ANCON HOSPITAL AS RECEIVED FROM THE FRENCH

examines all the dark places of the house to seek for possible accomplices, and having learned that nobody has been bitten takes himself off.

It does seem a ridiculous amount of fuss about a mosquito, doesn't it? But since that sort of thing has been done on the Zone death carts no longer make their dismal rounds for the night's quota of the dead, and the ravages of malaria are no longer so general or so deadly as they were.

Nowadays there are no cases of yellow fever developing on the Zone, but in the earlier days when one did occur the sanitary officials set out to find the cause of infection. When the French seek to detect a criminal they follow the maxim "*Cherchez la femme*" (Look for the woman). When pursuing the yellow-fever germ to its source the Panama inspectors look for the *stegomyia* mosquito that bit the victim—which is a little reminiscent of hunting for a needle in a haystack.

A drunken man picked up on the street in Panama was taken to the hospital and there died of yellow fever. He was a stranger but his hotel was looked up and proved to be a native house occupied only by immunes, so that he could not have been infected there. Nobody seemed to care particularly about the deceased, who was buried as speedily as possible, but the Sanitary Department did care about the source of his malady. Looking up his haunts it was discovered that he was much seen in company with an Italian. Thereupon all the Italians in town were interrogated; one declared he had seen the dead man in company with the man who tended bar at the theater. This worthy citizen was sought out and was discovered hiding away in a secluded lodging sick with yellow fever. Whereupon the theater was promptly fumigated as the center of infection.

Clearing up and keeping clean the two centers of population was, however, the least of the work of sanitation. The whole Isthmus was a breeding place for the mosquitoes. Obviously every foot of it could not be drained clear of pools and rivulets, but the preventive campaign of the sanitation men covered scores of square miles adjacent to villages and the Canal bed, and was marvelously effective in reducing the number of mosquitoes. Away from the towns the campaign was chiefly against the malarial mosquito—the *anophelinæ*. The yellow fever mosquito, the *stegomyia*, is a town-bred insect coming from cisterns, water pitchers, tin cans, fountains in the parks, water-filled pans used to keep ants from the legs of furniture and the like. It is even said to breed in the holy-water fonts of the multitudinous churches of Panama, and the sanitary officials secured the co-operation of the church authorities in having those receptacles kept fresh. The malarial mosquito however breeds in streams, marshes and pools and will travel sometimes

a mile and a half from his birth-place looking for trouble.

As you ride in a train across the Isthmus you will often see far from any human habitation a blackened barrel on a board crossing some little brook a few inches wide. If you have time to look carefully you will see that the edges of the gully through which the brook runs have been swept clear of grass by scythe or fire or both, and that the banks of the rivulet are blackened as though by a tar-brush while the water itself is covered by a black and greasy film.

This is one of the outposts of the army of health. Of them there are several hundred, perhaps thousands, scattered through the Zone. The barrel is filled with a certain fluid combination of oil and divers chemicals called larvacide. Day and night with monotonous regularity it falls drop by drop into the rivulet, spreads over its surface and is deposited on the pebbles on the banks. The mosquito larvæ below must come to the surface to breathe. There they meet with the noxious fluid and at the first breath are slain. Automatically this one barrel makes that stream a charnel house for mosquito larvæ. But up and down throughout the land go men with cans of the oil on their backs and sprinklers in their hands seeking for pools and stagnant puddles which they spray with the larvacide. So between the war on the larva at its breeding point and the system of screening off all residences, offices and eating places the malarial infection has been greatly reduced. It has not been

Photo by Underwood & Underwood

THE CANAL COMMISSION HOSPITAL AT COLON BUILT BY THE FRENCH

FRENCH VILLAGE OF EMPIRE AFTER CLEANING UP BY AMERICANS

eradicated by any manner of means. The Panama cocktail (quinine) is still served with meals. In one year 2307.66 pounds of the drug were served out. But if not wholly obliterated the ailment has been greatly checked. Dr. A. J. Orenstein, of the Department of Sanitation, says in summing up the results of the policy:

"The campaign against malaria was inaugurated on the following plan: (1) Treatment with adequate doses of quinine (about 30 grains a day for adults) of all cases of malaria. First, because this treatment is curative; and, second, because unless so treated, each case of malaria constitutes a focus from which malaria spreads. In malarial regions there are many persons who have what is often spoken of as chronic malaria. Such individuals frequently do not suffer any serious inconvenience. They more often suffer from occasional headaches, anemia or slight fever. These are the people most dangerous from the standpoint of the sanitarian. It is in the blood of these individuals that the malaria-causing parasite has attained the form in which, if taken by a female *anopheline*, it develops within this mosquito into the form capable of causing malaria in the individual whom the *anopheline* may bite a week or so thereafter. (2) Protecting dwelling with copper wire gauze against the ingress of mosquitoes. All houses occupied by Ameri-

