

in the bay. In this vicinity pearls are found, but no pearl fishing is now carried on, owing, I am told, to the low prices at present obtainable in Europe. All along the Coast I noted many deserted *ranchos*, the Indians having left owing to the prevalence of malaria, the result of the exceptionally wet season. Almost every *ranchito* we passed, not only along the coast but also in the interior parts, were to be found Indians suffering from fever, and I exhausted my stock of quinine according to their frequent demands for that specific.

Early in the morning of the 25th we sailed from Cabo de Vela and after five hours sailing reached a settlement of *civilizados* known as Carrizal, where we breakfasted. We sailed throughout that afternoon and all the night, landing only at 6 in the morning to prepare coffee. Continuing our journey we reached Rio Hacha at 2 o'clock in the afternoon, having occupied twenty-six days in this journey, the latter three being by canoe on the open sea. Of these twenty-six days only one passed without rain, and, fortunately for us this was the day when we were passing the dangerous Cosina country and had to rest on the roadside awaiting the rising of the moon.

Prospects of Agricultural Development.

The future progress of this peninsula is dependent on the development of such industries as the country favors. Apart from the question of valuable minerals, which is somewhat outside my province, I believe there to be considerable prospects in,

- (a) the development of a cattle raising and export industry.
- (b) the cultivation of cotton as a native industry.
- (c) the cultivation of groundnuts for export.
- (d) the exploitation of natural products.

The Development of a Cattle Raising and Export Industry.

Importance of Rich Natural Pastures.

In an earlier part of this report I drew attention to the excellent grazing lands of the southeastern parts near the Carraipia range of hills. My second journey has more than confirmed the favorable opinions first formed of the importance of these lands for cattle farming. And the fine pasture lands in various parts of the peninsula, to which in the description of my journey I have drawn attention, affords almost unlimited resources for cattle farming. Although the Indians have large herds of cattle, at least ninety per cent. of the available pasture is lost, for the lack of cattle to consume it. I do not lose sight of the fact that I have, from this point of view, seen the country at its best, and that many parts of the peninsula are in long and dry summers parched lands. I am told, however, that the cattle eat and flourish on the dry grass in such times providing water is available. In order to water their cattle the Indians have, in the dry seasons, to move them from place to place, and doubtless a large number of cattle are lost annually in this way.

Permanent Water Supply Essential.

Before these fine *sabanas* of Goajira can be converted to permanent grazing lands, permanent water supply is essential. The first necessity, therefore, is the provision of water, incredible as it may appear after what I have written regarding our experiences in flooded lands. In the northeastern parts of Brazil, where the climatic conditions are not dissimilar to those of Goajira, the Government has established artesian wells for the supply of water for the inhabitants and cattle; the water being pumped generally by windmills. For public purposes wells are provided by the Government,



Cheese Making in Goajira

for private enterprise the Government loans the boring apparatus at a nominal rate. Permanent water supplies should be provided by the Government in Goajira at all the Stations, and in all populated centers throughout the peninsula where it is needed. Such provision is, of course, more especially necessary in all important grazing centers for the cattle.

The Indians' Cattle and Dairy Farmers.

In the development of the cattle industry, I anticipate that the Goajiran natives would, in course of time and with tactful handling, prove of valuable assistance. They are now uncivilized and respect no law but their own, but this is doubtless due to the fact that the Government has never administered the peninsula, in a true sense of the word, having only a handful of officials distributed between centers noted for smuggling. I believe that if the Government established a powerful administration in the peninsula, that the Indians would be gradually subjected to the laws of civilization and be converted to useful subjects. They are born agriculturalists, possessing large herds of cattle, horses, mules, donkeys, sheep and goats. They are dairy farmers, the production of cheese being their principal occupation; and unlike most parts of Colombia the Indians milk their cows twice daily as is customary in Europe. At present their production of cheese finds its way chiefly to Venezuela, the nearest and best market for their produce. Magnificent results might be expected from the importation of good breeding stock, as the native breed forms an excellent type on which to build up a race suitable for export.

The Cultivation of Cotton as a Native Industry.

I believe that there are considerable prospects for the development of this industry in Goajira as a native cul-

tivation. It is a plant in which the Indians are interested, since they grow cotton to some extent and spin it for making their hammocks and girdles. An important feature in this respect to this industry locally is that there is a better market for raw cotton in Barranquilla and in Venezuela than in the United States or Europe; that is to say, better prices are obtainable locally. There are several *civilizados* interested in this cultivation, having commenced cotton plantations. I do not, however, consider that they are growing the most suitable type.

Annual Varieties of Cotton Preferable.

The kind being generally grown is the perennial type common to South America. As in Goajira there is usually a pretty well defined dry season, in my opinion better results would be obtained with annual types. I therefore recommend that the Government should obtain a few tons of seed from Egypt of the best varieties grown there, for free distribution amongst growers in Goajira by way of encouraging this important industry. Such varieties would require to be planted yearly, and after the crops have been gathered the plants should be rooted up and burnt. Not only do I think the climate more suitable for annual cotton, but I think it the most appropriate to grow as a native cultivation. The perennial cottons harbor and perpetuate various insect pests and diseases, and there is much less danger of the industry suffering in this way if the old plantations are destroyed yearly. I noticed, for instance, on a cotton plantation at Tucacara, that the plants were laden with the white scale, *Hemichionaspis minor*, Mask., a destructive insect against which much effort has been directed with the view to its eradication, but without, I believe, much result. I particularly look upon cotton growing in Goajira as a native industry which may prove of importance to the Indians in the maintenance of their domestic life, obviating the necessity to emigrate.



Sheep Farming in Goajira

Cultivation of Groundnuts.

The sandy lands of many parts of Goajira are also admirably adapted for the cultivation of groundnuts. I would suggest that the Government import and distribute a few cwts. of the best oil-yielding variety, with the view of encouraging its cultivation amongst the Indians for export.

The Exploitation of Natural Products. Salt.

By far the most important natural product exploited in the peninsula is salt. The principal wealth of the northwestern part of Goajira lies in salt; *salinas* occurring along the coast practically throughout the whole extension of the peninsula. I am informed these *salinas* are capable of producing annually no less than a million of sacks. The present production is, however, limited, owing to the fact that there are other *salinas* nearer the centers of consumption, for example: Santa Marta, Barranquilla and Cartagena. In competition with these centres of production, the product of Goajira, owing to the question of situation, works out at a higher cost; only by a reduction by the Government of the *derechos de consumo* could the *salinas* of this peninsula be worked to greater advantage. In 1915 the production amounted to 30,022 sacks, and during the present year (1916) 34,030 sacks have been despatched and there is a balance awaiting despatch of 35,250. The labour em-

ployed in the extraction of the salt are Indians of both sexes, and in the season of collection there are times when there are as many as one thousand Indians employed—a proof that the Indian can be harnessed to work.

Of other natural products skins and divi-divi rank in first importance, and the latter is not by any means exploited to the full extent possible.

Qüika Resin.

A new product found in this peninsula is that known as Qüika resin. This is produced by a small tree, *Cercidium spinosum*, Tulasne, and the trunk and branches are covered with a layer of this resin; even the roots, when exposed to the air, become covered with resin. A single tree should yield several pounds of this product, and as it is very abundant in certain parts, it should prove an important new article of export if its value is such as I believe it to be. Samples have been forwarded to Europe for examination and report.

Tacamaca.

At the extreme end of the peninsula is found another resin which may also prove of export value. It is known as Tacamaca and to the Indians as Aría. It is afforded by a small tree which I take to be a species of *Bursera*. The question of its properties and commercial value is being investigated.

THE GOAJIRAN INDIANS.

A Government Asset.

What has most impressed me as the result of this journey, apart from the question of possible industries, is the value to the Nation of the Indian population of Goajira. In my opinion the Indians are a valuable asset to the Government, in spite of the occasional hostility of certain of the tribes.

The Indian Population.

The Nation, if it is to develop its vacant lands, must have recourse to colonization by encouraging immigration; this is a big question and the difficulties in regard to it are not reduced by the present European War. Here in this peninsula is a valuable native colony already established, estimated officially at 40,000. There is a great divergence of opinion as to the exact number, some estimating as high as 50,000, others as low as 25,000. Whatever the number may be, there is no doubt that it is being reduced by emigration to Venezuela and deaths from malaria, etc.

Owing to a succession of bad years, and to the absence of local industries which would afford them employment at home, many Indians have emigrated to Venezuela. The remedy lies in the provision of water at all populous centers to secure the establishment of permanent homes. To encourage the cultivation of cotton and groundnuts, home industries that will afford

them employment and a livelihood that will help them to establish a home life and domestic ties.

