

## CHAPTER XVIII

### CONTROVERSY WITH COLOMBIA AND ACQUISITION OF THE CANAL ZONE

COLOMBIA DEMANDS INDEMNITY FROM FRENCH COMPANY—MINISTER CONCHA WITH-DRAWS—MAKING OF THE HAY-HERRAN TREATY—FIGHT OVER ITS RATIFICA-TION—COLOMBIA REFUSES TO RATIFY—ATTEMPTS TO ANNUL FRENCH COM-PANY'S CONCESSION—PANAMA DECLARES ITS INDEPENDENCE AND IS RECOGNIZED BY UNITED STATES—TREATY WITH PANAMA SIGNED BY MR. HAY AND M. BUNAU-VARILLA—COLOMBIA OFFERS NEW TERMS—SALE OF FRENCH PROP-ERTY EFFECTED AND UNITED STATES TAKES POSSESSION—INEFFECTUAL EFFORTS TO COMPOSE DIFFERENCES WITH COLOMBIA.

WE have now to deal with the tortuous negotiations between the United States and Colombia, which had for their object the making of a treaty facilitating the construction of the canal at Panama. The failure of this treaty, the secession of Panama from Colombia, and the making of a treaty with the new republic brought about the construction of the Panama Canal. Colombia's refusal to ratify the Hay-Herran treaty was regarded by the United States as a great blunder, with certain sinister aspects which gave rise to acrimonious exchanges between the two governments. Colombia, on the other hand, felt that it had been deprived of its territory and valuable properties without due compensation, and it demanded satisfaction. Efforts were made by four American Secretaries of State—Messrs. Hay, Knox, Root, and Bryan—to compose the differences between the two governments, but their negotiations were and have been fruitless up to the present time.

Colombia was extremely suspicious in regard to the transactions between the New Panama Canal Company and the United States government. When the Spooner act was passed in June, 1902, and the way was clear for the conclusion of a treaty between Colombia and the United States, Minister Concha received instructions of a drastic nature, requiring him to demand from the United States a payment of at least \$600,000 a year in perpetuity,

and to insist upon other conditions which would have made the treaty extremely burdensome upon the United States. Mr. Concha was openly unfriendly in his attitude, but through the persistent efforts of Mr. Cromwell as an intermediary, he consented to continue the negotiations until July, 1902, when a tentative understanding was reached.

In the meantime the United States, through Mr. Knox, who was then Attorney-General, made a thorough investigation of the titles of the New Panama Canal Company. Mr. Knox, Mr. Cromwell, and their associates went to Paris and spent two months in this work. The inquiry proved to the satisfaction of the United States that the company's titles were valid; that the stockholders would approve the transfer, and that the liquidator of the old company, with the permission of the Civil Tribunal of the Seine, would give his approval; and that nothing remained but the conclusion of the treaty with Colombia in order to take over the property and pay the price agreed upon.

Minister Concha's attitude, however, became more and more antagonistic. He had not received instructions to sign the tentative treaty agreed upon in July, and he proposed amendments from time to time which prolonged the negotiations. In October he made it known that he would refuse to sign any treaty. Secretary Hay thereupon notified the Colombian govern-

ment that the President would proceed to close a bargain with Nicaragua if word was not immediately received from Bogotá that Colombia would act. Mr. Concha then received instructions to discuss the proposed treaty. He proposed seven amendments, the chief of which was a provision that the permission by Colombia to transfer the French company's rights should be governed by a special agreement to be entered into between Colombia and the company. This was a plain intimation that Colombia intended to exact from the company an "indemnity" as the price of its consent to the transfer. The United States refused to consider this and the other amendments, and insisted upon the signing of the treaty as agreed upon.

Minister Concha then abruptly broke off negotiations and on November 29, 1902, he left Washington, without taking leave of the State Department or explaining his reasons for departure. The legation was left in charge of Tomás Herran, chargé d'affaires.

Congress was about to convene, and the friends of the Nicaragua route saw their hopes revive. They brought pressure to bear upon the President to close with Nicaragua, in view of the failure to come to terms with Colombia. Secretary Hay was strongly inclined to drop the Colombian negotiations.

Mr. Cromwell, nothing daunted, began conferences with Mr. Herran, who had received instructions from his government to continue the negotiations on the basis of the acceptance by the United States of the Concha amendments, including a provision for the payment to Colombia of \$10,000,000 cash and an annuity of \$600,000. Minister Hart, at Bogotá, advised Secretary Hay that Colombia intended to demand an indemnity from the French company before ratifying any treaty. Mr. Hay then lost patience, and advised Mr. Cromwell that he would send an ultimatum to Colombia, fixing a time for breaking off all negotiations. At Mr. Cromwell's urgent solicitation Mr. Hay de-

ferred sending in the ultimatum for a few days only. Mr. Cromwell then, after long conferences, induced Mr. Herran to abandon the Concha amendments, and to agree that the amount of money to be paid to Colombia should be determined by arbitration. The United States, however, preferred that a fixed sum should be named, and finally the negotiators agreed to compromise by fixing the amount at \$250,000 a year. The treaty was then drawn up as quickly as possible, and on January 22, 1903, at Secretary Hay's residence, it was signed by himself and Mr. Herran. The next day the President transmitted it to the Senate.

Then began a battle over ratification, first in Washington and then in Bogotá.

Mr. Cromwell always found in Senator Morgan a foeman worthy of his steel. The great Alabamian was a determined foe of the Panama route, and he promptly attacked the Hay-Herran treaty. He questioned the power of Vice-President Marroquin of Colombia to conclude any treaty. He questioned Mr. Herran's powers. He offered sixty different amendments to the treaty. He delivered many speeches, and for nearly three months the debate continued. The Democratic caucus agreed to support the Morgan amendments. On March 17, 1903, the treaty was finally ratified exactly as it had been signed.

The option given by the French company was to expire on March 3, but before that date, during the pendency of the treaty in the Senate, an agreement was reached whereby the United States accepted the company's offer, conditioned upon the ratification of the treaty. Official notification to this effect was given on February 17, 1903, by Attorney-General Knox to M. Bô, president of the company.

Instead of proceeding to the ratification of the treaty, Colombia then turned upon the French company and demanded an indemnity of 50,000,000 francs as the price of its consent to the transfer. Secretary Hay was informed by cable on June 2 from the American chargé d'affaires at

Bogotá that "Colombia intends to force the company to make a heavy payment; without which no ratification."

The debate over the Hay-Herran treaty in the Colombian Senate ran from June to August, 1903. A powerful faction demanded the repudiation of the company's extended concession and the forfeiture of the concession in 1906, the date upon which it would have terminated if no extension had been made. The plan was to regain possession of the property and then negotiate a new treaty with the United States, thus giving Colombia the money belonging to the French company. Proposals were made to the United States to agree to modifications of the treaty, but they were rejected. The Colombian congress adjourned on August 12 without ratifying the treaty.

Members of the congress representing Panama had told their colleagues plainly that Panama would rebel if the treaty were not ratified. They reviewed the long negotiations, the deferred hopes of Panama, the throwing away of the opportunity to secure the construction of the canal by the United States, and warned Colombia that the outcome would be secession. The United States government also insisted that Colombia should ratify the treaty according to its agreement.

The Colombian congress met again in October, 1903, and discussed the treaty for a month. Its committees recommended the repudiation of the company's extension. Finally the treaty was referred to the President of Colombia with power to negotiate for modifications; and on November 2 the congress adjourned.

The next day, November 3, 1903, the threatened revolution at Panama occurred. A provisional government was organized and the independence of the isthmian republic was proclaimed. Colombia sent troops to put down the uprising, but the United States gunboat *Nashville* warned the Colombians that they would not be permitted to land. The United States took the position that the treaty of 1846

required the American government to keep open the transit across the isthmus, and that the landing of Colombian troops would interfere with this transit. Thus Colombia's efforts to put down the revolution were thwarted, and the republic of Panama came into existence without bloodshed.

The United States immediately recognized the new government, and received its minister, M. Philippe Bunau-Varilla, who carried powers for the negotiation of a treaty providing for the construction of a canal across the isthmus. The French company cabled to Washington that it was willing to carry out its bargain under the new conditions.

Negotiations were immediately begun by Secretary Hay and Minister Bunau-Varilla, resulting in the conclusion of a treaty on November 18, 1903. The treaty provided that the United States should guarantee the independence of the Republic of Panama, and set forth the terms under which the United States was given exclusive jurisdiction over the Canal Zone and the conditions under which the canal should be constructed.

Naturally, the secession of Panama made a mighty uproar, whose echoes were heard throughout the Americas and in France. Colombia threatened war, and sent Gen. Rafael Reyes to Washington to negotiate a new treaty. The friends of the Nicaragua route raised an outcry. Colombia's charge that the United States government had incited the revolution was reiterated by many Americans. Mr. Cromwell was charged with being the head devil of the plot, although he had been in Paris during that period. M. Bunau-Varilla came in for a scoring. President Roosevelt was especially denounced both in Colombia and the United States. He vigorously replied, as usual, without mincing words, and has ever since maintained that the United States was innocent of all implication in the Panama affair, and that Colombia had been rightly defeated in an attempt to extort excessive sums from the United

States. Mr. Roosevelt's version of this portion of canal history is set forth by himself in another chapter.

Again the Senate took up the canal controversy in considering the Hay-Bunau-Varilla treaty. The debate continued from November, 1903, until February, 1904, when the treaty was approved. Panama promptly ratified the convention, and ratifications were exchanged on February 26, 1904. On April 28, 1904, Congress appropriated the \$10,000,000 payable to Panama under the terms of the treaty.

Failing to negotiate a treaty with the United States, Gen. Reyes sailed for Paris, and a suit to enjoin the French company from transferring its property to the United States was instituted by Colombia. This was met by energetic action by the company in hastening the sale. On March 2, 1904, Attorney-General Knox notified the company that the United States was ready to carry out its contract of purchase. Representatives of the United States were sent to Paris, where all legal preliminaries were disposed of. The banking house of J. P. Morgan & Co. was made financial agent in the transaction. The signing of the deeds of transfer of the Panama Canal and the Panama Railroad was effected in the American Embassy, in Paris, on April 16, 1904, in the presence of Ambassador Porter.

On May 4, the delivery of the Panama Canal, the Panama Railroad, and all other property on the isthmus belonging to the company was formally made to Lieut. Mark Brooke, U. S. A., representing the United States. On May 6 all the plans and archives of the company in Paris were delivered to the representatives of the Attorney-General. On May 7 the shares of the Panama Railroad were delivered. The government thereupon handed to J. P. Morgan & Co. a Treasury order for \$40,000,000, which was paid in gold coin, transferred to Paris, and paid to the representatives of the French company.

The suits brought by Colombia against

the French company came to nought. Several succeeding ministers of Colombia made strong representations to the United States, demanding a settlement of Colombia's claims. Accordingly efforts were made, first by Secretary Hay and later by Secretary Root, to come to terms. Gen. Reyes had been elected President of Colombia, and under his enlightened policy good progress was made. Secretary Root was able to bring about a tripartite arrangement between Colombia and Panama, Colombia and the United States, and Panama and the United States, settling all differences. Treaties were accordingly signed in Washington on January 9, 1909, by Secretary Root, Minister Cortes of Colombia, and Minister Arosemena of Panama. The two treaties to which the United States was a party were ratified by the Senate on March 3, 1909, but Colombia failed to ratify them, and they were abandoned.

