles nothing known. The tribe is anthropophagous, as are all the surrounding tribes, amongst whom exist a perpetual state of hostility. They had a doubtful appreciation of photography, and would not stay in the open when I talked to the stars, as I told them, with the theodolite. A flashlight picture of an interior created alarm and some suspicion. The staple food is "cumbri," or monkey-nut, cultivated in great size; but the plantations, which are extensive, produce maize, sweet potato, yuca, papaw, and a few bananas. The non-existence of bird or animal life in the surrounding forest is probably responsible for cannibalism. This particular tribe extract and bury the human entrails in earthenware urns. A neighbouring tribe eat the interior economy only, while a third tribe spit the victim on a long pole, roast him over a big fire, and while in that position pick the flesh off the body with their fingers. The latter two tribes are, however, exceedingly debased and brutal. We left this friendly tribe with regret.

Four days beyond their territory we encountered another tribe, estimated at 2000 to 3000 souls, considerably below the first one in development. These people live in shelters consisting of four poles, with a slightly slanting roof of palm-leaf. They are brutal and ugly. Their instinct is to attack strangers, and they followed it. We were saved by some luck from regrettable incidents—to ourselves—chiefly, I think, by the noisy discharge of the Mauser pistols. The brutality of savages of this kind leaves no possible measure but extinction. Various other tribes, about the same strength, inhabit the vicinity. Their utter brutality prohibited any knowledge of their customs or their language, which, however, is again quite distinct. The full area of this unknown region must contain at least a hundred thousand savages. They show neither sign of degeneration physically nor trace of the Mongol, which peculiarity is,



SAVAGES WHO HAD NEVER SEEN A WHITE CIVILIZED MAN.



A HUT OF THE NEW SAVAGES.



A MALOCA OF THE SAVAGES.

however, confined to the Indians of the Andean plateau and parts of the Caupolican and South-East Peru.

Our journey took us some distance beyond the tribes mentioned, from whose neighbourhood we discreetly withdrew. We reached, indeed, what appeared to be the proximity of another tribe, when sickness forced upon the expedition a premature return. One of my companions, Mr. Costin, narrowly escaped collapse, and the remaining two were much too ill to warrant advance. A heavy pack of over sixty pounds, perpetual insect attacks, all-day journeys, forest cutting, short food supplies, and constant alarms produce a severe nervous strain upon the greatest endurance. It is probably impossible to exactly describe what such conditions mean. They must be experienced. A single day's journey with such a pack through swamp with a few inches of mud, or cutting through the intricate mass of creepers and thorny undergrowth which makes bad forest, may be all right for the leader, who is more powerfully armed with enthusiasm, but it is killing for the rest of the party. Add other disabilities and it needs very exceptional men. The average British soldier is more than satisfied to occasionally carry a fifteen-pound pack over good roads! Rain, too, is disheartening, and there is plenty of it. In order not to court undue risk we were forced to make a wide sweep around the territory of the hostile tribes, now converted by self-defence measures into nests of angry hornets. Nor was it certain that we should avoid them or other tribes of a similar character. Fortune, however, favoured us. It is interesting to note the possibilities of forest navigation, for counting 2200 paces to the mile, and basing courses upon astronomical observation, we arrived at the original "maloca" with an error of 300 paces only, after a journey of about thirty leagues.

We returned at a most opportune moment. The two chiefs and (I suppose) the priest of the first "maloca" were sitting on their stools just inside the principal entrance totally oblivious of our presence, their eyes glassy. At intervals they made upward passes over their stomachs and were violently sick. To tell the truth, I fancied at first that there had been some drunken debauch. However, they suddenly came to and viewed us with amazement. They had been auto-hypnotized. We had struck the "maloca" during the ceremonies attending a death. A scrap, it appeared, had taken place with the second tribe we had met, resulting in the wounding and subsequent death of one of the tribe. He had been roasted over a big fire outside the "maloca," his entrails had been placed in an urn, closed by leaves, and tied up for burial, and the body had been cut up and divided amongst the various families. The ceremonies were designed to rid the "maloca" of the spook, which the chief informed me would return for three days to the scene of its former endeavours. The hypnotic ceremony and vomiting were repeated at intervals. The vomiting I could only surmise as having something to do with the "influence" consumed in the banquet. Subsequently a small screen of

plaited palm-leaf was erected inside the "maloca" in such a way that the light from the entrance fell full upon it. Opposite to it squatted on their stools the two chiefs and the priest. At the foot of the screen was placed a calabash of water with a few herbs.