Malaria.

As I have already mentioned, a good number of Indians have this year (1916) died from malaria. This should not give the impression that this peninsula is unhealthy, as the prevalence of malaria this year is undoubtedly due to the very exceptionally heavy rains. I noted, however, that there was a complete absence of any measures to remedy the situation. The Government of India, in order to deal with the malaria of that country established *Cinchona* plantations and placed quinine within the reach of the poorest subject, by putting up small packets of this specific and distributing same at the small charge of half a centavo each. Something might be done in this way in regard to the outlying and distant parts of Colombia, particularly since *Cinchona* is indigenous to the country.

Instead of allowing this valuable asset to dwindle in value, every effort should be made to encourage the increase of population. If there are 50,000, and according to my informants there were at one time more, the object should be to discourage emigration and try to reduce the death rate, so as to maintain as strong and prosperous a colony as possible for the development of the peninsula.

Training the Youth of Goajira.

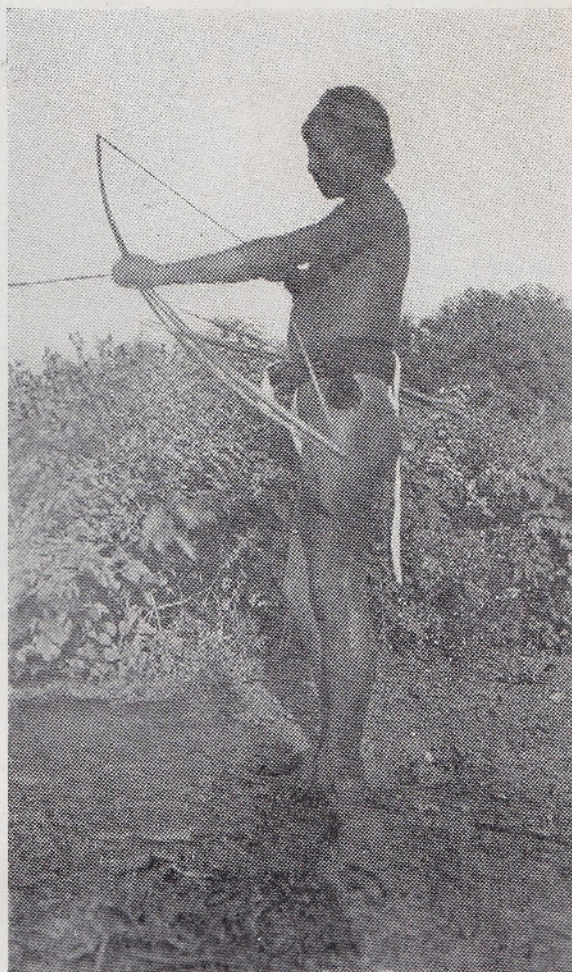
The advantages to be derived by the Departamento and the Nation should, in course of time, well repay any extra outlay necessary in Administration. Little can be done probably with the older generation, but efforts should be made to employ them as herdsmen and in agriculture and not try to educate them. Attention should be directed to the instruction of the young Indians, withdrawing them as far as practicable from the environment and influence of their parents, and accommodating them in establishments where they will be taught Spanish, arithmetic, to read and write and be catechised. More particularly should they be instructed in handicrafts, such as carpentry, smithwork, weaving, ropemaking (utilizing the native fibres), hatmaking and other industries that will prove useful and valuable.

Administration.

An efficient Administration would require a chain of Stations around the Coast, which, connected by telegraph, would also serve as Coastguard stations and help to control smuggling. Administrative Stations would also be necessary at all populated centers in the interior. Such an Administration manned by sympathetic and competent officials who understand the Indians, their customs and language, would doubtless produce a moral influence and command the respect of the Indians.

COMMUNICATIONS.

There are no roads in Goajira, merely tracks. Communications are desirable, but the question is an exceedingly difficult one. Roads to be of use in the wet season would be of little or no service in the dry, in view of the circuitous route they would have to take to avoid the flooded lands, and the fact that in the dry season everyone would use the most direct route when the country is dry and passable in all parts. The construction and maintenance of roads in Goajira would prove a most expensive undertaking, an expense which I do not consider at present justified, and I therefore



A Goajiran Indian

cannot recommend that the Government should consider the question for the moment. The first necessity is to provide water at all the most important native and cattle centers; when this has been done it will be time to consider the question of linking up these centres with roads.

LA PROVINCIA DE PADILLA

Route.

From Rio Hacha we left on December 6th for Valle Dupar. We proceeded via Trinta to Fonseca, visiting Barrancas from the latter town. Thence to Valle Dupar via San Juan del Caesar and Villa Nueva, visiting Orumito and the Sierra Montaña from Villa Nueva.

Maguey, Brasilwood and Divi-divi.

The first day's journey from Rio Hacha was through sandy lands alternating with clay soil in parts. The vegetation of the sandy lands comprise generally, as in the case of the Goajira peninsula, small spreading trees and

bush; while the clay lands support chiefly cactus trees, Opuntias, etc. In the sandy lands I noted the Maguey fibre plant (*Purcraea macrophylla*, Baker) abundant in various parts, but unfortunately always in waterless areas, so that its commercial extraction would be very difficult. Brasil-wood and divi-divi are also found in abundance. In the evening we reached a small *rancheria* known as El Abra where we camped the night. The distance from Rio Hacha to El Abra is computed at five and a half leagues, and the lands through which this road passes do not impress me of being of any agricultural importance, being in the main of poor character and waterless. Nevertheless they produce natural





Brasil-Wood Awaiting Shipment at Santa Marta

products of economic importance which might, as I have mentioned, be exploited.

Trinta.

On the 7th we left El Abra, and our journey continued during the first part of the day through lands of poor character similar to those of the preceding day. In a few hours, however, we reached lands with denser vegetation and better soil watered by various streams, and passed small settlements at frequent intervals. Cattle farming is the principal occupation of these parts, but I could not help noting the inferiority of the breed of cattle as compared with the herds of the Goajiran Indians. This more fertile zone was, however, in the latter part of this day's journey, replaced by poor, stony and sterile lands, which did not improve as the northeastern spur of the Sierra Nevada range was approached. At various intervals we passed caravans laden with produce, chiefly panela, en route to Rio Hacha, the capital of the province. Early in the afternoon we reached the village of Trinta, which is a collection of unwhitewashed and mud houses grouped around a square at the base of the *serrania*; bearing ill comparison, I thought, with the picturesque towns of the interior. I noticed here, and indeed throughout the province, that the epiphytic skin disease known as *pinta* is exceedingly prevalent in persons of both sexes. There is an entire absence in Trinta of any commercial activity, the inhabitants being dependent on local agriculture.

On the 8th we left Trinta and commenced the climb over the northeastern spur of the Sierra Nevada in the direction of the Caesar Valley. Here the vegetation changed and we noted many graceful palms and passed through beautiful forest land. The palms referred to are known locally as *Corúa*, and the fruits afford a kernel which is edible and has the flavor of coconut. The road

over the *serrania* is, however, a bad one, in turn, steep ascents and descents and very rocky. Avoiding the more rocky and steep lands, suitable parts may be found for cacao and coffee.

In descending the *serrania* we passed beautiful porteros of guinea-grass owned by a lady. On reaching her *ranchito*, our animals, tired out by the trying hill journey, being mules of Goajira and not accustomed to hill climbing, we were tempted to stay the night. We inquired of this lady of the hills whether we could be provided with pasture for our animals, but she informed us that she had no pasture today, and advised us to proceed to Fonseca which she assured us was quite close by and where we should reach before nightfall. We proceeded and on reaching the base of the hills had to cross the Rio Rancheria in the dusk, and not knowing the passing got wet through in doing so. We then reached the plains of the valley, covered, we could perceive in the dusk, by scrub forest. There being many tracks and our mules tired with their unusual journey, gave a lot of trouble by wandering frequently in the wrong direction. Eventually they stampeded in the bush and we heard with dismay our loads banging against tree after tree; we lost quite an hour in recapturing them and re-arranging their loads. Continuing our journey we eventually reached Fonseca at the late hour of 9.30 p. m., and although in no good humour I freely forgave the lady of the hills the discourtesy of refusing us, out of her abundance, pasture for our few animals, but not for deluding us as to the distance to Fonseca!

Fonseca.