THE BAY OF TABOGA FROM THE SANITARIUM

THE LITTLE PANGO BOATS COME TO MEET YOU

cans and most of the others are screened. (3) Catching and killing mosquitoes within the dwellings. This is done by negro "mosquito catchers", and is of great value in preventing malaria where other prophylactic measures cannot be inaugurated. (4) Destroying the breeding places of *anophelinæ* by filling, draining, and training the banks of streams. (5) Destroying the *anophelinæ* in the larval and pupal stages by oiling the water in which they are found, or applying a special larva poison to this water. (6) Clearing the rank vegetation in the immediate vicinity of dwellings and settlements, so as to destroy the shelter for such mosquitoes as may find their way to the vicinity of the houses; to hasten evaporation and the drying of small water collections and marshy places; to expose to view small breeding places and to remove the temptation to throw water containers into the vegetation.

"These measures, conscientiously and painstakingly carried out, resulted in reducing the number of malaria cases treated in the hospitals from 6.83 per cent of the working force per month in 1906 to 1.53 per cent of the working force per month in 1911, and the death from malaria among employees from 233 in 1906 to 47 in 1911".

"The malaria sick rate for 1906, if continued to 1911, would give, on the basis of the number of employees in 1911, about 40,000 cases of malaria sick in the hospitals for the year, or a loss in labor of about 200,000 days of work. The total number of employees sick in hospitals with malaria in 1911 was 8946—or a loss of 44,730 days of work. A gain of about 155,000 days was, therefore, made. Placing the loss to the Government for each day's labor, plus treatment, at the rather low figure of $3 per man, the gain in this one item of saving more than offset the cost of sanitation proper. These figures do not include malarial cases treated in the dispensaries and in homes. Among this class of patients the gain has undoubtedly been proportionate to the gain in hospital cases, and in addition it must not be forgotten that malaria is a disease that undermines a man's health insidiously and lowers his working efficiency to an extent not approached by any disease with the

OLD CHURCH AT TABOGA
The square box on the corner of the wall contains the mummied head of a favorite priest

THE RIO GRANDE RESERVOIR

IN PICTURESQUE TABOGA

possible exception of hook-worm. The less malaria the fewer inefficient workers in an organization".

Of course the screening system was vital to any successful effort to control and check the transmission of fever germs by insects. But the early struggles of Col. Gorgas to get enough wire netting to properly protect the labor quarters were pathetic. "Why doesn't he screen in the whole Isthmus and let it go at that"? inquired one Congressman who thought it was all intended to put a few more frills on houses for already highly paid workers. The screening has indeed cost a pretty penny for only the best copper wire will stand the test of the climate. At first there was reluctance on the part of disbursing officers to meet the heavy requirements of Col. Gorgas. But the yellow-fever epidemic of 1905 stopped all that. Thereafter the screening was regarded as much of an integral part of a house as its shingling.

The efforts that were put forth to make the Canal Zone a liveable spot have not been relaxed in keeping it so. A glance at the report of the Chief Sanitary Officer for any year shows something of his continued activity. You find records of houses fumigated for beriberi, diphtheria, malaria, leprosy, and a dozen other evils. The number of rats killed is gravely enumerated—during the year 1911 for example there were nearly 13,000. It may be noted in passing that the rats distribute fleas and fleas carry the germs of the bubonic plague, hence the slaughter. Incidentally guests of the native hotels in Panama City say that the destruction was far from complete.

Two large hospitals are maintained by the Canal Commission at Colon and at Ancon, together with smaller ones for emergency cases at Culebra and other points along the line. The two principal hospitals will be kept open after the completion of the Canal, but not of course to their full capacity.

IN THE GROUNDS OF ANCON HOSPITAL

Ancon alone has accommodations for more than 1500 patients, and when the army of labor has left the Zone there can be no possible demand for so great an infirmary. Both of these hospitals were inherited from the French, and the one at Colon has been left much in the condition they delivered it in, save for needed repairs and alterations. Its capacity has not been materially increased. The Ancon Hospital however has become one of the

THE SANITARIUM AT TABOGA INHERITED FROM THE FRENCH

great institutions of its kind in the world. The French gave us a few buildings with over 300 patients sheltered in tents. The Americans developed this place until now more than fifty buildings are ranged along the side of Ancon Hill. When the French first established the hospital they installed as nurses a number of sisters of St. Vincent with Sister Rouleau as Sister Superior. The gentle sisters soon died. The yellow fever carried them off with heart-rending rapidity. Sister Marie however left a monument which will keep her fair fame alive for many years yet to come. She was a great lover of plants, and the luxuriance of the tropical foliage was to her a never-ending charm. To her early efforts is due the beauty of the grounds of the Ancon Hospital, where one looks between the stately trunks of the fronded royal palms past a hillside blazing with hibiscus, and cooled with the rustling of leaves of feather palms and plantains to where the blue Pacific lies smooth beneath the glowing tropic sun. Beside the beauty of its surroundings the hospital is eminently practical in its plan. The many separate buildings permit the segregation of cases, and the most complete and scientific ventilation.