The priest in the middle worked his hands in front of the screen so as to throw shadows upon it. This shadow was carefully studied and discussed. Every few minutes the three of them would apparently squeeze some "influence" from arms to finger-tips, legs to toes, head to ears, and so forth, gather it in the hand and throw it at the screen. This procedure continued until something in the shadow satisfied them. In the mean time all the women chanted in unison a weird and monotonous dirge. The ceremony was remarkable, indeed impressive. For three nights the two chiefs and the priest sat on their stools in the moonlight outside from sunset to dawn singing a melodious and infinitely pathetic chant, the last words of which were "tawi takni—tawi takni—tawi takni," in solo successively and then in harmony together. After the third night the spook was assumed to have hied itself to the far bourne.

This ceremony is known as "tapi." In another "maloca" the same ceremony was in progress, though here the victim had died apparently a natural death. Anyway, he was, as they said, "chimbibi koko," which means "food for the pot." In spite of large deputations of warriors with requests to visit their "malocas," I had to put a limit upon our stay. My small stock of gifts had run out and we were suffering from the repletion engendered by too abundant a food supply. Having loaded ourselves with ten pounds of monkey-nuts each and exchanged everything available for bows and arrows, stone axes, and necklaces, we left these interesting folk for the long tramp through low bad forest back to civilization.

On the way we fell in with a troop of "marimons," the large black prehensile monkey, which augmented the larder. These monkeys, everywhere esteemed a great delicacy, rather upset us. The buoyancy of a vegetarian diet was, I remember, replaced by a sense of extreme lassitude after an abundance of meat. It is not improbable that monkeys are deleterious after being subjected, as these were, to the fright of a long chase. In these forests, by the way, exists an unusually large variety of the black howler, apparently unknown. Owing to the restriction of naturalists to the more accessible parts of the forest, I venture to suggest that much accepted data regarding the fauna of the interior requires modification or addition.

There are certainly species of the smaller animals which so far have not been recorded in the text-books—the "mitla," for example, a black mixture of dog and cat. Some of the monkey family have not yet been identified. There are, too, six distinct species of the cat family—the jaguar, the black panther, large puma, small puma, the "tigrecillo" or large cat, marked like a jaguar, and the "gato mielero" or honeysucker, variously

marked, rather smaller than the "tigrecillo," and hunting in troops of six to twelve. A wild dog, more like a wolf, and quite distinct from the fox, is not uncommon.

The giant armadillo, the great river tortoise, or "tartaruga," and the skunk are better known, but they are very rarely seen by travellers. Humboldt makes curious errors in the habits of the howler monkey, and Bates seems to have considered monkey-eating extraordinary, whereas it is esteemed a delicacy everywhere. It is a very necessary item of diet, for it is easy enough to starve. Edible palms or plants are not to be found everywhere, nor are fish always to be caught in the rivers, as some travellers imagine.

After three weeks of forest navigation we recovered our canoe, and had about twelve days of hard paddling before we reached a civilized trail. A fortnight later we heard rumours of the war, walked 500 miles, with very sore feet, to a point where transport was obtainable, and, subjected to many delays, returned home to take our part.

A thorough exploration of the region and tribes I have indicated is very desirable. It is risky, and, as such, attractive. It should, I think, be realized that ethnologists, boundary commissions, and river expeditions, albeit doing admirable work, are not "exploring." An extraordinary number of small tribes are scattered about on or in reach of the lesser navigable rivers, but almost without exception these are known to and have some sort of friendly intercourse with the rubber pickers. They are, however, being "discovered" again every year. The very retired forest sanctuary is not open to river expeditions; it is practically impossible for collectors; it has no rubber attractions; and here the large populations of savages still existent hold undisputed possession. I doubt if there is a single really wild savage, ignorant of the white man, within three weeks' journey on foot from a navigable river. To visit these people needs nerve and experience.

