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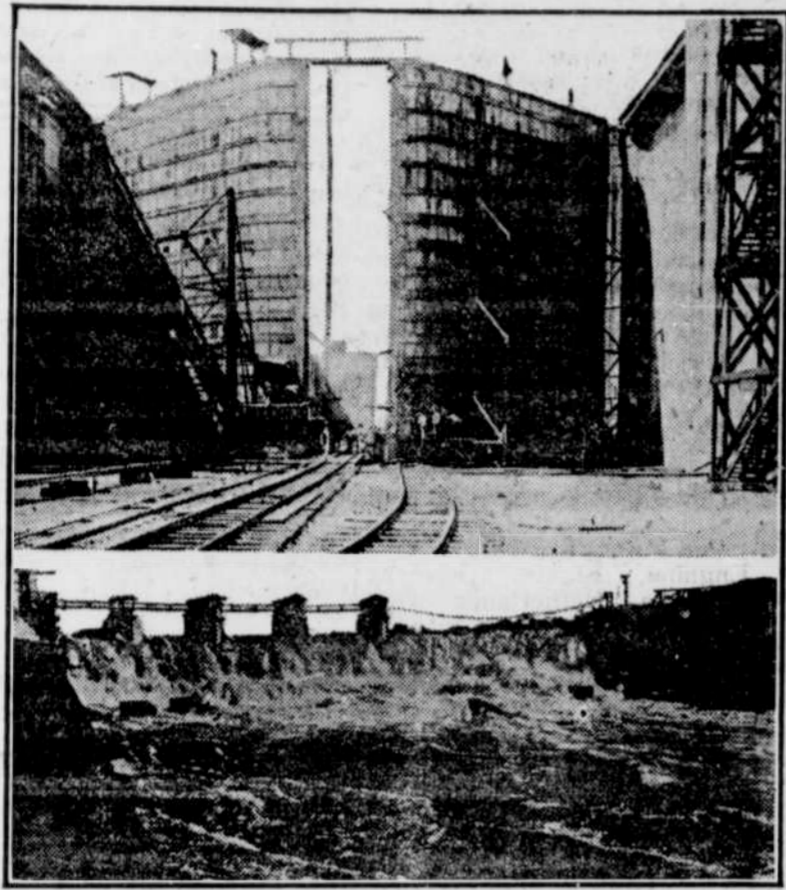
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The Americans In Panama

Story of the Panama Canal From Start to Finish.



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GATUN LOCK GATES AND GATUN DAM SPILLWAY.

By Wm. R. Scott.
(Continued from last week.)
The entrance to a point where five miles of the canal could be opened to navigation on Feb. 1, 1909. The Newport and San Jose of the Pacific Mail fleet, of American register, were the first ships to go through.

Columbus had been honored by naming Colon and Cristobal for him at the Atlantic entrance of the canal, and an executive order on April 30, 1909, honored the discoverer of the Pacific by changing the name of the Pacific terminal from La Boca to Balboa. It is at Balboa that the permanent machine shops, drydocks, yards, wharves, warehouses and general equipment to cost \$20,000,000 will be located.

In 1909 Colonel Goethals seems to have had the idea of making the canal zone habitable, but since then he changed his views in favor of making the canal zone a military reservation, the part not in use to be left to the jungle and only canal employees allowed without special permission in the ten mile limits.

Work on the fortifications was begun in 1911 on Flamenco Island, three miles out in the bay at the Pacific entrance, and on Toro point, at the Atlantic entrance. The estimate for their cost, as fixed by the officers appointed to design them, is \$12,475,328. The latest and largest disappearing rifle will be installed after the concrete work is finished. The locks at the Pacific end are nearly ten miles from the fortifications, which insures them against bombardment by an enemy's ships, and the Atlantic locks are seven miles from the fortifications. Some form of defense from airships must be worked out.

When the canal is completed the beautiful towns along the route will be abandoned. Gorgona, Bas Obispo, Las Cascadas, Empire, Culebra and Paraiso will be razed. A permanent camp for the army will be located on the east side of the canal, across the cut from the town of Culebra. Marines have been in the canal zone since 1904, and in 1911 the Tenth Infantry was added to the permanent garrison, which will be further augmented by several regiments. The soldiers will police the canal zone after construction work is finished. Balboa and Cristobal will be the principal cities, though at Gatun and Pedro Miguel forces to operate the locks will be housed.

President Taft signed on Aug. 24, 1912, a bill for the permanent government and operation of the canal. Colonel Goethals' ideas were followed almost to the letter in drawing this bill. The president is authorized as soon as the canal is sufficiently near completion to abolish the present commission and to appoint a governor for a term of four years at a salary of \$10,000 per annum. In time of war the president may substitute an army officer for this governor. Salaries and wages are not to be more than 25 per cent greater than in the United States, and many of the perquisites now enjoyed by the employees are to be eliminated. The canal zone will be open to only such persons as the governor may admit. American coastwise ships are exempted from paying tolls for passage, foreign built ships owned by Americans may register under the American flag, ships owned by railroads cannot pass through the canal, the Interstate commerce commission is given power to determine questions of

competition, and the present judiciary system is continued with right of appeal to the federal courts in the United States. In addition, the government may sell ships' supplies and coal and provide facilities for repairing vessels at the canal terminals.

