former location. With two full crews, and both Chiefs of Party thoroughly familiar with the country, we had to do very little preliminary work. We did in two months what it took us eight months to do in the first place. Again I was out of a job, but not for long. The Cuba Central Railroad Co. did not give up easily. I got a letter from Ames to meet their engineer, H. F. Wilson, Jr., and take him over the line we ran for them, from Nuevitas to Moron—which I did. Not very long after the trip was completed, I got a letter from Wilson offering me the position of his assistant in sounding Nuevitas Bay for dredging and docks. There was nothing spectacular about that job. Three men in a boat reading a sounding line, and two men on shore reading angles. We built a camp on Punto Pastelillo, and camped right on the job. Because of high winds in the afternoons, we were usually out on the bay just as early as we could see and stayed till the wind drove us off, sometime in the afternoon. The job lasted just four months. We had already received our notices that the company had no more work for us when we finished here, when I got a letter offering me a job on the Zapata Swamp Survey. I accepted it!

Chapter 17

THE ZAPATA SWAMP

(CIENEGA DE ZAPATA)

Looking at a map of Cuba, you will note that quite a sizable amount of land on the south coast extending from Batabano* just south of Havana, on the west, to Cienfuegos in Santa Clara Province, on the east, is marked as swampy. The map makers were not kidding. South of Matanzas Province, but actually in Santa Clara Province, is a peninsula extending down into the Caribbean Sea, more or less in the shape of a shoe. Zapata is the Spanish for shoe—hence the name.

Fronting on the Caribbean Sea, from the toe of the shoe to Cienfuegos Bay is a coral limestone ridge. It is not very high, probably not over 20 or 25 feet anywhere, but is high enough to cut off all surface drainage into the Caribbean Sea and turn it west into the Gulf of Batabano*. The swamp contains well over half a million acres and varies in elevation from just above sea level near the mouth of the Hateguanico River, in the west, to about eight feet near the east end, some seventy or eighty miles to the east, giving an approximate fall of one foot in ten miles which is insufficient fall to drain anything. To the north of the swamp are two or three million acres of red land underlaid with limestone. There are a few small streams in this area emptying into the swamp but by far the larger part of Cuba's heavy rainfall seeps into the ground and finds underground channels. What goes down must come up! All this water comes up out in the swamp in bubbling springs, varying in size from six inches in diameter up to twenty or twenty-five feet. In half a million acres there is room for a lot of kinds of swamp, and so there is here.

On the north side, "costanera" in Spanish, the native jungle at one time came down to and extended out into the swamp in places. When we surveyed it in 1913, there was still some forest and some good timber, but most of it was cleared and in cultivation right down to the water's edge, or in pasture clear

out into the swamp. Where the few streams came in, they brought down trash and drift—the sawgrass and cattails kept it from floating away. It accumulated and tree seeds fell on it and grew. When we were there, there were trees three or four inches in diameter on these floating islands; and the accumulation of drift was so much that you could walk on it in places although it wasn't easy. The water around these islands was generally waist deep or more. When you came to them, you couldn't push them aside; and, when you tried to climb on top, the edge broke up and you were still in the drink. You had to stay there till you could find a log or piece of driftwood big enough to support your weight. Once on top, you could start walking. As you walked, the apparent land you were on sank, and rose up in front of you. It was a funny feeling but you made progress till you suddenly stepped on a place too thin to support you. Down you went like a nickel in the slot! Then you were in a jam! It was too thin to support you, and you were fenced in on every side. The only escape was to start pulling it apart with your hands till you could find a timber big enough to hold you and they were sometimes quite a ways apart. We soon learned that the easiest way across these places, "temblederras" in Spanish, was to crawl over them on hands and knees, thus distributing our weight. That wasn't too hard when you had nothing to carry, but it was a real task to crawl and carry the heavy surveying instruments. Fortunately for us, while some of these were quite large, there weren't many of them.

Near the south side were thousands of acres of mangroves, a peculiar tree if you can call it such, that has its main body a few feet above ground and from that sends branches into the air, and spreads its roots out in all directions to send them into the ground. As these trees grow close together, the roots crisscross each other until getting through it becomes quite a formidable undertaking and can be accomplished only by the vigorous use of ax and machete. The only use for this wood is to use the bark for tanning hides, just as we used to use oak bark for tanning in the States. It seems to grow equally well in fresh or salt water.

There are still more thousands of acres of llana, pronounced "yana." That is a tree whose bark

and leaves very much resemble our northern willow but the wood is a reddish brown, just a little redder than black walnut. It is shallow-rooted and the swamp earth is very soft, so every wind that comes along blows it over. It doesn't die but points its branches skyward and keeps on growing. As the wind doesn't always blow from the same direction, these fallen trees get badly tangled up. To get our survey lines through, we had to go in with ax and machete to cut the branches off about where they headed upward, and walk across on the semi-horizontal trunks and branches. As our boots were always wet—and wet boots are always slippery—we got many falls and had difficulty finding places between the fallen trees and branches to set up our surveying instruments. In a few cases we had to cut miles through these llana forests, leave our boat and carry our whole camp, done up in bundles and hung on our backs with shoulder straps, or, rather, ropes, over this kind of trail. We didn't have any straps. It is both surprising and painful to a man who has never tried it, how heavy a fifty-pound load can get and how these shoulder ropes cut in when both hands are busy trying to keep you from slipping and can't be used to shift the load or run under the ropes to ease the cutting action.

Then there were the "blanquizales", from "blanca," (white). They were areas with no vegetation whatever, and with a white substance floating on the water, which at a distance looked like white or gray ashes, but on closer examination were found to be flaky. So far as I know, there has never been a satisfactory reason found for this peculiar condition. As there is no vegetation, you sink much deeper in the mud than where there is grass and roots; and, also, the mud is much stickier and harder to get through. As I remember it, the only one I ever crossed was some 500 or 600 feet across and it took us several hours of the hardest kind of work to get out. Fortunately for us, they were not very many and not very extensive. One was enough. We went to quite some lengths to go around the rest.

Then there were great fields of "cattails". These were where streams emptied into the swamp and brought silt and fertility from the higher ground and were just beyond the temblederras. Then came the

bulk of the swamp - miles and miles of sawgrass just a little higher than your head and dotted here and there with dry-weather tree-covered islands called "cayos". Had it not been for these cayos, surveying the swamp with the equipment of that time, would have been impossible. The entire swamp is covered with water and mud to a combined depth ranging from half-knee deep up to the armpits. The swamp is so big that it took several days to make a crossing, so it was impossible to return to dry land for the night and you can't sleep in water that deep, especially when there are crocodiles everywhere. We moved camp everyday and had to find a cayo for the night.

Cuba is in the torrid zone - hence, the Cubans make no provision whatsoever for warming their houses. Many is the time I have wished they did for there are days, particularly early in the morning, when it is quite cool. Their only fuel is wood so all cooking is with wood, yet they had no such convenience as a stove. In the country some cooked with three stones on the ground but most of them set four forked branches in the ground and put two poles across them. Then they split palm trees and made a box with the boards on top of the poles, and filled the box with dirt. Then, if they could get any brick, they built two walls eight or ten inches high and as far apart, and laid some iron bars across the top to set the cooking utensils on. The fire was built between the walls. Pots and pans were always black.

In the cities, they built their fireplaces or hearths of brick. They built them up about waist high and set grates in them at convenient distances apart and built a big hood over the whole thing with a pipe to take the smoke out above the house. The fuel is charcoal which is made from wood. The wood is burned into charcoal before it goes to town. The charcoal weighs less, gives off more heat and less smoke than raw wood. Almost any wood will make charcoal but some make better charcoal than others. Sometime, somehow, somebody discovered that the llana wood on the southside of the Zapata Swamp makes the best charcoal in Cuba. As the housewives of Havana learned this, they began asking for llana charcoal and the price went up. Had there been llana on the northside of the swamp, getting it to Havana would have been easy by railroad, but on the southside with

neither road nor railroad, nor beast of burden it was next to impossible, but still a trickle of it reached the market in Havana—enough to build up a demand. Many of these charcoal-burners were Gallegos from the Province of Galecia in Spain. The Gallegos have the reputation of being the most stupid and the least educated, but the hardest workers of any of the Spaniards—the typical "man with a strong back and a weak mind".