Making the hospital attractive was one of the points insisted upon by Col. Gorgas. Some of the doctors think that possibly it has been a wee bit overdone. Some of the folks along the Zone look on a brief space spent in the hospital as a pleasant interlude in an otherwise monotonous life. As they have thirty days' sick leave with pay every year they are quite prone to turn to the pleasant slopes of Ancon Hill, with a week at the charming sanitarium on Taboga Island as a fitting close—a sort of café parfait to top off the feast. Surgery even seems to have lost its terrors there. "Why, they even bring their friends to be operated on", said one of the surgeons laughingly when talking of the popularity of the hospital among the Zone dwellers.

Charity cases have numbered as many as 66,000 a year and the records show that during the period of greatest activity on the Zone as many as 70 different nationalities were ministered to. The question of color was often an embarrassing one. The gradations of shades between pure white to darkest African is so exceedingly delicate in Panama that there is always difficulty in determining whether the subject under consideration belongs to the "gold" or the "silver" class, for the words black and white

A FETE DAY AT TABOGA

are tactfully avoided in the Zone in their reference to complexions. "This is my plan", said Col. Mason in charge of the hospital. "On certain days the patients are allowed visitors. When the color of the inmate is problematical, as is usually the case with women, I ask if she wants her husband to visit her. If she does and he proves to be a negro, she goes into the colored ward. If she still insists that she is white, she can go into the white ward, but must dispense with his visits".

FEATHER PALM AT ANCON

Under our treaty the Zone sanitary department takes charge of the insane of Colon and Panama, and a very considerable share of the grounds at Ancon is divided off with barbed wire for their use. The number of patients runs well into the hundreds, with very few Americans. Most are Jamaica negroes and the hospital authorities say that they are mentally unbalanced by the rush and excitement of life on the Zone. I never happened to see a Jamaica negro excited unless it happened to be a Tivoli Hotel waiter confronted with the awful responsibility of an extra guest at table. Then the excitement took the form of deep melancholy, exaggerated lethargy, and signs of suicidal mania in every facial expression.

Beside the hospital service the sanitary department maintains dispensaries at several points on the line, where necessary drugs are provided for patients in the Commission Service free. Patent medicines are frowned upon, and such as are purveyed must be bought through the Commissary. Medical service is free to employees and their families. All doctors practicing on the Zone are on the gold payroll for wages ranging from $1800 to $7000 a year. I could not find upon inquiry that the fact that they were not dependent upon the patient for payment made the doctors less alert or sympathetic. At least no complaints to that effect were current.

To my mind the most notable effect upon the life of the Zone of this system of free medical attendance was that it added one more to the many in-

TABOGA FROM THE BATHING BEACH

ducements to matrimony. Infantile colic and measles are shorn of much of their terror to the young parent when no doctor's bill attends them. Incidentally, too, the benevolent administration looks after the teeth of the employees as a part of its care of their general health. One effect of this is to impress the visitor with the remarkable number of incisors gleaming with fresh gold visible where Zone folk are gathered together.

The annual vacations of the workers during the construction period may properly be considered in connection with sanitation work on the Zone, for they were not permitted to be mere loafing time. The man who took a vacation was not allowed to stay on the Isthmus. If he tried to stay there Col. Goethals found it out in that omniscient fashion of his and it was a case of hike for a change of air or go back to work. For, notwithstanding the fact that Col. Gorgas pulled the teeth of the tropics with his sanitary devices and regulations, an uninterrupted residence in that climate does break down the stamina and enfeeble the energy of men from more temperate climes. Every employee was given 42 days' vacation with full pay, but he had to quit the Zone for some country which would afford a beneficial climatic change. Of course most went back to the United States, being encouraged thereto by a special rate on the steamship of $30—the regular rate being $75. But beside this vacation each employee was entitled to 30 days' sick leave. It was not an exceedingly difficult task to conjure up enough symptoms to persuade a friendly physician to issue a sick order. The favorite method of enjoying this respite from work was to spend as little of the time as possible at Ancon, and the rest at the sanitarium on the Island of Taboga.

TABOGA IS FURTHERMORE THE CONEY ISLAND OF PANAMA

That garden spot in the Bay of Panama where the French left the sanitarium building we now use is worth a brief description. You go thither in a small steamboat from Balboa or Panama and after about three hours' steaming a flock of little white boats, each with a single oarsman, puts out from the shore to meet you like a flock of gulls as you drop anchor in a bay of truly Mediterranean hue. To the traveled visitor the scene is irresistibly reminiscent of some little port of Southern Italy, and the reminder is all the more vivid when one gets ashore and finds the narrow ways betwixt the elbowing houses quite Neapolitan for dirt and ill odor. But from the sea one looks upon a towering hill, bare toward its summit, closely covered lower down by mango, wild fig, and ceiba trees, bordered just above the red roofs of the little town by a fringe of the graceful cocoanut palms. Then come the houses, row below row, until they descend to the

curving beach where the fishing boats are drawn up out of reach of the tide which rises some 20 feet.