When Mr. Knox became Secretary of State he resumed negotiations with Colombia through Minister Du Bois, at Bogotá, but Colombia's demands were still regarded by the United States as excessive, and the two governments failed to agree.

Thaddeus A. Thomson was sent to Bogotá as United States Minister in the summer of 1913. He reopened negotiations with Colombia, under instructions from Mr. Bryan, Secretary of State, and on April 6, 1914, a treaty was concluded between the two governments providing for the payment of \$25,000,000 to Colombia. The convention contained an expression of regret on the part of the United States for the occurrences at Panama, which was construed by opponents of the treaty to be equivalent to an admission of wrongdoing on the part of this government. The treaty was bitterly assailed in the Senate and by former President Roosevelt. It was still pending when Congress adjourned on March 4, 1915.

Copies of the treaties herein mentioned are to be found in the Appendix.

## CHAPTER XIX

### THE COMPLETED CANAL

THE PANAMA CANAL COMPLETE—THE GREATEST LIBERTY MAN EVER TOOK WITH NATURE—232,000,000 CUBIC YARDS TAKEN OUT AND 30,000,000 CUBIC YARDS PUT IN TO COMPLETE THE CANAL—THE LOCK CANAL A SURPRISE TO SEA-LEVEL ADVOCATES AND TO THOSE WHO DECLARED IT COULD NOT BE BUILT—CONGRESS NEVER TURNED AWAY FROM PROJECT AFTER SENATOR HANNA POINTED OUT DANGERS AT NICARAGUA AND APPEALED FOR A CANAL AT PANAMA—FIRST ESTIMATES OF EXCAVATING REQUIRED, FAR TOO SMALL—AMOUNT OF WORK DONE, FAR IN EXCESS OF ESTIMATES MADE—A TRIP THROUGH THE CANAL—THE ATLANTIC APPROACH—THE BREAKWATERS, TERMINUS AND FORTIFICATIONS—THE SEA-LEVEL DITCH—GATUN LOCKS—A GLORIFIED HYDRAULIC ELEVATOR—CARE OF THE LOCKS—A GREAT FRESH-WATER LAKE—DESTROYER OF BARNACLES—THE CULEBRA CUT—THE FIRST STEP DOWNWARD—PEDRO MIGUEL—MIRAFLORES LAKE—END OF THE JOURNEY—THE PACIFIC TERMINUS—THE AMERICAN TOWN—REPAIR FACILITIES—DEFENSES OF NAOS AND HER SISTER ISLANDS—A RETROSPECTIVE VIEW OF THE WATERWAY—ENLARGEMENTS MADE IN LOCKS—CULEBRA CUT DIFFERENT FROM WHAT IT WAS INTENDED—CHANGES AT PEDRO MIGUEL—SOSA HILL UNSATISFACTORY FOR A DAM SITE OR FOR LOCKS—CONCESSIONS TO SAFETY—AN ACCIDENT PROOF, NATURE PROOF CANAL—WELFARE OF THE CANAL ARMY—DEVOTION TO ITS LEADER—THE ART OF REDUCING COST OF LIVING.

THE Panama Canal stands today a completed waterway. Faith in American genius has removed mountains, built an inland sea and made the waters of the land a connecting link uniting the waters of the oceans. The valley has been exalted and the mountain has been made low; the river has gone up to meet the mountain and the mountain has been brought down to meet the river; the meeting point is now the highway between the oceans.

Never before has man essayed such a task. The building of the pyramids, for five thousand years or more the wonder of the world, was play in comparison, and the digging of the Suez Canal appears but a small enterprise. The "Soo" Canal, busiest of the world's great artificial highways, sinks into insignificance when measured by Panama. We fought tropical disease and won a great victory. We fought a rampant river and converted it from a

bitter foe into a firm friend. We attacked a mountain; were forced to settle down into a life and death struggle with it; but out of this we emerged thrice a victor. We brought the Atlantic Ocean inland to Gatun, and the Pacific inland to Miraflores, led rivers to do our will, made peninsulas out of islands and lakes out of rivers, justifying in very truth the statement of that citizen of the world, Lord Bryce, to the effect that the Panama Canal is the result of the greatest liberty man ever took with Nature.

The total amount of material handled in the construction of the Panama Canal ranged somewhere around 260,000,000 yards. If this were used to build a wall around the District of Columbia, it would be enough to make that wall sixty feet thick and as high as the Washington monument. If it were piled around the earth at the equator, separating the northern hemisphere from the southern,

it would make a solid wall nine feet high and six feet thick. If it were loaded on Lidgerwood dirt trains such as were used at Panama, it would require 13,000,000 cars, made up into 619,000 trains, to move it, which would make a belt of four dirt trains around the earth. The string of engines required to move such a load, assuming an engine and tender with an over-all length of fifty feet, would be upward of 6,000 miles long—about enough to fill a four track road solidly from New York to Chicago.

We think of the Pyramid of Cheops as one of the wonders of the past and as the one hand-reared structure that has defied the wreck and ruin "of time's remorseless doom" through upward of half a hundred centuries; but the material handled at Panama would make a row of pyramids like Cheops, with base touching base, nearly eleven miles long.

Yet all the wonder is not in the magnitude of the task; much of it lies in the superb audacity of American engineers in facing that task and in overcoming the difficulties it involved. When we started to build the canal there was one class of people who said it would be so easy that we might as well go down to sea-level, and another class who said it would be such a gigantic task that we were foolish to undertake it at all. As we look back over the years gone by since the work began, we see both prophecies unfulfilled and are grateful that neither of them affected the purpose of the United States to build a waterway there. The 32,000,000 cubic yards of slides that went into the canal and delayed the completion of Culebra Cut for two years, fought so relentlessly against the United States that they left no doubt in the minds of those who struggled with and conquered them, that if we had decided to go eighty-five feet deeper, they and not ourselves might at last have been the victors. As will be seen in coming chapters, each foot of depth multiplied the difficulties caused by the slides. The men who said a sea-level canal would not

be difficult to build were no worse confounded than the men who said no canal could be built. Some of them saw one specter and some another.

But all the criticisms and fears and prophecies never turned Congress away from the project, from the day when Senator Hanna pointed out the dangers at Nicaragua and appealed to both houses of Congress to face about and to authorize a canal at Panama.

It is interesting to view these things in retrospect and to see how wide many prophecies went of the mark. When the Board of Consulting Engineers made their estimates, they said that 103,000,000 cubic yards of material would have to be removed to make a completed waterway, and while they disagreed as to the type of canal, they all agreed that if a lock canal were built it would take nine years to complete it. Some of those who advocated a sea-level canal said that it would take longer to build the locks of a lock canal than it would require to excavate a sea-level Culebra Cut. How far from the truth this statement was is revealed by the fact that the locks were ready for use a year in advance of the completion of the Culebra Cut down to the eighty-five foot level. And the locks that were thus completed ahead of the Culebra Cut were larger by ten per cent. than the ones about which the statement was made.

To construct a canal in nine years requiring the excavating of 103,000,000 cubic yards of material, contemplated the removal of about a million yards a month. With 232,000,000 yards to excavate, the actual time consumed was seven and a half years, or the removal of an average of approximately 2,600,000 cubic yards a month. Had we taken out an average of only a million cubic yards of material a month, as was provided for in the estimates, we would have taken over nineteen years, instead of seven and a half years, in building the canal. It would have been ready in 1925 instead of 1915.

Let us take a trip in fancy through this

great waterway and see it as it is today before we go into the chapters that tell how it became what it is.

We come down to the isthmus on an almost due south course. As our steamer approaches the canal we first encounter two great breakwaters. The one juts out two miles from Toro Point and is extended to keep the Atlantic terminus protected from the violent northers that sweep down over the Caribbean Sea. On our port side is the second breakwater, which has no land connection. It was built to keep the ocean currents from filling up the Atlantic end of the canal with silt. At the land end of the first breakwater, the fortifications of Toro Point—harmless looking little mounds they appear to us—stand guard with guns that can hurl a ton of steel propelled by a quarter-ton charge of smokeless powder, a distance of fifteen miles or more.

On the other side of us are the fortifications of Margarita Island. The hostile fleet that would essay to run through the narrow entrance between the two breakwaters, even if there were no torpedoes to escape after it got through, would be going to certain destruction. For the first few miles, the canal has its banks under water, and we begin to see something of it only when we get in to the shore here, only two or three miles from Gatun. Once inside the breakwater, we go up to the terminal works, built at a cost of many million dollars. Here is where Uncle Sam proposes to make things attractive to the ships of the world; he wants to supply every need they may have and to supply them more cheaply than they can be supplied on any other trade route of the world. There are coal storage basins, where hundreds of thousands of tons of coal are stored; machine shops, where all sorts of repairs may be made and all kinds of spare parts and equipment supplied. There is a bakery, an ice plant, and docks and piers, where cargoes may be unloaded or taken on. Secondary breakwaters are to be found here, which make the anchorage off the line of the canal as still as a mill pond.

After all matters have been attended to here, from putting off the ship's laundry and taking on its coal; from paying the toll to taking on a pilot, we steer our course inland toward Gatun. First we pass through a swampy country, where the banks of the canal are but little above the water; then we come to the Mindi Hills region, where the canal begins to resemble a Culebra Cut in miniature. From this section we pass through a short level stretch which literally as well as figuratively brings us to the Gates of Gatun. Here we find ourselves at the end of the sea-level channel. Above us, eighty-five feet, there is a fresh water lake, and we must get up into that. Here the locks come into play—a glorified hydraulic elevator that will lift us up. Across our path, however, there stretches a great chain, and our ship must come to a standstill before it reaches this chain.

We draw up alongside a great pier that juts out into the canal channel and await our turn to go through the locks. Presently there come four electric locomotives down the walls of the locks. They make fast to our ship, two at the stem and two at the stern. Held thus in leash, the ship cannot go too fast, nor swing too much from one side of the lock to the other. While the lines from the towing locomotives are being made fast, the big chain that stretched across our path is being let down, the gates of the lower lock are being swung open and everything is made ready for our entrance. Meanwhile, an official of the canal has come aboard. He locks every lever in our engine room so that under no circumstances can one of them be moved while we are in the locks. By this time, the towing locomotives have been made fast; they begin to hum and slowly move us into the first lock. Once in this place, the big gates swing shut after us and up out of the bottom of the lock comes a flood of water. This water gradually raises us a distance of twenty-eight and one-third feet. While we have been lifted the locomotives which pulled us forward







SECRETARIES OF STATE

- 1. John Hay.
- 3. Philander C. Knox.

- 2. Elihu Root.
- 4. William J. Bryan.



SECRETARIES OF WAR

1. Luke E. Wright.  
3. Henry L. Stimson.

2. J. M. Dickinson.  
4. Lindley M. Garrison.



to this position have run up an incline to the next level and are ready to pull us up to the place of the next lift. Other gates ahead of us are now opened and we are towed into the second lock. Again the gates are closed behind us, the water is allowed to come in through the bottom of the lock and we slowly rise again a distance of twenty-eight and one-third feet. A third lift of twenty-eight and one-third feet is accomplished in the same manner, and we have reached the level of the lake, eighty-five feet higher than the sea-channel through which we entered. The gates ahead of us are opened, we are towed out to the great center guide wall, the towing locomotives are turned loose, the locks are taken off the levers in our engine room, and we are told to proceed.