Among these charcoal-burners was a man of real vision, despite his race and reputation. His name was Maximino Yebres. He got tired of doing the hard work himself; went to Havana; enlisted some capital and put the charcoal business on a real paying basis. He imported a lot of his countrymen, who thrive on hard work and small pay. He went down to Bahia de Cochinos (Bay of Pigs) and put in a store; advanced these men groceries and sent them up into the llana woods to make charcoal by the sack. He dug a canal by hand from the bay up into the woods; constructed places to burn the charcoal; built barges to haul the wood and charcoal; and either bought or rented sailboats to haul the charcoal to Batabano, where it was loaded on a train and shipped to Havana. Just how many tools and ideas he used he had seen in use before or how many were his own, I will never know, but the whole set-up was almost fantastic with what they had to work with. His canal from the bay to the swamp was dug with pick and shovel, which is the kind of work Gallegos are adept at. But, when he hit the swamps, it had to be dug under water and the material to be dug was peat,not soil. Picks and shovels could not be used. He went to the blacksmith-shop; got thin steel plates about five-by-seven inches; sharpened one seven-inch side to almost a razor-edge; welded a smooth rod about three feet long, with a smooth knob on one end, to the other seven-inch side at right-angles to it and called it a "coa". I didn't see them dig the transition from dry land into the peat swamp but did watch some of them digging in the peat. Believe me it was a laborious task, and showed real ingenuity on the part of the man who thought it up.

As I just happened to come along when the canal was in process of digging, the sides were already established and were all vertical. The man doing the

work stood waist deep in water in the canal and faced the way the canal was being dug. He took the knob of the coa in one hand and the rod in the other and setting it so as to continue the side of the canal, shoved it down till the knob hit the peat. He then moved over seven inches, the width of his coa, and made another cut parallel to the first. Then he turned his coa at right angles to his cuts and ran it down again cutting out the chunk between the two former cuts. After running the coa down to the knob, he jiggled it a little to break loose his chunk; let go of the coa; put one hand on the top of the chunk; stuck his toe under it; with his toe, raised it up to where he could get his other hand under the bottom without diving; then with both hands he heaved it out on the bank and cut another. Thus he proceeded cutting chunks about seven-inches square by three-feet long and piling them on the banks in such a way that they could later be walked on and used as a tow-path. The canal was about 8 or 9 feet wide.

The barges were also of special design. They were fifty to sixty feet long, about six-feet wide and three-feet deep. Built strong enough to stand hard bumps. There was no place to turn it around so it had a prow on both ends. On the top of both sides was a two-by-ten plank laid flat. When the swamp was low, two men walked on the spoil bank and pulled the barge with ropes. The man at the bow, pulling alone, would promptly pull the bow into the bank. The man at the stern would pull the stern into his bank and the bow into the opposite. By co-ordinating their pulls, the barge proceeds up or down the canal in the center. When the water in the swamp is so deep they cannot walk on the spoil bank, each man takes a long slender pole, specially prepared and kept for the purpose, and standing on the two-by-ten plank on the bow of the boat places one end of his pole firmly in the bank; then, both leaning on their poles, they walk in unison toward the stern. When they reach the stern, still working in unison, they lift their poles and walk to the bow and go over it again. The thrust of their feet propels the barge. Judging from the fact that they use the ropes when the water is low enough, rather than the poles, I gather that that is easier work when it is practical. But don't get the

idea that either method is child's play. These Gallegos are not accustomed to child's play.

When the canal reached the llana woods, they cut the wood out of the way and piled it on the side to be burned into charcoal later, and dug the canal into the woods as far as they cared to haul the wood. There they dug a circular canal on one side, throwing the material dug inside the circle to raise the ground-level above water and construct a place to burn the charcoal. This area they spelled "plan", but pronounced "plung". When the plan was done, operations began. First they cut their wood approximately three-feet long and laid it on trestles something like saw-horses but higher, with boards across the bottom of the legs so it would not sink in the mud. They had a kind of carrying harness with a thick-padded cap that fit over the head and the traces hung down the back. When there was a man-load on the trestles, they put on the harness and backed under the load and brought the traces up back of the load and over their shoulders. The loads these men carried would stagger a pack animal. To keep from sinking in the mud, they always kept two-by-twelve planks to walk on. When a plan was new, they laid a plank across the canal around the plan and carried the wood direct to the plan. Later they carried the wood to barges and hauled it in. They stood the wood on end and built the pile from three-to-five layers high. When they had the pile as big as they wanted it, they cut sawgrass and covered it up. Then they went to the seashore and hauled sand and covered the sawgrass. With a hole at the bottom to light it and a vent at the top to draw the fire through the wood, they lighted it. When it had burned the right amount to be well on fire, they stopped the vent, and made the whole thing smoulder till it was charcoal. Once lighted, they had to keep continuous watch until the burn was complete. The grass had to be cut fresh for every burn. The sand was used over and over. When the charcoal was burned and cooled off, they sacked it; put it on the barges and hauled it to the bay where they loaded it on sailboats for Batabano. There it was loaded on the train for Havana. Maximino Yebres became quite wealthy at his charcoal business.

When Jose' Miguel Gomez was President and handing out big concessions to everyone who could pay him and

enough Congressmen their price to pass the law, Maximino got another and bigger idea. He got other capitalists interested and formed the Zapata Land Company. Some of the land around the edges of the swamp was privately owned but somewhere between seventy-five and ninety percent was government owned. They got a law passed giving them all the government land they would drain. Since you can't drain the middle of a swamp without draining the edges, the same law provided that private owners must pay their proportionate part of the cost of drainage or forfeit their swampland. This land is the same kind of land as the Florida Everglades; so it looked like a good deal both for the Zapata Land Company and the Cuban Government and certainly was a good deal for Jose' Miguel and his Congressional friends.

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I was vaguely aware that there was a Zapata Swamp, but that is all I knew about it - and cared less - when on August 1, 1913, I got a letter from Jack Gass, Chief Engineer of the Zapata Land Company. He said they were surveying the swamp and were finding it tough going. The mud and water were deep and their supplies had to be carried in on men's backs; but so far they had had no sickness, but that they were having a lot of trouble keeping engineers. Stockley was with them and had recommended me as a man who could take hardships. He offered me a position (Engineers are supposed to hold positions; this turned out to be a job) as Chief of Party at $175 the first month and $200 a month and expenses after that if I stuck. That hit me in a very tender spot. At that time I was getting $125 and the job was just winding up. I had no idea where there was another job. Furthermore, $150 was the biggest salary I had ever had.

What puzzled me was Stockley. He was an able engineer who had worked in Mexico and had been chased out by the revolution. Ames had hired him in Havana and sent him to me as transitman on a previous survey. It was supposed to be in the dry season but turned out to be the wettest dry season I ever saw. Stockley stuck it out but sure did a lot of beefing about the hardships we had to endure. I just couldn't picture him taking the hardships Gass had described. I learned later that Gass had neglected

to mention that Stockley was in charge of the office. There was still one fly in the ointment. That letter had had to chase me down, which was a slow process in those days, so was several days old. I immediately got a telegram off asking if the job was still open. Promptly came the reply, "Report at once." I just as promptly did.

The nearest town to the job was Jaguey Grande in Matanzas Province. The company had rented a vacant building that belonged to the then defunct sugar mill, Australia, about two miles south of town, and fixed it up for a combined office and living quarters. My introduction to Mr. Gass was something of a shock. After the usual preliminaries he said, "I'm going to give you a level to run." Levelman is usually well down on the list of engineers so I said, "I thought I was to be Chief of Party." "You are, but it's a level party, and to be sure it is well done you are going to run your own level. Levels are the most important things on this job. We have had several parties on this job and have been working over two months, and I haven't a level I can put my finger on and know it is right. Your job is to straighten them out and remember that in this case your job is the most important on the project."

I arrived in camp in the afternoon and spent the next day buying camp equipment and supplies, preparing for the expedition. Both nights I was there I slept in a big room fixed up with cots as a kind of bull pen. Some of the Cubans sleeping there took particular delight in telling me hair-raising crocodile stories. I figured that they told the stories to all the tenderfoot engineers, and it was no wonder Gass couldn't keep engineers. I figured that while there might be a grain of truth in the stories, they were very much enlarged for the special benefit of the tenderfeet. On the second morning, just as I was ready to start for the swamp, Mr. Tufts, Assistant Engineer, walked out and handed me a brand-new, police-special, long-barrel thirty-eight Colt revolver, and said, "We furnish all our engineers with these. We have a license for you to carry it. Here is a box of special high-power ammunition. When it is gone, you may requisition to buy more."

At that time there were a lot of men - Cubans, Spaniards, and Americans - who took out licenses to

carry arms and carried them openly, as they expressed it, for their protection. I had already made up my mind that these were all "bullies" who made a habit of imposing on others and carried guns to prevent retaliation. I always treated men as men and never felt any need for a gun, so I said, "Thanks but I won't need it. I get along fine with the men." His answer: - "Oh, we expect you to get along with the men, this is for crocodiles." I sure felt a cold chill run down my spine, but took the gun.