For these journeys, for all journeys, one might say, of "exploration" the refinements of surveying are impossible. Large instruments and wireless equipment are unthinkable. Any one who suggests such things has no knowledge of what the forest is. A large party invites disaster, because it is too great a tax upon the food supplies of the wild people and too easily victim to starvation, whilst a small party runs proportionate risks and is too easily destroyed. Experience alone can limit the risk. Insect pests are much exaggerated by "tenderfeet." Fortunately, numerous as they are, they are restrained by seasons and localities.

Diseases are more or less confined to civilized places, nor are fevers acquired in unexplored forest. Wild Indians need not necessarily be met with. A German living for thirty years within a few leagues of extensive tribes of savages has never yet seen one! I remember that a certain American traveller and writer of books doubted the existence of jaguars and savages because on his travels he had seen neither!

It is a curious continent of apparent contradictions. Any one can traverse the continent east to west or north to south by the recognized trade routes, with some discomfort, perhaps, but with no great risk. Yet within 15 leagues of Sta Cruz, the capital of a province, and close to a main trail, are hostile savages in the stone age, who necessitate half a dozen small garrisons for the protection of the traveller. Within 3 leagues of the much-navigated upper Mamore, on the Lake of Cusi, is a tribe of over (reputed) a thousand hostile Indians, quite unapproachable. The right bank of the lower Mamore, near the confluence of the Itenes, is closed by savages to all but a large force. The river Heath, an international boundary river, successfully defied the entry of boundary commissions. The Parecis Indians near Matto Grosso city may be entered with impunity by the white man, but are deadly enemies of the negro. They, however, are renegades from civilization. The populations of the Northern Chaco are little known, and difficult to visit.

Brutality has alienated some of the tribes. Only lately the "kultur" of a Peruvian official in the Madre de Dios inspired him to wipe out the harmless and amiable "chunchus" of the middle Tambopata. We who knew them regret it deeply. A curious bearded tribe in the river S. Martin in East Bolivia resented ill treatment by burning the rubber trees and disappearing, no one knows where. Many of these tribes, it is true, are intractable, hopelessly brutal, but others, like our friends of 1914, are brave and intelligent, deserving much consideration.

In closing I gladly acknowledge the services of my companions. Mr. Costin, who accompanied me four years, is at the front with the Rife Brigade; Mr. H. Manley, who accompanied me two years, has enlisted; and Mr. Brown elected to remain in South America. That they formed so small a party is a recommendation of their worth.