I sallied forth in the early morning to find that Fonseca is a picturesque little township, situated between the Sierra Nevada range and the Eastern Cordillera of the Andes, of something like four thousand inhabi-

tants. The little houses are neat and whitewashed and at once present the appearance of possessing a more prosperous and industrious population. The town bears, however, the scars of the last revolution, remains of buildings telling the tale that it has not yet fully recovered the blow then received. Cattle raising and sugar-cane growing for panela are the principal occupations. The lands are somewhat sandy and poor, but considerable areas are irrigated from the river Rancheria which flows past the town; this is the same river which at Rio Hacha is known as Calancara.

Barrancas.

Later on the 9th I left for Barrancas in company with the Alcalde of Fonseca. Barrancas is situated about two leagues from Fonseca, and the road traverses poor, sandy or stony lands, with a small peasant *rancho* here and there. The town of Barrancas possesses an excellent situation between the two great mountain ranges, but is composed principally of wattle-and-daub houses, for the most part unwhitewashed. The town has evidently seen better days, it has suffered from frequent fires, and the ruined houses around the square depict a tale of poverty and want.

Coal.

My visit to Barrancas was made specially to inquire into the coal deposits said to be found in the Cordillera at Cerrejon, but on arrival there found the coal further from Barrancas than I was led to believe, so later the same evening we returned to Fonseca. I am told that coal has been found at Conejo and at other points along the Cordillera, so it would appear that these are outcrops of the same vein, and that coal is abundant throughout this region of the Cordillera. If this be so, it is a point of considerable importance for the future development of this section of the Department, for what would more justify a railway through to the Goajira peninsula with its terminus in the bay of El Portete as a coaling station and shipping port, than rich mines of coal?

San Juan del Caesar.

On the 10th we left Fonseca at 9 a. m. and arrived at San Juan del Caesar at 1 p. m., a distance of some four leagues. The lands between these towns are covered with scrub forest, are poor and sandy in character and with little or no water. Brasil-wood and divi-divi are found at irregular intervals, and I noted on nearing San Juan that the Aloe which is cultivated at Rio Hacha is fairly common. San Juan del Caesar is a pretty town and lies on the banks of the Rio Caesar; it is the more aristocratic of those we passed through, for does not the youth of the Province boast with pride when he is about to marry a young lady of San Juan? Cattle farming and sugar-cane growing for panela are also the principal industries of this neighborhood. San Juan feels, probably as much as either of these towns, its isolation from centres of commerce and the need for roads and more rapid means of communication. In spite of the difficulties of situation and transport, the inhabitants struck me as being industrious and hard-working.

Brasilwood Trees.

In the morning of the 11th I was kindly accompanied from San Juan on a short excursion to the cascade of the Rio Caesar at the foothills of the Sierra Nevada, by Señor Dr. Rodolfo Danies. From San Juan to the cascade I noted the lands of a very poor and sandy character, but I was surprised to find extensive forests of brasil-wood trees of a larger size than I had hitherto seen. I had met with nothing to bear comparison with these rich forests of brasil-wood in the Goajira peninsula, nor have I seen its equal since; unfortunately, however, its situation precludes the possibility of its exploitation at present. The cascade of the Rio Caesar is a miniature Tequendama, and the power it affords might some day be harnessed and applied to economic use in the district. In the afternoon I left alone for Villa Nueva, having sent my caravan on in advance in the early morning. I noted a considerable improvement in the character of the lands to those we traversed in the preceding days. The chief industries of Villa Nueva are cattle farming and coffee growing in the neighbouring hills.

PROVINCIA DE VALLE DUPAR.

Orumito.

The boundary of the Provincias of Padilla and Valle Dupar we passed this day, Villa Nueva being situated in the latter. The Province of Valle Dupar is the largest in area of the Department, and has according to the last census 23,477 inhabitants. On the 12th I sent my caravan from Villa Nueva to Valle Dupar direct early in the morning, with the intention of making a hurried journey to the coffee growing region in the Sierra Montaña. Señor Antonio Aponte, the Alcalde of Villa Nueva, was good enough to accompany me and we set out about midday, passing about an hour later the village of Orumito where we lunched on the way.

Copper.

Numerous claims have been registered at Villa Nueva for copper fields in this region, and if the number of claims means anything, the locality should be rich in copper. Certainly I was presented at Orumito with an exceptionally rich sample of this ore, which is said to have been found in a claim registered as "Chiquinquira." This sample, which represents almost pure copper is now on view at the Ministry of Agriculture and Commerce at Bogotá. Suitable means of communication must be provided before any value can be placed on the copper finds of this locality. This means must needs be a railway, for how can the necessary machinery and plant be brought to this locality otherwise, or the ore exported

at a profit in competition with other copper producing countries?

We left Orumito late in the afternoon for Sierra Montaña and ascending passed at first rocky lands with scant vegetation. Later we passed open hills and sabanas with short sweet grass which afford excellent grazing lands, though not particularly well watered. After an arduous journey which continued till nearly 8 p. m., we reached a small *rancho* where we were glad to pass the night in a hammock.

Coffee.

We arose very early in the morning to continue our journey, but found that two of our mules had strayed back towards Villa Nueva, so our departure was considerably delayed. We, however, reached the lowermost coffee plantations within one and a half hours from our camp. I found the plantations badly cultivated, and the crop is handled in equally unscientific and antiquated methods. The industry is in the hands of small growers who own from 10,000 to 80,000 trees, and whose production varies from 40 to 600 quintales per annum. The casual methods of cultivation, and the costly methods of hand preparation, none employing cleaning or drying machinery, renders the cultivation very costly. I understand that many of the growers are in a bad way, having at times to sell their crops in advance in order to obtain the wherewithal to clean their plantations and gather their crops. In this way the plantations soon become mortgaged and the owners, if a bad season comes along, lose their property and livelihood. There are about thirty *cafetales* on this mountain, and the planters struck me as being a particularly hard-working and industrious people, and I felt sorry not to find them more prosperous. A little cooperation amongst themselves should place them in a position to obtain the necessary machinery for the cheaper and better preparation of their coffee. There are no reliable statistics of the actual annual production, but I believe, from what I am informed by various authorities on the subject, that the total production does not exceed 3,000 to 4,000 quintales per annum. After having seen the lowermost *cafetales* of this region, we descended the mountain and again reached the valley in the early afternoon at La Jagua.

Cañaguati.

At La Jagua Señor Aponte left me to return to Villa Nueva, and I proceeded on my way to Valle Dupar. The lands traversed from La Jagua onwards were of richer soil, and carry a more luxuriant vegetation with abundant and large serviceable trees. One of the most striking trees of these forests is a Bignoniad (*Tecoma spectabilis*), known locally as Cañaguati; its golden blossoms form a flame of color in the forests and remind me very forcibly of a similar tree of Central Africa known as Nsambya (*Markhamia platycalyx*). Like its African relative the timber of the Cañaguati is said to be very useful and durable.

Ticks.

At dusk we reached the Rio Caesar which we crossed in a canoe. We travelled on till 8 p. m., when the dark- to pass the night on the road, in preference to running the risk of losing the way in the dark. This was the second night in succession that I passed without a change of clothes and without sleep, for I had unwittingly made a large collection of little ticks or *garapaticas*, which cause painful irritation and render sleep impossible. The only remedy for these parasites is an alcohol bath. These little ticks, which can hardly be seen in their young state with the naked eye, are common in the hill grass lands of many parts of Colombia, and are known to science by the name of *Amblyomma cayennense*, Fabr.

Valle Dupar.

In the early hours of the morning we proceeded by moonlight and reached Valle Dupar at about 7 o'clock, after crossing the Rio Guatapuri, which lies at the base of the town. Valle Dupar is the capital of the province of that name, and is an old Spanish town, though the buildings are in a somewhat neglected condition. The number of inhabitants of the district of Valle Dupar is 6,300 according to the last census. The chief occupation is cattle farming, but sugar-cane is grown to a considerable extent for the production of *panela*, and in *Puebloviejo* coffee occupies chief attention.

RIO HACHA TO VALLE DUPAR.

General Observations.

The route of this part of the journey, it will be noted, was through the Caesar Valley which lies between the two great mountain ranges, the Eastern Cordillera of the Andes and the Sierra Nevada. These lands up to the foothills of the mountain ranges are for the most part flat in character, and almost throughout tend to a sandy nature, due partly to the fact that the larger rivers which water this area have their source in the granitic mountains of the Sierra Nevada. There are extensions of excellent lands in certain parts, particularly in the southern regions of the valley, though in the main these lands are only of medium quality and cannot be ranked as first-class agricultural lands. Apart from the plains of the valley, the foothills on both sides are usually rocky and dry in character with scant vegetation. These foothills often furnish excellent grazing lands for cattle, though there is frequently a scarcity of water. In the medium elevations are to be found sabanas of excellent pastures suitable for breeding-cattle, and in the upper parts suitable lands for coffee.