The next two weeks we spent running a line of levels along the north "costanera". The outline of the swamp is very irregular, so every day we crossed arms of the swamp, but managed to find places to camp on dry land. As we all slept in hammocks, and supplies were readily available among farmers and country stores, our camp outfit was light and we moved it every day by pack horses. When we could find one, we slept in abandoned shacks. When no shack was available, we slept in the big out-of-doors. Every night we had hair-raising crocodile stories to sooth us to sleep but on the whole north costanera we didn't see a single crocodile and I began to think they were all a myth. I didn't know that the crocodiles had waged a war on the farmers' pigs, puppies, and chickens, and that their hides were quite valuable, so the farmers had met the challenge and won. When we reached Havana Province, we turned directly into the swamp and spent one night on a "cayo" in the swamp. No one had suggested tying the hammocks high, and nobody did. Sometime during the night someone yelled "crocodile"! I awoke suddenly and looked out and saw two pair of eyes. Nothing more - Remembering how low my hammock was, to say I was scared was a vast understatement. I fumbled around and got my gun at the ready; but how are you going to shoot to kill when you not only can't see the sights on the gun, but can't even see the gun? As my eyes became accustomed to the darkness I finally saw they were dogs hunting scraps from our evening meal. What a relief! Whether they belonged to some native or were wild dogs, I will never know. There were plenty of both all over Cuba.

I forgot to say that horses do not travel through the swamp. On all our trips the pack horses went around the road on solid ground, while the level

party went through arms of the swamp, a much shorter route. To get into our "cayo" in the swamp, we dismissed the horses and carried the camp in on our backs. Next day we carried our camp out to a railroad station and took the train back to headquarters at Australia. There we overhauled our outfit and got ready to cross the swamp. While we had been running west, Mr. Gass had had carpenters build a flat bottom boat of half-inch lumber so it would be light. Instead of oarlocks he had holes bored near the top and fastened shoulder ropes on. Three on each side. These were tied as a kind of harness. You put it on over your head and let it come down on the shoulder away from the boat. Then the men waded the swamp and partially pulled and partially carried the boat and its contents.

All Cubans that work away from home sleep in hammocks, but this was a special job so they had to fix them for extra safety. There were so many hammocks used in Cuba that a factory in Spain made a special hammock cloth for the Cuban trade. It is just the width of a hammock and is made of very strong fabric, loosely woven for ventilation. To make the hammock, you cut off the required length and make the end hems five or six inches wide and double or triple sew them so they will stand strain. Then you take the scissors and cut through the hem, but not through the seams, making eight or ten loops. Then you get two steel rings and a bunch of cotton cord and proceed to "string" the hammock. Theoretically, a good way to do that is to tie the cord in the loop in one corner, then pass it alternately through the rings and loops and wind up in the loop across the end. Theoretically, that allows the cord to slide through and equalize the pull. Actually, the weight of the body gives the hammock too much sag in the middle. I found a better way was to cut my cord in pieces long enough for two cords; then loop it into the ring and tie the ends into the loops in a knot that could be easily untied. If I didn't get it right the first time, I could easily change it. I have had hammock ropes to break and drop me on the ground. We couldn't have that happen here, so all hammocks were supplied with half-inch ropes two or three times the usual length so they could reach to tie between trees some distance apart.

Then we all had to have mosquito bars. Ordinary mosquito bar is too open-mesh. Small mosquitoes and "jejenes" went right through them. So we made them of light weight calico, and were they hot on a hot night! It took a lot of cloth to make them. They had to be long enough to reach from ring to ring of the hammock and wide enough so that the hammock when hung inside wouldn't reach the bottom. There was a slit on one side long enough to crawl into and a flap that hung down over it and buttoned. There was a small hole with a draw string at both upper corners and a series of small rings sewed into the upper seam. To put the thing together, you stuck the hammock through the door in the mosquito bar, and poked the ropes out through the holes at the corners, then drew up the draw string at the hammock rings, then ran another cord through the little rings and tied it to the hammock rings to hold the mosquito net off you. That took care of the hammock apparently; but, when the mosquitoes were bad, I got up of a morning with my arms burning where the mosquitoes bit me through the mosquito net, the hammock and my shirt. I remedied that by slipping a spreader stick through the loops at the head end of the hammock thus holding the mosquito net out away from me.

Next was the shelter. We took a wide piece of heavy canvas the length between the hammock rings and put a tie-string in the center of each end and several long strings on each side. After the hammock was hung, we put the canvas up over it with the cord that held up the mosquito net also acting as ridge for the canvas. Then we tied the center of both ends to the hammock rope and tied the side strings to anything they would reach, so the canvas would spread out as a roof. I have taken a lot of hard rains in this shelter and the only wetting I got was when it rained long enough and hard enough for the water to run down the hammock rope and wet the hammock. That didn't happen but about twice in all my experience. When we moved camp, which was every day, we loosed the canvas from the hammock and rolled the hammock, sheet, etc. in the canvas. Then whether it rained or whether someone was carrying it on his back and fell down, the hammock stayed dry.

Another thing we did was to splice the level legs till they were eight feet long. The swamp was

so soft you just couldn't set up an instrument with standard legs. Even with the long legs, as one engineer expressed it, if you shifted the quid of tobacco in your mouth while looking through an instrument the level bubble would shift, too. He wasn't too far wrong at that. As levels were the most important thing on the survey, I took every precaution I knew how to do a good job. I ran with two rodmen and had all turning points driven to exact water level. Then, with all the care I could take, I read both back sight and foresight twice. Then, for a check, I looked at the water. There were always little particles floating both on top of and down in the water. The particles on top were frequently driven by the wind. Those down in the water showed the way the water was running but didn't show why. Their velocity indicated the slope I could expect.

There were two very large underground channels to the south coast and the general get-away to the west. Each had its pull on the water; but a very important, yet erratic, factor in direction of flow was the big springs. Water ran out from them in all directions, and as you couldn't see them but a few feet away, we couldn't figure on how the water should run. Regardless of how I thought the water ought to run, I figured that it was going as gravity pulled. If the water was running in the same direction we were travelling, the new point should be slightly below the old point, and vice versa. If the water was running at right angles to the line, the two points should have the same elevation. If they did not, it meant that in shifting my weight from one foot to the other to look in the opposite direction I had also shifted the bubble on the level, and had it all to do over. By using these precautions I got very good closures on my work considering the kind of ground I had to run over.

With your feet alternately being stuck in the mud and sinking down in the mud, it is almost impossible to hold your equilibrium. To put your weight on an ordinary walking cane would be to sink it out of sight. So each of us cut walking sticks from the woods. They were large enough to bear a pretty good weight, about shoulder high with a wide flat fork on one end. We turned the fork down and tried to catch as much sawgrass in the fork as

possible every time we set it down. In addition, as we walked we turned our toes out and caught as much sawgrass under our feet as possible, to form a sort of mat. Everything possible was done to keep from sinking in the mud.

When all was ready we set out for our trip across the swamp, but not without some misgivings. We took the train to Murga, a small town on the edge of the swamp where we were to start across the swamp and where our new boat was already awaiting us. The lines we had to go over had been cut and leveled by other engineers. The cutting was O.K. but the levels had not been satisfactory. After we got our goods packed in the boat, I organized the outfit. I made the cook the captain of the camp and gave him five helpers. Whoever heard of a cook with five helpers? Well, he didn't need them for the cooking but sure did need them to drag the boat. I ran the level myself and used two rodmen and had one macheteman that went ahead and cut all branches that had grown up enough to obstruct the view. The other was a combination level-carrier and watchman. The level with the splices on the legs was very heavy; and, when we went forward, I had to keep my books, watch, gun, etc. dry, which wasn't easy, and keep the gun where I could get it quickly if needed. I couldn't carry it on my belt for my belt too frequently went under water when I stepped into a spring. You can't concentrate on running an instrument and watch for crocodiles at the same time; and, if they ever see you standing still, that is the time they take to slip up on you.

I selected the biggest coward in the whole outfit for this job. I don't see to this day how anyone who was so deathly afraid of crocodiles as he was could ever force himself to stay in the swamp with them, but he did, and later results showed my choice was good. While I stood at the level he didn't have a thing to do but watch for crocodiles. His deathly fear of them kept his mind (if he had one) strictly on the crocodiles; and he could see the grass moving as one slithered through it at least two hundred yards away. I had no need to worry. He always saw them in plenty of time for me to dispatch them. Sometime about this time I asked a big Spaniard I had on the crew if he wasn't afraid of crocodiles. I consider

his answer one of the best I ever heard, and I got to having the same attitude myself later, but I sure didn't have it then. His answer: "That depends altogether on what you mean by being afraid. If you mean afraid to let one get hold of me, I definitely am. If you mean afraid to work where they are, I am not but I always expect to see them first."

We hadn't gone many hundred meters into the swamp when we ran straight into trouble of an unexpected kind. I was looking through the level, watching my rodman go forward, when suddenly he dropped out of sight like a nickel in the slot. He had dropped into a very large spring some fifteen or twenty feet across and of unknown depth. It was plainly visible and I can think of but one possible reason for falling in. The grass and weeds around it were very high and probably leaning over it till he couldn't see the bank and just walked off it. Be that as it may, it was lucky for him he held onto his level rod and the macheteman was close by. He reached one end of the rod to the macheteman and he pulled him out. When I came up I gave it a wide berth.

