

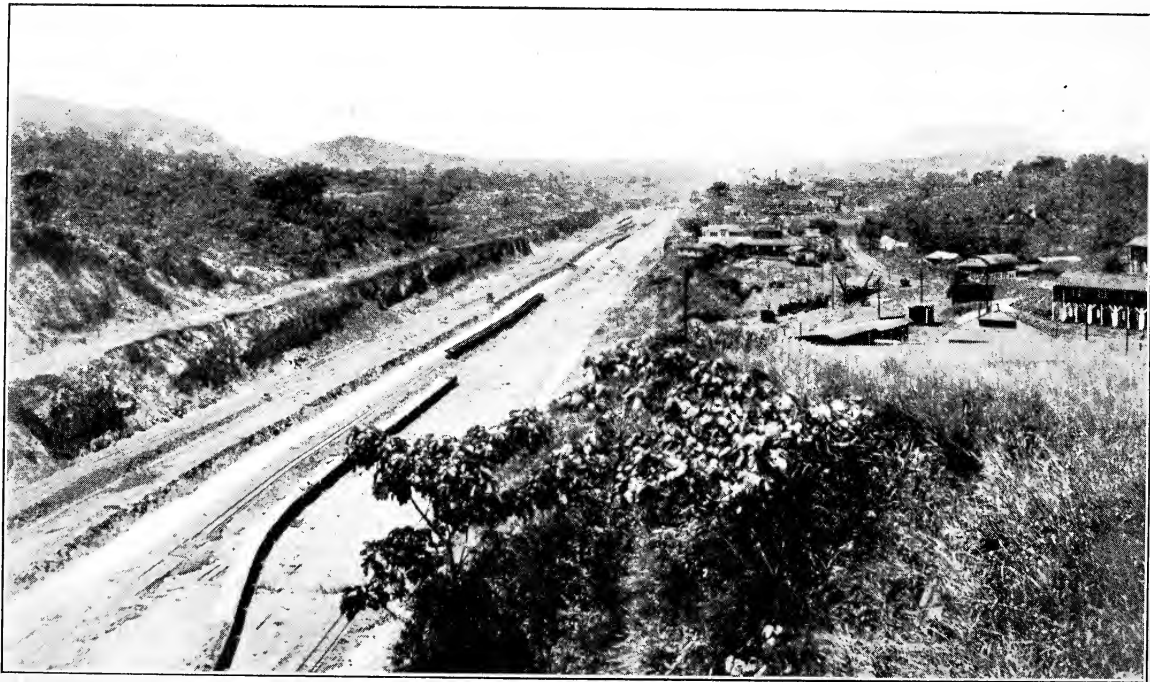
CHAPTER XV

THE CULEBRA CUT

POPULAR interest always has centered chiefly in the excavation phase of canal construction, losing sight of the fact that the locks, dams, and breakwaters call for an expenditure of \$85,643,000. The Culebra cut has been exploited more than any other feature of the canal, yet it was estimated to cost \$80,481,000, or five million dollars less than the features just enumerated. Even the dredging of fifteen miles of sea-level channel has received little publicity, and this was to cost no less than \$30,906,000.

The physical aspects of the dry excavation doubtless account for this singling out of one feature by the public mind. However stupendous the laying of concrete might be in the locks, or the sucking up of mud by the dredges, they are not as impressive as cutting through a mountain chain. They are prosaic operations compared with the picturesque attempt to change geological conditions. In the Culebra cut, Man was wrestling with Nature, whereas, in lock-building, he merely is playing the rôle of mason.

One finds in government work that the chief aim seems to be to plant two employees where only one worked before, and the canal organization is the least overworked set of employees in the world, but in the excavation phase of the government work the organ-



Photograph, Underwood & Underwood, N. Y.

THE CULEBRA CUT, LOOKING TOWARD THE PACIFIC.

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ization has attained as great efficiency as any private contractor could have attained, under the conditions adopted in the Canal Zone. World records for steam shovel performances have been broken by government employees in Panama under adverse circumstances.

The Culebra cut is nine miles long with a curve for nearly every mile. At these curves, the cut is widened to permit the ships to pass easily. Always the chief problem has been one of transportation, or how to keep empty cars in front of the steam shovels constantly, in a canyon only three hundred feet wide. In a working day of eight hours it has been found possible to keep the steam shovels working only about six hours, because of this circumscribed field of operations.

Naturally the 75 miles of track in the Culebra cut must be shifted constantly as the excavation work carries the levels down. This keeps the track shifters and hundreds of men at work day and night. During the maximum operations in the Cut, 6,000 men were employed in the daytime, while at night 400 men worked to keep the steam shovels in repair, to replenish their coal bins, blast more material for the shovels, and otherwise to get the Cut in shape for the next day's activities.

About 100,000,000 cubic yards were to be removed to complete this part of the canal, or practically half the total excavation. On July 1, 1912, the beginning of the last year of work, there were 7,399,615 yards left to be removed, which would have been out by January 1, 1913, at the rate of excavation, if it had

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not been for the slides. To this had to be added 6,000,000 yards from that source, or more than 14,000,000 yards to be removed in order to get the Cut in shape for the passage of the first ship. It was decided then to keep the 38 steam shovels at work and operations at full blast until July, 1913.

