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ANNUAL REPORT

OF THE

GOVERNOR OF  
THE PANAMA CANAL

FOR THE

FISCAL YEAR  
ENDED JUNE 30

1919



386  
P187

WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1919

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# ANNUAL REPORT OF THE GOVERNOR OF THE PANAMA CANAL.

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THE PANAMA CANAL,  
OFFICE OF THE GOVERNOR,  
BALBOA HEIGHTS, CANAL ZONE, *September 15, 1919.*

SIR: I have the honor to submit the annual report covering the construction, operation, maintenance, and sanitation of The Panama Canal for the fiscal year ended June 30, 1919.

## ORGANIZATION.

There were a few changes in personnel in the principal administrative positions of the organization. Mr. Walter J. Douglas, who assumed the duties of engineer of maintenance for the period of the war emergency and whose services were of much value to the canal, both as engineer of maintenance and as acting governor during the absence of the Governor in the United States in December and January, resigned his position on April 30, 1919, to resume his private practice in New York City.

On May 31, 1919, Lieut. Col. Jay J. Morrow, Corps of Engineers, United States Army, who was called from the canal for service at the front during the war, was reappointed engineer of maintenance.

Lieut. Col. A. T. McCormack, Medical Reserve Corps, United States Army, was relieved from duty with the canal on January 23, 1919, and his position as chief health officer was filled by the appointment on March 31, 1919, of Col. H. C. Fisher, Medical Corps, United States Army. Between the date of Col. McCormack's relief and the assignment of Col. Fisher, Maj. Robert L. Loughran, Medical Reserve Corps, United States Army, was acting chief health officer.

Mr. Hartley Rowe resigned his position as resident engineer in charge of the building division on August 14, 1919, after almost 15 years' continuous service with the canal. His vacancy was filled by the promotion of Mr. T. C. Morris, assistant engineer.

Commander R. D. Gatewood, Construction Corps, United States Navy, superintendent of the mechanical division, was relieved from duty with the canal by orders from the Navy Department on February 21, 1919, and Commander E. G. Kintner, Construction Corps, United States Navy, was appointed to the vacancy.

On September 20, 1918, Mr. T. L. Clear, collector, resigned his position with the canal to accept a commission in the Inspector General's Department, United States Army. His vacancy was filled by the appointment of Mr. E. P. Sine.

In several additional cases, in positions of less responsibility, civilian employees who entered the military or naval service for the

period of the war have received honorable discharges from such services and have been reappointed to their former positions with the canal. During the critical periods of the war it was necessary for me to decline to release several employees in the higher grades who were anxious to serve the country at the front and who could not be spared without seriously crippling essential work of the canal. They were performing patriotic service for the country in capacities for which they were particularly qualified by training and experience, and there would have been no net gain to our belligerent forces on account of their release from the canal, as their positions must have been filled by others less well qualified for their duties here and equally as well qualified as they for military service. In order to assure these men that they were performing their full duty to their country in its time of stress I initiated the following correspondence with the office of the Secretary of War:

BALBOA HEIGHTS, August 17, 1918.

HON. NEWTON D. BAKER,  
Secretary of War, Washington, D. C.

SIR: I inclose copy of letter received from -----, acting physiologist, dated the 6th instant, and copy of my reply, together with copy of letter from -----, chemist, which has a bearing on the same subject. This correspondence relates particularly to the status of chemists serving on the canal during the war, but it also has application to employees of various other classes. With the departure of many employees who have resigned to enter the military or the naval service, with others leaving from day to day, and still others considering whether it is not their duty to do so, the subject has become one of pressing importance. This is especially so since we have no local supply from which our force may be replenished, but for every man lost must employ in the States and bring to the Isthmus a new man, with attendant expense to the Government for canvassing and transportation, and some loss in efficiency due to changes.

The canal organization must not only maintain and operate the canal but, as essential subsidiary functions, must repair, provision, and bunker ships, and for itself, as well as for the military and naval establishments here, must supply water, light, fuel, transportation, and provisions. Our mechanical division, incident to the war, has in recent months been called upon to do considerable repair work on merchant and naval vessels, and it is found increasingly difficult to maintain our force of mechanics and shipwrights for this purpose.

Something has been done to meet the situation by the employment of men over age or disqualified for active service or of men less competent than would be ordinarily required and, for clerical work, by the employment of women resident with their families on the Isthmus. We have just employed a woman chemist, having found it impossible to secure a man for the place, which it was necessary to fill. However, the backbone of our gold force must consist, as hitherto, of technical men or skilled craftsmen who know their work and can be relied upon to perform it day in and day out. It would not be safe to attempt to do the work that must be done here with a force of any other kind.