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The incident here brought out another story, or should I say incident? As I remarked before, in Gass' letter to me he said they were having trouble keeping engineers. Well, right here is where he lost two. Two young Cuban engineers, learning of the high wages they were paying, went down to the Havana office and hired to go on the survey and went to Australia. They were thoroughly advised of the difficulties of the job, but it is much easier to be brave sitting in a comfortable office than under several feet of water, or looking a crocodile in the face. Again, in Australia, they were advised of the hardships, and again assured Mr. Gass that they could "take it". So he got the necessary equipment together and rounded up men to make them a party and sent them to Murga to run this line across the swamp. One was to run the transit, the other the level. They came just this far and the levelman watching the transitman going from one point to another saw him disappear, just as I had seen my rodman disappear, and in the same identical spot. He didn't have a level rod to hang onto but his whole machete crew was there and they pulled him out. They learned from the natives that a train

for Havana would pass through Murga shortly. In spite of wet clothes, they caught that train, leaving the whole camp with brand new instruments and a whole survey party, like sheep without a shepherd, right out there in the swamp. Next day they wired Australia to send them their trunk.

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The water at the edge of the swamp was too shallow to float the loaded boat so the camp crew was delayed in getting started till we of the level crew were well into the swamp. When they got into deeper water they soon passed us. As they went by, one of the level crew who grew up beside the swamp, called out: "Boys, you had better get the hammocks up tonight! We are apt to have crocodiles!"

As I have said before, we always had to find a "cayo" for our camp. My instructions were that when they went to set-up camp, the first thing to do was to find a place for my hammock that had an open space on one side. Then hang the hammock with the flap toward the open space. Then build a "barbacoa" (a kind of temporary table built of poles on forks set in the ground) in the open space about as high as a man could comfortably reach, and put all food on the barbacoa. Then while the cook prepared supper the others found places and hung all the hammocks, taking good care that they were on the other side of my hammock from the barbacoa, or to the ends, so there would be no danger of their being hit with a ricochet or poorly aimed bullet intended for a crocodile.

The crocodiles could smell the food and rarely a night passed but that they made a raid on the barbacoa; and, if anyone carelessly left a sack hanging down, our menu was short whatever happened to be in that sack from then till we got to a store. I don't think they could actually smell canned goods, but whenever they succeeded in shaking a can off the barbacoa, they promptly clamped down on it, squashed it and ate the contents. I slept with my left side to the door in my mosquito bar, and my gun in the holster hanging from a cord of the hammock, within easy reach. When the raids got sufficiently noisy as to wake me up, I got into action. On moonlight nights I could see to take deadly aim and the raid was soon over. On dark nights I not only couldn't

see the sights on the gun, but couldn't even see the gun nor the crocodile. The best I could hope to see was a pair of eyes. I have killed many a crocodile, and wounded many more, without seeing a thing to shoot at. I knew where the barbacoa was and shot in its direction but intending to shoot low enough to miss it. (I hit it one night and put some of our enamelware out of commission.) Frightened either by the noise of the shot or the swish of the bullets they usually took off after two or three shots, but sometimes came back before morning. When I hit one, whether he died from the shot or not, he never died so quickly but what he got clear of camp and the other crocodiles turned their attention to him. They are all cannibals and when one is wounded and they smell blood they all attack. But their hides are very tough so they don't do much damage to the hide of one killed by a shot, but succeed in tearing a lot of flesh from one killed by a machete. Regardless of whether the wounded one died or not, the others never returned that night.

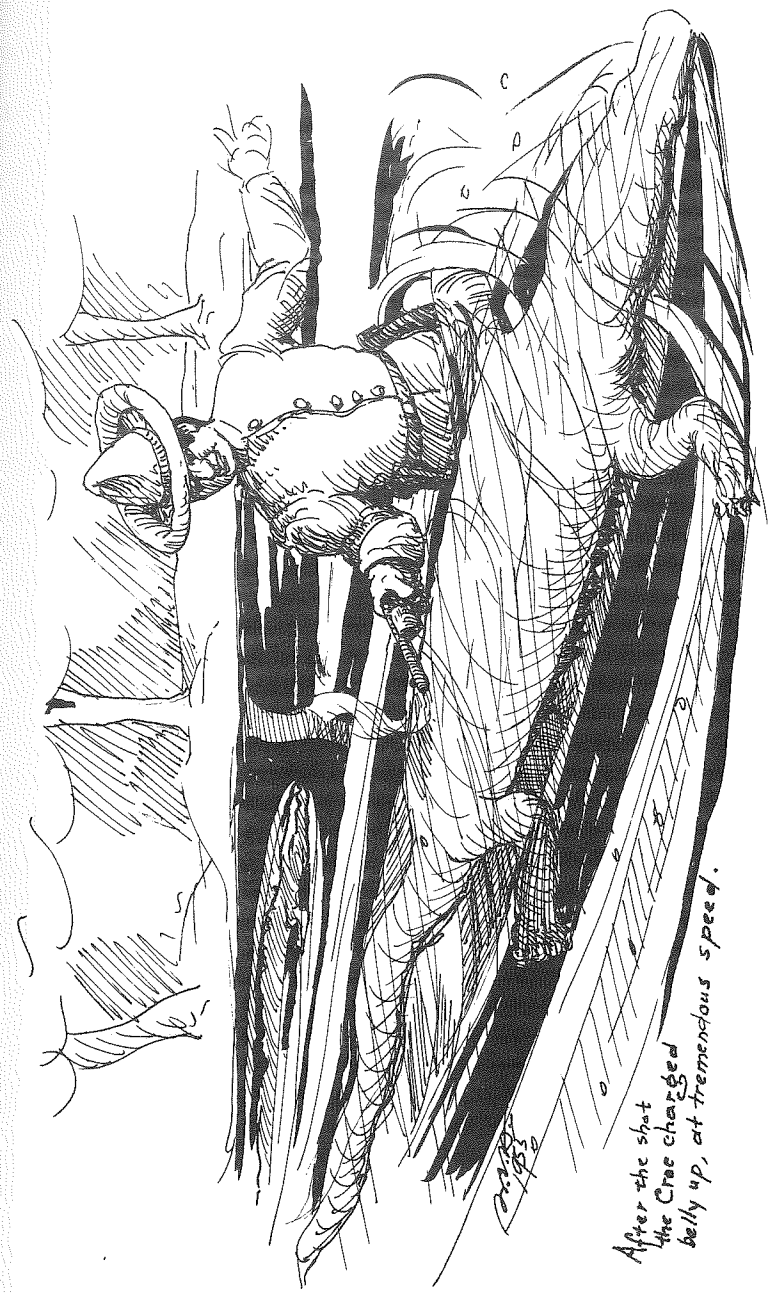
That first night deep in the swamp was an entirely new and not desirable experience. After supper, directed by an experienced swamp man, I climbed the tree that the head end of my hammock was tied to, got out on a limb, stripped off my wet clothes including my boots, and hung them up on the branches, taking care they were securely fastened so a wind wouldn't blow them down to the crocodiles. Then I slipped into my night clothes and climbed out along my hammock rope till I could slip through the mosquito net door into the hammock. It wasn't easy, but I managed it.

Another one of our hardships was the mosquitoes. During the day we rarely saw any in the open swamp, but there were always plenty of them in the timber around the edges of the swamp. Just as soon as dusk came, they descended on us by the million, any place in the swamp. On account of the mosquitoes and also of the crocodiles, we always tried to get supper over and get into our hammocks before dark, and we stayed there until after daylight.

Sometime during the night that first night someone yelled "crocodile". Naturally I was excited; but strain my eyes as I would, I could see none, nor did I hear any. Next day about ten o'clock someone yelled "crocodile" and when I looked where he pointed,

I saw him. He was some four-and-a-half or five feet long and forty or fifty feet from me. I bravely set forth to do battle but when I tried to draw a bead my gun went around in circles. Then I took the end of the gun barrel between the thumb and forefinger of my left hand. That steadied the gun a lot but my knees were like Belshazzar's knees when he saw the hand-writing on the wall - "they smote one against another". I blazed away and missed the crocodile by three feet. I could tell by where the bullet hit the water. I had shot too low. The crocodile never budged. Just stayed right there and blinked at me. Next shot I hit him but didn't kill him. He took off and one of my men after him and killed him with his machete. I never felt so humiliated in all my life. There I was with a perfectly good gun, and plenty of high power ammunition and so scared I couldn't kill a croc-odile when he stood still and looked at me, and a Cuban, with only a machete, ran right up to him and killed him. Let me say right here that killing croc-odiles with machetes is both a science and an art. On the back of a crocodile's neck is a series of bony spines. These spines come out just above the vertebrae. Between them is what little articulation the neck has. Those spines will turn a machete's edge. The hide in the joint is not as tough as in other places, so a well-directed blow in this joint will go right down between the vertebrae and sever the spinal chord. It takes a very hard blow by a man that can hit exactly where he wants to.