From the bay the village with its red-tiled roofs and yellow-white walls looks substantial, a bit like Villefranche, the port of Nice, but this impression is speedily dispelled when one lands in one of the boats, propelled by the oarsman standing and facing the bow — a fashion seldom seen save in Italian waters. For seen near at hand the houses are discovered to be of the flimsiest frame construction, save for a few clustering about the little church and sharing with it a general decrepitude and down-at-the-heels air that makes us think they have seen better days. As indeed they have and worse days too, for Taboga once shared in the prosperity of the early Spanish rule, and enjoyed the honor of having entertained for a few weeks Sir Henry Morgan, that murderous pirate, whom England made a baronet and a colonial governor by way of reward for his exploits in piracy and rapine. Taboga must have treated the buccaneer well, for not only did he forbear to sack the town, but so deep was the devotion paid by him and his men to certain tuns of excellent wine there discovered that they let a Spanish galleon, deep-laden with gold and silver, slip through their fingers rather than interrupt their drinking bout.

Tradition has it that the galleon was sunk nearby to save it and its cargo from the pirates, and treasure seekers have been hunting it ever since with the luck that ordinarily attends aspirants for dead men's gold.

BURDEN BEARERS ON THE SAVANNA

Just now the wine and wassail of Taboga is limited to about six grog shops, which seems an oversupply for the handful of fishermen who inhabit its tumble-down hovels. Each bar, too, has its billiard table and one is reminded of Mark Twain's islands in the South Sea where the people earned an honest living by taking in each other's washing. One wonders if the sole industry of the Tabogans is playing billiards. There is indeed little to support the town save fishing, and that, if one may judge from specimens carried through the lanes, must be good. Some of the boats at anchor or drawn up on the beach attest to some prosperity amongst them that go down to the sea in ships. One that I saw rigged with a fore-and-aft sail and a jigger was hewn out of a single log like a river cayuca and had a beam

HOTEL AT BOUQUETTE, CHIRIQUI
The only point in Panama at which Canal employees may spend their vacations

exceeding four feet. Before many of the houses were lines hung with long strips of fish hanging out to dry, for it is a curious property of this atmosphere that despite its humidity it will cure animal tissues, both fish and flesh, quickly and without taint.

Agriculture in Taboga is limited to the culture of the pineapple, and the local variety is so highly esteemed in the Panama markets that some measure of prosperity might attend upon the Tabogans would they but undertake the raising of pines systematically and extensively. But not they. Their town was founded in 1549 when. at the instance of Las Casas. the King of Spain gave freedom to all Indian slaves. Taboga was set apart as a residence for a certain part of these freedmen. Now what did the freedom from slavery mean but freedom from work? This view was probably held in the 16th century and certainly obtains in Taboga today, having been enhanced no doubt by the liberal mixture of negro blood with that of the native Indians. If the pineapples grow without too much attention well and good. They will be sold and the grog shops will know that real money has come into town. But as for seriously extending the business—well, that is a thing to think of for a long, long time and the thought has not yet ripened. It is a wonder that the Chinese who hold the retail trade of the island and who are painstaking gardeners have not taken up this industry.

We may laugh at the easy-going Tabogan if we will. but I do not think that anyone will come out of his church without a certain respect for his real religious sentiment. 'Tis but a little church, of stuccoed rubble, fallen badly into decay, flanked by a square tower holding two bells, and penetrated by so winding and narrow a stair that one ascending it may feel as a corkscrew penetrating a cork.

A BIT OF ANCON HOSPITAL GROUNDS

But within it, shows signs of a reverent affection by its flock not common in Latin-American churches. We may laugh a little at the altar decorations which are certainly not costly and may be a little tawdry, but they show evidences of patient work on the part of the women, and contributions by the men from the slender gains permitted them by the harsh land and the reluctant sea. About the walls hang memorial tablets, not richly sculptured indeed, but showing a pious desire on the part of bygone generations to have the virtue of their loved ones commemorated within hallowed walls. Standing in a side aisle was an effigy of Christ, of human size, bearing the cross up the hill of Gethsemane. The figure stood on a sort of platform, surrounded by six quaint lanterns of panes of glass set in leaded frames of a design seen in the street lamps of the earlier Spanish cities. The platform was on poles for bearers, after the fashion of a sedan chair, and we learned from one who, more fortunate than we, had been there to see, that in Holy Week there is a sort of Passion Play—rude and elementary it is true, but bringing to the surface all the religious emotionalism of the simple people. The village is crowded with the faithful from afar, who make light of any lack of shelter in that kindly tropic air. The Taboga young men dress as Roman soldiers, the village maidens take their parts in the simple pageant. The floats, such as the one we saw, are borne up and down the village streets which no horse could ever tread, and the church is crowded with devotional worshipers until Easter comes with the joyous tidings of the Resurrection.