For the whole length of the Cut, the average depth from the surface to the proposed bottom of the canal was about 120 feet, the highest point on the center line of the canal being at Culebra between Gold and Contractor's hills where excavation has gone down 272 feet. After the soil had been removed for a short depth, solid rock was struck and to January 1, 1913, 54,504,150 pounds of dynamite were used in blasting, or the staggering total of 27,252 tons. The lay mind thinks of a pound of dynamite as impressive, but its use in the canal work has been bewilderingly heavy.

The following table shows the amount of dynamite used for the nine years of American operations:

1904 and 1905	500,000 lbs.
1906	1,400,000 "
1907	5,087,000 "
1908	6,822,000 "
1909	8,270,000 "
1910	10,403,000 "
1911	9,501,850 "
1912	8,533,000 "
1913	3,986,500 "

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Most of the explosive has been used in the Culebra cut. It is estimated that a pound of dynamite will break up 2.14 cubic yards of rock and earth, and as much as 26 tons has been set off in one blast in the canal. Stringent rules have prevailed to prevent accidents, and while deaths from this cause have run into the hundreds the handling of this amount of dynamite has been distinguished for the small number of fatalities. In September, 1908, a steam shovel dug up a bushel of dynamite left by the French in 1887, but it had lost its potency. The largest single shipment of dynamite to Panama was 846 tons received on June 27, 1911, without an accident in loading or unloading from the steamer.

All through the day drills, operated by compressed air, are boring into the rock in the Cut for 24 feet. A small charge of powder is set off at the bottom of these holes to enlarge them for the real charge of as much as 200 pounds. Then after the men have quit for the noon hour, or after five o'clock in the afternoon, the charges are set off by electric current. It sounds like the steady booming of artillery in the Cut. Many persons have been killed by being struck by rocks hurled long distances in these blasts. The next morning the steam shovels find plenty of food for their hungry jaws, which bite off four or five cubic yards at a dip, swing around and drop the six or seven tons upon the cars. Frequently they lift rocks so heavy that the cars are broken.

From 150 to 175 trains a day loaded with excavated materials leave the Culebra cut for the dumps.

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A great deal has gone to build the mighty Gatun dam; much has been used in reclaiming nearly 400 acres from the ocean at Balboa, the Pacific terminal; the new Panama Railroad has required millions of yards in making fills; and the breakwater at Balboa also has taken a considerable amount. What could not be usefully employed has been wasted on dumps. The average haul from the Cut has been twelve miles, but as much as thirty miles must be traveled by some of the dirt trains. Twenty flat cars constitute a train and one car can be loaded by a shovel in two and a half minutes, or with seven scoopsful of earth and rock. When the trains get to the dumps, an unloading plow is drawn by a steel cable over the flat cars, sweeping the material off the side which is open. Then spreaders are pushed over the track to shove the material to one side and down the embankment. Track shifters later come along and move the track over to the edge of the fill. Between 1,000,000 and 1,500,000 yards have gone out of the Culebra cut every month, except one, since December, 1907.

The employees are carried from the various towns to their work in the Cut, or on the locks and dams, by labor trains. The largest labor train in the world was operated out of Panama to Pedro Miguel until July, 1912, when it was divided into two sections. These trains bring them to their homes, or the hotels, for the noon meal, consuming from ten minutes to half an hour in the journey. But as the rest period at noon is for two hours in the Canal Zone, ample time for eating is allowed. Tourists go through the

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Cut on a special train that costs the government a great deal of money because of the disarrangement of dirt train schedules, every minute a shovel is kept idle thereby costing Uncle Sam a pretty penny and making the men swear because they may be sweating for a record day's work.

In the month of March, 1909, more dirt was taken out than in the first twenty-two months of operations. The excavation in one month usually exceeds an amount equal to the Pyramid of Cheops, which is 750 feet square and 451 feet high. The canal force of 1909-1910-1911 would have dug and finished the Suez Canal. March, 1911, retains the record for the greatest excavation in the Cut, when 1,728,748 yards were removed, and this also is the record month for excavation for the whole canal, with a total removal of 3,327,443 yards. The average daily output of steam shovels rose from 500 yards in 1905, when only dirt was handled, to 1,500 yards in 1911, when rock predominated. The cost in the Central division has ranged from 10 cents a yard to 91 cents a yard, with an average of 91 cents, from 1904 to 1909, and fell to 51 cents in 1911-12.

Rains interfere with the excavation work in the Cut, reducing the output in the rainy season several hundred thousand yards a month. During the downpours, operations must be suspended, but the Cut has been dug at a slant on both sides of the mountain system, so that water is drained out of it by gravity, running out at both ends. Rivers which crossed the line of

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the canal have been diverted by digging new channels for them.

The precise date when the canal was half dug, in the year 1910, cannot be fixed until the water is turned into the Cut and dredges begin handling the slides, after ships are using the canal, but on a basis of 221,000,000 yards excavation, it was half done about July 1, 1910. Slides make a revision of the estimates almost a monthly task for the Chief Engineer. The Culebra cut was half finished about July 1, 1910.

Almost at the wind-up of operations the canal diggers made the highest records for excavation. On April 11, 1912, forty-four steam shovels took out 68,505 yards in the Cut, which is the record for one day in that division. Steam shovel No. 257 working at Gatun took out 5,554 yards in one day, the highest record in the Canal Zone for one shovel, the date being May 2, 1912, and in August, 1912, the same shovel made a record by removing 86,844 yards in 26 working days.