As the subject is of so much importance to others of our employees, as well as to the chemists, I have expressed myself rather fully in my reply to -----, and I believe that I am on firm ground in stating that the services of our essential employees are just as necessary and just as patriotic as the services of men employed in similar capacities by the Government in the United States. If you can briefly indorse the views expressed in my letter to -----, for the information of our employees through publication in The Panama Canal Record, it would tend to clear up the situation and to relieve the minds of many of our employees who desire at this time to do their full duty, but are doubtful where that duty lies. In any event, it will continue to be my policy to spare, if at all possible, the services of any employee who desires to join the military or naval forces.

Respectfully,

(Signed)

CHESTER HARDING, Governor.



WASHINGTON, D. C., *September 9, 1918.*

Colonel CHESTER HARDING, U. S. A.,

*Governor of The Panama Canal, Balboa Heights, Canal Zone.*

MY DEAR GOVERNOR: I am in receipt of your letter of the 17th ultimo, with its inclosures, regarding the loss of men in the Panama Canal service on account of present war conditions. Your statements regarding the particular case mentioned have been noted, and it is also observed that you have assumed a very liberal attitude in sparing, whenever possible, the services of any canal employee who desires to join the military or naval forces. I agree with you that an efficient canal organization must be maintained and that the services of essential Panama Canal employees are just as necessary at this time, and just as patriotic as the services of men employed in similar capacities by the Government in the United States, and I have no objection to your communicating my views in the matter to any employee who may be undecided as to whether to remain on the Isthmus or to return to the United States to assume employment there.

Very truly, yours,

(Signed)

BENEDICT CROWELL,  
*Acting Secretary of War.*

WASHINGTON, D. C., *September 20, 1918.*

Colonel CHESTER HARDING, U. S. A.,

*Governor of The Panama Canal, Balboa Heights, Canal Zone.*

MY DEAR GOVERNOR: The receipt is acknowledged of your letter of the 4th instant, supplementing your letter of the 17th ultimo, regarding the loss of men in the Panama Canal service on account of existing war conditions.

In my opinion the operation and maintenance of The Panama Canal is a very important part of the present war program, and therefore it is imperative that an efficient canal organization be maintained. During the present crisis men must be placed where they can be of greatest value to the Government, which action must be based upon their previous training and experience. Those men who have served for a long period on The Panama Canal, working up to responsible positions, should not be transferred to other branches of the Government service unless you can fill their places without serious loss of efficiency or unless it can be clearly shown to you in each individual case that their services can be used to much greater advantage during the existing war by another branch of the Government. \* \* \*

Sincerely, yours,

(Signed)

BENEDICT CROWELL,  
*Acting Secretary of War.*

Quotations from essential parts of this correspondence were furnished employees whose requests for release had been declined by me and served to reassure them that they were giving best service to the Government in the positions in which they were employed. The total number of canal employees who left the service to enter the military and naval service for the period of the emergency was approximately 394.

The services rendered by the canal that had a bearing upon the conduct of the war were made the subject of a special report to the Secretary of War on December 6, 1918.

## DEPARTMENT OF OPERATION AND MAINTENANCE.

### BUILDING DIVISION.

This division is charged with all new building construction work for the canal and railroad and such work for the Army and Navy establishments in the Canal Zone as is assigned to it from time to time. Its organization performs maintenance and repair work on buildings of the canal and railroad which in any instance exceed \$75

in estimated costs. Mr. Hartley Rowe continued in charge as resident engineer until June 14, 1919, when he left the Isthmus in anticipation of his resignation. During his absence the work was in charge of Mr. T. C. Morris, assistant engineer, who was later appointed to fill the vacancy in the position of resident engineer. On August 1, 1918, the northern and southern districts were consolidated, and on September 17, 1918, the separate district including the work for the Army and Navy at Coco Solo and vicinity, was eliminated as a separate district.

Two of the larger projects under construction at the beginning of the year, the new Pier No. 6 at Cristobal and the hospital group at Ancon, were completed. Detailed descriptions of the work were given in the report for last year. The noteworthy feature of the design of Pier No. 6 as constructed is the general substitution of reinforced concrete for steel in the floor and in the roof structure, necessitated by the abnormally high cost of steel shapes. The roof trusses, originally designed in steel, were cast in concrete, with the necessary reinforcing, and lifted into position after having thoroughly set. The heaviest truss so built in place weighed 18.35 tons. The saving effected by the substitution of this type of roof truss for steel is estimated at \$200,000. The total cost of the pier was \$2,093,190, and the amount expended during the year was \$827,330.20.