Directed by a pilot we take our course through the beautiful Gatun Lake. The lake is so spacious that the ships of the world might congregate there and ride in safety. It is the largest artificial lake in the world. As we sail through it, the barnacles that have adhered to our ship's bottom, carried out of their native salt water, begin to sicken in their new element and one by one to drop off. By the time we have completed our journey of thirty-odd miles through Gatun Lake and Culebra Cut, the bottom of our ship, however foul it may have become, is as clean as if it had just come from a dry dock.

Our journey through the lake continues for twenty-three miles. Near the latter stages, the lake narrows gradually until it takes on the semblance of a canal. The great Culebra Cut is before us. It is a huge gorge with towering banks, cut through the mountain by human hands. Nine miles in length, mighty in proportions, it demands a toll from every traveler, no matter how blasé—a heart toll of admiration for the great digging army that created it. It is here, more than at any other place in the canal, that one can appreciate best the terrific battle waged by man against Nature. We can see signs of the struggle in the sloping sides of the gorge. We pass

through this cañon and come to the second set of locks, Pedro Miguel.

At this point we take our first step downward toward the sea. As at the first lock at the entrance to the canal, a giant fender chain stretches across our path. Towing locomotives appear on the extended walls of the locks and are attached to the stem and the stern of our ship. An official of the canal appears also as before, boards the ship, locks every lever in our engine rooms and orders the towing operations to proceed. Meanwhile, the fender chain has been lowered and the upper gates thrown open. We are towed into the lock, the gates are closed behind us and the water begins to pass out through the floor of the lock. Down we go, but slowly, until we find ourselves at the level of the water below the lock, thirty feet lower than the level of Gatun Lake. The gates ahead are opened, and we are towed out into Miraflores Lake.

This body of water is something more than a square mile in area. Across this, a short sail, we come to the gates of the Miraflores locks. There are two locks here, and we are passed through them and find ourselves on the level of the Pacific. We are towed out into the sea-level channel and are ready to commence our eight mile journey to the Pacific Ocean.

We sail out through a low-lying, swampy country, the hills of Agua Dulce on our right, and come presently to a point off Ancon Hill, where the capital of the Canal Zone is located. At Ancon Hill is a modern office building, built of steel and concrete, in which are located the administrative offices of the waterway. Here is the new American town, where the white employees of the canal all live. A little farther along is Balboa, the Pacific terminal, with its great machine shops, its big coaling plant and its modern dry docks. Here are all the facilities for ship repairing that are to be found in any shipyard in the country. According to the scheme of organization at the canal, the Atlantic terminal will furnish the supplies for the shipping world

and the Pacific terminal will provide the facilities for repairs. Any ship that can pass through the canal can be dry docked and repaired at the Balboa terminal.

From this point, passing the cargo handling plant with its docks on our left, we steam out toward the ocean. We pass the 500 acre plot of land reclaimed from the Pacific Ocean and on which are the permanent quarters for the Pacific Coast Artillery. These quarters do not include, however, those of the companies stationed on Naos and her sister islands. Connecting Naos with the mainland is a great embankment that rises out of the sea and whose crest is wide enough for a railway and a roadway. This was built of material hauled down from Culebra Cut and dumped into the shallow bay.

The defenses on Naos and her sister islands are the last word in American armament. Even if there were no mines to encounter within the point, no hostile ship would venture within the blank range of these guns. Here is planted the great sixteen-inch gun built at Watervliet, N. Y., which carries a projectile weighing more than a ton, hurling it for a distance of twenty miles.

The embankment connecting the mainland with the fortified islands, which are themselves connected by stone causeways, serves the double purpose of giving the military forces dry-land connection between the islands and the mainland and of keeping the cross currents of Panama Bay from sweeping millions of cubic yards of silt into the canal.

Having passed through the big waterway, let us take a retrospective view of its construction history. To begin with, the canal that is now a completed waterway is not the canal that we started out to build. We never planned to build locks with a usable length of 1,000 feet and a width of 110 feet. What we did plan were locks with a usable length of 900 feet and a width of 96 feet. Then the Olympic and the Titanic were designed, and President Roosevelt concluded that the locks should

be made larger. Congress had authorized him to provide a canal with dimensions sufficient to take care of the largest ships then constructed and in prospect.

The Culebra Cut, also, is different from what was intended. It is 300 feet wide at the bottom, while the original plans called for a cut 200 feet wide at that point. Here again, it was the word of Roosevelt that made the change. He was moved to order it enlarged from the same considerations that led to an increase in the size of the locks. These orders applied only to the increase in the bottom width of Culebra Cut; the vast increase in the top width was not ordered by any one. Nature spoke the word that changed this. At places where the original cut was planned to have a top width of 670 feet, it now has a width of more than a third of a mile. All this meant doubling the task of digging the cut. The great army employed in this work never flinched, however. It showed the world that it could dig two Culebra Cuts in less time and with half as many steam shovels as was thought would be required. Even with such a wonderful showing as this to inspire them, however, the canal diggers were heartily glad they were not asked to sink Culebra Cut to sea level.

At Pedro Miguel, another change was made. It was early decided that ships going through Culebra Cut from the Atlantic to the Pacific might need to wait for lockage at Pedro Miguel; so a basin was constructed at the upper end of Pedro Miguel for this purpose.

Below Pedro Miguel, it was planned originally to build the other Pacific locks at Sosa Hill. It was intended to throw dams across the saddles between the several hills at the Pacific end of the canal and thus make a miniature duplicate of Gatun Lake at the Pacific end. Two conditions changed these plans. Upon more mature examination, it was found that Sosa Hill was a very poor site for a duplicate flight of locks and an equally poor one for a dam. The dam site formed the habit of swallowing up the dam as fast as it was put into

place, and the site was abandoned. From an engineering standpoint, also, the lock site was not satisfactory.

But if Sosa Hill was unsatisfactory as a dam site and as a lock site from the engineering standpoint, it was much more unsatisfactory from a military standpoint. The place stood out close to the open sea, and consequently exposed to bombardment. When this phase of the situation was discussed, all the strategists of the Army and the Navy were unanimous in favor of moving the locks and dams farther inland. Fortunately Miraflores offered a fine position for both the locks and the dam, so that to-day, instead of a large Pacific-side lake, extending from Pedro Miguel to Sosa Hill, there is a sea-level channel from Miraflores to the sea with a small lake between Pedro Miguel and Miraflores.

No other great engineering undertaking ever witnessed so many concessions to safety as the Panama Canal. That it was built for the Government and therefore that he must avoid every chance of failure was kept constantly in mind by the Chief Engineer. No plan for any part of it ever was approved by the chief official until the engineers under him could demonstrate to him that there was no such word as fail in the lexicon of engineering in connection with it. Gatun Dam may have been built much more strongly than was needed to make it safe, but it was considered better to put in five million cubic yards of material too much than ten cubic yards too little. The gates of the locks may have been constructed in a far more substantial manner than seemed to be necessary, but it was preferable to go far beyond the safety point than to come just below it. The facilities for controlling the Chagres River might be great enough to control two rivers instead of one, but it was advisable to provide for the discharge of a hundred million cubic feet a second more than was needed rather than to leave any element of doubt.

The completed canal is a waterway that is as safe as human hands can make any-

thing, and its successful operation as sure as anything in the future may be. The American people may have had fears in the past, but if they had known anything of the determination of the Chief Engineer to eliminate the millionth chance, they would have resigned their fears years ago. It was being constructed for a hundred million people and for generations yet unborn, and "safety" was the pole-star by which the builders shaped their course. The result is that the completed Panama Canal stands to-day as the world's most carefully constructed piece of engineering. There is a margin of safety everywhere that is surprisingly large, but it permits the American people to feel that they have a canal that partakes of the permanence of Nature itself.

Not only is the Panama Canal a stupendous work viewed from an engineering standpoint, but it is unique in the methods of its execution. Never in the history of man was there a greater combination of paternalism and despotism than at Panama. There was paternalism, because the United States did everything for the people; from giving them free rent, free light, free medicine and free amusements, to providing them with government without taxation. There was despotism, because the power of the Chief Engineer, Colonel Goethals, was all sufficient and autocratic. In some respects the Czar of Russia had no more power than this man. The Chairman and Chief Engineer might not have had the power of life or death over his force, but he did have the power of deportation, and he knew how and when to use it. His word was law and there was neither appeal nor repeal.

In building the Panama Canal, the United States wrote a chapter in the art of preventive medicine. It transformed a pest-hole into a healthy community; and while it never went as far as did Great Britain, which completely exterminated the malarial mosquitoes at Ismailia, it did prove that with proper sanitation and proper medical attention, the tropics may

be made as fit an abode for white men as the temperate zones.

A new chapter in the art of reducing the cost of living was also written at Panama. Through the Government commissary, the best western dressed beef was sold to the householder at Panama at prices lower than those in American cities.

What was true of meat prices was true in other lines. With rents, fuel, lights, medicine and medical attention free; with everything the people had to buy marked down to prices which had not been known in the United States in twenty years; and with salaries and wages about fifty per cent. higher than United States standards, the cost of living was never an issue at Panama, except as it was made an issue by those who were unrelenting in their efforts to drive it down still lower.

In view of the triumphant completion of the canal, it is a matter of interest to recall one at least of the many ancient predictions that the wrath of God would follow any attempt to unite the two oceans by an artificial waterway. Among the early travelers through South and Central America after the voyages of Columbus and Ojeda, was Josephus Acosta, a learned Jesuit, of Spain. He wrote much of what he saw and heard, and in the third volume of "Purchas His Pilgrimes," published in 1625, appear the first four "bookes" of Acosta's "Natural and Moral History of the Indies." Among the venerable traveler's observations is the following in regard to the proposal to cut a canal across the Isthmus of Panama:

"They say, that he that first discovered this Sea, was called *Blascowunes* of *Bilbo*, the which he did by that part which we now call *Maine Land*, where it growes narrow and the two Seas approach so neere the one to the other, that there is but seven leagues of distance. . . . Some have discoursed and propounded to cut through this passage of seven leagues, and to joyne one Sea to the other, to make the passage from *Peru* more commodious and easie, for that these eighteen leagues of land betwixt *Nombre de Dios* and *Panama*, is more painefull and chargeable then 2300 by Sea, whereupon some would say, it were a meanes to drowne the Land, one Sea being lower then another. As in times past we find it written, that for the same consideration, they gave over the enterprize to winne the red Sea into *Nile*, in the time of King *Sesostris*, and since in the Empire of the *Othomans*. But for my part, I hold such discourses and propositions for vaine, although this inconvenience should not happen, the which I will not hold for assured. I believe there is no humaine power able to beate and breake downe those strong and impenetrable Mountains, which God hath placed betwixt the two Seas, and hath made them most hard Rockes, to withstand the furie of two Seas. And although it were possible to men, yet in my opinion they should fear punishment from heaven, in seeking to correct the workes, which the Creator by his great providence hath ordained and disposed in the framing of this universall world."