That part of the Central division which is little mentioned, extends from the Gatun locks to the entrance of the Culebra cut, about twenty-three miles. Only about 12,400,000 yards had to be excavated to complete this channel as it follows the Chagres River valley from about sea-level to Bohio, then the level rises until it reaches 48 feet above sea-level at the Cut. From Gatun to Obispo the Chagres River crossed the line of the canal twenty-three times. In the same distance the Chagres River has 26 tributaries, the more

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important ones being the Gatun and Trinidad rivers. All contribute to the great Gatun Lake.

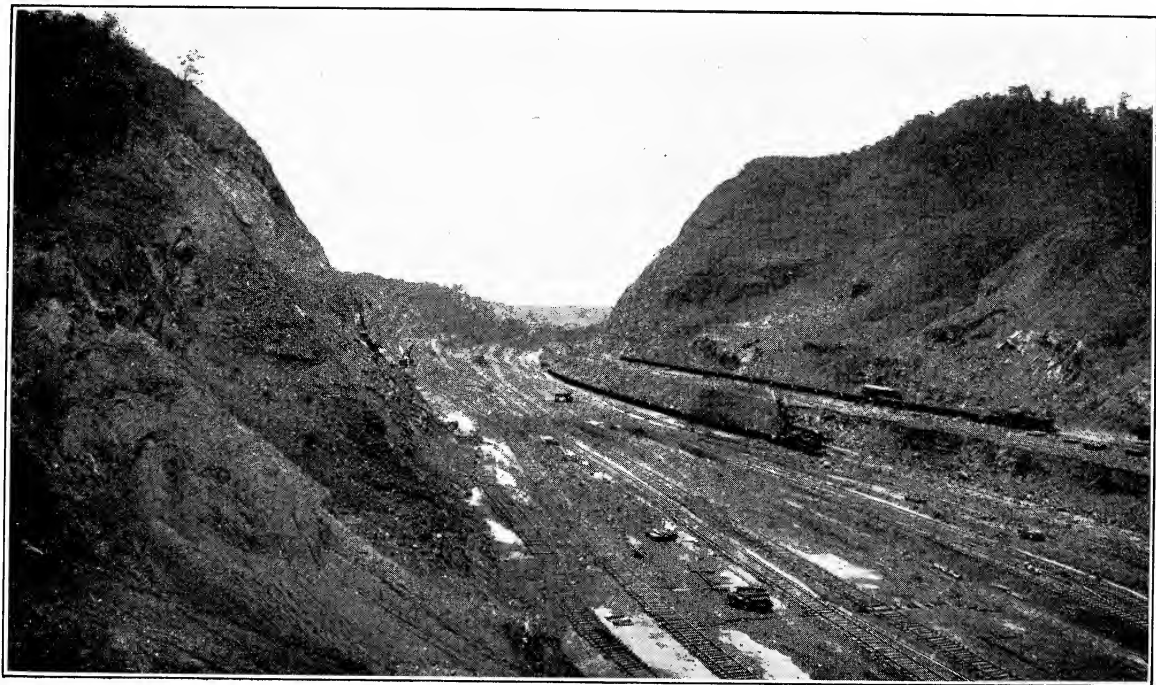
The slides, which have been accurately and inaccurately exploited in the press, represent the steep sides of the Culebra cut breaking off and falling down into the excavated part. Even where the Cut has been sunk through solid rock these slides occur, as the rock formations of the Isthmus are brittle and dissolve to dust after exposure to the atmosphere. An attempt was made to prevent slides by plastering the sides of the Cut with concrete, but the experiments were futile. There are between fifteen and twenty important slides on both sides of the nine-mile Cut, the largest being on the West side of the canal near the town of Culebra, and embracing 63 acres. Around the towns of Culebra and Empire are many smaller slides that have given much trouble to the engineers. Steam shovels, locomotives, and flat cars have been caught in these slides, but, singularly, few lives have been lost.

Sometimes the pressure on the sides of the canal operate to make the earth bulge up in the bottom of the Cut. Division Engineer Gaillard devised the plan of terracing the sides of the Cut to relieve this pressure with the result that much extraneous material has been prevented from sliding into the Cut. Engineers who formerly stood stanchly for the sea-level type of canal, after seeing the slides of the present 85-foot level lock type, are forced to admit that the attempt to sink a cut through the Isthmus for a sea-level channel would be attended by such prodigious

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earth movements, necessitating such an inestimable additional excavation, as to make it well nigh impossible. For a sea-level canal the Culebra cut would have to go 85 feet deeper than in the present plan, which would require both a wider bottom and indefinitely wider surface opening, and then the slides would be immeasurably greater than at present. The best year's work in the Culebra cut was 16,586,891 yards. Slides first and last have added more than that amount to the total estimate of excavation for the division. Yet the increase in efficiency of the organization has enabled the workers to handle the extra amount within the time and cost estimated for taking out the original yardage.

Three methods of excavation have been employed in digging the seven miles of sea-level channel on the Atlantic side and the eight miles of similar channel on the Pacific side. Steam shovels dug down on the Atlantic side to forty feet below sea-level, with great dikes to hold out the water, and dredges have done the remainder of the excavating. On the Pacific side, in addition to dredges and shovels the hydraulic method has been used. This method consists of playing a powerful stream of water on the earth and draining the water with the soil in a fluid state to a selected dump which has been boarded, the water being drained off when the mud has deposited. The Atlantic entrance required an excavation of 47,523,000 cubic yards and the Pacific entrance 58,287,000 yards. On July 1, 1912, the former lacked 8,592,773 yards of



THE DEEPEST PART OF THE CULEBRA CUT.