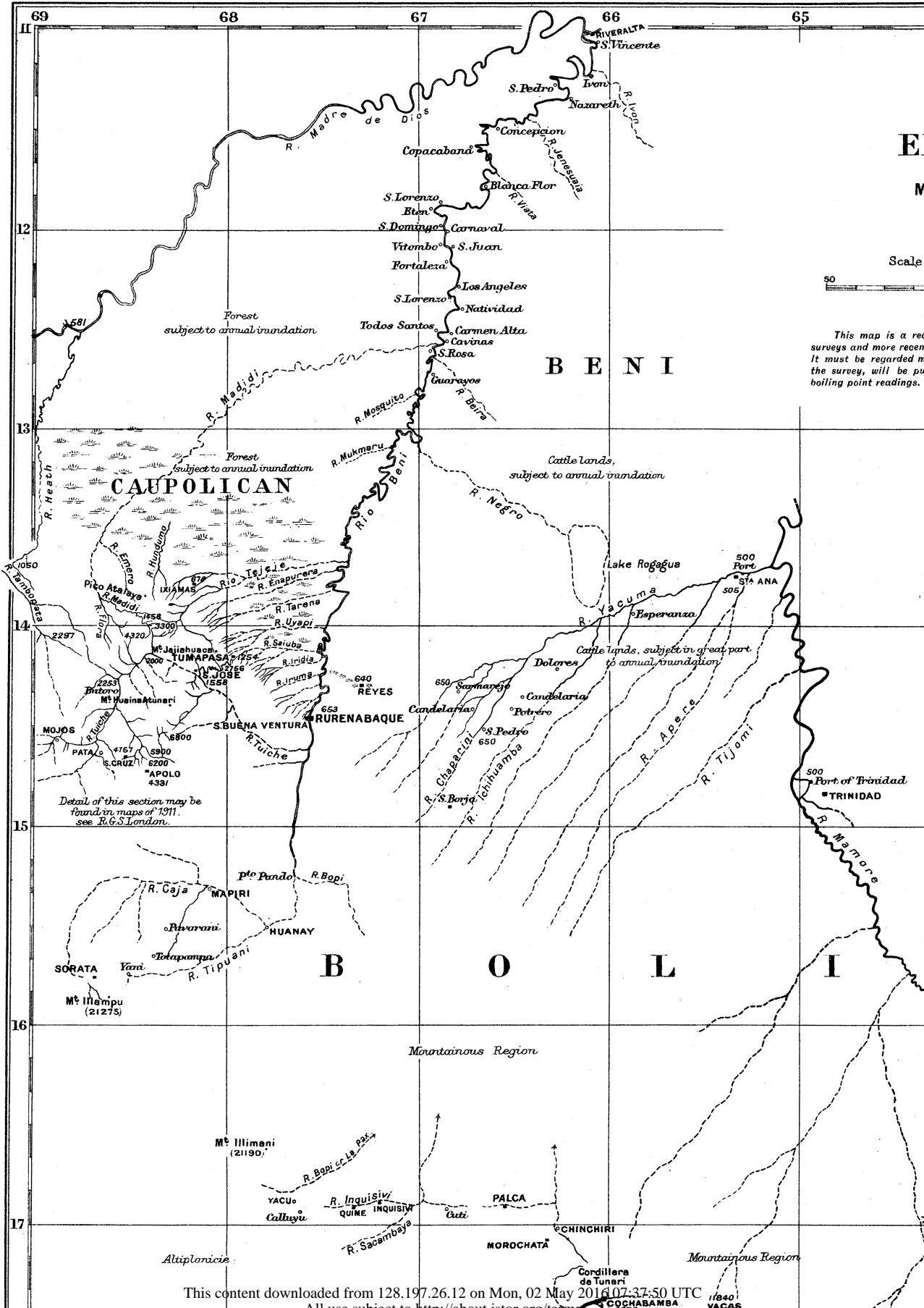
DR. F. DE FILIPPI'S ASIATIC EXPEDITION.

FOURTH REPORT.

EARLY in September, 1914, the expedition left the Suget station in the valley of the Kara Kash, to the north of the Karakoram, to cross the Kug Art pass (16,160 feet) into the upper Yarkand or Raskem Daria valley. On reaching the river at Kirghiz Jangal we again divided into two parties. Major Wood went up the valley to join at Kufelang Mr. Spranger and Petigax, with whom he proceeded to explore the two western tributaries which they had seen in the preceding month.

Dr. De Filippi, Prof. Abetti, and Marchese Ginori went down-stream with the intention of reaching the Oprang by crossing the Aghil pass.

The hope that the bad weather experienced in the summer would



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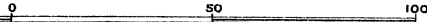
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BOLIVIA

Sketch Map to illustrate the EXPLORATIONS

of
MAJOR P. H. FAWCETT, R.G.A.
in
1913-14.