## CHAPTER XX

### THE SANITARY DEPARTMENT

PANAMA'S LESSON TO THE WORLD—A DEATH-RATE SPLIT IN TWO—LIBERALITY OF EXPENDITURES—THIS LIBERALITY JUSTIFIED—SUCCESS IN PORTO RICO AND ELSEWHERE—DR. GORGAS APPOINTED—HIS EXPERIENCES IN CUBA—HANDICAPPED AT FIRST—THE MOSQUITO GETS HIS CASE REOPENED—MAGOON TO GORGAS'S RESCUE—SLEUTHING FOR MOSQUITOES—GOETHALS AND GORGAS—GETTING RID OF YELLOW FEVER AND MALARIA—OIL ON MOSQUITO-TROUBLED WATERS—THE ISTHMIAN QUARANTINE—VACCINATING INCOMING PASSENGERS—FREE HOSPITALS—THE TABOGA SANITARIUM—THE SPIRITUAL HEALTH OF THE PEOPLE—WORTH MANY TIMES ITS COST—ARMY SURGEONS SUCCESSFUL EVERYWHERE.

THE story of the sanitation of the Canal Zone constitutes one of the most dramatic examples that the world affords of what medical science can accomplish when properly backed by a government. With the eyes of the world focused upon the big undertaking, there was that degree of the spectacular in the work that is required to command universal attention, and so it has come to pass that one of the greatest benefits that the Panama Canal will bring to the people of the earth is the splendid lesson it has taught humanity—the lesson that contagious or infectious disease may be controlled and held in check.

To any one who has visited the Canal Zone, no statistics are necessary to show what has been, and what may be, accomplished by sanitation. His own eyes tell him of the wonderful transformation that has taken place, as he travels across the isthmus and sees where thousands of mosquito paradises have been transformed into disease-free spots. He looks from the vantage point of an observation car at the fifty-mile parkway across the isthmus. But to others, it need only be said that the death rate for the population of Panama, Colon and in the Canal Zone has been cut down from the forty-two per thousand that obtained when the Americans went to Panama to the twenty-two per thousand that existed when the canal became a

completed waterway. Apply that wonderful decline to our own country and see what results: If our growth as a nation has been normal since 1910, our present population must approximate a hundred million souls. A saving of twenty lives per thousand would mean to us the saving of 2,000,000 lives a year, and a saving of at least 5,000,000 cases of sickness. There is the measure of what has been accomplished at Panama.

The wonderful liberality with which the United States provided for health purposes on the isthmus is revealed by the fact that nearly \$20,000,000 was appropriated for carrying forward that work during the ten years of the construction period—which appropriations covered the hospitals, medical attendance, sanitation and other activities. Of this about \$4,000,000 went to sanitation proper. Now, when we remember that the population of the Canal Zone was only 62,000 and that the area of that part of the Zone under active sanitary control amounts to only 1,200 acres, it will be understood that there was no lack of funds with which to prosecute the work. It is not to be presumed, however, that the entire Canal Zone has been cleaned up and converted from an untamed jungle into a place fit for the residence of men; as a matter of fact, except for the 1,200 acres in the settlements along the canal and the few little clearings made by negroes for



their tiny yam patches, all of the 278,000 acres of the Canal Zone's area lie outside of the sanitary district.

When we come to look elsewhere we find that equally brilliant results were accomplished with the expenditure of very much less money. That is true of Porto Rico. When the Americans took possession of that island the death rate was practically the same as the death rate at Panama when we took over the canal strip. To-day the death rate in Porto Rico is just as low as it is at Panama, notwithstanding the fact that Porto Rico is the most densely populated island on earth. The same density per square mile, if applied to the United States, would give us a population of nearly a billion. Dr. Bailey K. Ashford, who cleaned up Porto Rico, had only a small percentage of the funds per capita or per acre at his disposal that Colonel Gorgas had at Panama. But in Porto Rico they could afford to count the cost. There was not a great international project at stake, nor would the world have suffered from failure in that country as it would have suffered from disaster at Panama.

When the United States started in to build the Panama Canal, all eyes turned to Dr. William Crawford Gorgas, then a surgeon in the United States Army with the rank of major, as the man of all men best fitted to take charge of the work of sanitation. He was fresh from his successes in Cuba, where he had, under General Leonard Wood, applied the lessons of sanitation that had been learned by Dr. Walter Reed and his associates in their remarkable series of experiments with yellow fever. Although he had gone into the work of ridding Havana of yellow fever with a skepticism that he afterward admitted, he had carried it to a highly successful conclusion. As late as 1902 he stated that he had doubted the conclusion of Reed that yellow fever was caused only by mosquitoes, adding that he had not believed it was even the ordinary, much less the only cause.

But his own work proved a cure for his skepticism, and from that day to this he

has stood out as the world's most famous master of tropical sanitation. He went to Panama with the first forces that steered their course that way after the American occupation. He laid out his sanitary campaign in the utmost detail, in which he was assisted by a number of experienced surgeons, as well as by Major Roland Ross, the man who had proven the mosquito theory of the causation of malaria, and upon whose work Reed and his associates builded in making out their case against the yellow fever mosquito.

Dr. Gorgas returned to the States for a few months, and then went back to his work of cleaning up the isthmus. From the first he was handicapped. A commission of seven men of equal authority never was known to do things promptly under any circumstances; and when it came to a commission, a part of whose members were in Washington and another part in Panama, it was worse than ever—so that more money came to be spent on telegraph and cable tolls than was spent on sanitation. But Colonel Gorgas was a patient man; and though Major General George W. Davis, then Governor of the Zone, and managing commissioner, was somewhat out of sympathy with him, he did the best he could and hoped the day would come when he could do better. Finally General Davis was relieved, and Gorgas was made acting governor and given temporary free rein.

Chief Engineer Wallace was somewhat distrustful of Gorgas's ability to control yellow fever, and at one time Mr. Taft seemed to hold the same opinion. But when Charles E. Magoon became Governor of the Canal Zone, he told Colonel Gorgas that he wanted him to understand that all the resources of the Canal Commission were behind him. With this inspiring assurance, Colonel Gorgas set out to undo the damage that had been done. *Stegomyia* had been tried and convicted in Cuba, but had moved for a new trial in Panama and had obtained it. With the outbreak of the epidemic of 1904-5 some of the people settled down to the conviction that

the mosquito was not responsible for the yellow fever; many of them went so far as to tear the screens off their windows as a protest against the theory. Every ship that left the isthmus carried a full passenger list, and those who had to remain behind were under daily fear of contagion.

But Governor Magoon changed things. The chiefs of divisions were held responsible for the keeping of the doors and windows of the rooms of their employees properly screened. Guards were stationed around to see that screening orders were obeyed and office doors kept closed. Whenever there was a case of yellow fever the antecedents of the patient were investigated with extreme care. Here was a man who was registered at a Panama Hotel. He was sick and some one feared he had yellow fever. When the authorities came to look him up, he had disappeared. The next day he was found in the streets intoxicated and suffering from yellow fever. He was taken to the hospital, where he died. Then they looked for his associates. Nobody seemed to know him. Finally it was heard that some of his countrymen frequented a certain bar room. Here again no one knew him, but several of them had heard him talking with an Italian. The Italians of the entire City of Panama were canvassed, and at last the man who had talked with him was found, but the man knew him only slightly. However, he did know that the man was acquainted with the watchman at a certain little theater. This watchman was hunted down and was found to be ill with yellow fever himself. Then a little girl who frequented the theater was found to have taken the disease. Every case was thus rigidly investigated and all sources of infection run down. The result was that the last case of yellow fever was stamped out in the early part of 1906, and a second and final decision was rendered against the mosquito, this time in the court of last resort—a decision which the world owes to the energetic measures of Colonel Gorgas, and the support of Gov. Magoon.

From that day forward Colonel Gorgas enjoyed the confidence of the world and of the canal engineers alike. In more recent years there was up some feeling between the partisans of Colonel Goethals and those of Colonel Gorgas. Acting upon the order of President Taft that the actual work of digging ditches, cutting grass, and the like, should be placed in the hands of the Quartermaster's Department, under the supervision of the Sanitary Department, Colonel Goethals directed that this course be pursued. It resulted in no loss of sanitary efficiency, and in a considerable saving of money. But the friends of Colonel Gorgas always felt that Colonel Goethals was responsible for the order, whereas it was issued at the direction of the President himself and in spite of Colonel Goethals's views in the matter. Colonel Goethals never has failed to commend the excellence of the sanitary work at Panama, upon all proper occasions.

The first work of protecting the health of the people of the Canal Zone always had been that of holding the mosquito in check, for malaria and yellow fever had to be controlled—the one kept down and the other kept out, if the sanitary work was to be successful. There are upward of a hundred species of mosquitoes on the isthmus, but only the *anopheles* and the *stegomyia* families have evil reputations.

The habits of the mosquitoes lend themselves easily to the needs of man in his war of extermination against them. They lay their eggs in the water, and when their larvæ hatch out, they must come to the surface for a breath of air. By spreading oil upon the surface of standing water the larvæ are destroyed.

Numerous methods of "pouring oil on the troubled waters" have been in use at Panama. One of the favorite methods is to put a wick in a piece of pipe soldered into a large ash can. The can is filled with oil and set on a board that spans the little streamlet it is meant to protect. Drop by drop the oil in the can passes down and along with the waters, and when they reach quiet

levels there is a scum of oil over the placid surface of the water from bank to bank. Another method of applying the oil is to strap a spraying tank filled with it upon the back of a husky negro and then send him forth to "nose out" all little pools of stagnant water in the neighborhood and to cover them with a film of oil. In these ways about 700,000 gallons of oil and 124,000 gallons of larvicide were used annually.

But with all that, there were still breeding places that could not be found, so it was necessary to keep down the grass and brush, to the extent of about twenty million square yards of the former and about half as much of the latter every year. And then some two million feet of ditches had to be kept clean and about a quarter of a million feet of new ones dug for drainage purposes.

Yet with all of this war against the mosquitoes, a few of them still managed to perpetuate their species, and this required the expenditure of about a million dollars for screens for shutting them out of the houses. Even then some few would manage to get inside, and these were either caught in traps or killed. About a quarter of a million malarial adult mosquitoes were so destroyed.

While the quarantine on the Canal Zone was a very rigid one, it did not include malaria in the list of diseases to be excluded. But for those diseases which were banned it was as unrelenting as fate.

Shortly after the United States began operations on the Canal Zone a ship load of deck passengers from Martinique was brought over. When it was announced that they had to be vaccinated, one of their number, a voodoo doctor, led a mutiny against inoculation, in which a hundred and fifty took part. He pronounced it an attempt to put "the inextinguishable mark" upon them, so that they could never escape from the isthmus. They declared they would rather suffer martyrdom aboard than to be held captive ashore, and it was only after three days of unsuccessful parleying that the mutiny was broken up by their

being driven ashore by the police. Still protesting, they were rounded up, in spite of their efforts to escape, vaccinated, and the next day sent to work.

A quarantine station was maintained at each end of the canal, and will be continued under the permanent organization. Every ship arriving was boarded, and if a clean bill of health could be presented, nothing remained to be done except for every passenger and member of the crew to be examined for quarantinable disease. But if the ship had come from an infected port there was trouble—all passengers went to the quarantine station until it was safe to pass them through the lines.