Cattle.

Throughout the Provinces of Padilla and Valle Dupar cattle is preeminently the principal industry, though it is only now recovering from the depletion of stock suffered during the last civil war. I noticed that in some parts ticks were very abundant, and that little or nothing was being done to deal with the pest, while cattle were dying from the loss of condition brought

about by its prevalence. Owners should establish dipping tanks or spraying machines, and cooperate in a general way to endeavor to reduce and eradicate this pest. There is no doubt, however, that there is very considerable room for the expansion of the cattle industry in this region; the breeding of cattle can be carried on in the natural pasture lands of the hills, though for the fattening of stock artificial *potreros* are necessary.

Planting Industries.

Apart from the cattle industry, planting enterprises are sadly limited owing to the absence of roads and the high cost of animal transport. There are considerable possibilities in coffee, cacao, cotton, tobacco, sugar, maize, groundnuts, etc., but until the pack mule be replaced by more modern and more suitable means of transport the possibilities of the expansion of planting industries are exceedingly limited. This question will, however, be dealt with in a later part of this report.

EXCURSION TO SIERRA NEVADA AND ROUTE.

Valle Dupar to Puebloviejo.

Having received urgent instructions to return to Bogotá, immediately having concluded my journey to the Sierra Nevada, I made hurried arrangements on the 15th for the mountain journey. With the kindly assistance of the Alcalde and Señor J. M. Castro Bauti, who was good enough to provide transport animals for me as far as Puebloviejo, I was able to leave on the 16th. The object of this excursion was to obtain an opinion of the higher regions of the Sierra Nevada range regarding its agricultural resources and possibilities, and the prospects of establishing agricultural colonists in these parts. The route taken was via Puebloviejo and San Sebastian del Rabago.

Valle Dupar to Santo Tomás.

I set out from Valle Dupar at about midday on the 16th, accompanied by my attendant and a guide from the town with three transport animals, and we reached a farm in the evening known as San Tomás, situated near the Río Clavo, where we passed the night. San Tomás is about six leagues from Valle Dupar, and the road is chiefly through forest which carries useful timber trees of medium dimensions. The Cañaguati tree (*Tecoma spectabilis*), referred to in a previous part of this report, is here also at this time of the year (December) the most conspicuous tree, owing to its mass of golden bloom. As Santo Tomás is approached the land assumes a more open character, bush land alternating with sabanas of short grass. Here I noticed the cattle were in very poor condition, owing to the prevalence of Tabanid flies and ticks.

Ginger.

On leaving Santo Tomás the road soon commences to ascend, the track was along forest clad streams and open grassy hill slopes, where I observed the cattle were

in better condition than on the plains. I was very agreeably surprised this morning on making the important discovery that ginger is wild in these parts. The plant has never before, I believe, been found in a truly wild state, having been supposed for many years to be a native of tropical southeast Asia. In this neighbourhood it is found wild and in great abundance. On subsequent inquiry I found that ginger grows wild over extensive areas on the lower hills of the Sierra Nevada range, and also I am informed in various parts of the Eastern Cordillera. This is therefore another laurel for South America, and for Colombia in particular in that the theory that ginger was originally a native of tropical southeast Asia must now be abandoned and the credit given to Colombia. To Cinchona (also abundant in a wild state on the Sierra Nevada), cacao (also indigenous to the Department of Magdalena), the potato, various rubber plants and tobacco, etc., economic products which South America has furnished for world-wide use, must now be added ginger. The commercial importance of this discovery, however, lies in the fact that there are extensive wild sources of a valuable product which can be immediately exploited, and a new local industry established in the collection and preparation of the roots. I consider this discovery of great importance, and have already recommended an immediate shipment of a consignment of half a ton of these roots to foreign markets, in order to afford a practical test of its value in comparison with the cultivated root. Now is the dry season (December) in this region, and now is the season for the collection of the roots, the plants being in a dormant state.

Ginger as a Plantation Industry.

Apart from the question of the exploitation of the wild product arises the possibility of its cultivation, and the initiation of a new plantation industry for this part of Colombia. Ginger is well known to be somewhat fastidious as to soils, the most valued root being produced in Jamaica, where it was probably introduced originally from South America and not the East. The fact that ginger is indigenous is proof that not only the soil, but also the climate, is appropriate; and it therefore only remains for planters to take up its cultivation as a plantation industry. I have noted that the roots of cultivated ginger are generally double the size of the wild product. A word of warning should, however, be given regarding its curing and drying; whatever method be employed the roots must be thoroughly dried and bleached before shipment, or it may reach the market in a mouldy or decayed condition and bring disappointment at the outset.

Puebloviejo.

The track from Santo Tomás to Puebloviejo ascends until an altitude of some 1120 metres above sea level is reached. The hills are open in character and covered with short grass, only the valleys and ravines being covered with forest growth. After passing the higher part of the hills, the road descends to the sabana of Puebloviejo, which settlement we reached in the early afternoon. Puebloviejo is not a town or village as the

name implies, but rather a settlement, with houses spread here and there over the sabana. Puebloviejo was the site of an old Spanish settlement, and the numerous walls still standing seem to indicate that the sabana was at one time divided up in the form of small allotments between many settlers. The chief occupations are now coffee growing, and cane cultivation for the production of panela.

Coffee.

On December 18th, while awaiting oxen to proceed up the mountain, I visited several of the *cafetales* and *cañaverales* in this locality in the company of the local agriculturists. The coffee is cultivated without system, and the industry is conducted on similar lines to that I have described regarding that industry on the Sierra Montaña. The coffee is gathered in one picking, ripe and unripe berries alike, and it is placed in the cherry on flats to dry. It is subsequently prepared for the market by manual labor with a pestle and mortar, or by a contrivance consisting of two large wooden wheels drawn by oxen or horses around a circular wooden trough. There are about twenty growers in this locality whose production averages from 15 to 250 quintales per annum, but there are others who produce in even lesser quantity. The total estimated production of coffee in the Puebloviejo region is 2,000 quintales per annum. The growers could augment their production very considerably, if they cooperated and adopted mechanical means of cleaning their coffee, and devoted the time now wasted by the existing methods to the improvement and extension of their plantations. The time occupied in spreading the coffee out on the flats, the recollection, storing, hulling, winnowing, hand picking, etc., involves these poor people in continual labor almost throughout the year before they can dispose of their crop. I have placed these growers in touch with the makers of suitable coffee machinery, and am hopeful that they will adopt more modern methods of dealing with their crops, to their personal advantage and that of the industry generally. The cultivation of coffee is a matter that sadly needs more attention; trees should be methodically planted from plants raised in nurseries from selected seed. Suitable shade should be furnished and excessive shade reduced, and trees pruned when necessary. I noted the *mancha* or coffee-leaf disease (*Sphaerostilbe flavida*, M) very rife in some parts; badly attacked trees should be rooted up and burnt, and trees less affected sprayed with Bordeaux Mixture or Copper Carbonate. Coffee is grown by the Arhuacos much higher than San Sebastian, where it is at this time of the year attacked by frost. The trees in these higher altitudes are of compact habit and robust growth, and I observed that they were bearing heavy crops of coffee of doubtless exquisite aroma.

Panela.

The lands of Puebloviejo are very suitable for sugarcane, and an excellent quality of panela is here produced. The production of this product here, as in other parts of the Provinces of Valle Dupar and Padilla is limited to the small consumption and to the high cost of animal transport.

Ginger.

Planters would do well to consider the question of devoting attention to the cultivation of ginger in these parts, a product of higher value than coffee or panela. It is further a cultivation which requires very little outlay, and consequently appropriate for the man of small means. The value of good quality Jamaica ginger ordinarily runs in the vicinity of one shilling per pound, a more remunerative price than coffee affords.

Road to Fundacion.

The great drawback to agriculture in this region is the absence of a road by which produce could be exported to a market centre. It is said that in the days of the Spanish occupation there existed a road connecting Puebloviejo with the port of Santa Marta. The natural route for such a road is along the valley to Fundacion, and proposals have been made, and, I understand, approved by the Government, to open up such a road. There is no doubt that such a communication with the Santa Marta Railway is necessary and essential to the development of this region. I am informed by responsible persons that richer lands are to be found down the valley from Puebloviejo, lands suitable for cacao, cotton, sugar-cane and also coffee, and that such a road would result in the opening up of a new and rich agricultural region. Time prevented me from making a journey down this valley, so I am not able to confirm the information furnished me.

PUEBLOVIEJO TO SAN SEBASTIAN.