That same day at noon we were sitting down in a little cayo eating lunch when again someone yelled "crocodile". This was a real man-size one. He must have been eight or nine feet long, and big all over. In my humiliation I had shamed myself into getting a good hold on myself. I walked right out in front of him, but fifty or sixty feet from him and learned a lesson I never forgot. My knees didn't smite to-gether and my hands didn't tremble. I took deliberate aim right between his eyes and simultaneous with the crack of the gun I heard the ricochet bullet sing and the crocodile passed within two feet of my left side, belly up and going at terrific speed. Had he hit me with that momentum, I doubt very much if I should have lived to tell the story. I never again stood in front of a crocodile to shoot him. If I couldn't



An uninviting Opening

maneuver around so I could shoot him from the side, I didn't shoot. I had heard that to shoot them in the eye was a quick and sure way to kill them. It is all right if you hit the eye, but the result was rather horrifying. I expected to see the eyeball burst. Those eyeballs must be awfully tough and they are not round like the human eye and eyes of our domestic animals. They are more like two balls connected together with a kind of neck a little smaller than the visible eye, and the inner eyeball is larger than the outer one. That shape is the reason he can't roll his eyes. I have shot many a one in the eye and never yet have I burst an eyeball. Instead, not one but both eyes pop right out of his head and he sure looks horrible.

From that day forth there were very few days but what I killed a few crocodiles, though there were a few; and two days I logged more than twenty. Killing crocodiles became everyday stuff, but I did have a few cases I think worthy of mention and I will give just a few with no attempt to give them in chronological order.

One afternoon shortly before the usual quitting time one of the men of the camp crew came and told us they had struck some "dry swamp" so had made camp in a nearby cayo, and he had come to guide us to it. Reader, please don't get the idea that any place in that whole swamp was dry. It wasn't. He meant that the water in that particular place was so shallow the boat would not float clear, and they didn't have manpower enough to pull it. The swamp has no guideposts. But where a man walks, tramping the grass down, he leaves a trail; and, where several crocodiles travel together they don't make as many trails as men but one goes behind the other making a clearer trail. When our guide started out to find us he knew the general direction we were in and guided himself by the sun till he could see us. On the way he killed a crocodile. Our only way to locate the camp was to follow his back trail. On the road he showed us his crocodile. Next morning I put both crews to pulling the boat and I followed along behind. Knowing crocodile habits, as we approached the dead crocodile I told the men I would now go ahead and scare the crocodiles out of the way. One remarked, "You had better be very careful or they will scare you out

of the way." As I neared the carcass I saw crocodiles in great numbers. Knowing that crocodiles follow trails when there are any and that they usually duck when they hear a voice, as I had no desire to step on one I got outside the trail and gingerly approached the carcass. I don't know whether to believe in premonition or not but the evidence in my case has been frequently in the affirmative. I had shot two or three and was just drawing a bead on another, when something seemed to say, "you had better look closer home". The water was just about thigh deep, and just as I looked down at the trail by my left side a big one poked his head up out of the water, not a foot from my left leg. Was he attacking me? No, he didn't know I was there. He was just poking his head up to see what he could see. I could have laid my hand on his head. That is one time I didn't wait to take the gun in both hands and take deliberate aim. I didn't even wait to pull the trigger on the one I was drawing a bead on. I brought the gun over quickly, placed the muzzle practically against his head and blew his brains out. I finished emptying my gun on other crocodiles, reloaded and continued the slaughter. All told I killed nine there without moving over twenty feet. That was one of the days I killed more than twenty.

I have often been asked if the crocodiles would attack you. That is a hard question to answer. My answer would be that it depends on the personal ferocity of the individual and how hungry he was. I have watched them try to sneak up on both me and my men many times; but, as I remarked before, we always, or at least almost always, kept close watch and never let them get away with it. I can honestly say that only once in all my experience did I have one make a frontal assault on me and that was largely due to my own carelessness. I was plodding along one morning not too far from the costanera, where, as I have said, the farmers had pretty well killed off the crocodiles and I had not seen any for a day or so. So, I got careless and wasn't even thinking of crocodiles when suddenly I saw one right square in front of me about six feet away and with his mouth wide open just waiting for me to walk into it. The shock was something terrible. I had one foot in the act of stepping forward when I saw him. Naturally my first instinct was

to jump backwards - and I did just that - so far as I could with the other boot stuck in the mud. When he saw me jump backward instead of just walking into his mouth as he had planned, he charged. When I couldn't run there was nothing left to do but try to defend myself, so instinctively I raised my walking stick to hit him over the nose. The motion attracted his attention and he stopped to look up to see what it was all about. That look was his undoing. It gave me time to get my gun and dispatch him.

I had many experiences with crocodiles, but I think the three cases above were the closest I ever came to actual danger. Neither was there a single case of bodily injury from a crocodile in the whole survey, but we all took thorough precautions to guard against it. I never saw but one man who had been bitten by one. That was several years before I saw him, and it was a close call. He was standing on the edge of a pool of water, holding to a limb and leaning out, baiting a crocodile to get him where he could kill him. While he was interested in that crocodile, another one grabbed the arm holding to the tree. I didn't think to ask if he was alone; but suppose he was not or he would not have survived, for the first thing a crocodile does with its prey is to drag it underwater and drown it. Be that as it may, he was in a very inaccessible part of the island. They had to get him to the coast, then wait for a sailboat to take him to Batabano', then by train to Havana. It was two days before they got him to a doctor and the doctor at once amputated his arm. He had waited so long and infection was so spread, gangrene set-in and they had to amputate it again. The arm was off close to his shoulder.

As I have remarked, the crocodiles stalk their prey. Many times when one of my men has passed along a trail I have seen a crocodile slip out of the grass, get in the trail and start stalking him. With the care we took, as I said before, no one was ever hurt, but I sure had two scares out of that habit. In both cases the water was more than waist deep. A crocodile, stalking the man in front of me had heard me coming and ducked. I came along and stepped on his tail. Talk about stepping on dynamite - that was it! It is hard to tell which of us was worse frightened, he or I, but it wasn't a bit hard to tell which did the

most about it. Like hearing a loud clap of thunder you are frightened, but you needn't be, the danger is past. Even so was it with the crocodile. When I felt the earth jump from under me, the danger was past but there was an awful feeling in the pit of my stomach, and I was glad I had stepped on his tail and not on his head.

On one occasion we crossed the swamp, went over the coastal ridge to check on a sea-level bench along the beach to and around Cochinos Bay and started up a charcoal burners' canal. Our trip had been so long our food supply was running low. We stopped overnight in the charcoal burners' camp. They told me that down another canal on the coast was one of Maximino Yebres' stores. So next morning I sent the cook in the boat to get some groceries. As it was on the canal he could "pole" the boat easier than men could pull it; and the rest of his crew waited for him in the camp. Down at the store he found some of his countrymen and they started "drinking the other" as they called it. I took my level crew and started back across the swamp. Along in the afternoon the men began kidding each other about what a night we were going to have without supper or hammocks. The later it got the more serious things began to look. About the usual quitting time we quit work and went over to a nearby cayo, and began preparing places to hang our hammocks. The men repeatedly called to see if they could hear from the camp crew. Finally, there was a reply and most of us heaved a sigh of relief. We were going to get our hammocks, but our old swamp adviser shook his head and said, "They will never make it."

"What do you mean they'll never make it?"

"They have the boat to pull and it is just too late."

"What will they do?"