The government furnished all of its employees with free medicines, free medical attendance, and free hospital and burial services. It dispensed about a ton of quinine a year, provided camps where the laborers who were not ill enough to go to the hospital could rest and be treated, and ran one or two hospital cars on every passenger train that crossed the isthmus.

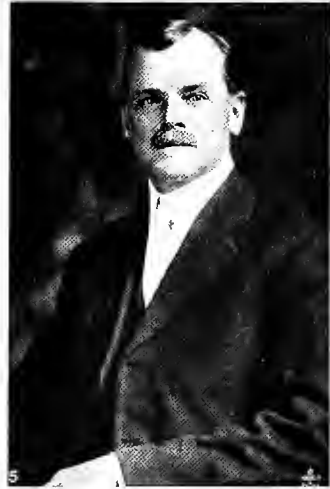
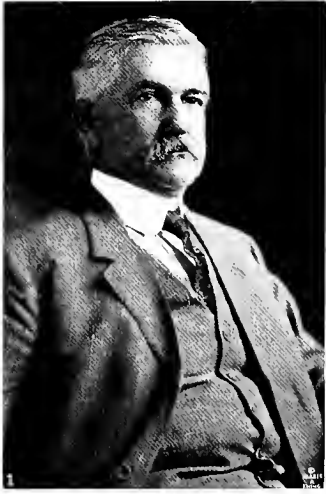
The hospitals maintained were by far the best to be found anywhere in the tropics. The one at Ancon is very large, perfectly appointed, and situated in attractive grounds. It is a monument to the Catholic sisters who conducted the institution and beautified the grounds under the French régime. The hospitals had an average of about 600 whites and 1,200 negroes as patients, and during each year there were admitted and discharged some 18,000 whites and 14,000 negroes. About 5,000 whites and 11,000 negroes were treated annually in the sick camps. The total number sick in hospitals, camps, and quarters in 1913 was 48,000. Applications to the dispensaries for treatment amounted to 311,000 among the whites in 1912 and 322,000 among the colored employees.

A modern sanitarium was maintained at Taboga, where the white employees who had passed through the hospitals were sent to recuperate. The number of white employees on the sick list ranged around forty





1. Gorgona as it was during construction days ; today its site is under water.  
2. View from grounds of Taboga Island Sanitarium, where American invalids were sent to recuperate.



GOETHALS'S CHIEF AIDS

1. Maj. Gen. Wm. C. Gorgas  
4. Rear Admiral H. H. Rousseau

3. Brig. Gen. Wm. L. Sibert

2. Brig. Gen. Harry F. Hodges  
5. Lt. Col. D. D. Gaillard



per thousand, while the number of colored employees averaged around seventeen per thousand, in spite of the fact that the death rate among the colored people was higher. The cost of operating all the hospitals, sick camps, and dispensaries of the Sanitary Department amounted to \$739,000 in 1912, at an average cost of \$1.22 per day in the hospitals and forty-seven cents in the sick camps.

The Sanitary Department not only looked after the physical health of the people, but after their spiritual health as well. The churches were under its jurisdiction and it carried some fifteen ministers of the gospel on its pay rolls. It also took care of the cemeteries and conducted the undertaking and embalming business required for the canal army.

Looking over the history of sanitation on the Canal Zone, it must be pronounced a wonderful record. Any careful analysis of the figures of expenditures of the Sanitary Department must show that the work was expensive, that it cost perhaps more, result for result, than sanitation anywhere else in the world. But that does not detract from the fact that it

was successful, and that it was worth far more to the United States than its cost. Carrying with it that degree of publicity that enabled it to arrest the attention of the world, it ever will stand out as the creating force of a world-wide movement in the direction of better sanitation. And in that way it has done more for the health movement that is sweeping over the world than any other single agency in the history of man.

The success of the American army surgeon has been universal, whether his work is at Panama, in Porto Rico, in the Philippines, or at home. There is glory enough for them all, and if the successful work at Panama serves to awaken the American people to a knowledge of the fact that they have medical triumphs to be proud of wherever the American army surgeon has gone, its benefits will extend far beyond the limits of the Canal Zone.

The experience in sanitation at Panama in its application to the quarantine of the world's trade routes is graphically presented in a later chapter in this volume by Dr. Rupert Blue, Surgeon-General of the United States Public Health Service.



## CHAPTER XXI

### THE CANAL UNDER WALLACE

THE NEGLECTED BEGINNING—TAKING OVER THE FRENCH PROPERTY—"UNSCRAMBLING" THE CHAOS OF THE HOUR—EXCELLENCE OF THE FRENCH EQUIPMENT—VALUE OF THE FRENCH PROPERTY—THE FIRST CANAL COMMISSION—ITS TRIP TO THE ISTHMUS—MORE INFORMATION NEEDED—SETTING UP THE CANAL ZONE GOVERNMENT—WALLACE APPOINTED CHIEF ENGINEER—"MAKING THE DIRT FLY"—AT CROSS PURPOSES—ANNOYING RED TAPE—UNSATISFACTORY CONDITIONS—GETTING RID OF THE COMMISSION—THE NEW BOARD—WALLACE SEEMINGLY SATISFIED—HIS RETIREMENT, AND THE REASONS THEREFOR—GOETHALS' JUST AND GENEROUS VERDICT.

WHEN one comes to write the story of a great project successfully carried to completion there is temptation to pass by that era of unsightly chaos which marks the laying of the foundations and to begin with the completed undertaking and the days when it began to take shape.

And so it has been with every historian of the Panama Canal. The administration of John F. Wallace is passed over lightly, and that of John F. Stevens is given but little more attention. And yet the work that was done by these men was so essential to the ultimate success of the canal, and the steps then taken so illuminative of what was required for the triumph of the American canal diggers, that he who would know and appreciate the full story of the construction of the big waterway must go back further than the Goethals administration.

It was on the morning of the 4th of May, 1904, that, the formalities of the sale of the French property to the United States having been perfected, Lieutenant Mark Brooke, of the United States Army, took possession of this property. There was comparatively little ceremony about it, but the keys were delivered, and immediately the work of getting under way was begun. The first step was to reëngage all the employees of the New Panama Canal Company and continue the work just as it had been going on. This did not mean

a great deal, for the French company was merely keeping enough men at work to justify its title to the concession.

The next step was to begin the work of "unscrambling" the chaotic pile of French property that had been acquired. From one side of the isthmus to the other there was an almost unbroken row of houses and machinery, material and junk, and to extricate all this and classify it was a task whose proportions were enhanced by the wreck and ruin and tropic growth of some fifteen years. The railroad was a mere spectre of rust and decay, running through a fifty-mile cañon of tropical jungle. The rolling stock had degenerated, and even the steamship line had become a byword up and down the Spanish Main.

There were 2,148 French buildings acquired, many of them standing out in the jungle and infested by all sorts of tropical pests. The force that was to prepare the isthmus for the canal diggers had to occupy these houses until new ones could be built, and it was nearly impossible to make many of them habitable.

The best machinery and supplies had been gathered into several great parks and storehouses, and the rolling stock in the main had been kept well painted, the same being true of the floating equipment. It took many weeks to card-index the French equipment so that it could be found when needed, but the results amply justified the trouble. For whatever the French did on

the isthmus was done well. Tiny Belgian locomotives bustled over the works as if they were fresh from the factory instead of rehabilitated mechanical waifs which had been exposed to the rust and ruin of fifteen rainy seasons. With a new cab to replace one that had rotted away, with a new pipe here and a new piece of brass there, they hustled around, handling concrete trains as proudly as though they were strong Baldwins drawing the huge dirt trains to the dumps.

What was found to be true of the engines was equally true of the dredges and other floating equipment. When we compare it with our canal-digging equipment of a quarter of a century ago, it becomes evident that the very latest word in excavating machinery that had been spoken at that time was incorporated in the French equipment at Panama.

Much was said at the time of the acquisition of the property of the New Panama Canal Company to the effect that the United States had paid too much for it. This statement has been amply disproven by experience and by more recent inventories of what actually was acquired. To begin with, the profits of the Panama Railroad operations have been large enough to amortize the entire outlay made on its account. The usable excavations of the French were worth \$25,000,000; maps, drawings, and records, \$2,000,000; lands, Pacific ship channel, and roads, \$1,750,000; and the Panama Railroad, upward of \$9,500,000. According to a careful estimate in 1911, the total value of the property amounted to nearly \$43,000,000.

The first Isthmian Canal Commission appointed for the building of the canal, in accordance with the terms of the Spooner law, under which the waterway has been built, was composed of Rear Admiral John G. Walker, Major General George W. Davis, William Barclay Parsons, William H. Burr, Benjamin M. Harrod, Carl E. Grunsky and Frank J. Hecker. In appointing them President Roosevelt declared

that "What this nation will insist upon is that results be achieved."

The commission arrived on the isthmus on April 5, 1904, and after three weeks of study of the problems to be met, decided that they needed more information than the French records disclosed. So they returned to the States and began to organize surveying parties. Meanwhile Major William C. Gorgas, fresh from his sanitation successes in Cuba, after accompanying the Commission to the isthmus, at the direction of President Roosevelt, was engaged in drafting the plans of the sanitary campaign that was to clean up the isthmus and make it habitable for the canal-digging army soon to invade that territory.

When the surveying parties returned to the isthmus they had to go out into the jungle, and supplies were so scarce that they were compelled to live almost like aborigines. The only way they could get fresh meat was to kill monkeys, and some of them declared that the outlines of a skinned monkey so closely resembled those of a baby that monkey meat did not make a very delectable dish.

Major General Davis and Colonel Gorgas returned to the isthmus with the surveying parties, and the former set out to organize the civil government of the Canal Zone. He first issued a proclamation announcing his assumption of the Governorship of the Canal Zone, and then negotiated an agreement with the Panaman Government concerning the relations that would have to exist between them. He then created the Sanitary Department and set Colonel Gorgas to work carrying out his plans.

John Findley Wallace was elected chief engineer of the canal, May 6, and assumed the duties of the office June 1, 1904. He arrived on the isthmus the last of that month. His first undertaking was to get the equipment already on the isthmus into shape. The insistent demand that the chief engineer "make the dirt fly" was heard by him and heeded, and by equipping the machine shops he was able to repair about five or six of the French locomotives

a month and about a hundred French dump cars, sending them to Culebra Cut at once. It was his intention also to install a new American steam shovel, with its equipment of three locomotives and a hundred big cars, every week.

But it was not long until Mr. Wallace was at cross purposes with his commission. With an auditing system in Washington that made it next to impossible to get action, he found himself so handicapped that it was but natural that he should have become impatient. Up to August 1, 1904, Major General Davis was the managing representative of the Commission on the isthmus, and Mr. Wallace was under his immediate direction. At that date General Davis was relieved of the duties of managing director, and the chief engineer was directed to report to and receive orders from the Chairman of the Commission. Something of the feeling that existed between Wallace and the Commission crops out in the annual report of the Commission for 1904, in which it was somewhat sarcastically stated that "while the orders give the chief engineer entire independence as respecting the resident member of the Commission, he is required to furnish the said member with copies of his reports to the chairman. Up to the present time, October 1, no such reports have been received, but this circumstance is perhaps due to the fact that Mr. Wallace has been absent from the isthmus since Sept. 14th."