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completion and the latter 18,348,176 yards of completion. Of the amount removed to July, 1912, from both channels—78,868,134 yards—steam shovels excavated only 14,016,409 yards, but it was decided to remove most of the remaining material in the Pacific channel by steam shovels during the remainder of 1912 and in 1913, to about July 1st, when it is planned to take the great dredge Corozal through the channel, and locks up into the Culebra cut for the work of handling slides and silt after the water is turned into the Cut, in preparation for the passage of the first ship in September.

The following table shows the excavation year by year in the Culebra cut, from May 4, 1904, to May 4, 1913, a period of nine years of American operations:

From May 4, 1904 to May 4, 1905.	648,911 cu. yds.	
“ “ “	1906. 1,250,570	“
“ “ “	1907. 4,861,895	“
“ “ “	1908. 11,285,217	“
“ “ “	1909. 13,955,753	“
“ “ “	1910. 14,886,427	“
“ “ “	1911. 15,925,976	“
“ “ “	1912. 16,446,313	“
“ “ “	1913. 14,754,155	“

9 yrs. 94,015,217 cu. yds.

By calendar years, the excavation in the Culebra cut is as follows, to September, 1913:

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1904	243,472 cu. yds.	
1905	914,254	"
1906	2,702,991	"
1907	9,177,130	"
1908	13,912,453	"
1909	14,557,034	"
1910	15,398,599	"
1911	16,596,891	"
1912	15,314,978	"
1913	9,200,000	"

99,015,217 cu. yds.

For the whole canal, the excavation year by year since 1904 was as follows:

May 4 to December 31, 1904.....	243,472 cu. yds.	
January 1 to " 1905.....	1,799,227	"
" " 1906.....	4,948,497	"
" " 1907.....	15,765,290	"
" " 1908.....	37,116,735	"
" " 1909.....	35,096,166	"
" " 1910.....	31,437,677	"
" " 1911.....	31,603,899	"
" " 1912.....	29,258,852	"
" to August 31, 1913.....	13,653,564	"

205,933,379 cu. yds.

The above table estimates the excavation by the time the first ship is scheduled to pass through the

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canal. Terminal works at Balboa requiring more than 8,000,000 yards excavation, and finishing details of the canal channel proper, will bring the total excavation, by January 1, 1914, when the canal is expected to be in regular commercial use, to 221,000,000 cubic yards.

It will be noted that the calendar year 1908 marks the highest record for annual excavation since the Americans began, overtopping the nearest year's record by more than two million yards. It also represents the amazing increase of two and a half times the output of the year 1907, just preceding it, the explanation of which is found in the fact that the long period of preparation has been passed in 1907 and the great canal organization, built up by Mr. Stevens, struck its stride and plunged dynamically at the natural obstacles.

The year 1908 recorded the greatest annual excavation in the Atlantic division, the year 1909 the maximum excavation in the Central division, and for the Pacific division the highest annual excavation was in 1910.

In the late spring of 1912, the press in the United States exploited the discovery of volcanic formations in the bottom of the Culebra cut. The engineers have not been alarmed by these vaporous emissions, which, in July, had about stopped, and were caused, according to the Commission geologist, by the warm atmospheric effect upon pyrite material. A great variety of colored stones are found in the blasted material in the Cut, and when cut and polished make attractive ring

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settings and other souvenirs. One crystal-like stone has been found hard enough to cut glass. No coal or other usable minerals have been struck in the excavations.

In the first plans for relocating the Panama Railroad, it was designed to run the tracks on the edge of the Cut at an elevation of 10 feet above the water level, but the slides made this impossible. The new line was placed well back from the Cut away from the probability of slides. An observation tower used by thousands of tourists, back of the town of Culebra, for viewing operations in the Cut, was removed in June, 1912, just in time to prevent its sliding into the cut, and in August two slides near Empire threw 1,200,000 yards into the Cut, or more than a month's work.

It will be a time of mingled emotions when the canal employees stand on the side of the Cut, in 1913, and watch the waters of Gatun Lake creep up and cover the scene of nine years' work, and then to watch a ship pass in an interoceanic trip that has been the dream of four centuries.

CHAPTER XVI

LABOR

SAN FRANCISCO'S Exposition, in 1915, celebrating the formal opening of the Panama Canal, will be the most truly international Exposition ever held in this country or any other.

Not only is the object of the Exposition international in interest, but there is not a nation under the sun, possibly, which has not contributed some of its citizens to the construction force of the canal. Panama always has been cosmopolitan, a world transit route. The actual promise of building a canal, made when the Americans took charge, centered the eyes of the adventurous spirits of all races in the direction of the Isthmus.

Every nation which participates in the Exposition will feel a pride that the canal, in some measure, large or small, owes its being to the efforts of its own subjects. The list of nationalities, or geographical designations, represented among the employees of the Commission, or the Panama Railroad, gives an idea of the international appeal the canal exerts.