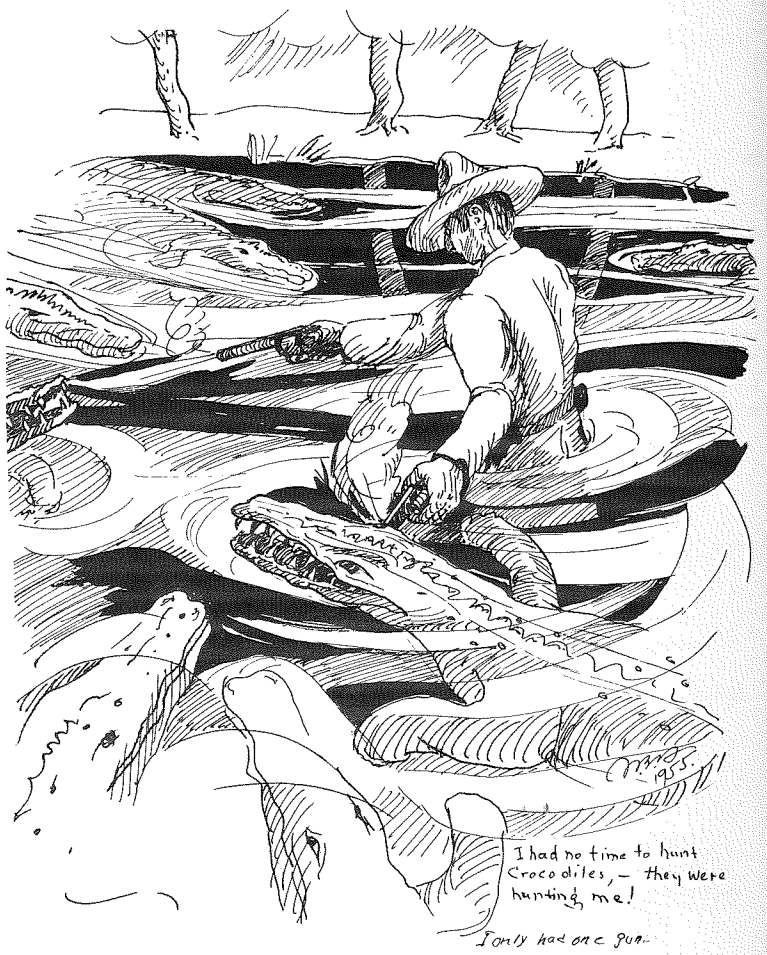
"They will camp at the last cayo we passed."

"Well, we have no boat to pull, let's go back to meet them."

"We can't make it either."

"What do you mean we can't make it? We have just come over it."

"Yes, we have just come over it, but crocodiles in the daytime are one thing and crocodiles at night are another. We would never live to get through."



The Cubans had so frequently told me through the years that a thing couldn't be done and I have gone right on and done it. My first thought was to go right on and start back. But on further consideration I remembered that Jose' had lived near the crocodiles all his life and I had found his previous counsel on crocodiles sound, so reluctantly gave in and started looking for a place to make myself as comfortable as possible. In my years of wandering I have spent many nights that were far from comfortable but this was far and away yonder the longest and worst night I ever spent.

As night came on the mosquitoes came by the million and the crocodiles by the dozen. This cayo was just mangroves. No big trees to climb, so we couldn't get very high. We had to cut small branches and fight mosquitoes all night long. If we found a place to sit down, the mosquitoes promptly bit us through the seat of the pants and lifted us. Our clothes were wet and as the night came on we were cold. When our clothes began to dry out, it rained and we were wet again and colder, and the crocodiles were jumping at us from below.

One of the men had a pointed machete. He lashed it onto a range rod we had with us and stuck it through a small crocodile. When the knife went through him, he went into action and really made the water fly, and crocodiles grunted by the dozen in all directions. Then the crocodiles left us alone for awhile and turned on him. He wasn't big enough for a feast for so many, so when he was devoured they were back and jumping at us again.

Our trip had been a long one and lots of crocodiles so my ammunition was running low. We had a long way to go to get across the swamp so I was conserving my ammunition. During the night, at different times, three unusually big ones attacked us; and, as we couldn't climb any higher, I was obliged to shoot them in self defense. Each time I shot one the others turned on him and gave us a little rest. But as hides were tough they were unable to eat them so were soon back.

As everyone smoked but me they all carried matches in their hats so we cut some limbs and built a pole platform for a fire. Dry kindling was non-existent but with much work we finally succeeded.

The fire was quite a success both in scaring the mosquitoes away and in warming us, but it was short-lived. When the limbs burned through, the fire dropped down and the branches under it scattered it everywhere. Even a crocodile knows what fire is and doesn't like to be burned so we had the biggest and most vigorous scattering of crocodiles I ever saw, but they just wouldn't stay scattered. They were soon back again.

They say that all good things eventually come to an end. So do the bad ones. With the rising sun, both the mosquitoes and crocodiles disappeared. We descended into the water and took stock of the situation. Two of the crocodiles I shot were dead and each measured over ten feet long. The other was gone.

We got back to where we quit work just before the camp crew came from the other direction. As we could not carry boxes to box our instruments at night, we carried a heavy canvas hood; and where we quit at night, we pulled the long legs of the instrument near together so the instrument would be high above water, put on the hood and left it till morning. When we got to the level it was down to about two feet above water; one leg was broken; the hood was torn to shreds; and all the telescoping mechanism was gone. We searched all around and found the sunshade and telescoping screw. The sunshade was mashed flat as though a crocodile had bit into it and didn't like the taste. I shot two big crocodiles that were hanging around and cut them open to see if they had swallowed the telescope. They hadn't.

As we hadn't had any supper the first thing to do was to cook some breakfast, then decide what to do. We had to have a new level and there definitely wasn't one any closer than the office in Australia and we didn't know if they had an extra. My first thought was to send three good men into Australia for another level and pitch camp right there till their return. But one of the men had been over the line on the original survey and said it was the worst line in the whole swamp. Water was deep; mud was soft; and many snags of dead and fallen trees which made traveling both difficult and dangerous. It was still nine kilometers to the costanera and several miles from there to Australia.

While waiting for breakfast we had a little comedy along with the tragedy. The men had kidded my level carrier so much about being a coward, he decided to do something about it. He was a big, powerful macheteman, fully as good as any man on the crew, but just a plain coward when it came to crocodiles. They saw a crocodile some four or five feet long, and he said, "This is mine!" He did a very creditable job of dispatching it. If you charge a crocodile direct he will either charge you or run away, more likely the latter. But in either case you get no chance to give him the blow in the vital spot, and none other is fatal; so the Cubans have developed a very nice technique. A man slips up on a crocodile as close as he thinks he safely can, then takes his machete in his left hand and puts his hat on the end of the blade and waves it gently up and down in front of him. The crocodile stalks the moving hat rather than the standing man. By patiently moving the hat along and up and down he maneuvers the crocodile to just where he wants him, then quickly changes the machete into his right hand, grabs his hat with the left and deftly gives the fatal blow.

Soon after my carrier killed his first crocodile they saw another. Enthused by his initial success he again yelled, "This is mine!" But he evidently hadn't taken time to take a good look at him. He was really a big one, at least eight or ten feet long. He started his technique all right; but when he got him to the place for the fatal blow, he somehow lost his nerve and said, "Oh, this is a big one; just look how big he is." While he was calling attention to the crocodile's size, the crocodile grabbed his hat off the machete, dived and took off with it. Then the carrier's cry suddenly changed. "Oh! He's got my hat! He got my hat! Somebody come and help me get my hat!" Several of the men came and they searched in vain, for they never saw crocodile nor hat again. I felt sorry for him, for that tropical sun in open swamp was terrible. It not only shone down from above, but was reflected up from the water and the result was very painful. I was indeed sorry for him, but there was nothing I could do about it. Poor fellow, he had to go three days without his hat, and all the time the men ribbing him—"This is mine! Oh! Look how big he is! Oh, he's got my hat! Come somebody quick and

help me get my hat!" With all the ribbing I didn't suppose he would go back into the swamp for anything, but he did and stayed till the end of the job; but he devoted himself strictly to the job he was being paid for—carrying the level and watching for crocodiles. He made no more attempts to be brave. He showed the crocodiles to me and let me shoot them.

After breakfast and due deliberation, I picked two men to go with me; we packed lunches; strapped our hammocks on our backs and took off for Australia. That was definitely the hardest nine kilometers (five and three-fourths miles) I ever traveled. The line was, as the man had said, "Water deep, mud soft and many snags" and in addition - which the man didn't mention - we had been all night without sleep; the crocodiles were numerous; and towards evening the masamorra was eating our feet something terrible. As I said before, my ammunition was running low, so I only shot three or four of the most obstreperous crocodiles and reached the costanera with only two bullets left.

That masamorra is a fungus parasite, found mostly along the costanera. It attacks the feet; and once you feel it, it can completely incapacitate you in a very few hours if you don't do something about it. And what chance did we have to do something about it there in the swamp? I had heard about it from the natives and also their remedies, but really learned about it the hard way. Their remedies were: the juice of a tree gourd that grows there, alcohol, kerosene, bichloride of mercury, and axle grease. We tried all of them; and finally decided that the best remedy was to take a bath every night in a strong solution of bichloride of mercury just as high as we had been in the water that day, and in the morning before we got into our wet clothes we smeared axle grease - yes, regular cart axle grease - just as high as we expected to be in the water that day. The axle grease was somewhat smeary but seemed to be effective. At least I never got the masamorra when I gave myself the combined treatment but we had neither bichloride of mercury nor axle grease in the mangroves that night, hence I had it. I never was so completely exhausted in my life. We had our hammocks with us and were so completely exhausted I was tempted to stop for the night on a cayo we came to. But from

past experience I knew if I didn't do something for that masamorra that night I wouldn't walk at all next day, so we sat down and rested, then went on.