Under the cumbersome administrative machinery then provided, coupled with the internal dissensions of the Commission, Mr. Wallace and Colonel Gorgas were in the plight of the little girl who obtained her mother's consent to go in to swim, but who was, in the same breath, forbidden to go near the water. They were authorized to clean up the Canal Zone and Panama and Colon, and to construct the necessary waterworks and sewers in the terminal cities, but delay and red tape met them at every turn. They might have had the water turned on in Panama six months sooner if they had been given proper

support. Colonel Gorgas begged for screen wire to shut out the mosquitoes, but he might as well have kept silent. In disgust Wallace declared that red tape was "system gone to seed." He said a child could break a single hemp fiber, but that many strands woven together would hold in leash the biggest ship that floats; and that by the same token enough red tape could prevent the building of the Panama Canal. He concluded that it would take infinitely longer to build a lock canal under such a system than to build a sea-level canal under contract.

Under these conditions, the situation on the isthmus was most unsatisfactory during the latter part of 1904. There were no acceptable quarters, no suitable food supplies, and no attempt to make conditions attractive. But for the high wages the white employees would have left.

At this juncture Mr. Wallace visited Washington. The result of his visit was that the Commission was asked to resign and a new one was appointed. President Roosevelt called the attention of Congress to the fact that building a canal with a seven-member commission was a failure and asked that it be reduced to five, or, preferably, to three. The House granted his request, but the Senate ignored it.

The result was that Mr. Roosevelt decided to take one of his famous short cuts around a legislative obstacle. He created an executive committee of three members of the second commission, with powers almost coextensive with those of the entire body—the other members having few other duties than to agree to what the executive committee did. The Commission consisted of Theodore P. Shonts, chairman; Charles E. Magoon, governor of the Canal Zone; John F. Wallace, chief engineer; Mordecai T. Endicott, Peter C. Hains, Oswald H. Ernst, and Benjamin M. Harrod. At the same time the Panama Railroad was reorganized, and placed under the virtual control of the chief engineer. Under the new arrangement Mr. Wallace seemed to have obtained all the authority he

needed. He returned to the isthmus, content with the revised organization, arriving there June 2. An epidemic of yellow fever was raging, and the wife of his secretary had died. Six days later he cabled for permission to return to the States. Governor Magoon, it is said, privately cabled to Secretary Taft that Mr. Wallace thought he had a slight attack of yellow fever, and that this, coupled with the prospect of a better salary, was responsible for his desire to return home. Secretary Taft granted his request. Mr. Wallace prepared to leave, and when the canal force learned what was transpiring a rush for shipboard followed. It looked as if nothing could prevent a yellow fever panic.

When Mr. Wallace told Secretary Taft of his disgust with red tape, of his promise to his family to consider well before accepting a permanent residence on the isthmus, and of his prospective employment in a better-paying position, Mr. Taft was furious. He ordered Mr. Wallace to present his resignation at once, and it was immediately accepted. In a later chapter of this work the reader will find Mr. Wallace's own story of his experience on the canal.

It seems, at this distance, and with Mr. Wallace's statement to a congressional committee before us, that the conditions that led up to his resignation were cumulative. That he was afraid of yellow fever, as was his family, he himself admitted. That he was disgusted with red tape hindrances he frequently declared, both before and after his resignation; that he found a better engagement in New York an attraction under these conditions needs only to be stated to be believed. But it is probable that greater than all these reasons

was his conclusion that service under Chairman Shonts, to whom the President had promised a "free rein," would not be conducive to success.

The retirement of Mr. Wallace was a blow to the work, undeniably. It came at a critical time in the history of the canal; and it came in a way that demoralized the force on the isthmus and shook public confidence at home. But it was, under the circumstances, the natural result of trying to execute a complex undertaking under a mistaken plan of divided authority.

It may be best to take the estimate of the situation that confronted both Wallace and Stevens, as expressed by their successor, Colonel Goethals. "I think," said he, "that either of these engineers might have built the canal had he been given a free rein. They had been engaged in a field where all that was asked of them was results. They laid out their plans, submitted them to their boards of directors, with the accompanying estimates of cost, and then were told to go ahead. They went ahead, responsible only for the final result, and that result was satisfactory. They never knew anything of the irksomeness of red tape, had no patience with interference by the Commission and by the Government. They were men whose whole training had fitted them for exercising a 'free rein' and had unfitted them for the hampering restrictions of red tape.

"Army men are familiar from their youth with other conditions. They know that it is their duty to adjust themselves to the doing of things in the way their Government directs, and it is their acquiescence that makes possible successful work by them. That is why the army succeeded."

## CHAPTER XXII

### THE STEVENS RÉGIME

JNO. F. STEVENS APPOINTED CHIEF ENGINEER—AROUSING CONFIDENCE IN THE DISCOURAGED FORCE—YELLOW FEVER, MALARIA, AND COLD FEET—A COLLISION HAS ITS MERITS—STEVENS AND HIS HEAD CARPENTER—PICKING HIS ENGINEERS—CLEANING UP PANAMA AND COLON—BUILDING QUARTERS AND PROVIDING CLUB HOUSES—RECRUITING THE CANAL ARMY—THE INDIFFERENT WEST INDIAN NEGRO—THE CHIEF ENGINEER'S HANDICAPS—ARRANGING PLACES FOR DUMPING SOIL—BOARD OF CONSULTING ENGINEERS—THE MARKELL FEEDING CONTRACT—THE EIGHT-HOUR LAW AND CIVIL SERVICE—STEVENS AND SHONTS AT ODDS—THE RESIGNATION OF MR. STEVENS—THE PROPOSAL TO BUILD THE CANAL UNDER CONTRACT—DIFFICULTIES IMPOSED BY THE RAINY SEASON—GOETHALS CARRIES FORWARD THE PLANS OF HIS PREDECESSOR.

THE selection of Jno. F. Stevens to succeed John F. Wallace as chief engineer of the Isthmian Canal Commission was announced within a day or two after Mr. Wallace resigned. Mr. Stevens was to be paid \$30,000 a year. He was on the eve of accepting a contract to go to the Philippines to build the Government railroads there. His determination to accept the isthmian berth instead of going to the Philippines was reached at the personal solicitation of President Roosevelt.

When Mr. Stevens arrived on the isthmus, July 26, 1905, he asked the Canal Commission to permit him to suspend work on the excavations in Culebra Cut in order that he might perfect the transportation facilities needed there. His first effort was to infuse confidence into the dispirited canal army. He had a knack of saying and doing things that pleased the canal employees. He promptly told the people that there were three diseases on the isthmus—yellow fever, malaria, and "cold feet," and that the greatest of these was "cold feet."

In reporting on conditions as he found them on the Panama Railroad, he said that the world had moved and that the Panama Railroad had not, in personnel, equipment, methods, or otherwise. All efforts prac-

tically had ceased to remedy the congestion of freight. "About the only claim for good work," said Mr. Stevens, "that I have heard made, was that there had been no collision for some time. But even a collision has its good points as well as bad points—it indicates that there is something moving on the railroad."

On one occasion the chief engineer sent his head carpenter to Gorgona to build certain sheds on the site subsequently occupied by the machine shops. The carpenter found the proposed site covered with old burnt equipment. He wrote to Mr. Stevens for instructions as to how to proceed under these conditions, and received this prompt reply: "Wait until I have a free Sunday, and I will come down and move the material for you."

Mr. Stevens was a ubiquitous man on the isthmus during those days. He went out over the line in overalls every day, and at no time did he allow any of the work to escape his attention. It was not long before he had secured a strong force of engineers, a large number of whom stayed with the work until it was completed.

There were many things to be done in reducing the chaos that existed on the isthmus, and in preparing for the great work that was ahead. Comparatively

little had been done in the direction of cleaning up Panama and Colon. Under the treaty with the Republic of Panama, the United States was to build modern water and sewerage systems for the cities of Panama and Colon, and was to be reimbursed for this work by collections from the sale of water. In this way about two and a half million dollars was spent, and this debt is being gradually amortized by the water rent collections. These cities had been pest holes of disease, with a supply of drinking water brought in barrels from springs of questionable character, and with no sewerage facilities whatever. Under the ministrations of the United States Government they were abundantly supplied with hydrant water, sewerage systems were provided, and their streets, though still narrow, were well paved. The transformation was such as to be almost beyond belief. The story can be told in no other way so graphically as by contrasting pictures of Panama streets before and after the sanitary campaign.

Another problem facing the chief engineer was that of providing suitable quarters for the men who were to dig the canal. The buildings which had been acquired with the French purchase were all remodeled, and hundreds of others were built. In addition to this the Y. M. C. A. club houses had to be completed, and many other important structures planned and equipped. During the first year and a half of his administration, Mr. Stevens spent \$30,000,000. Of this, \$5,000,000 was for governing and sanitation, \$7,000,000 for quarters, and \$12,000,000 for supplies.

Mr. Stevens then undertook the task of recruiting an adequate force for the building of the canal. This was perhaps the hardest task of all. Panama had made a highly unsavory reputation in the labor markets of the world. Recruiting agents were sent to the West Indies, to Italy, and to Spain. It was not long before these agents were sending a steady stream of West Indian laborers to the canal. By making certain concessions in the way of

guarantees, the consent of the Spanish Government was obtained for the departure of its laborers for Panama.

When the work got under way it was found that the West Indian laborer was a rather lazy, indifferent individual. Mr. Stevens once likened him to a Japanese flagman he had employed on the Great Northern Railroad. This flagman was sent back to stop oncoming trains, but permitted an engine to run by him without flagging it, thus precipitating one of the most serious wrecks in the history of the road. When asked why he had not flagged the engine, he replied that his orders were to flag trains. So it was with the West Indian laborer: he carried out orders literally, and very slowly. The chief engineer found that one white man was worth three negroes in the digging of the Panama Canal. When Mr. Stevens established the wage scale that continued to the day of the completion of the canal, he granted twenty cents an hour for unskilled white labor, and ten cents an hour for negro labor. The negro laborer was inclined to resent this seeming discrimination against him, but he continued to improve to the end, and finally was able to render good service for the money paid him.

The red tape which had bound the hands of Chief Engineer Wallace was almost as vexing to Chief Engineer Stevens. He found a tendency everywhere to postpone action, and sometimes he went forward on his own responsibility. This policy soon began to show results. He laid new railroad tracks through the Culebra Cut. Where there were little old French dump cars in use, no two of which had trucks of the same gauge, and some of which even had trucks of different gauge, the dirt trains were now made up of up-to-date Lidgerwood and Western dump cars. Where drilling for blasting had been done with individual plants, and by the old and expensive method of hand drilling, a compressed air system was installed, and the efficiency of the drilling force immensely increased.

Indifferent judgment had been shown

in the selection of sites for dumping material, and in laying them out. It became necessary to select new dumps, and to lay out those already established in such a way that trains could be unloaded in the shortest possible time. By the time Mr. Stevens had been on the ground a year he had perfected a system of transportation and spoil disposal which was good enough and broad enough to last to the end of the construction period, with only the extensions that the operations called for. When it is remembered that over 100,000,000 cubic yards of material had to be disposed of on these dumps, it will be seen how necessary it was that they should be properly laid out.