Cinchona.

On leaving Puebloviejo on December 19th, we crossed the sabana, and at once commenced a pretty steep ascent up the grass-covered mountain slopes. On reaching an altitude of some 1,590 metres above sea level I noted the first Cinchona trees in the forest lands. Here there are two species represented and bark of both species has been collected for analysis and investigation, one is known as the white and the other as the yellow variety. The latter, in the opinion of the Indians, affords the best quality bark.

Curará.

In these same forest lands, in the locality known as Chinchiqua, is also found a tree known locally as Curará, which is employed locally as a febrifuge and a stomachic, and has a considerable reputation. A sample of the bark of this tree has been collected and forwarded to Europe for investigation in order to ascertain if it really possesses the medicinal properties attributed to it, and whether it may prove of any value in medicine.

San Sebastian.

Continuing our journey we reached a stream midway between Puebloviejo and San Sebastian. From here we continued the ascent, and crossing the páramos we reached San Sebastian late at night, owing to delays with the oxen. The vegetation of the páramos reminded me very much of that of the páramos of Bogotá of

similar altitude. The *Pega-pega* or *Pega-mosca* (*Befaria ledifolia*), one of the most striking plants of the páramos of Bogotá, is here represented by a much more handsome species which has large handsome flowers resembling an Azalea. San Sebastian is a collection of small white-washed houses with narrow streets, a church and a square, all enclosed within stone walls. At either end there is an entrance with large wooden doors that are kept locked day and night, admittance

only being gained by calling the Arhuaco *comisario* charged with the keys. The principal occupants are the Arhuaco Indians, but a Government representative is also stationed here, and there are also a few civilized residents engaged in trading. San Sebastian may be termed the city residence of the Arhuacos of this region, for apart from their town quarters, most of them possess a country house and *roza* in the valleys or hills adjacent.

THE ASCENT TO THE SNOWS.

On the morning following our arrival at San Sebastian we lost no time in requesting transport to continue the ascent. We were fortunate in enlisting the sympathy of Juan Bautista Villafaña, an intelligent Arhuaco Indian who had recently returned from a first visit to the Capital of Bogotá whither he went on a representative mission to His Excellency the President of the Republic. Despite his assistance, however, we were not able to leave till the afternoon of the 22nd. During this delay I got an insight into the character of these interesting people, their most pronounced characteristic is that of exceeding tardiness. Nothing whatever will induce them to hurry, having no appreciation whatever of the value of time.

Señor R. García T., of San Sebastian, kindly accompanied me in the journey to the snows, the guide from Valde Dupar and four Indians including Juan Bautista and his uncle. We took two transport oxen which two Indians on foot looked after. The first day we did not get beyond Circayuca, as we did not reach there before 4 p. m., and here Juan Bautista and his uncle left us to secure horses for themselves.

Ceroxylon Palms.

Circayuca lies at about 1380 metres above sea level, and from here we obtained first glimpse of the beautiful *Ceroxylon* palms, which find their lowest limit at about this altitude. These palms are apparently distinct from the *Ceroxylon andicola* of the Quindío, as they are much more slender, having a bole only 20 to 30 centimetres in diameter, though they grow up to a height of about 30 metres. Like the *Ceroxylon andicola* the trunk is covered with a wax, but evidently a much thinner layer, and it is doubtful if in quantity sufficient to be of any commercial importance. These palms are abundant in the valleys and ravines within the bamboo zone, and form the most striking feature in the vegetation of this part. The Indians employ the trunk of these palms for fencing their *rozas* when stone is not used. Another interesting tree found within the bamboo zone is a species of *Podocarpus*, known locally as Santocana; various species of *Podocarpus* yield valuable timber of the pine class.

Duriamenya Camp.

Leaving Circayuca we continued to ascend until we reached the ridge of the mountains which lie on the

San Sebastian side of the Duriamenya valley, and here in an exposed position, commanding a beautiful panorama of the lower hills and of the Cordillera in the distance we camped for the night. Juan Bautista here possesses a small hut with *roza* and *corál*. The hut we found unoccupied, and this shelter helped to protect us from the bleak cutting wind which we experienced here. From the *roza* we obtained vegetables to augment our rations for the evening meal, which we cooked in the hut in a suffocating smoke produced by the only available fuel—stalks of the *frailijón*. The site of this camp was 2,920 metres above sea level, and the temperature at 7 in the morning registered 5 degrees centigrade. Sharp frost occurred during the night, and we were obliged to break the ice which had formed over a small stream in order to obtain water for domestic purposes in the early morning. This was our coldest camp of the ascent, and my *calantano* guide of Valle Dupar, who had been converted to cook, found his duties particularly objectionable, as with benumbed fingers he tried to wash the cooking utensils and plates. It is said that this ridge in the winter time is covered in snow, but at this time of the year the snow limit is much higher.

Duriamenya Valley.

On the 24th we descended the valley of Duriamenya, through which flows the river by that name. The ridge of hills which divides the Duriamenya from the Mamanacanaca valley appear to be very barren and rocky in the upper parts, but the valley of Duriamenya affords fair grazing lands, and supports a good number of cattle belonging to the Indians. Leaving this valley on the left we rounded the hill range which separates the valley from that of Mamanacanaca to gain access to the latter. About half way between these two valleys we obtained the first view of the snow capped mountains, a panorama of remarkable beauty. In the foreground we saw a number of wild horses or *caballos simarrones* as they are called locally; we had just passed a herd of wild pigs and a flock of wild sheep, once domesticated but grown wild and now unapproachable. Before entering the Mamanacanaca valley we had to round precipitous hills on foot leading our animals. This was the most trying part of the whole journey, or it seemed so to me as I performed this day's journey with a sharp attack of fever. I wondered how it was possible for the oxen with their loads to pass over these precipitous cliffs, and

it says much for the oxen of the Sierra Nevada and the Indians leading them that they did so without mishap. The mountains here present a greyish hue, due to the abundance on the grassy slopes of a plant with silvery foliage, known locally as *Vira-vira*. This plant is a Composite, and is in repute as being a medicinal plant of considerable merit.

Mamancanaca Valley.

The Mamancanaca valley is a very narrow one, and has no comparison with the Duriamenya valley, having a poor and stony soil. It is covered with scrub, *Opuntias*, *Agaves*, *Furcraeas*, *Dodonea viscosa*, shrubby *Solanaceae*, plants in fact characteristic of dry and arid lands. In the upper part of this valley we camped for the night, and being Xmas-eve and short of provisions we shot, with the consent of the owner, Juan Bautista, a young bullock to replenish our larder.

The Ascent.

On Xmas-day, my fever having abated, we started early for the snows, continuing our journey up the Mamancanaca valley for some distance, and then by way of the páramo of Jansabanaca to the peak known as Tayrona or Chundwa. My companions were Señor García, Juan Bautista and his uncle and another Indian who travelled on foot. We rode as far as it was possible, and then tethered our animals to the rocks, to continue on foot. At this point we halted for a few minutes to take a little refreshment, and to admire the beautiful scenery. Here before us stood out the snow-capped peaks with their glistening slopes of frozen snow, crystal streams and cascades born of the melting snow. Below in the deep and distant valley on the right we saw the lakes of Janmeina, and noted cattle on its banks grazing in peaceful contentment. Janmeina is a chain of three lakes, and the picture from the snow-white peak down to the valley with the lakes, is one of unique and magnificent beauty and well worth a special visit of the artist. On walking to the other side of the ridge on which we stood we noticed also several picturesque lakes within closer view.

The upper part of the Sierra Nevada is exceedingly rocky, and the climb, though by no means difficult, was very arduous and trying. Climbing over huge boulders, rounding others too large to climb, and then crossing land slides composed of shale or finely broken rock, down which one might easily be carried hundreds of feet below, was the manner in which we made the final part of the ascent. At about 4 o'clock in the afternoon I reached the snow line, and shortly afterward the Indian who was carrying my instruments and camera, but Señor García and the other two Indians, fatigued with the climb, returned to the point where we left the horses. I have no doubt that I should have been left alone to complete the latter part of the ascent, had not the Indian who accompanied me been charged with the responsibility of carrying my outfit. On reaching the top of the ridge at the snow line another panorama of

remarkable splendor met our view, another range of snow capped peaks and numerous little lakes situated at varying altitudes. More beautiful in grandeur appeared this entrancing panorama before us than the peak on whose ridge we stood. A false step here and one would be carried down the glacier hundreds of feet to the abyss below. Having taken the temperatures we descended the mountain, as it would have been quite impossible at that late hour of the day to have climbed the highest point of the peak, being obliged to return to our base camp in the valley. Apart from the question of time I doubt whether it would have been possible to have reached the summit of this peak without climbing equipment. Hurrying on, therefore, as fast as the rocky road permitted, we duly regained the point where our horses had been left, and where the other members of our party were awaiting us, and continuing our journey we reached our base camp at 7.30 at night.