In the Ancon Hospital project buildings under construction and completed were two ward groups having a capacity of 192 patients each and a superintendent's house. As explained in last year's report, this project was begun in 1915 under authority of Congress and involved the removal of the old frame wards, operating rooms, administration units, etc., constructed by the French, and the erection of concrete buildings of modern type. The total cost of the project now completed was \$1,590,330.52, of which the sum of \$310,156.02 was expended during the year.

For the canal the building division constructed various other buildings, as follows, the state of completion and the amount expended to July 1, 1919, being indicated in each case:

	Per cent completed to July 1, 1919.	Amount expended to July 1, 1919.
10 family quarters for silver employees, at Mount Hope, frame.....	90	\$99,362.79
1 restaurant, Pedro Miguel.....	100	32,604.21
1 crude oil tank, Mount Hope.....	100	54,065.60
1 silver clubhouse, Red Tank.....	100	10,489.28
1 silver clubhouse, Gatun.....	90	6,937.57
1 Lighthouse subdivision office, for marine division, Gatun.....	45	11,885.60
1 storage building for section of surveys, Balboa Heights.....	100	4,739.36
1 tuberculosis ward at Corozal.....	85	20,394.85
1 12-stall boathouse, Gatun.....	100	7,201.11
1 storehouse for printing plant at Mount Hope.....	100	2,824.98
For the Panama Railroad:		
1 ice and cold-storage plant, at Cristobal.....	100	530,648.25
1 slaughterhouse, at Cristobal.....	100	149,443.14
1 meat canning plant, Cristobal.....	100	70,685.73
1 machine shop, Cristobal.....	90	7,400.91
1 carpenter shop, Cristobal.....	90	5,461.07
1 boiler house, Cristobal.....	95	24,630.94
1 garage, Cristobal.....	97	7,587.22
1 temporary bone mill and fertilizer plant, Cristobal.....	100	2,155.58

For the Navy building-construction work was performed at Coco Solo, payable from Navy funds, at a total cost of \$905,801.32.

For the Army, from funds appropriated for cantonments, three barracks were completed; also a large amount of alteration and repair work to existing barracks was performed. The total amount expended under the \$500,000 cantonment appropriation was \$254,363.06.

By direction of the Secretary of War the amount of \$3,986,849 appropriated for the housing of two Infantry regiments on the Canal Zone was allotted to the Governor for expenditure, and the work contemplated, as approved by the military authorities, was assigned to the building division. Work was begun in June, 1919. A detailed description of the types of buildings to be constructed is contained in the report of the resident engineer, Appendix "B."

Work was done for companies authorized to locate within the Canal Zone as follows: For the Central & South American Telegraph Company, eight type 17 quarters and two sets of nonfamily quarters of special design.

Work was begun on office building and bachelor quarters in Balboa. For the West India Oil Company at Balboa, one type 17 non-family house was constructed and one of similar type for the Seamen's Home at Cristobal.

A table showing the unit cost of the various types of buildings constructed is attached to Appendix B.

#### LOCKS OPERATION AND MAINTENANCE.

The number of lockages of all classes of vessels for the year was 6,938, of which 2,161 were at Gatun, 2,444 at Pedro Miguel, and 2,333 at Miraflores. These lockages drew from Gatun and Miraflores Lakes a total of 17,071.68 million cubic feet of water. A total of 2,061 commercial vessels passed through Gatun locks, 2,045 through Pedro Miguel locks, and 2,048 through Miraflores locks. Two hundred and eighty-two vessels of the United States Army and Navy, for which no tolls were paid, passed through Gatun locks, 243 through Pedro Miguel locks, and 242 through Miraflores locks. A delay of five hours to traffic occurred on June 14, due to flooding of the lower east chamber at Miraflores by a blunder of the operator in manipulating the control board, as the result of which the lower chamber was connected with the Miraflores Lake level. Beyond the delay to traffic no serious consequences resulted from the accident.

For purposes of inspection and maintenance work on submerged parts of the locks, gates, and machinery the lock chambers were unwatered and out of commission as follows: At Gatun—West chamber from January 10, 1919, to February 10, 1919; east chamber from February 10, 1919, to March 10, 1919; at Miraflores—west chamber from March 22, 1919, to June 12, 1919.

No unusual work of maintenance or repair was required at any of the locks, except that the wooden fender at the north approach wall at Miraflores had to be entirely renewed, on account of the destruction of the timbers of the old structure by the teredo. This work of replacement was begun in February, 1919, and completed in June. It was done by the lock forces, the cost being \$16,803.16. The fender at the south approach wall at Pedro Miguel was repaired, its condition not requiring its entire replacement.