These eighty-six varieties of canal employees afford an opportunity to brush up on geography. In the census of the Canal Zone, taken in February, 1912, forty nationalities are listed, while in the following list, geographical subdivisions are noted to emphasize the variegated labor supply at Panama:

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Africa.	Fiji Islands.	Norway.
Algeria.	Finland.	Panama.
Antigua.	Fortune Islands.	Peru.
Arabia.	France.	Porto Rico.
Argentina.	French Guiana.	Portugal.
Australia.	Germany.	Philippines.
Austria.	Greece.	Roumania.
Barbados.	Grenada.	Russia.
Belgium.	Guadeloupe.	San Salvador.
Bolivia.	Guinea.	Santo Domingo.
Brazil.	Guiana.	St. Croix.
Bulgaria.	Guatemala.	St. Kitts.
Bahama Islands.	Hindustan.	St. Lucia.
Bermuda Islands.	Honduras.	St. Martins.
Bohemia.	Holland.	St. Thomas.
British Honduras.	Hungary.	St. Vincent.
Canada.	Iceland.	Scotland.
Chile.	India.	Spain.
China.	Ireland.	Sweden.
Colombia.	Italy.	Switzerland.
Costa Rica.	Jamaica.	Syria.
Cuba.	Japan.	Trinidad.
Curacao.	Liberia.	Turkey.
Demerara.	Martinique.	Turks Island.
Dominica.	Mexico.	Uruguay.
East Indies.	Montserrat.	Venezuela.
Ecuador.	Nassau.	West Indies.
Egypt.	Nevis.	
England.	Nicaragua.	

At the beginning of the American occupation, in 1904, there were 746 men employed on the canal. According to the Quartermaster's department the highest force of record since then was on March 30, 1910, when the pay-rolls showed 38,676 employees. This record nearly was reached on January 10, 1912, when there were 38,505 employees on the rolls. The census report, as of February 1, 1912, estimated the num-

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ber of employees as 42,174, for the Commission and the Panama Railroad, which would be the record force in the history of the project, and not likely to be equaled again with the canal nearing completion.

In the following tables the maximum force for each year under the Americans is given, from figures reported by the Quartermaster and the Sanitary department. The discrepancy in favor of the Sanitary department is accounted for by the fact that from five to ten thousand workers always have been in the Canal Zone in excess of the number actually employed, and had to be cared for the same as the regularly employed men. The third column shows the number of Americans in the Canal Zone for the same period.

Year	Quarter- master	Sanitary Dept.	Ameri- cans
1904	3,500	6,213	700
1905	10,500	16,512	1,500
1906	23,901	26,547	3,264
1907	31,967	39,238	5,000
1908	33,170	43,891	5,126
1909	35,405	47,167	5,300
1910	38,676	50,802	5,573
1911	37,271	48,876	6,163
1912	38,505	48,000	6,008

The percentage of Americans in the total working force usually has been one sixth or one seventh. Their work is of a supervisory character, or skilled labor, such as mechanics, carpenters, plumbers, masons, electricians, etc. They also are the steam shovel,

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locomotive and marine engineers, railroad conductors, time inspectors, firemen, policemen, all branches of civil administration, office forces, sanitary and hospital officers, foremen, civil engineers, and the like. In 1912 there were 4,064 wives and children of American employees.

Laborers did not come to the Canal Zone in sufficient numbers during the early years, necessitating recruiting offices in Europe, the West Indies, and the United States. A total of 43,000 men were imported under contract with the Commission, from 1904 to 1910, and it was thought the labor problem had been solved, but in July, August, and September, 1911, it became necessary to import 1,300 laborers to fill up the ranks depleted by the migration of employees to other Central and South American fields.

Spain furnished the largest number of European laborers to the canal until the government of that country, in 1908, forbid further emigration to Panama. The Spaniards also proved to be the most satisfactory common labor employed by the Commission. Out of a total of 11,797 European laborers imported to 1910, 8,222 were Spaniards, and the others came principally from Italy, France, and Armenia.

The colored labor predominates in the Canal Zone and was obtained in the islands of the West Indies. Barbados furnished the largest number, 19,448; Martinique, 5,542; Guadeloupe, Jamaica, Trinidad, St. Kitts, Curacao, Fortune Islands, etc., 4,677—a grand total of 29,667. Costa Rica, Colombia, and Panama

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furnished 1,493: unclassified, 2,163. The largest immigration for one year was in 1907, when 14,942 laborers were imported, while in 1906, 12,609 arrived.

Chief Engineer Stevens in his first annual report estimated the native labor to be about 33 per cent as efficient as common American labor. However, this standard has been raised under the perfection of the organization in later years, though nothing like the capacity for hard and effective work, shown in labor under private management in the United States, has been developed. Mr. Stevens asked for bids for supplying 2,500 Chinese coolies to the Canal Zone, in 1906, with a provision for 15,000 if needed, but this move never resulted in importing any Chinese under contract. Conditions as to pay, quarters, and treatment received such favorable advertising that, in 1910, more than 2,000 Europeans voluntarily came to the Canal Zone to seek employment.