At the close of the fiscal year ended June 30, 1913, Colonel Goethals could look forward to one year more of the arduous labor and heavy responsibility he has borne before the big job would be in the clear. Involving conditions at that date, we find that the great Gatun dam was completed; the concrete work in the locks and spillway was about 99 per cent completed; the Culebra cut was approximately 96 per cent completed; the relocated Panama railroad was finished, and the work of establishing permanent shipping facilities at Balboa and Cristobal was under way.

Owing to fresh slides in the Culebra cut and to changes in plans in the Pacific division a new estimate of the total excavation for the completed canal and necessary plant became necessary at the beginning of the last complete year of canal construction, Jan. 1, 1912 to Dec. 30, 1913. The revised estimate then placed the excavation at 218,138,299 cubic yards, of which amount 202,201,000 cubic yards had been removed at the end of July, 1913, leaving to be excavated outside of the completed canal 15,325,948 cubic yards. The canal organization cannot remove the uncompleted portion before the first ship is scheduled to pass through the canal in October, 1913, but of the amount left more than 8,000,000 yards are to be excavated outside of the canal proper or in the sites for the coaling station, drydocks and terminal at Balboa, so that the actual canal channel substantially will be finished before the passage of the first ship.

During the early part of 1913 the Gatun lake was stationary at about fifty feet, but with the beginning of the rainy season in May it began to rise and will be allowed to rise to eighty feet, and this would back the water up by October, 1913, to a depth through the Culebra cut to permit the passage of some kind of ship. The ultimate level of the lake will be eighty five feet.

Colonel Goethals is indeed a great administrator. Even if the employees have had soft conditions of employment it is an achievement to impress 35,000 men with a faith both in your capacity as an engineer and your sense of justice. This writer knows of no higher tribute that can be paid to him than the statement that in five months in the canal zone he never heard any one speak slurringly of the chief engineer.

As Admiral Schley said of the controversy over the battle of Santiago, "There is honor enough for us all," so with regard to the Panama canal Colonel Goethals, as the star of the last six years, gets the curtain calls, but Messrs. Stevens and Wallace, too, did their parts well. And the whole company of Americans, composing the chorus or supernumeraries, have contributed vitally to the success of the play. After all, it is no one man, but the spirit of Americanism, indomitable and triumphant, that we admire in Panama.

CHAPTER XI.
Wonderful Locks and Dams.
An elevator system for ships is being installed at Panama at a cost of \$58,000,000. These elevators, known as locks, will

raise ships to and lower them from the great artificial inland lake which is eighty five feet above sea level.

There are six locks on the Atlantic side and six on the Pacific side, at each end of the Gatun lake.

A ship arriving at Colon from New York, on its way to San Francisco, enters the sea level channel in Limon bay and steams for seven miles through the canal, which is 500 feet wide and forty-one feet deep, to Gatun. Here its way is barred by a massive pile of masonry with impressive steel gates, and towering eighty-five feet above the ship is the surface of the Gatun lake. To the west of the ship runs the man made mountain, the Gatun dam, which holds the lake in bounds. The problem is to lift the ship to this lake.

As if by magic, the gates swing open, and an electric locomotive, which has run out on a guide wall and fastened to the ship, tows it into the first lock. The gates swing together, and the ship is imprisoned in a chamber 1,000 feet long and 110 feet wide and built of concrete. In a moment the water in this chamber begins to rise, being supplied through holes in the bottom, and the ship rises with the water.

Fifteen minutes after entering the lock the ship has risen with the water for twenty-seven and one-half feet. If the full capacity for filling the lock should be used the ship would rise that height in eight minutes. Another set of gates swing open in front of the ship, and the locomotives tow it into the second lock, a concrete chamber of the same dimensions. The gates having closed behind, this chamber begins filling with water until the ship is raised again for twenty-seven and one-half feet. A third set of gates open, and the ship is towed into the final lock, where the operation is repeated with a rise of thirty feet, or a total lift for the three locks of eighty-five feet. When the gates in front swing open the ship steams out into the Gatun lake. The time spent in climbing eighty-five feet was an hour and a half.

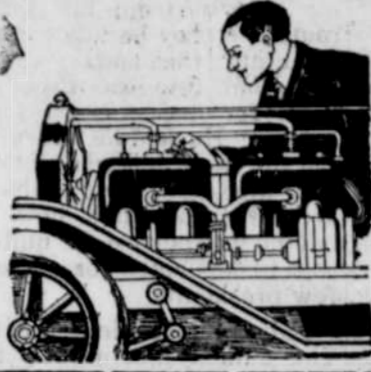
For sixteen miles through this lake the ship steams in a channel 1,000 feet wide, for four miles in a channel 800 feet wide and for three miles in a channel 500 feet wide, or twenty-three miles in all. Then it enters the famous Culebra cut, which is 300 feet wide through the continental mountain divide and nine miles long. At the end of the cut is the Pedro Miguel lock, thirty-two miles from Gatun.

After entering this lock, which essentially is the same as the ones on the Atlantic side, the ship goes through the reverse of the process at Gatun. The water in the concrete chamber begins falling, taking the ship down with it. When it has fallen thirty feet the gates in front open and the ship goes out into another artificial lake, a mile and a half long, at the end of which are the Miraflores locks. These two locks lower the ship twenty-seven and a half feet each, or a total for the three locks of eighty-five feet, which was the height the ship was raised on the other side. The ship then steams through a sea level channel for seven miles to

(Continued next week)

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