We reached the costanera just before dark, found a farmer and hired him to take us on horseback into Australia. We got there about nine o'clock, only to learn that there was no level there, so we had to wire Havana for one and wait till it came. But things came out about even at that. It took two days for it to come. I was laid up for two days doctoring the masamorra on my feet and it took the camp three days (the one we took and two more) to come over what we had made in one day. That isn't quite true—it took them three days to arrive but they had to make a few long detours around mangrove swamps that we went through.

Liquor can do great damage to people who never touch it. Witness our deaths on the highways caused by drunken drivers. It was liquor that caused our awful night in the swamp. Daniel, my cook, was my biggest, strongest and best worker in the outfit, and when sober was perfectly trustworthy; but you never can trust a drunkard. I couldn't fire him in the middle of the swamp but when I got to dry land I let him go.

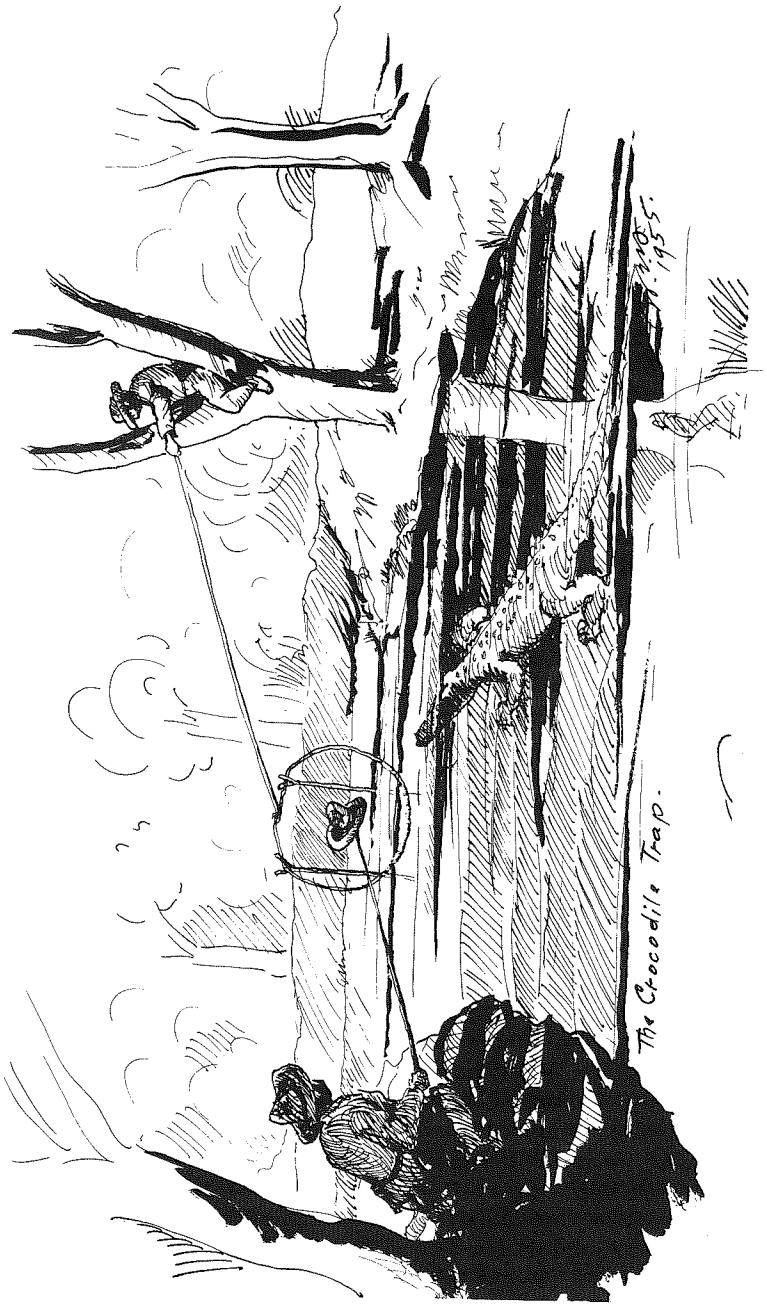
On the fourth day we headed back for the swamp. Our instructions were to run that same line, beginning at the north end and tie-up when we reached where we quit. Then send the notebook in, and move to the south costanera, take another line east, then north across the swamp on another line.

Our boat was made of half-inch lumber in the first place, and it is surprising how rapidly it wears dragging it over sawgrass. About mid-forenoon on the day we tied-up, it struck a snag that punched a hole right through it. One of the men quickly threw things aside and clapped his hand over the hole and held the water out while the others unloaded it and hung the contents on the snags in the vicinity. There were plenty of them. We had nothing to mend the boat with, and it was questionable if it was worth mending anyway—it was worn so thin. We had no choice but to leave it—but how? The men carried everything to the nearest cayo and made camp. We ran on past camp where we tied-up about two o'clock and returned to camp. As it was too late to send a

messenger out, it had to be for the night.

While I was sitting in my hammock getting my book and report ready to send in, a crocodile was loafing around camp. Instead of killing him, one of the men said, "Let's tie him." I had no idea how they were going to do it but knew that fooling with crocodiles was dangerous business, so told them to be very careful. I got my gun handy just in case. I soon saw that at least some of them knew their crocodiles. There was an isolated tree near camp. They took my two longest ropes and tied them together, then one man climbed the tree and tied one end around the tree. Then the others took the other end and made a lasso noose in it, and stretched it out to see how far it would reach. Near the end they tramped down a good trail in the sawgrass at right angles to the rope. Then they cut two thin forks and two small hooks from the woods. With the forks they propped the lasso knot about two feet above water and with the hooks they fastened the other side of the noose down on the ground under the water. Then one of the men cut a long light pole and put his hat on it and went through the same maneuvers as they did with their machetes when they meant to kill him. He coaxed the crocodile into the trail and down the trail till he put his head in the noose. The moment his head was through the noose the man in the tree pulled the rope. That did it! Talk about action! For some time all I could see was seething, swirling, flying water. The man with the pole knew his crocodile, also the length of the rope, and cut his pole long enough to be clear of the crocodile's tail. The man I was worried about was the man in the tree. Trees in the swamp are shallow rooted and I thought for sure the crocodile would jerk the tree over, but he didn't. After he wore himself out they tied his jaws together and eventually killed him.

Next morning my troubles began. I had to send my notebook in—which meant two men, for we never sent one man alone. This part of the line had been levelled, so we didn't run a level party. Our tools all had to be carried as we had no boat. We didn't have nearly enough men to carry it, and the day wasn't long enough for two trips. I sure had to do some figuring. Our cooking was done in two big pewter kettles, and they were heavy. Our plates were enamel



soup plates. Cups were tin and we didn't use saucers. Neither did we use knives and forks. The cook had a hunting knife and we ate with soup spoons. We had a big food grinder and considerable quantity of canned milk and other canned goods and all those are heavy to carry—those in addition to our sugar, salt, hard tack, rice, jerked beef, coffee and dried codfish, and all our sleeping outfits.

We had a long wide strip of heavy canvas we used to cover the boat with in the daytime and our barbacoa at night. I turned up the sides and one end and cut big enough holes in it so I could pin it with wooden pins. Then we put our food grinder, canned goods and some other things that it wouldn't hurt to get wet in this. We put our plates, cups, etc. in the pewter kettles, and tied the lids on. Everyone took his own sleeping outfit, including myself. When we were ready for the start, one man took the free end of the canvas over his shoulders and dragged the loaded end in the water like it was a boat. I followed with my pack, notebooks, gun, etc. and whenever the canvas boat got stuck on a downed tree or snag, I helped it over. We divided the other eats as evenly as possible among the other men. Two men led the pewter kettles on leashes like dogs and each had a follower to help him over the trees and snags. If a kettle turned over, it got loaded with water and sank. The follower picked it up and poured the water out—no damage done. We made quite a procession.

I told the men, even that many years ago, I wished there was a movie camera handy to take our pictures. We sure would make a good movie. The water was deep; the mud was soft and our loads were heavy. In spite of it all, we made progress till we came to a long stretch of mangroves where our canvas boat and kettles could no longer be pulled. (From the numbers on the survey stakes I knew just how far it was through the mangrove and llana to the charcoal burners' camp.) The eight men I had couldn't carry it all, so after taking my load I divided the rest into twelve as nearly equal loads as possible, and they shouldered eight of them and left four. Such things as we knew crocodiles liked—if we had to leave them—we hung up. Items such as kettles, pots, pans, etc. we left on the ground. At the half-way place I called a halt and had four men lay their loads down

and return for the things left behind. I went on with the other four, and made arrangements with the charcoal burners to hang our hammocks under cover for a change. I sent the four back for the loads the others had laid down.