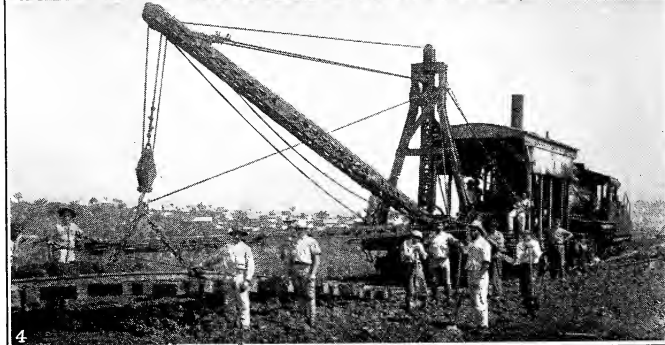
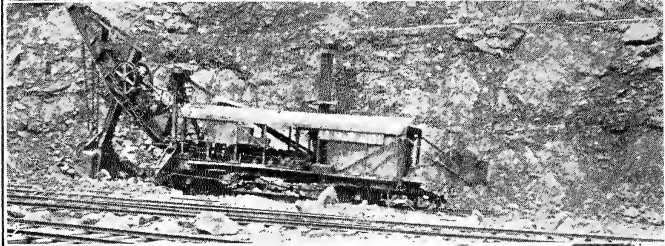
The color line has been drawn in the Canal Zone by dividing the employees into "gold" and "silver" men. In the first category are the Americans, and in the second the common and unskilled laborers. Wages are paid in silver to the laborers and salaries to the Americans are paid in gold. This distinction is not a hard and fast one and the idea was adopted as the best means for the Government to draw the color line—a practice it would not attempt under the Constitution in the United States. Second-class coaches are provided on the trains, special windows in the

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post offices, special clerks in the commissary, and separate eating places for the silver employees.

Stability has not been a feature of the American working force at Panama. In 1911, the gold force changed to the extent of 60 per cent, and the average stay on the Isthmus, of mechanics, has been only one year. The reason for this is found partly in the fact that many workers come simply to see the big job and make expenses while on the trip and partly in the lack of diversions after work hours. There are saloons in the Canal Zone, and the clubhouses afford billiards, pool, bowling, gymnasium, reading room, and a weekly moving picture show, but the simple life rules supreme, palling on those who have a taste for the gay white lights. Panama and Colon do not afford much greater entertainment if they were easily accessible to the inland canal employees. This lack of relaxation and recreation facilities is the only drawback to the otherwise ideal working conditions in the Canal Zone. Eat, sleep, and work is the monotonous round of the canal employee and the most of them save money.

Tourists in the Canal Zone commonly do not see the great shops at Gorgona and Empire, where repairs for the machinery and equipment used in building the canal are made, and where original iron and steel construction is done. The Gorgona shops cover about 22 acres and have seven miles of tracks. Much small iron work, such as making bolts, machinery parts and pattern work, is done more cheaply than in the United States, when freight to the Isthmus is considered.



1. OLD FRENCH LOCOMOTIVE. 2. STEAM SHOVEL. 3. SLIDE IN CULEBRA CUT. 4. TRACK SHIFTER.

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Owing to the long distance from the base of supplies these shops early were equipped to do any work the canal plant might require. All equipment on the canal receives rough handling in the desire to make records in excavation, dumping or concrete laying, with the consequence that the shops usually are crowded with broken down dump cars, locomotives, steam shovels, and other apparatus. Gorgona is the Pittsburgh of the Canal Zone. The town and shops will have to be abandoned before the opening of the canal as the waters of Gatun Lake will surround it, and cover the present shop site.

Many labor-saving devices have been born of necessity in the Canal Zone. The honor for inventing the greatest of these belongs to W. G. Bierd, formerly general manager of the Panama Railroad, and the man who most largely was responsible for bringing that archaic system from chaos to order, under Chief Engineer Stevens. He originated a Track Shifter which does the work of 500 men in one day and requires only nine men to operate it. This locomotive machine has a crane which raises the tracks, ties and all, clear of the ground, then swings it to the side for three feet or more, according to the elasticity of the rails. Thus the hand method, of pulling out spikes, removing the ties to the desired place and relaying the rails, is abolished. If we figure that one track shifter has worked an average of 300 days in the last six years, it has done work which by the old hand method would have required more than 1,000,000 men to do in one day, or 500 men working each day during the

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six years. The track shifter in that six years required 16,200 men, on the basis of nine men a day, for its operation. There were three track shifters when Col. Goethals took charge in 1907 and there were ten in 1912. At 10 cents an hour, 500 men a day would cost \$400. In a year this would be \$120,000 and in six years \$720,000, but that estimate of the cost by the hand method is too low, and when the number in use is considered, making allowances for hours not at work, the track shifter has saved the government several million dollars. Mr. Bierd received nothing from the Commission for his invention. A Spaniard who devised a simple method of dumping steel cars received \$50 a month royalty.

Strikes have never been successful in the Canal Zone. In 1904 President Roosevelt gave the Commission the power to expel anybody from the Canal Zone who, in its discretion, was not necessary to the work of building the canal, or was objectionable for any reason. No such power resides in any American State government, but the Supreme Court held that the Canal Zone was not under the Constitution and was subject to the regulation of a military reservation. The President took the wise view that the Americans were there for the express purpose of building a canal and nobody should be allowed to remain whose conduct or presence might clog the wheels of construction. This power also has been used to expel undesirable women as well as men.

On November 22, 1910, the boilermakers in the Gorgona and Empire shops struck for higher pay, and

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for the same vacation allowance given to employees on a monthly pay basis. They were receiving 65 cents an hour, or about 40 per cent more than similar work in the United States earned, and in addition had quarters free. Their demand for 75 cents an hour was refused but two weeks' vacation with pay and extra time without pay was granted. Although the strike crippled the shops for a few weeks, Col. Goethals saw to it that they left on the first steamers out for the United States and the Washington recruiting office soon supplied their places. The steam-shovel men, in a restive mood, met the same treatment and the locomotive engineers, who threatened a walk-out, thought better when they had the alternative of returning forthwith to the United States, or going to work, presented to them.