NURSES' QUARTERS AT ANCON

As to the part of Taboga in the economy of the Canal work, we have there a sanitarium inherited from the French, and used as a place of convalescence for almost recovered patients from the hospitals of the Zone. After breathing the clear, soft air, glancing at the comfortable quarters and enjoying to the fullest a lunch costing fifty cents that would put Broadway's best to the test, and make the expensive Tivoli dining-room seem unappetizing in comparison, we could well understand why every employee with thirty days' sick leave to his credit gets just such a slight ailment as needs a rest at Taboga for its cure.

Near Taboga is the leper hospital and the steamer stops for a moment to send ashore supplies in a small boat. Always there are about 75 victims of this dread and incurable disease there, mostly Panamanians with some West India negroes. A native of North America with the disease is practically unknown. The affliction is horrible enough in itself, but some cause operating for ages back has caused mankind to regard it with more fear than the facts justify. It is not readily

THE CHIEF INDUSTRY OF THE NATIVES IS FISHING

communicable to healthy persons, even personal contact with a leper not necessarily causing infection unless there be some scratch or wound on the person of the healthy individual into which the virus may enter. Visitors to the Isthmus, who find interest in the spectacle of hopeless human suffering, frequently visit the colony without marked precautions and with no reported case of infection.

To what extent the sanitation system so painstakingly built up by Col. Gorgas and his associates will be continued after the seal "complete" shall be stamped upon the Canal work, and the workers scattered to all parts of the land, is not now determined. Panama and Colon will, of course, be kept up to their present standards, but whether the war against the malarial mosquito will be pursued in the jungle as it is today when the health of 40,000 human beings is dependent upon it is another question. The plan of the army authorities is to abandon the Zone to nature—which presumably includes the *anopheles*. Whether that plan shall prevail or whether the United States shall maintain it as an object lesson in government, including sanitation, is a matter yet to be determined. In a hearing before a congressional committee in 1913 Col. Gorgas estimated the cost for a system of permanent sanitation for the Zone, including the quarantine, at $90,000 a year. As his total estimates for the years 1913–14 amounted to $524,000, this is indicative of a very decided abandonment of activity in sanitary work.

At all times during his campaign against the forces of fever and infection Col. Gorgas has had to meet the opposition charge of extravagance and the waste of money. It has been flippantly asserted that it cost him $5 to kill a mosquito—of course an utterly baseless assertion, but one which is readily met by the truth that the bite of a single infected mosquito has more than once cost a life worth many thousand times five dollars. To fix precisely the cost of bringing the Zone to its present state of healthfulness is impossible, because the activities of the sanitary department comprehended many functions in addition to the actual work of sanitation. Col. Gorgas figures that the average expenses of sanitation during the whole construction period were about $365,000 a year and he points out that for the same period Chicago spent $600,000 without any quarantine or mosquito work. The total expenditures for sanitation when the Canal is finished will have amounted to less than one per cent of the cost of that great public work and without this sanitation the Canal could never have been built. That simple statement of fact seems sufficiently to cover the contribution of Col. Gorgas to the work, and to measure the credit he deserves for its completion.

THE LEPER SETTLEMENT ON PANAMA BAY

CHAPTER XV

THE REPUBLIC OF PANAMA

THE Republic of Panama has an area of from 30,000 to 35,000 square miles, roughly approximating that of the state of Indiana. No complete survey of the country has ever been made and there is pending now a boundary dispute with Costa Rica in which the United States is arbitrator. The only other boundary, not formed by the sea, is that at which Panama and Colombia join. But Colombia says there is no boundary at all, but that Panama is one of her provinces in a state of rebellion. So the real size and bounds of the Republic must be set down as somewhat indeterminate.

The circumstances under which Panama became an independent nation have been set forth in an earlier chapter. It is safe to say that with the heavy investment made by the United States in the Canal Zone, on the strength of a treaty with the infant republic, the sovereignty of Panama will be forever maintained against all comers—except the United States itself. There are political philosophers who think that the Isthmus state may yet be the southern boundary of the Great Republic of the North. For the present however Uncle Sam is quite content with the Canal Zone and a certain amount of diplomatic influence over the government of Panama.

Panama is divided into five provinces, Bocas del

THE GORGE OF SALAMANCA

NATIVE FAMILY IN CHORRERA

Toro, Cocle, Colon, Chiriqui, Los Santos, Panama and Veragua. Its total population by the census of 1911 was 386,749, a trifle more than the District of Columbia which has about one five-thousandth of its area, and almost precisely the same population as Montana which has less than half its size. So it is clearly not over-populated. Of its population 51,323 are set down by its own census takers as white, 191,933 as mestizo, or a cross between white and Indian, 48,967 as negro; 2313 Mongol, and 14,128 Indian. The census takers estimated that other Indians, living in barbarism remote from civilization and unapproachable by the enumerators, numbered 36,138.