While Chief Engineer Stevens was at work on the plans for the successful attack against the isthmian barriers, he was also engaged in gathering data upon which could be predicated a judgment as to the type of the canal that should be constructed, and as to the probable unit costs which its construction would involve. President Roosevelt, in the latter part of 1905, sent a board of consulting engineers to the isthmus with instructions to consider the question of the relative merits of a lock canal and a sea-level canal, the cost of the two projects to be taken into account, as well as the time within which either could be completed.

This commission voted eight to five in favor of a sea-level canal. Chief Engineer Stevens did not agree with its conclusions, nor did any of the members of the Isthmian Canal Commission, except Rear-Admiral Endicott. When President Roosevelt read the statement of Chief Engineer Stevens, in which he favored a lock canal, the President became a convert from the sea-level type, and ordered work on the isthmus to move forward with a view to constructing a lock canal. This decision afterward was ratified by the Senate and House of Representatives, and as soon as the chief engineer had completed the preliminaries, he was free to begin the actual excavation work.

Mr. Wallace had planned to have the canal forces fed under contract with J. E. Markell, of Omaha, Nebraska. Markell had made a reputation in the conduct of "eating houses" in the West, and Mr. Wallace felt that he would be able to purvey for the forces on the isthmus better than the commission could. When Chief Engineer Stevens came to look into this matter, he concluded that the canal commission could operate its own eating houses and hotels more cheaply than any contractor could operate them, and the Markell contract was canceled by mutual consent.

One thing in the condition of affairs on the isthmus that was a thorn in the flesh of Chief Engineer Stevens was the eight-hour-day law, which was forced upon him by Congress. Another law which handicapped him in the prosecution of his work was the civil service law, which had been extended to the isthmus, and which had interfered with the plans of Mr. Wallace.

The eight-hour law applied to the common laborer was a hardship on the government, and forced unit costs higher than any one had intended they should go. The civil service law was a handicap in the selection of the force. The application of these two pieces of legislation led him to the conclusion that the best way to build the canal was by contract. In this conclusion he was supported by Chairman Shonts, and President Roosevelt at one time accepted the same view of the matter.

But as Mr. Stevens proceeded further with his work of organization he was finally convinced that the canal should be constructed by the government itself. He found ways to make the civil service law his servant, rather than his master, and the eight-hour day was robbed of some of its disadvantages under the plans he worked out.

Mr. Shonts, however, adhered to the belief that the canal should be built by contract, and urged that view upon the President so strongly that Mr. Roosevelt decided to ask for bids providing for its







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The Cristobal commissary neighborhood before and after the sanitary work of 1906-1907.



Eighth and Front Streets in Colon, before and after the Americans cleaned up the city and furnished it with water, sewers and paved streets.



construction under private contract. It was not long before Messrs. Stevens and Shonts were at odds over this and other questions. When President Roosevelt finally decided to support the recommendations of Mr. Stevens, Mr. Shonts concluded that his usefulness in the canal project was at an end, and he resigned. Upon the retirement of Chairman Shonts, President Roosevelt appointed Mr. Stevens to head the commission. About the same time he decided to put army engineers in direct charge of the work, a decision which was most unwelcome to Mr. Stevens.

When Mr. Roosevelt, in February, 1907, designated Major George W. Goethals as chief engineer under the direction of Mr. Stevens, the latter protested for fear that civilian engineers and army engineers could not work together. The upshot of the whole matter was that Mr. Stevens grew impatient with the situation as it then appeared to him, and wrote a letter of protest. He is said to have shown this letter to a friend, who asked Mr. Stevens to withhold it, as it appeared to be equivalent to a resignation. Whether Mr. Stevens really intended to resign or not, President Roosevelt construed the letter as a tender of resignation, and he cabled his acceptance.

In justice to Mr. Stevens it must be said that he never issued any statement indicating his reasons for resigning, and that after he did resign he was always loyal to his successor, and heartily aided the efforts he put forth in the building of the canal.

The proposition of building the canal by contract went as far as the consideration of bids by the Secretary of War. These bids were opened in January, 1907. It was stated that none of them met the terms imposed, and they were all rejected. As a matter of fact, owing to the progress that

Mr. Stevens had made in the recruiting of a canal-digging army, the administration had undergone a change of heart, and had decided that the canal should not be built by contract. The terms under which it had been proposed to build the waterway by contract were such that the contractors would have been little more than superintendents of construction, receiving a definite percentage of the total cost of the work.

The decision of Mr. Stevens to leave the government service was due in part to the inherent weakness of the plan of organization. It was this that led President Roosevelt to decide that the next commission should be made up mainly of army men.

The retirement of Mr. Stevens threw the canal army into some confusion, but he had builded so well that it could withstand even the shaking up following a change of administration and a change of leadership without any serious interruption of the work. When Colonel Goethals reached the isthmus he soon indicated that he intended to proceed along the lines that had been laid out by Mr. Stevens. He went there determined to accept everything that was good as a heritage from the Stevens administration, and he found so much that was good that all the changes made thereafter were by evolution, rather than by revolution.

There can be no question that Mr. Stevens proved himself a competent official while on the isthmus, and the evidences of this are to be found in the fact that many of the elements of the organization under which the canal work was carried to a successful conclusion were effected by Mr. Stevens. His own story of his régime at Panama is presented in this volume.

## CHAPTER XXIII

### THE COMING OF GOETHALS

SECRETARY TAFT VISITS THE ISTHMUS WITH MAJOR GOETHALS—GOETHALS RECOMMENDED TO THE PRESIDENT—WANTED COL. HARRY F. HODGES TO ASSIST HIM—THE COMMISSION AS CREATED—NO MILITARY RÉGIME FOR GOETHALS—“SIMPLY DO YOUR DUTY”—GOETHALS’ WILLINGNESS TO GIVE DUE CREDIT TO OTHERS—READY TO ASSUME RESPONSIBILITY—INVESTIGATING FROM BED ROCK UP—MAKING THE DIRT FLY—RAISING THE LIMIT—REDUCING UNIT-COSTS—CAUTIOUS IN PREDICTION—A BENEVOLENT DESPOTISM—GOING OVER THE WORKS—CHECKING UP AT MIRAFLORES—A DANIEL COME TO JUDGMENT—DECISIONS CHEERFULLY ACQUIESCED IN—WILLING TO FOREGO HIS SUNDAY MORNING REST—A MAN WHO KNOWS NOTHING OF THE SUBTLE ARTS OF POLITICS.

**A**FTER two engineers from civil life had demonstrated that the system of canal organization was a failure, President Roosevelt decided that the only way to carry forward the great project was to put at the head of the organization a man who would be compelled, under the rigor of military law, to remain at his post of duty. The army officer selected for this task was George Washington Goethals, then a major in the Engineer Corps.

In 1905, Major Goethals had gone to the isthmus with Mr. Taft, as a member of the general staff, to consider the question of the fortification of the canal. Later when the board of consulting engineers made its report upon the type of canal, Secretary Taft asked the aid of Major Goethals in drafting the report to the President recommending a lock canal. In this way he was brought under the favorable notice of Mr. Taft. Later, General Alexander Mackenzie, then chief of engineers of the United States Army, was called to the White House by the President, where they held a conference concerning the selection of a successor to Mr. Stevens. After this conference, in which Secretary Taft also took part, Major Goethals was called to the White House and told that the army would build the canal, and that he had been selected as the man to direct its operations. President Roosevelt re-

quested him to keep his appointment secret, and to prepare to take the first ship for the isthmus, which sailed three days thereafter. But Mr. Roosevelt could not keep the secret, and the next day the world knew that Major George W. Goethals had been selected for this post.

Major Goethals was asked by the President to suggest the names of his chief assistants. His first request was that Lieutenant Colonel Harry F. Hodges be made one of his associates. He stated that Colonel Hodges' record as the designer of the Soo Locks preëminently fitted him for this position. When President Roosevelt discussed the appointment of Colonel Hodges with General Mackenzie, that officer opposed the suggestion, saying that Hodges was his chief assistant in the river and harbor improvement work of the country and that he could not afford to lose him at that juncture. So the appointment was not made.

On the third Isthmian Canal Commission were Major D. D. Gaillard and Major William L. Sibert of the United States Engineer Corps, both of whom had been engaged for years in river and harbor improvement work; Civil Engineer H. H. Rousseau, who had entered the navy through the civil service and had proved himself to be the ablest civil engineer in the naval establishment; Colonel Wm.

C. Gorgas, who had been the chief sanitary officer under the preceding two commissions; former Senator J. C. S. Blackburn of Kentucky, who was to be the head of the department of civil administration; and Jackson H. Smith, who had proved his ability in the recruiting of the labor forces on the Isthmus.

When Colonel Goethals arrived at Colon there was a feeling in many quarters that his appointment would mark the rise of a strictly military régime. He soon disabused the minds of the canal army on the subject, declaring in a speech that he proposed to be the commander of the army, while the heads of the various departments would be the colonels, the foremen the captains, and the laborers the privates. He added that the organization would be no more military than in the past, except in the precision of its work, and that no man who did his duty, whatever his rank or his station, need have any fear of the incoming administration. "I am no longer a commander in the United States Army," said he. "I am commanding the Army of Panama; the enemy is Culebra Cut and the locks and the dams."

In discussing on one occasion the need of a continuous policy for the permanent organization on the isthmus, Colonel Goethals remarked that there always was a disposition upon the part of a new administration to undo what had been done by previous administrations, if for no other reason than a desire to make a showing. He believed that there ought to be a continuous policy, which would be made possible by the appointment of a vice governor who would be the chief assistant of the governor, and who would become governor in turn. In that way he believed abrupt changes of policy, usually harmful, could be averted. When we survey his administration at Panama we find that he put into effect the ideas he has since advocated in connection with the permanent organization of the canal. While some men have professed to see in him a tendency to take unto himself all credit

for the success of the work at Panama, we may read in his very first report his readiness to commend whatever was good that had been done by those who preceded him, and to make the most out of the things which had been done by them. In that report he quotes from the previous administration on the isthmus as follows: "During the year the first stage of canal work, that of preparation, has virtually been passed and the commission finds itself in position to enter upon the second stage, that of the actual construction of a lock canal." Commenting upon this statement Col. Goethals says: "This statement is peculiarly applicable to the Culebra division, on which work had been concentrated, for, irrespective of the type of canal to be constructed, the excavation in this section of the territory had to be done. Moreover, for the time being it was the most important part of the work." That the preparation was efficiently made, and the organization effective, is best attested by the results accomplished and the relatively small decrease of the output during the wet months.

Although Colonel Goethals thus early in his career was ready to praise the effective work of his predecessors, at the same time he was not afraid to make such changes as good business judgment dictated. He found, for instance, that general supervision of the entire ten miles of Culebra Cut by one man was not productive of the best results in fixing responsibility for possible delay. He therefore subdivided the cut into five construction districts, each under the charge of a superintendent of construction, who was held responsible for the work in his district. Better results and less friction promptly followed.

One of the first things to which Colonel Goethals committed himself after arriving on the isthmus was that of checking up every bit of available data gathered for the determination of the type of canal. There had been assertions that the foundations on which the locks were to rest were not solid enough. In order to determine

this question beyond the peradventure of a doubt he had five test pits sunk to solid rock in which he could study the actual conditions that would be encountered. If there ever was a project investigated from bed rock up, the project of building a lock canal at Panama was investigated by Colonel Goethals; and no engineer who visited the canal during his administration failed to come away with a tribute upon his tongue for the scrupulous attention to detail that had characterized the investigations of Colonel Goethals.