This peremptory manner of handling employees is justified only by the peculiar conditions at Panama. In truth there never has been any excuse for strikes or dissatisfaction with working conditions, after the first two years. The canal employees are the most pampered set of workers in the world. An eight-hour day with a two-hour intermission at noon, first-class board cheaper than in the United States, free quarters, free medical service on full pay, nine holidays on pay, reduced railroad rates, wages and salaries from 30 to 80 per cent higher than in the United States, an annual vacation of forty-two days on full pay for gold employees, and the necessaries of life for sale at lower prices in the government commissary than in the United States.

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Yet, with conditions of employment on this utopian basis, there has been considerable complaining. These complaints reached the limit of absurdity, in 1912, when a petition was presented to Col. Goethals asking that employees be paid for all the sick leave they did not use during the year. In other words, as an employee could be sick for thirty days on pay in one year, if he was sick only five days they asked that the twenty-five days not used, during which he was being paid for his work, should receive an additional compensation of full pay for that time. It was a plain invitation to the government to pay employees not to get sick. Col. Goethals said the Commission could not even consider such a proposition.

It is a noticeable fact to one who spends several months among the canal employees that many look upon themselves much in the light of war veterans who should be pensioned or receive special consideration from the government. Certain older employees are the worst offenders in this way. They think the government owes them some sort of a position at equally good pay for the remainder of their lives. The proposal to reduce salaries, for the permanent operating force, to a point 25 per cent above the standard in the United States is scouted by them as preposterous. Many of those who went through the hardships of the first two years, although they stayed with the job because it looked good as a business proposition, now assume that such service entitles them to be ranked as national heroes who henceforth are to be the wards of Uncle Sam's bounty. When they finish at Panama

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they expect to be shifted to positions in the government service elsewhere, at the same pay, which would be impossible, unless they were made bureau chiefs or salaries should receive a perpendicular treatment unknown to the civil service in the United States. The older employees are thinning out, however, as may be noted by the statement that in May, 1912, there were only 63 employees who had come in 1904.

No one realizes how generous the government has been to its employees at Panama more than the employee who leaves the service to return to work in the United States. Over and over again such employees have returned to the Canal Zone to take work at wages or salaries less than they were receiving when they quit. One foreman drawing \$250 a month in Panama decided he could do as well at home. In a year he returned to the Canal Zone and gladly took a position at 65 cents an hour, or about \$132 a month. The cost of living, and standard of pay, in the United States made him repent his action.

In many departments the government work at Panama is not as exacting in its standard of efficiency as under private industry in the United States. This especially is true of the transportation department where young fellows are drawing \$190 a month, as dirt train conductors, who could not earn \$65 a month as cub brakemen on a high-grade American railroad. The high pay in the Canal Zone not only draws employees back to the job, but the pace of American industrial life is so much swifter than the easy-going canal organization, that this, too, makes them think

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of the flesh-pots of Egypt. The steam-shovel men, who are after records, come nearer to the mark of efficiency in the United States than perhaps any other class of employees. Efficiency here is used in the sense not only of capability but of productivity, for necessarily the canal organization is capable in its engineering and administrative departments, but has most of the ear-marks of a government job—the-take-your-time-and-don't-overwork characteristic.

Any employee on a monthly salary basis may take eighty-one days off at full pay in every year. He has a vacation of forty-two days on pay, a sick leave of thirty days on pay, and nine holidays on pay, a total of eighty-one days that the government voluntarily deprives itself of the employee's services. The sick leave, too, is pretty generally used up by the employees, who have little trouble in persuading a district physician they need a rest at Taboga sanitarium or Ancon hospital. It is apparent that the government has invested some of its millions in a way no private contractor could follow, except into bankruptcy. If an employee does not take his vacation one year, he can accumulate it for the next year, and so get 84 days at full pay, and his trip to the United States will cost him only \$20 or \$30 a one-way passage.

Pay days until October 1, 1907, were semimonthly. Since then monthly pay days have been the custom, the pay car starting out on the 12th and finishing in three days for the entire Canal Zone. The Disbursing Office, at Empire, is a great bank handling nearly \$3,000,000 a month. A Chinaman and a Hindoo are

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the expert money counters in this office. Payments for wages have increased from \$600,000 monthly, in 1905, to nearly \$2,000,000 a month as a maximum in 1910-1911-1912.

Silver employees, or common laborers, earn 5, 7, 10, 13, 16, 20, and 25 cents an hour, with a few exceptions at 32 and 44 cents an hour, and a maximum monthly silver rate of \$75.

Gold employees, which includes all the Americans, are paid from a minimum of \$75 monthly to a maximum of \$600 monthly, not including in this classification heads of departments. Col. Goethals, as Chairman and Chief Engineer and President of the Panama Railroad Company, receives \$21,000 annually; other members of the Commission, \$14,000 annually; clerks, from \$75 to \$250 monthly; draftsmen, \$100 to \$250; engineers, assistant, special and designing, \$225 to \$600; foreman, \$75 to \$275; inspectors, \$75 to \$250; marine masters, \$140 to \$225; master mechanic, \$225 to \$275; physicians, \$150 to \$300; district quartermasters, \$150 to \$225; hotel steward, \$60 to \$175; storekeepers, \$60 to \$225; superintendents, \$175 to \$583.33; supervisors, \$200 to \$250; teachers, \$60 to \$110; trainmaster, \$200 to \$275; yardmaster, \$190 to \$210; nurses, \$60 to \$150; policemen, \$80 to \$107.50; master car builder, \$225; fire department privates, \$100; traveling engineer, \$250; accountants, \$175 to \$250; musical director, \$166.67; mates, \$100 to \$175; postmasters, \$50 to \$137.50.