All these figures have to be qualified somewhat. The mestizos are theoretically a cross between whites and Indians, but the negro blood is very generally present. It is doubtful, too, whether those classed as white are not often of mixed blood.

A singularly large proportion of the population lives in the towns. In 12 towns, exceeding 7000 inhabitants each, are more than 150,000 people. More than one-third of the people therefore are town dwellers, which is to say they are unproductive citizens. Meanwhile more than five-eighths of the arable land in the country is not under cultivation.

The five chief towns of Panama with their population in 1911 are:

Panama	37,505
Colon	17,748
David	15,059
Santiago	13,081
Bocas del Toro	9,759

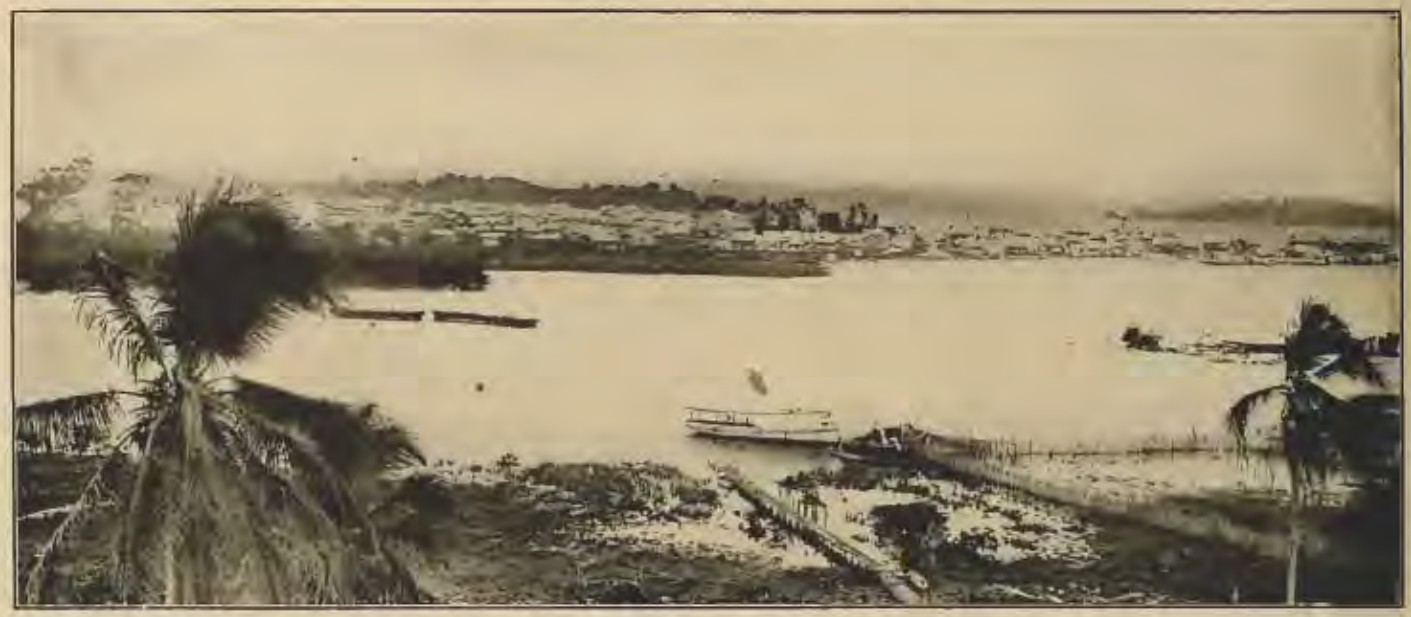
Of these towns David is the capital of the Chiriqui province, the portion of the republic in which cattle growing and agriculture have been most developed. Bocas del Toro is a banana port, dependent upon that nutritious fruit for its very existence, and the center of the business of the United Fruit Company in Panama. At present the former town is reached by a 300 mile water trip from Panama City; the latter by boat from Colon. The government has under way plans for a railroad from Panama to David which give every indication of being consummated.