The eight came in together with another story to tell and evidence to back it up. When they got back to where we left the first loads, a flock of crocodiles was making a shambles of the place. They were squashing the canned goods and eating the contents and had already made a colander of our tin dishpan and clamped down once on our enamel washpan. He left the shape of his mouth well marked by a row of holes that looked like they might have been made with a press drill. I think it gave him the toothache. The dishpan was a total loss and we discarded it at once. The washpan was still usable by propping up one side, and it was the only thing we had to prepare our bichloride of mercury baths in. We used it till the job was done and I turned it in with the other equipment. I have regretted over the years that I didn't ask to keep it as a memento of the swamp.

The charcoal burners told me where there was a boat for sale, so next morning I went over and bought it; and, though short handed, resumed our work, going east on a line along the south costanera then north on another line across the swamp. About 2:00 P.M. some three or four days after they left, the messengers to Australia overtook us. They brought with them about as big a dog as I ever saw in Cuba. I was very much provoked and asked why they had brought him. They said they didn't bring him, he just followed. I said, "Too bad, but he will be crocodile bait before morning." I knew a lot about crocodiles and their love for dog meat but I didn't know that particular dog. That night was as beautiful a moonlight night as you ever saw even in the tropics. Sometime in the night I was awakened by a commotion in camp which was "run-of-the-mill", but what wasn't "run-of-the-mill" was that this noise was not around the barbacoa on my left but out beyond my feet on the right. The roots of a tree always shoves the ground up next to the tree so there is always a spot of dry ground there. I looked out and saw the dog lying on my side of a tree and intently looking away from me. Pretty soon he got up and leisurely sauntered over and lay

Breaking up Camp.—
and canned goods and kitchen ware.

down on the far side of another tree and resumed his looking back. I looked back to see if I could see what was attracting his attention and saw the biggest crocodile I ever saw just coming around the tree where the dog had just been and continued stalking the dog. When he got fairly close, the dog got up and went over behind another tree. The dog never hurried; and he, also, never took his eyes off the crocodile for many seconds at a time. It became quite an interesting show and I watched them until they passed out of my range of vision.

I had just settled back to try to go to sleep when Jose' let out a yell that would almost raise the dead. We all wanted to know what was the trouble and he said the crocodile jumped at his hammock and hit his feet. You can't blame him for being scared. I don't know if the yell scared him off or if he was just plain discouraged because he couldn't get either dog or man. Be that as it may, he started to retrace his steps and passed again on the right side of my hammock. As the door of my mosquito bar was on the left, I didn't have a chance to shoot him, but gathered up the mosquito bar with my right hand, and with my left hand reached around underneath the hammock and blazed away at him. I didn't hit him but either the swish of the bullets or the crack of the gun moved him on and he went right under the cook's hammock. The cook also had a gun and put a bullet right through the middle of his back. That paralyzed his hind quarters, but he could still fight with his front end. When the other crocodiles which had been giving him a wide berth smelled his blood, they all jumped on him and we had pandemonium the rest of the night. Next morning he was dead- the biggest, but not the longest, crocodile killed by any party on the survey. The night we spent without hammocks I killed two that measured a little over ten feet but were rather slender. This one only measured nine and a half, but was exceedingly big around. Normally we didn't skin crocodiles for several reasons. Primarily, we had no salt to preserve the hides, and the odor wouldn't be good for our victuals—nor bedding. This was such a fine specimen and we expected to reach the costanera that day so I had him skinned and sent the hide into the Chief Engineer. He thanked me very profusely and had it tanned as a memento of

the job.

When we got our wits sufficiently collected, we looked around for our dog and the men called him. No dog. I naturally dismissed him as more crocodile bait. We had a long hard day that day, lots of deep water and a very large tembledera which I have previously described. We, of the level party, had to work our way across the tembledera but the boat had to make a long detour around it. We arrived at the end of the line about the same time in a driving rain. It is some job to unroll a hammock and tie it up in a pouring rain without getting it wet with both feet on the ground, let alone trying to do it while climbing trees. So, as the crocodiles were supposed to all be dead along the costanera, we all stood on the ground to hang our hammocks. Sometime in the night someone yelled "crocodile". Naturally, remembering my hammock was hanging low, I awoke with a start and grabbed my gun. Whoever gave that yell certainly must have used only his ears. It was a beautiful moonlight night and when I looked out there was our dog collecting his supper from what the cook left in the pots. Before we turned back across the swamp we gave him to a farmer, who, after hearing his story, was glad to get him. I can certainly say for him he was one dog that knew his crocodiles.

Stockley told me that all told there were practically one hundred engineers that went to work in the swamp. There were just seven who stayed till it was finished—one German, one Swede, one Spaniard, and four Americans.

Each of the engineers who stayed to the end was required to make a sketch and describe his idea of a system of drainage. I don't know a thing about what the other engineers wrote but my closing statement was that "so long as Cuba has so much unused fertile land that needs no drainage, this project is economically unfeasible."

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I was back in the swamp in January, 1954, just forty years after I left it. About the only change I noted in the swamp, itself, was that a railroad had been built from the rebuilt sugarmill at Australia to Cochinos Bay. It was built on cribbing—poles and cross poles laid right down in the swamp till they got it built above water. After they got it up where

they got the track on it, they hauled dirt and rock in and lifted the track till it was three feet above water. The road is standard-gauge but built with light rails and the equipment used on it is light weight. The owner and builder was killed in an accident just about a year after it was built, and the road has been in operation all these thirty-seven years and has been slowly sinking until today it is under water from one side of the swamp to the other, a distance of about seven miles. It is probably the longest underwater railroad in operation anywhere in the world.

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My first trip across the swamp I carried my razor. It rusted so I left it at the office and let my whiskers grow. My hair also grew till it was so long it interfered with my work, so I put my forehead against a tree and cut the front off with my pocket knife. I don't remember how long we were without seeing a barber. Once, when we came out on the north costanera, one of the men came back from a nearby canteen and said there was a barber down there. I rushed down for a haircut. He was an ambulating barber. He had a small barber outfit in a case and went about to wherever he could find a customer. He sat me down on a log and went to work. During the process I asked, "How much do you charge for a haircut?"

"A peseta." (Twenty cents, which was the standard price.)

"That's retail; how much do you charge wholesale?"

"What do you mean wholesale?"

"By the dozen."

"One dollar." When he finished I tried to hand him a dime. He said, "No, a peseta."

"But you said a dollar a dozen."

"But you are not a dozen."

So, I handed him a dollar and went back to camp and told the men to all go get a haircut. It was paid for and they all needed it. I couldn't quite deliver the dozen for there were only eleven of us, but they were still cheap hair cuts.

Beards were more common in those days than they are today. When I was all through with my work in the Zapata Swamp and ready to go home, I went to the barber and had my beard trimmed to a nice VanDyke. I then sent my wife a telegram that I would be home

on the ten-thirty P.M. train. She gathered up some of the neighbors and came down to meet me. I stood on the car steps as the train pulled in, and rode right by them. Not one of them recognized me.

Next morning was Sunday and she refused to go to church with me unless I shaved my whiskers off; but she did allow me to get my brother-in-law to come over and take my picture.

Chapter 18

CAMAGUEY

On my return from one of my trips across the swamp, instead of my usual pay check, Stockley handed me a letter from my brother-in-law, Dr. Anderson, addressed to Mr. Jack Gass, Chief Engineer, Zapata Land Company. It said that my wife was in Camaguey and stranded. That I was somewhere out in the swamp and she could not contact me. Would he kindly send her a check for $100.00 and take it out of my pay? And that's how we moved to Camaguey.

Since I was away from home so much of the time, and it was so lonesome and inconvenient for Birdie, I had tried to sell the place at Galbis but couldn't find a buyer. She had found a buyer and sold it at my price, and moved to Camaguey. The catch was she had sold the home, and the team, wagon and harness, and didn't get one dollar down payment. Walter Miner, her buyer, was a bachelor about fifty years old, and as honest and hard-working a man as you could find anywhere, but somehow he just didn't have the executive ability to get ahead in the world. In all his fifty years his accumulated wealth amounted to just about nothing. In their negotiations I can see what Birdie was thinking about. She was thinking of just one thing. Getting away from Galbis. But I can't see what Miner was thinking about to take on that obligation in that place, where there wasn't a thing he could do to even earn a living—let alone pay for a home.

Again, Lady Luck rode with both of us. About two years later, Salvador sold the whole tract of land to Pete Green, a cattleman. Cattlemen have to have a place to live. Here, right in the middle of his ranch, was the finest country house for miles around—palm-leaf roof— yes, but a good one— hard-wood floor, board sides, glass windows, and running water in the kitchen. Miner sold for enough to pay me and leave him a profit besides, and I made the deed direct to Pete and got my money.

When I finished in the swamp, naturally I went to my new home in Camaguey. I soon found that living