Wages on an hourly basis are in part as follows: apprentice, 10 to 25 cents; blacksmith, 32 to 70 cents;

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boilermakers, 32 to 70 cents; bricklayers, 65 cents; car inspector and repairer, 32 to 65 cents; carpenter, 32 to 65 cents; ship caulker, 65 cents; coach cabinetmaker, 65 cents; coppersmith, 32 to 65 cents; ironworker, 44 to 70 cents; lineman, 32 to 65 cents; machinist, 32 to 70 cents; molder, 32 to 70 cents; painter, 32 to 65 cents; pipefitter, 32 to 65 cents; planing mill hand, 32 to 56 cents; plumber, 32 to 75 cents; tinsmith, 32 to 65 cents; wireman, 32 to 65 cents; shipwright, 44 to 65 cents; locomotive engineers earn from \$125 to \$210 monthly; steam-shovel engineer from \$210 to \$240; steam engineer, \$75 to \$200. The hourly rates quoted run as high as 62 per cent greater than the pay for similar work in the United States Navy yards, or private industries.

The canal was estimated to cost \$375,000,000. Out of that amount, the part which had gone into wages and salaries to June 30, 1912, was approximately \$120,000,000. By the time the canal is finished, and opened for permanent use, in 1914, this item will reach the startling total of \$150,000,000. From 20 to 25 per cent of it has gone into salaries of officers and supervisory employees, and from 75 to 80 per cent into wages to skilled and unskilled labor.

The Commission has the work of repatriation of imported employees already under way. While nearly 45,000 workers were imported under contract that provided for their return home when the canal was done, the Commission will not have anything like this number to repatriate as thousands have left voluntarily to new fields of labor or quit the service under conditions

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that forfeit their right of return at the Commission's expense. It will not be difficult to get sufficient common labor for the permanent canal.

As the conglomeration of races presents names impossible of uniformly correct spelling, every employee has a numbered brass check for identification, which he must show to get his pay.

CHAPTER XVII

COMMISSARY—QUARTERS—SUBSISTENCE

DURING the first year of American operations in Panama, the problem of food and merchandise supply for the army of workers was not worked out. The Panama Railroad long had maintained a commissary for its employees, but its facilities totally were inadequate, as they existed in 1904, for satisfactory service to the increased thousands of employees and their families.

Chief Engineer Stevens, in 1905, turned his attention to this problem as one, upon the proper solution of which would depend satisfactory conditions of living for the canal workers. By April, 1907, when he resigned, the present commissary and hotel systems, as well as the system of housing the employees, which challenge the admiration of the tourist, had been created, and all that was left to Col. Goethals to do, in this phase of the task, was to enlarge the systems as the organization expanded.

Under Mr. Stevens the Department of Labor, Quarters, and Subsistence covered the whole ground. In 1908, Col. Goethals modified the organization by creating a Quartermaster's Department along Army lines, which had charge of all buildings and the accountability for all physical property of the Commission, the recruiting of labor, storage of material and sup-

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plies, collection of garbage, distribution of commissary merchandise to employees, and the cutting of grass as directed by the Sanitary Department. A Subsistence Department then was created, which in addition to operating the hotels, kitchens, and messes, was given supervision over the Panama Railroad Commissary. The bookkeeping for the commissary, however, is done by the railroad company and the profits go into its accounts, but as the government owns the railroad, the distinction only is one of bookkeeping.

Merchants in Panama and Colon objected to a government commissary on the idea that it would be a competition not contemplated when the Canal Zone was ceded, and they made overtures to the Commission for taking over the business of supplying canal employees with the necessaries of life. Had this been done an inconceivable amount of dissatisfaction would have resulted, through the ruinously high prices the employees would have been compelled to pay for the privately owned merchandise.

The government has made a profit from the commissary operations because it arbitrarily has fixed the price of commodities at a point which would pay for the construction of storehouses, and the usual expenses of merchandising two thousand miles from the markets of the world. But, owing to the immense quantities in which all articles are bought, and the absence of a grasping policy as to profits, the canal employees customarily buy almost everything more cheaply than the same merchandise sells for in the United States.

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For one reason, there is no tariff in the Canal Zone. Foreign made goods are imported without the expense to the consumer that the high protective duties at home necessitate. Irish linens, English and Scotch cloth, French perfumery, Swiss and Scandinavian dairy products, and a wide variety of other European manufactures, make the commissary, with the American merchandise in stock, a great department store which in the fiscal year 1912 did a business amounting to \$6,702,355.68.

General headquarters are at Cristobal, on the Atlantic side. The steamships of the Panama Railroad Line every week replenish the food supplies with seasonable offerings from the American markets. The scope of the operations include a laundry, bakery, ice cream plant, ice factory, cold storage, coffee roasting plant, and laboratory for making extracts.

The year 1911 is typical of the scale on which the commissary has been operated since 1906. Importations of principal commodities were as follows:

Groceries	\$1,278,594.79
Hardware	86,768.86
Dry Goods	603,490.18
Boots & Shoes	164,168.89
Cold Storage Supplies	1,573,202.97
Furniture	9,020.48
Tobacco	182,590.96
Raw Materials	215,375.22
Paper, Stationery, etc.....	54,579.05
Total	<u>\$4,267,792.05</u>