THE HOTEL AT DAVID

The soil of the Republic differs widely in its varying sections, from the rich vegetable loam of the lowlands along the Atlantic Coast, the outcome of years of falling leaves and twigs from the trees to the swamp below, to the high dry lands of the savannas and the hillsides of the Chiriqui province. All are undeniably fertile, that is demonstrated by the rapid and rank growth of the jungle. But opinions differ as to the extent to which they are available for useful agriculture. Some hold that the jungle soil is so rich that the plants run to wood and leaves to the exclusion of fruits. Others declare that on the hillsides the heavy rains of the rainy seasons wash away the surface soil leaving only the harsh and arid substratum. This theory seems to be overthrown by the fact that it is rare to see a hillside in all Panama not covered with dense vegetation. A fact that is well worth bearing in mind is that there has never been a systematic and scientific effort to utilize any part of the soil of Panama for productive purposes that has not been a success. The United Fruit Company in its plantations about Bocas del Toro has developed a fruitful province and created a prosperous town. In the province of Cocle a German company has set out about 75,000 cacao trees, 50,000 coffee bushes and 25,000 rubber trees, all of which have made good progress.

A STREET IN PENENOME

The obstacles in the path of the fuller development of the national resources of Panama have sprung wholly from the nature of its population. The Indian is, of course, not primarily an agriculturist, not a devel-



VIEW OF BOCAS DEL TORO

oper of the possibilities of the land he inhabits. The Spanish infusion brought to the native population no qualities of energy, of well-directed effort, of the laborious determination to build up a new and thriving commonwealth. Spanish ideals run directly counter to those involved in empire building. Such energy, such determination as built up our great northwest and is building in British Columbia the greatest agricultural empire in the world, despite seven months annually of drifting snow and frozen ground, would make of the Panama savannas and valleys the garden spot of the world. That will never be accomplished by the present agrarian population, but it is incredible that with population absorbing and overrunning the available agricultural lands of other zones, the tropics should long be left dormant in control of a lethargic and indolent people.

Photo by Critchlow

VISTA ON THE RIO GRANDE

Benjamin Kidd, in his stimulative book, "Social Evolution", says on this subject:

"With the filling up to the full limit of the remaining territories suitable for European occupation, and the growing pressure of population therein, it may be expected that the inexpediency of allowing a great extent of territory in the richest region of the globe—that comprised within the tropics—to remain undeveloped, with its resources running largely to waste under the management of races of low social efficiency, will be brought home with ever-growing force to the minds of the Western (Northern) peoples. The day is probably not far distant when, with the advance science is making, we shall recognize that it is in the tropics and not in the temperate zones we have the greatest food-producing and material-producing regions of the earth; that the natural highways of commerce in the world are those which run north and south; and that we have the highest possible interest in the proper development and efficient administration of the tropical regions, and in an exchange of products therewith on a far larger scale than has yet been attempted or imagined. . . . It will probably be made clear, and that at no distant date, that the last thing our civilization is likely to permanently

was preparing to become a man of family. Maria was quite willing, and so one day they strolled off together hand in hand to a clearing Miguel had made with his machete on the river bank. With that same useful tool he cut some wooden posts, set them erect in the ground and covered them with a heavy thatch of palmetto leaves impervious to sun or rain. The sides of the shelter were left open during the first months of wedded life. Later perhaps, when they had time they would go to Cruces at the period of the priest's regular visit and get regularly married. When the rainy season came on and walls were as necessary as a roof against the driving rain, they would build a little better. When that time came he would set ten stout uprights of bamboo in the ground in the shape of an oblong, and across the tops would fasten six cross pieces of girders with withes of vine well soaked to make them pliable. This would make the frame of the first floor of his house. The walls he would make by weaving reeds, or young bamboo stalks in and out betwixt the posts until a fairly tight basketwork filled the space. This was then plastered outside with clay. The dirt, which in time would be stamped down hard, formed the floor. For his second story a tent-shaped frame of lighter bamboo tightly tied together was fastened to the posts, and cane was tied to each of the rafters as we nail laths to scantling. Thus a strong peaked roof, about eight feet high from the second floor to the ridgepole was constructed, and thatched with palm leaves. Its angle being exceedingly steep it sheds water in the fierce tropic rain storms. The floor of the second story is made of bamboo poles laid transversely, and covered heavily with rushes and palmetto. This is used only as the family sleeping apartment, and to give access to it Miguel takes an 8-inch bamboo and cuts notches in it, into which the prehensile toes of his family

BANANA MARKET AT MATACHIN

IN THE CHIRIQUI COUNTRY

may fit as they clamber up to the land of Nod. Furniture to the chamber floor there is none. The family herd together like so many squirrels, and with the bamboo climbing pole drawn up there is no danger of intrusion by the beasts of the field.

In the typical Indian hut there is no furniture on the ground floor other than a rough hewn bench, a few pieces of pottery and gourds, iron cooking vessels and what they call a kitchen, which is in fact a large flat box with raised edges, about eight square feet in surface and about as high from the floor as a table. This is filled with sand and slabs of stone. In it a little fire is built of wood or charcoal, the stones laid about the fire support the pots and pans and cooking goes on as gaily as in any modern electric kitchen. The contrivance sounds primitive, but I have eaten a number of excellent meals cooked on just such an apparatus.