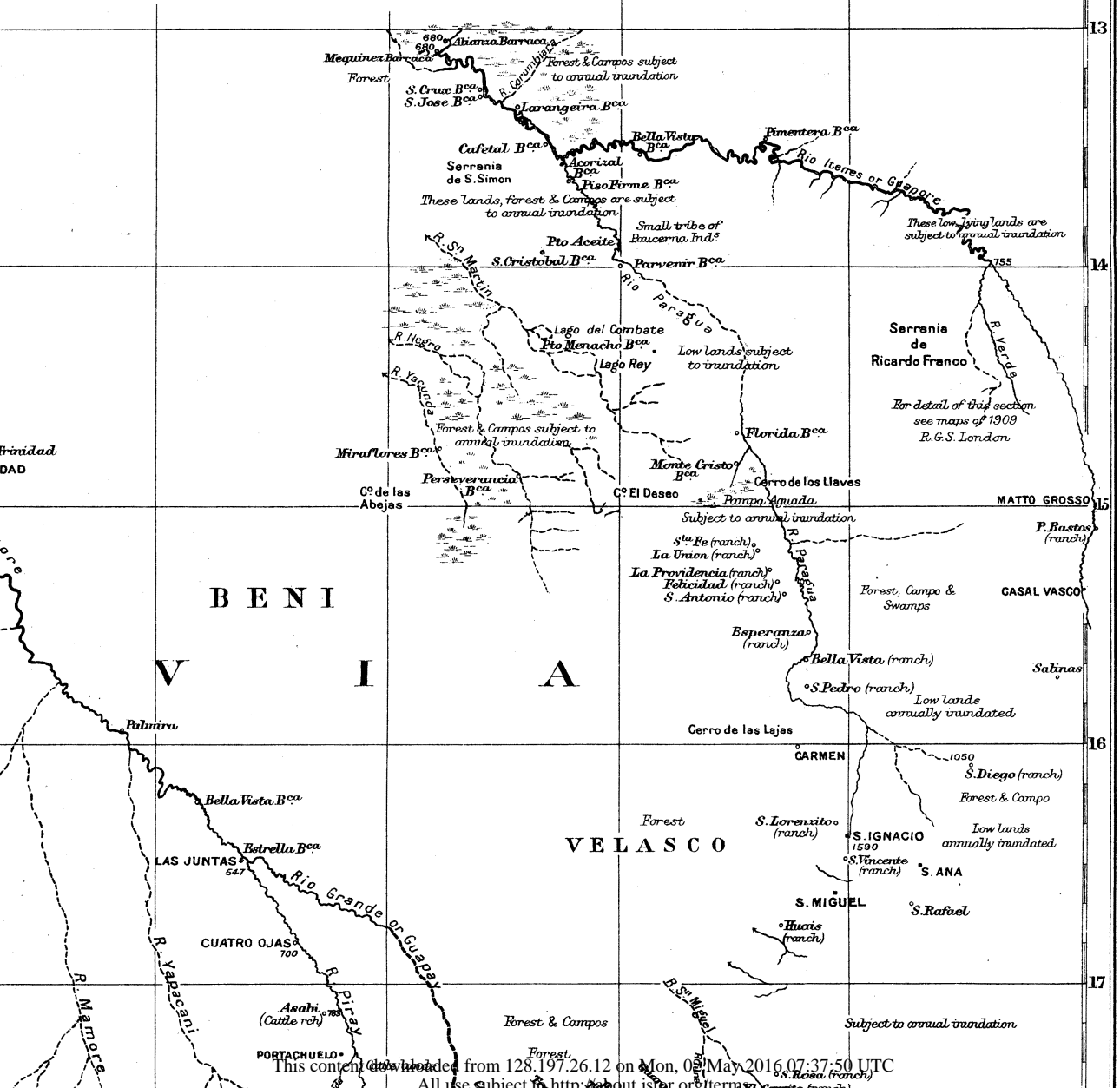
Scale 1:3,000,000 or 1 Inch = 47.3 Statute Miles



Note.

This map is a reduction of Major Fawcett's original drawing, based upon his previous and more recent prismatic compass traverses, adjusted by astronomical observations. It is regarded merely as a preliminary sketch: the finished map, with full details of contour, will be published later. Heights thus 2297 are from aneroid, adjusted by barometrical readings.

B R A Z I L



B E N I

V E L A S C O

V E L A S C O

MATTO GROSSO

CASAL VASCO

CARMEN

S. MIGUEL

17

16

15

14

13

12

11