When the new chief engineer began to get his bearings after arriving on the isthmus, he promptly decided that his first great duty was to "make the dirt fly." The people at home had grown weary of the era of preparation—they could not understand how necessary to the success of the work these days of preparation were. Their incessant demand now was that the canal army make the dirt fly. Colonel Goethals was alive to the importance of meeting that demand, for he realized that after all public sentiment was the force behind the canal. Every colonel, every captain, and every private in the canal army was asked to get down to work and make the showing which the people of the United States demanded. The result of this call to the shovels was most gratifying. By August of 1907 a rainy season record of 1,000,000 cubic yards a month was established, and President Roosevelt sent to Colonel Goethals and his army a resounding cablegram congratulating them in behalf of the American people for their notable performance. Thus inspired they redoubled their efforts, and in a little while they were removing 2,000,000 cubic yards a month. Still further up the heights of achievement the valiant leader guided his men, and soon 3,000,000 cubic yards a month was the record. Colonel Goethals then determined that this record should be maintained. The army was equal to the demands made upon it, removing 73,000,000 cubic yards of material in two years. Never in the history of engineering

had such a high state of efficiency been reached, and never in the history of construction work had half as much material been removed in that length of time.

The demand of the people that the dirt be made to fly had now been met, and Colonel Goethals was ready to turn to the problem of reducing the cost of making it fly. His resolute purpose to do the work as cheaply as conditions would permit resulted in the hammering down of unit costs in a way that is well worthy of being told in a separate chapter.

Colonel Goethals was always cautious in prediction and generous in fulfillment. In 1908 he stated that the high-water mark in the excavation of Culebra Cut probably had been reached. "You see," said he, "as we go down deeper the ditch becomes narrower and there is less elbow room for our steam shovels and our dirt trains. There will be a gradual slow-down, and thus the latter half of the work will move forward much more slowly than the first half." In 1908, Colonel Goethals said that he was afraid that he would not be able to finish the canal in five years from that date. But for the slides which could not have been foreseen, he would have been able to present to the United States a completed Culebra Cut in four years, or even less.

From the beginning of the work under his direction Colonel Goethals was omnipresent on the isthmus. Every morning he spent going over the work in the field and every afternoon he was in his office engaged in administrative duties. No superintendent knew the details of his own end of the work better than the chief engineer knew the details of every phase of the undertaking. He once stated that any one who looked for things to criticise doubtless would find them. "But when you find them, come to me," he added, "and you will not have opportunity to criticise my desire to remove every just cause for criticism." That was the spirit of the man from first to last. Everything was open to inspection—he delighted in

having everything inspected by those who came unheralded and with a desire to learn the truth. Such investigators were given letters directing all concerned to place at their disposal every facility for seeing the work and to give all information the investigator might desire. To Colonel Goethals the unheralded investigator was a means of transmitting a fair statement of conditions to the people back home, who, according to his view, had a right to know.

In the work of maintaining a satisfactory force Colonel Goethals ruled with that firm hand that makes for discipline, with that spirit of justice that makes for contentment, and with that fatherly counsel that makes for peace. When he issued an order he expected it to be obeyed, and it was. He was careful at all times never to ask the impossible. As he went up and down the isthmian highway, sometimes in a motor car, more often in a day coach on a regular train, but most frequently afoot, he talked with everybody he met. Now he discussed the whole sweep of the undertaking with the head of a department; now he made inquiries about the work under the immediate charge of a resident engineer; now it was a steam shovel man; now a dirt train conductor; now a Jamaica negro switch boy. Always he was making mental notes of the answers to his simple questions, and thus keeping in direct touch with every phase of the work.

The following details of a trip through the Miraflores Locks and the dikes below give a characteristic outline of the forenoon inspections by Colonel Goethals. He was at Miraflores by seven o'clock in the morning. Walking through the tunnel at that place he boarded his motor car, and was whisked away to the concrete spillway dam at Miraflores. After ordering his chauffeur to pick him up on the other side of the canal he started over the work. First he was met by Resident Engineer Cole. Climbing up the steep embankment, Colonel Goethals immediately plunged into a dozen details of the work on the spillway dam. "How soon do you think you can make

this a finished piece of work? Couldn't you handle another mixer over there to advantage if we can find an idle one? Is there anything else you need to keep things moving along?" These were only a few of his questions. Leaving the spillway, he climbed among concrete mixers and structural steel until he came to some finishing-up work on the upper locks at Miraflores. "Who is doing that work?" he queried. When told that one part of it was being done by the fifth division and another part by the second division, he wanted to know whether in the interest of economy and time it would not be best to have it all done by the one division. As he clambered down the side lock walls he saw the preparations for placing the lamp posts to be used in lighting the locks. He suggested that they could be made less subject to settling if pieces of railroad iron were set into the walls under the lamp post foundations. A little further on he encountered the superintendent of the McClintic-Marshall Company, who had oversight of the work of erecting the lock gates. "When are you going to give us those west chamber gates?" queried Colonel Goethals. "If we have good luck we can let you have them by the first of September, but at any hazard we will be able to give them to you by the first of October," answered Mr. Wright. "This estimate gives due consideration to all delays from rain that you are likely to encounter?" pressed the chief engineer. "Yes, we have taken that into the reckoning," replied the gate builder. "Very well then," said Colonel Goethals, "we shall count on your being ready for us by the first of October."

A moment later, while crossing a temporary bridge across the lofty locks, Colonel Goethals chanced to spy a little railroad track on the bottom of the lock. "I thought all these tracks were to be taken out of the locks," said he to Resident Engineer Cole. "They were," replied Mr. Cole, "but Mr. Wright said we could use this one to bring some of our material



through the locks, as it would not interfere with the gate work at all." "You are sure that it will not afford an excuse for further delay on the lock gates?" "We had a perfect understanding as to that, sir," replied Mr. Cole. "All right, then, go ahead," replied the chief engineer. From this point he went down to the dike which had been thrown across the channel to keep the waters of the Pacific Ocean out of the unfinished ditch extending to the locks. Between this dike and another one like it, which was then holding back the waters of the Pacific, there was a stretch of the sea level channel which was being filled with water from the Rio Grande River. Colonel Goethals wanted to know how much water was going into the channel, how much would be required to fill it, what precautions had been taken to make the dike impervious, how many holes had been bored in the old dike, how much dynamite would be used in blowing it out, and a dozen other things that gave him assurance that the work was going forward properly.

Thence he went over the dam that links the locks to the hills west of the canal, inspected it carefully, and ascertained from the man in charge just when they could promise its completion; now he was talking to a brawny old Irishman who had worked his way up from the bottom and had charge of dumping the trains which were bringing in the spoil for surfacing the dam. It did not matter that this Irishman was old and weather-beaten and grimy—he knew how to dump material and where to put it.

When eleven o'clock had come the whole field had been surveyed by Colonel Goethals's watchful eye. A hundred bits of information had been gathered, and a hundred helpful suggestions had been made. Then the railway motor car turned its cowcatcher toward Culebra, and the presiding genius of America's great waterway was speeding back to an early lunch and an afternoon in his office.

One feature which had much to do with

the success of Colonel Goethals at Panama was his manner of hearing and adjusting grievances. Every Sunday morning he was down at his office bright and early, and every person with a grievance was invited to visit him and tell him his troubles. There was no rank or order of precedence in this unique little court of justice. It was a case of the first come, first heard, the only condition being that each man should state his grievance quickly, bearing in mind that there were many following him who had as much right to be heard as he himself possessed. Now it was a negro laborer who complained that he had not received a fair accounting on his time; now it was a railroad engineer who felt that some other engineer had been promoted out of turn; now came a delegation who wanted the cooperation of Colonel Goethals in holding an athletic meet. Here was a group of men who found that a good steam shovel man had been laid off in order to put another on the job because he was a first-class ball pitcher. The next in line was a woman who felt that she had been discriminated against by the district quartermaster in the number of electric lights allowed in her house. Here was a woman whose husband was figuring in one of those eternal triangles that are to be found in every clime.

Each one was heard patiently. The negro laborer who complained regarding his pay check was assured that the matter would be looked into; the railroad engineer who felt that he was cheated out of his promotion was shown his efficiency record and that of the man who was promoted. The delegation preparing for the athletic meet were told that every facility consistent with the service would be provided. The steam shovel man who had seen his place taken by a man who could add strength to the Culebra ball team was told to go to another division where he would be put to work, and was asked to remember that good ball teams added to the contentment of the people on the Canal Zone. He was

assured that he would in no wise suffer by the exchange. The woman with the electric light grievance was hardest to satisfy, but she departed believing that the chief engineer would do his best to adjust matters fairly. The woman who was the victim of the eternal triangle was assured that her husband would mend his ways or be invited to leave the isthmus.

And so justice was meted out. At one time there was a waiters' strike at the Tivoli Hotel. Colonel Goethals promptly issued an order publishing the names of the strikers and forbidding their employment in any capacity at any future time by the canal commission. Again, the engineers threatened to stop every train on the isthmus if one of their number, who had run over a negro laborer, was not released from custody at once. They set a time limit. Colonel Goethals replied that they would receive his answer at the penitentiary, and that any man who stopped his engine because of that answer would be deported to the United States by the first boat leaving the isthmus. His answer was against them, but not an engine failed to move at the appointed time.

Congress gave to Colonel Goethals the power of deportation without appeal, and while it was a power he never abused and seldom used, it made for peace and contentment. No man was more anxious to promote every reasonable aspiration of organized labor and of the individual employee than Colonel Goethals. He could easily have left the hearing of grievances to others. Some of the wiseacres who visited the isthmus proposed that there should be a labor commission to attend to these matters. Colonel Goethals replied that he wanted to keep in the closest touch with every condition on the isthmus, and that his Sunday grievance court afforded the best agency of doing so. Ambassador Jusserand of France, who attended one of these sessions, remarked that it reminded him of the court of justice

held by Saint Louis beneath the majestic oak at Vincennes.

Colonel Goethals had a very fixed idea as to the usefulness of this plan. He said on one occasion that only in a very small percentage of the cases could he grant the requests of complainants, but that his readiness to devote Sunday mornings to hearing them was taken as proof of his earnest desire to "see that every one got a square deal," and thus allayed discontent. "If you think that the time has come when the machinery of the canal army moves without friction and without jar," said he, "you will have your mind disabused if you will come up to my 'at home' next Sunday."

Colonel Goethals cherished no false notions about his position. He said that he realized full well that a single false step on his part might bring down upon his head the criticism of the people of the United States. But he did not employ modern methods to exploit his personality. He seemed to rely upon the character of his work. He knew nothing of the subtle arts of politics. There were a thousand men under him who had better sources of confidential information from the National Capital than he possessed. In his dealings with Congress he was always the soul of frankness; he never asked of that body anything that was not needed, and his greatest effort on the isthmus was to make every dollar go as far as it could.

Colonel Goethals was always ready to accord to every man the credit that was his due in the work at Panama. He said frequently that if either Wallace or Shonts had been permitted to operate on the lines pursued by corporations in great undertakings, either could have completed the canal without question. He also stated that too much credit could not be given to Stevens for the work of providing the facilities for digging the canal, and that without this work the army itself might have failed.