Now it will be noticed that in all this habitation, sufficient for the needs of an Indian, there is nothing except the iron pots and possibly some pottery for which money was needed, and there are thousands of families living in just this fashion in Panama today. True, luxury approaches in its insidious fashion and here and there you will see a $1.25 white iron bed on the main floor, real chairs, canned goods on the shelves and—final evidence of Indian prosperity!—a crayon portrait of the head of the family and a phonograph, of a make usually discarded at home. But when Miguel and Maria start out on the journey of life a machete, a gun and the good will of their neighbors who will lend them yams until their own planting begins to yield forms a quite sufficient capital on which to establish their family. Wherefore, why work?

It is beyond doubt to the ease with which life can be sustained, and the torpidity of the native imagination which depicts no joys to spur one on to effort that the unwillingness of the native to do systematic work is due. And from this difficulty in

BANANA PLANT; NOTE SIZE OF MAN

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A TYPICAL NATIVE HUT

While native architecture is not stately it is artistic in that it harmonizes with its natural surroundings and is eminently adapted to the needs of the people who inhabit the huts.

getting labor follows the fact that not one quarter of the natural resources of Panama are developed. Whether the labor problem will be solved by the distribution throughout the republic of the Caribbean blacks who have worked so well on the Zone is yet to be seen. It may be possible that because of this the fertile lands of Panama, or the savannas so admirably fitted for grazing, can only be utilized by great corporations who will do things on so great a scale as to justify the importation of labor. Today the man who should take up a large tract of land in the Chiriqui country with a view to tilling it would be risking disaster because of the uncertainty of the labor supply.

A NATIVE LIVING ROOM AND STAIRWAY
By pulling up the bamboo ladder, or turning it, communication with the upper floor is closed

Another obstacle in the way of foreign settlement of Panama has been the uncertainty of land titles. Early surveyors seem to have been in the habit of noting as the identification marks of their lines such volatile objects as a blackbird in a tree, or such perishable ones as an ant hill or a decaying stump. Facilities for recording titles also have been ill arranged. One of the first tasks of the new Republic was to take up this matter and it has been reduced to fairly systematic form. The Republic is offering for sale great quantities of public lands long held as commons by various municipalities. Much of this land lies along the line of the railroad from Panama to David, and is of varying grades suitable for grazing, forestry or agriculture. A fixed price of 50 cents per hectare is charged, a hectare being practically 2½ acres. The government has gone quite efficiently into the task of disposing of these lands, and pamphlets explanatory of methods of securing titles, terms, etc., can be obtained by addressing the Administrator-General at Panama. The Pan-American Union, of Washington, D. C., has issued a pamphlet giving a summary in English of the Panamanian law bearing upon the subject.

CONSTRUCTION OF ROOF OF A NATIVE HOUSE
The photograph is taken looking directly upward from the ground floor

With the lack of labor, and the uncertainty of land titles, the final impediment to the general development of the interior of Panama is to be found in the lack of roads. It is not that the roads are bad—that is the case in many of our own commonwealths. But in a great part of Panama there are literally no roads at all. Trails, choked by the jungle and so washed by the rains that they are merely lanes floored with boulders, are the rule. The heavy ox-cart is the only vehicle that will stand the going, and our light American farm wagons would be speedily racked to pieces. In the Canal Zone the Com-

mission has built some of the best roads in the world, utilizing the labor of employees convicted of minor offenses. Stimulated by this example the Panama government has built one excellent road from the chief city across the savannas to Old Panama and thence onward into the interior. It is hoped that the spectacle of the admirable roads in the Zone will encourage the authorities of the Republic to go into road building on a large scale in their own country. In no other way can its possibilities be realized. At present the rivers afford the surest highways and land abutting them brings higher prices.

RUBBER PLANTATION NEAR COCLE

The planter's original hut in the foreground. The board cabin with corugated iron roof shows prosperity

David, the largest interior town of Panama, is the central point of the cattle industry. All around it are woods, or jungles, plentifully interspersed with broad prairies, or llanos, covered with grass, and on which no trees grow save here and there a wild fig or a ceibo. Cattle graze on the llanos, sleek reddish beasts with spreading horns like our Texas cattle. There are no huge herds as on our western ranges. Droves of from ten to twenty are about the average among the small owners who rely on the public range for subsistence. The grass is not sufficiently nutritious to bring the cattle up to market form, so the small owners sell to the owners of big ranches who maintain potreros, or fattening ground sown with better grasses. A range fed steer will fetch $15 to $18, and after six or eight months on the potrero it will bring $30 to $35 from the cattle shipper at David. Since the cost of feeding a beeve for that period is only about one dollar, and as the demand is fairly steady the profit of the ranchman is a good one. But like all other industries in Panama, this one is pursued in only a retail way. The market is great enough to enrich ranchmen who would go into the business on a large scale, but for some reason none do.

Passing from llano to llano the road cuts through the forest which towers dense and impenetrable on

BOLIVAR PARK AT BOCAS DEL TORO