Flora of the Sierra Nevada.

The splendor of the mountain scenery of this upper zone, the snow-capped peaks and ridges, the picturesque lakes and lagoons quaintly situated at varying elevations, cannot be denied. Regarding the flora, however, of this region, as represented by the part traversed in this excursion, the Sierra Nevada has disappointed me. It is possible that there are other parts of the Sierra Nevada where the flora is richer in the upper reaches, but of this I have no personal knowledge, except regarding the Santa Marta side where the forest flora extends to higher reaches. I have ascended the mountains of India and Africa, the Ruwenzori of Africa, for example, and can say that the Sierra Nevada of Santa Marta bears no comparison with this African range, either in the variety of species or the beauty of the flowers. But the Ruwenzori has a different climate, the upper reaches of that mountain are nearly always enveloped in fine mist and the vegetation drips with moisture; there being no dry season of considerable duration as in the case of the Sierra Nevada. The flora of this mountain cannot, therefore, be expected to be so luxuriant. On the Andes near Bogotá, well within a range of a thousand feet, one meets with three distinct species of *Frailejón* (*Espeletia spp*) affecting different altitudes. Here on the Sierra Nevada I did not see more than one species, and that affecting only the upper zone; this *Frailejón*, though of the arborescent type, is of a different species to those of the Bogotá region, and has white or straw-colored flowers instead of yellow.

The Descent.

On the 26th we left our camp at Mamancanaca and returning the same way as we ascended, we reached Circayuca at dusk. On the following day we proceeded on our journey to San Sebastian by another route, reaching there about mid-day. I had hoped to leave the same day for Valle Dupar, but unfortunately the tardy Indians did not provide oxen in time, nor did they appear till the evening of the following day.

San Sebastian to Valle Dupar Via El Talco.

We left San Sebastian on the 29th, returning by way of El Mamon and El Talco and the valley of Guatapuri to Valle Dupar. The first part of our journey led us through interesting fertile lands, thence over the mountain known as El Mamon, the road reaching an altitude of 2,400 m. at its highest part. I was led to take this route in preference to the one via Puebloviejo, as it was said to be nearer and moreover enabled me to see a further part of this interesting mountain range. We were destined to camp the night at El Talco and this meant a descent from 2,400 metres to 750 over an awful track. El Talco is merely a camp on the road, and has apparently received its name from the supposition

that talc is found in the locality. The mineral supposed to be talc is, however, mica, so the locality would be more appropriately named La Mica and not El Talco.

Guatapuri Valley.

The road from El Talco to Valle Dupar is along the Guatapuri valley and a very rough one, the greater part being exceedingly rocky or stony. I noticed that efforts had been made to establish *portreros* in various parts of this valley, but the falling and decaying fences told the tale that success had not accompanied these efforts. The valley of Guatapuri from El Talco to Valle Dupar, is not, in my opinion, of any appreciable agricultural value.

THE SIERRA NEVADA.

I have no hesitation in stating that I consider the Sierra Nevada range the most valuable region of this Department. Firstly, for the reason that within its limits can be grown a variety of products; from tropical crops in the lowlands, sub-tropical and temperate crops in the intermediate parts, to crops peculiar to cold regions in the upper zone. Secondly, because of the geographical position of the Sierra Nevada, being within easy reach of the most important markets of the West and of Europe. And lastly, because the Sierra Nevada should become the sanatorium of the Coast region, replacing the wasted forces of the tropical worker. Is not the Sierra Nevada the lungs of the Department, the accumulator of the forces which should be utilized to re-establish health and vigor?

From a very hurried journey such as the one I have made, restricted to a relatively small area of this important range, I do not feel justified in treating the agricultural possibilities of the Sierra Nevada as a whole. The observations which follow, it should therefore be borne in mind, are framed from impressions made on this hurried trip, and are not the result of a detailed exploration of the range, such as I had desired to make and such as undoubtedly should be undertaken.

Wheat.

I had pictured the Sierra Nevada mountain, from what I had been told, a country of remarkable fertility and of wonderful and extensive wheat-growing lands. The Sierra Nevada is not in this respect any such "El Dorado." There are in parts considerable expanses of fairly fertile lands, but there are equally large, if not larger areas of poor sterile lands. To describe the Sierra Nevada as a wheat-growing country, would be to display an ignorance of the wheat-producing lands of the world; for nowhere did I notice extensive areas where wheat could be grown and cultivated by modern methods such as would place the Sierra Nevada on a competing basis with wheat-producing countries. I do not say there is not land suitable for growing wheat, on the contrary, there are areas where wheat may be grown and grown at a profit for consumption in the

country, lands without doubt superior to the lands above Bogotá devoted to that cereal. It is a matter of history that the early Spanish settlers grew wheat at or in the vicinity of Puebloviejo. I have there seen a mill stone, found in recent years, which was doubtless hewn centuries ago from the granite boulders by the Spaniards for milling wheat. It is now employed for hulling coffee in one of the animal-drawn contrivances at Puebloviejo. This mill stone might well find a place in the National Museum at Bogotá, as a record of the industry of the early settlers, an industry which it is to be deplored has not been emulated locally in more recent times. One of the principal features that struck me in this journey was the abundance of water everywhere. The Sierra Nevada is wonderfully well watered with beautiful clear crystal streams, affording abundant water for irrigation and power.

Possible Crops.

The Sierra Nevada, as represented by the part I have traversed in this journey, is essentially the country for the colonist or man with small capital who is not afraid to work; for here is a country which is perfectly healthy and where the farmer's or planter's life is ideal. There are the lower zones adapted for cotton, cacao, sugarcane, maize, etc. A little higher are lands suitable for coffee, ginger, citrus fruits, etc. Citrus growing should prove a new industry of great possibilities with suitable communication with the port at Santa Marta; for grapefruit and oranges should find a ready market in Panama and the United States, as well as the *aguacate* and *granadilla* and probably other fruits peculiar to this country and little known to the outside world. At a still higher elevation, wheat, barley and oats might be grown in sufficient quantity to render the importation of these cereals from other countries no longer necessary. Is not the population of Santa Marta and the Coast generally importing potatoes from the United States, while here close at hand are suitable lands for the cultivation of that tuber, and indeed all classes of vegetables? With rapid communication with the Coast the cultivation of vegetables should indeed prove a

very profitable one, for excellent prices are obtained in Panama for vegetables, and a considerable export business might be worked up, apart from the important question of supplying the Coast lands.

Sheep Farming.

Leaving the question of plantation industries, sheep farming for the production of wool and mutton should prove a paying industry. The Arhuaco Indians utilize the present production of wool for their own domestic needs, weaving a cloth from which they make their personal clothing. The introduction of suitable breeds of wool-producing sheep for the improvement of the native breed is desirable and would in course of time augment the production of wool for local manufacturing purposes.

Arhuaco Cattle.

The Indians possess an excellent breed of cattle of hardy nature, reminding one somewhat of the famous Scotch breed of Great Britain. Much might be done, however, in the improvement of these herds by the introduction of good breeding stock of say the Scotch cattle. While pasture is not over-abundant in the dry season, there are moderate areas available for cattle farming, and a good deal could be done in valleys like the Duriamenya in the improvement of the pastures, and in growing forage roots for feeding purposes. The flavour of the beef I can vouch for as being excellent, comparing very favorably with the famous Scotch beef. Were the Duriamenya valley anywhere in the Bogotá region, it would be divided up into several properties, and converted into flourishing haciendas. The Indians possess some very fine specimens of transport oxen which are very powerful, and should prove very useful for ploughing and other field work on the hill slopes.

Sierra Nevada the Sanatorium of the Coast.

Apart from the agricultural side, should not the Sierra Nevada be to the Coast population of Colombia what the hill stations of India are to the labourers of the hot and tropical plains? Here is an ideal climate which should be utilized to repair the debilitating effects of the trying climate of the Coast region, and to restore health and vigor to the tropical worker. Would not the Coast troops be more advantageously situated

in the Sierra Nevada, rather than in the debilitating lowlands, once railway communication be established which would facilitate their mobilization and transport? These are questions of vital importance for the Government in framing its programme for the future, and of importance in aiding the development of these parts.

Colonization.

The future of this region depends on its colonization by suitable settlers. The region, as I have before stated, is one for the man with small capital, the worker. Nowhere in the route of my tour have I seen extensive coffee lands as are found in the interior, for example in Cundinamarca; though of course extensive coffee plantations exist on the Santa Marta side of this mountain. At Puebloviejo, for instance, the coffee lands are confined to small valleys and ravines, such as are covered with forest growth. Again lands for fruit growing are not found in extensive areas, but rather in small allotments suitable for the small grower. Fruit growing, by the way, it might be mentioned, is not a cultivation that can be conducted in such a careless way as coffee is grown in these parts. Fruit growing for export is an occupation which requires much care from the selection and propagation of the trees to the picking and packing of the fruit, and those not prepared to bestow the necessary care and attention would better leave that industry alone.

Roads and Railways.

It is premature, however, to consider the question of colonization previous to the opening up of the country by railroads and roads. Before families are established in this region, it is necessary to provide means of communication, and this means should be suitable for the industries it is proposed to foster. Fruit growing for export should be the most important cultivation in view, and to foster such an industry the Santa Marta Railway should be extended from Fundacion to the centre of the most important region for fruit growing. There is no reason why Santa Marta should not become as renowned for the export of citrus and other fruits as it is for the shipment of bananas, as the Sierra Nevada has much in its favor in being so much nearer to the American and European markets than the fruit growing lands of South Africa.

ARHUACOS.

The Arhuaco Indians who inhabit the Sierra Nevada are a people of fine physique. They appear to have no relation with the Goajiros or Mutilones, having no semblance either in physique, customs or language. Unlike their neighbours the Arhuacos are a peaceful and industrious people. They possess wattle-and-daub houses, a necessity probably born of the rigorous climate. They possess little gardens or *gallineros*, neatly enclosed by stone walls or *Ceroxylon* palm fences, in which they cultivate *Canna indica*, onions, cabbage, beans, peas, coffee, sugar-cane, oranges, *manzanas*, etc. The *manzana* is the fruit of a medium-size tree of the

size of an orange, with large brown seeds embedded in a golden farinaceous substance which is edible. It has no relation to the apple as the name *manzana* suggests, but belongs to the order *Sapotaceae*. From cotton and wool the Arhuaco spin yarn which they weave in their simple looms cloth from which they make their clothing; which, for the men consists of a heavy *manta* with trousers and sash and a quaint helmet made of *fique* fibre. They possess a considerable number of cattle, horses and sheep, though by no means so rich in this respect as the Goajiran Indians.



Indian Women of the Arhuaco Tribe

Coca.

One of the peculiar and interesting customs of the Arhuacos is the use of coca by the men. No Arhuaco is ever seen without his *muchila* of coca leaves and a *calabashita* of lime. One of the friendly customs of these people when they meet on the road is to exchange a small handful of coca leaves. This, to them divine leaf, they chew nearly all day long and it is said that they can forego food for a considerable time without inconvenience if they have coca leaves. It is chewed together with lime much in the same way as the areca nut in India.

One of the chief characteristics of these people is their extreme tardiness. If on a journey and two friends meet they do not part until they have recounted every detail of news. On the arrival of one of my Indian companions at a camp where there were many Indians repairing a road, he spent nearly an hour recounting the object of my mission, detailing what I had said and what I had done, and during this time the crowd listened standing around without a single interruption. These people must have marvelous memories, for this custom must be a wonderful aid to the cultivation of memory; not one second did the orator falter for want of a word, it seemed like the recital of an oration learnt by memory. The Arhuacos are very independent and appear to have no desire for civilized customs; in fact, they have a strong desire to deal with and administer their own affairs, although extremely loyal to the Government. They appear to have little desire for trading, and do not seem to care to sell or even hire their cattle or horses; only as a favor do they part with a chicken or a few eggs. Even the Indians who are rich plead poverty and will tell you that they have very few or no cattle. I offered to buy a horse from an Indian known to have many, but the owner would not sell, observing that he would not be able to lend it to another person if he sold it to me.

VALLE DUPAR TO THE MAGDALENA RIVER.

Valle Dupar to the Magdalena River.

After having dealt with my collections at Valle Dupar, we left on January 3rd for El Banco on the Magdalena river via El Paso. We first journeyed through poor sandy lands, but the character improved as we proceeded, and later in the way we passed through heavy forests containing much useful timber. We camped the first night near the river Viejo.

Corozo or Cuesco Palm.

The following day we continued our journey through heavy forest land, which, however, was soon replaced by more open lands with extensive *sabanas* of fine short grass, affording excellent grazing lands for cattle. The chief feature in this part is the *cuesco* or *corozo* palm, which is very abundant. I have referred to this palm in an earlier part of this report and mentioned that a sack of its nuts have been forwarded to the Exterior for examination and report. If these nuts prove to contain a percentage of oil that would pay for extraction, this region, in view of the abundance of these palms, should become an important centre for the collection of the nuts. I observed that the palms were more productive in the forest lands than on the *sabanas*, a fact doubtless due to injury caused to the palms by the annual fires of the *sabanas*. At noon we rested by a river to continue in the afternoon, owing to the heat of the plains by day. Leaving at dusk we travelled on till nearly midnight when we camped at a *ranchito* near the village of Los Venados.

A Moonlight Ride.

Having rested during the day on the 5th, we left at 4 o'clock in the afternoon to continue our journey across the plains by moonlight, since it was difficult to travel by day owing to the heat of the plains and the absence of water along the rest of the road to El Paso. We rode on through these dusty plains till nearly midnight, when we camped under a small tree, passing the night without food or water. At 4 a. m. we continued our journey and reached El Paso in the early morning.

Cattle Lands.

These plains afford excellent grazing lands for cattle, but owing to the absence of water in the dry seasons, the cattle have then to be removed to the *playones* near the Caesar river. Artesian wells established at various intervals along these plains would immensely increase their value as cattle lands. It also occurs to me that their grazing value would be enormously enhanced if the famous *cadilla* grass of Goajira, to which I have already drawn attention, could be established on these plains; the experiment is certainly one well worth making. This region of the Province of Valle Dupar is very important from a cattle point of view, and its advantages over the cattle lands of the Magdalena river zone has been amply demonstrated recently by the

heavy losses incurred in that zone through the floods. Although in the dry season the cattle have to be removed from the plains to the *playones*, the permanent waters in the vicinity of the Caesar river affords a guarantee of abundant green pasture even in the driest seasons, a fact of great importance for this region.

Dipping of Cattle.

The question, however, of the improvement of the local breed, is one that needs serious attention. Very little care appears to be given to the selection of breeding stock, with the result that the race leaves much to be desired. The tick pest is also one that must be handled, and dipping tanks established at convenient centers for the systematic dipping of cattle periodically. The tick most common is probably the *Boophilus australis*, Fuller, which is also found all along the Magdalena river. Tabanid flies are also very common in various parts from the Goajira peninsula to the Magdalena river, the species found in Goajira is *Tabanus trilineatus* Latr., and probably this and other species extend throughout this region.

Chiriguaná.

On the following day we left by canoe at dusk for El Banco, breaking the journey at Chiriguaná where we reached about noon on the 8th. Here I was met by the genial Prefecto of Valle Dupar, Señor General Nehemias Maestre, to whom I am indebted for much valuable assistance in my journey through the Province

Cacao.

The next day, accompanied by the Prefecto and several gentlemen of Chiriguaná, we visited a *cacaotale* in the neighbourhood. Cacao was at one time more extensively cultivated in this neighbourhood than it is to-

day, having given place to cattle raising. Owing to the long dry seasons which occur here, cacao appears to be a speculative cultivation without irrigation, and I am doubtful if it yields remunerative crops.

Pita de Colombia.

On the 10th I visited the *pitales* which are found on the Santander road on the river Anime about one and a half leagues from Chiriguaná. The *pita* is a fibre plant of considerable importance in this locality; as the local people when they have little else to do go into the forests and extract the fibre for the local markets. The fibre has a great reputation for its strength and durability, it being used by bootmakers locally in substitution for thread and for a variety of purposes, including fishing nets. It is sold at Chiriguaná at the rate of 15 centavos per pound, and at El Banco at the absurdly high rate of 25 to 30 centavos per pound. *Pita* is an inappropriate name for this plant since sisal is in certain countries known by that name. It is also known locally under the name of *Pita del Opón*, but this name is also inappropriate, since it is not only found on the Opón river but also on the Carare and Caesar, and it is said also in the Choco and the llanos of San Martin. I therefore suggest that it may be more appropriately named Pita de Colombia. I believe this is a fibre plant with a great future, it grows in the shade of forest over extensive areas; in fact densely established nature-sown plantations, through which it is quite impossible to pass without cutting a way through. I forwarded a sample of this fibre to Kew last year, and it was then valued by London brokers (March) at £40 a ton, if shipped in quantities of not less than 100 tons at a time. I have since sent a sample to the Government Fibre Expert of the United States, who reported that it would command a price equal to that Yucatan henequén which was then (February, 1917) quoted at the high



PITA DE COLOMBIA—A View in One of the PITALES of Chiriguaná

value of 16½ cents per pound in New York. In my opinion, the exploitation of this fibre should, in the near future, develop into a most important industry in these parts. These nature-established plantations are to be found over vast areas and in accessible locations where decorticating plant can be easily imported, conveyed and established, and where freight rates to the coast are insignificant. The existing types of decorticating machinery may need some modification since the *pita* leaf is more membranous and of different texture to the leaves of sisal or *fique*, but these are questions which are now being studied. I may mention that this plant belongs to the pineapple family, *Bromeliaceae*, but the species has not yet been determined satisfactorily.

Guanabanitá.

On the plains at Chiriguaná, I noted an interesting *Anona*; a shrub bearing an orange-colored edible fruit known locally, from the resemblance of the young fruits to the *Guánabana*, as *Guanabanitá*. The fruit is very attractive in appearance, and may be possibly improved as a table fruit by cultivation. Seed has been procured with that object in view.

Chiriguaná to Chimichagwa.

On the evening of the 10th we departed from Chiriguaná down the river for El Banco. Having recently travelled through hot and dry regions we had not given the possibility of rain a thought, and had not therefore provided for it in fitting out our canoe. At about midnight an awful storm arose and rain fell in torrents, drenching ourselves and almost swamping the canoe. So heavy and penetrating was this *aguacero* in the cool hours of the night, that both boatmen fell down helpless with ague and fever, and we had to tether the canoe to the bank until they recovered. Eventually we reached Chimichagwa at 4 o'clock in the morning, but

as the village was some little distance from the port, and moreover asleep, some hours passed before we could change our sodden clothes. We rested at Chimichagwa the whole of that day, as I was too ill with fever to proceed; having suffered continuous attacks since leaving Valle Dupar, and my condition had not improved by the exposure to the storm of the previous night.

Chimichagwa to El Banco.

On the 12th we left Chimichagwa for El Banco. In this day's journey we had to pass the Cienega; the boatmen have considerable fear in crossing this large expanse of water, as in windy weather the passage can be a very rough one and very dangerous for the canoes. We crossed, however, in safety, and spending a night at a village on the way, we reached El Banco the next morning glad that we had at last reached the main road to Bogotá.

Fishing.

The principal industry along the Caesar river, particularly along the lower part and the Cienega, is fishing. Fish of excellent quality is exceedingly abundant, and fishing affords a livelihood to a large number of people in this region. El Banco is consequently an important port of the Magdalena in connection with trade in fish.

Recent Floods.

We had an excellent opportunity of seeing, in the villages along the Caesar towards its mouth, the damage that had been done to property by the recent floods. This whole region had been flooded in November and December previously, the buildings standing in a metre or more of water. As most of these buildings are of wattle-and-daub, and the daub had been dissolved away up to the water line, the houses presented a curious appearance, the lower parts showing nothing but the frame work.

CONCLUSIONS.

Roads and Communications.

One thing is certain, that until the pack mule be replaced by more efficient and modern means of transport, there can be no appreciable development either in agriculture, mining or any commercial industry in this Department. As long as the pack mule is the vehicle by which the markets are reached, the present unsatisfactory conditions will continue. The most urgent need of this Department is therefore railways and roads. It would be possible to link up by a cart and motor road the various towns from Rio Hacha to El Paso, the navigable point to the Magdalena river on the Rio Caesar. Such a road, however, would be costly to construct and to maintain, and there is no doubt that the most suitable means of communication would be a railway, since there are many products in the interior parts such as timber, brasil-wood, divi-divi, salt, etc., that would not pay to transport by road, only as low freight produce by rail.

The Need of a Railway from Goajira to Rio Magdalena.

I understand that it has been proposed to construct a railway from Goajira to Tamalemeque on the Rio Magdalena, with the object of its being eventually extended to Bogotá. Such a line would render possible the exploitation of the indigenous products such as salt (from Goajira), timber, brasil-wood, divi-divi, pita de Colombia, magucy, etc., etc. It would give an impetus to plantation industries such as sugar growing, cotton cultivation, coffee planting, cacao, ginger, etc. It would facilitate the movement and export of cattle and the importation of breeding stock. It would help to develop Goajira, if such a railway traversed the peninsula to the bay of El Portete, since it must do as Rio Hacha is only an open roadstead and not a port where steamers can call. It would place the interior parts of this Department within touch with the centers of commerce and civilization, and it would liberate the large number

of beasts now employed in slow and monotonous transport for the tillage of the lands, thus increasing the production of crops. These are, in short, some of the advantages that such a railway would bestow on agriculture.

Mineral Survey Necessary.

But what of mining? It is said that there are rich mines of coal at Correjon and Jagwa, and that coal exists also in other parts of the Cordillera. If this is so, what would more justify such a railway than coal mines near the port of Goajira and the Magdalena river? The former to supply a coaling and shipping port in Goajira, and the latter the river steamers on the lower Magdalena and its affluents and the Coast. Apart from coal, copper is said to be abundant in the Cordillera, but it would be impossible to work copper mines in the Cordillera without a railway for the importation of the machinery and necessary plant and for the export of the ore. Other minerals are said to be found, but little definite knowledge is available regarding the actual extent and value of the mineral resources. This appears to be a matter of great importance for investigation, and I would recommend that a mineral survey should be made of this region to ascertain whether from a mineral point of view a railway would be justified. Such a mineral survey as I have indicated would occupy two expert geologists at least a year and would cost from say, \$15,000 to \$20,000 gold. The Government would then be in possession of facts that would enable it to take a definite decision on the vital and important question of railway communication in this Department.

The Cattle the Nation's Asset of the Coast.

Following the question of roads and communications is the no less important one of colonization. While, however, this question is being studied, the Government would be well advised to give special attention to the development of the cattle industry, in view of the advantageous situation of this Department for the shipment of cattle, and in view of the fact that this industry requires very little labor to develop an immense wealth. With the limited time at my disposal I was only able to visit a very limited part of the cattle raising lands of this Department. If, however, only one-half of what I have been told regarding the cattle

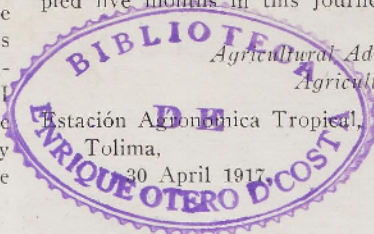
raising resources of the Coast, including Bolivar, be true, then Colombia is destined to become a second Argentine in the cattle raising and export trade. A further and detailed study of the possibilities of this industry should be made by the Government, and the results given publicity, in order to bring about the development of the Nation's best Coast asset by the introduction of capital, which would be followed as a natural course by immigration and so help to solve the question of colonization.

Colonisation.

The total population of the Department, according to the last census, is 140,106. It is clear that no rapid progress can be made in agricultural and mining industries without recourse to immigration. The European War precludes any possibility of obtaining European colonists, now or after the War. The Government would therefore be well advised to encourage Japanese immigration and colonization, which has been attended with such magnificent results in other parts of South America and especially in Brazil. There are various Japanese Emigration Societies who have furnished Japanese settlers to many agricultural enterprises in South America, and particularly Brazil, where there are, in the State of San Paulo, some 15,000 Japanese immigrants. There are also political reasons why Japanese would prove suitable settlers for Colombia. I would therefore venture to recommend that the Government of Colombia should enter into relations with the Government of Japan or with one or more of the Japanese Emigration Companies, with the view of securing Japanese settlers to develop the resources of this country, and particularly the large and important Department of Magdalena in the region of the Sierra Nevada.

I returned to Bogotá on January 24th, having occupied five months in this journey.

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GOLFO DE VENEZUELA

LAGO DE MARACAIBO

CARTAGENA
MONTERIA
BOYACA
CUNDINAMARCA
VALLE DEL CAUCA
ANTIOQUIA
BOGOTA
NECANDIA
ARMENIA
PEREIRA
IBAGUE
MEDELLAN
COLOMBIA
AMAZONIA
GUAYANA FRANCESA
VENEZUELA
PARAGUAY
BRAZIL

(Note: The map contains numerous other place names and geographical labels, including rivers like the Magdalena and Cauca, and various provinces and municipalities.)