The increasing salinity of Miraflores Lake, due to the inevitable transfer to it of sea water in lockage operations, subjects all sub-

merged timbers in Miraflores locks and at the lower end of Pedro Miguel locks to active attacks of these marine worms. Where practicable trial is being made of a native hard wood, almendra, to determine its resistance to such attacks. Careful examination was made to discover the wear of moving parts of submerged mechanisms of all locks, with the object of providing for the timely renewal of such as required it. The only parts that showed progressive deterioration were the roller trains and tracks attached to the rising stem valves, for the purpose of providing rolling friction and thus reducing resistance to the operation of the valves. The roller shanks were generally considerably reduced in size, and the bearings were enlarged to such an extent as to necessitate their gradual replacement. Provision will be made in the estimates submitted for funds to cover the work. The valves were found to be generally in good condition, the corrosion of rivet heads and seals by voltaic action, as noted in previous reports, having been apparently checked by the application of bitumastic enamel. For further details see the report of the engineer of maintenance, Appendix A.

#### ELECTRICAL DIVISION.

This division continued in the charge of Mr. Walter L. Hersh, as electrical engineer. The work consisted of operating and maintaining the steam and hydroelectric power plants, substations, transmission lines, and power-distribution systems; the maintenance of the systems of lighting for the Canal Zone, including the Army and Navy establishments, the maintenance of telephones and telegraphs, fire alarm and railway signal systems, and the railway interlocking plants, and the installation and maintenance of such electrical equipment as was required by the canal, the railroad, the Army and Navy, and such commercial vessels as required electrical work while transiting the canal.

The installation of the new generator unit, No. 4, at the Gatun hydroelectric station, with its appurtenances, reported as being in progress in last year's report, was completed and placed in operation during the month of November. This work increased the capacity of the Gatun hydroelectric station to 13,500 KW. The additional unit, No. 5, for which funds have been heretofore provided, has been ordered. After the unit No. 4 was placed in operation, the capacity of the Gatun station was sufficient to take care of peak loads without the necessity of operating the Miraflores steam-power plant for the purpose. The Miraflores plant is therefore on a strictly reserve basis and is not operated for the generation of current, except in emergency cases or failure of the transisthmian transmission line. For this purpose, in order to be immediately available for emergencies, it is necessary to maintain steam on the boilers and to operate the generators synchronously with the generators at Gatun by power derived from the Gatun station. By the proper mechanical devices the steam power at Miraflores automatically drives the generators at Miraflores as soon as the failure in the transmission line occurs.

At the Gatun substation the work of changing the bus potential from 2,200 volts to 6,600 volts, in progress at the date of last year's report, was completed in November. An additional 2,200-volt feeder

equipment was installed in Gatun substation for supplying power and lighting current to the new Army post at Gatun.

At the Cristobal substation a second 2,667 KVA., 44,000-2,200-volt transformer, which was removed from the Gatun substation, was rebuilt and installed. This change has increased the capacity of the Cristobal substation for the purpose of supplying power for the new cold-storage plant at Mount Hope and for the Army and Navy establishments to the east of Manzanillo Bay.

At Miraflores substation a 2,200-volt feeder equipment was installed to serve the new Army post near Miraflores. An additional feeder equipment was installed at the Balboa substation to meet the increased demands for light and power in the vicinity. An additional transformer was installed at the Balboa substation for supplying service required by the Army establishment at Fort Amador and vicinity.

Failures in the transmission line across the Isthmus were greatly reduced in number by the installation of an additional unit to the insulators on the line. Failures from the breakdown of insulators occurred in 1917 to the number of 17, and in 1918 to the number of 29, and in 1919, up to the month of February, at which time the additional insulators were installed, there were 32 breaks. From February to June 30 there were no transmission line interruptions due to insulation failures.

Extensions and improvements of the underground power systems included a main of 82,740 duct feet of vitrified-tile duct, 40,460 feet of fiber duct, and 218,840 feet of lead-covered cable. Included in these figures the principle items are: Feeder circuits to the Army post at Miraflores, additional feeder to Ancon Hospital, a 6,600-volt feeder to the Army post at the Pacific entrance, and distribution systems in the Army and Navy establishments to the east of Manzanillo Bay. The additions to the street-lighting systems at Coco Solo, New Cristobal, Ancon, Quarry Heights, and Red Tank required a total of 173 additional street lamps, and approximately 53,000 feet of armored lead-covered cable. The average monthly unit output from the generating stations was 4,478,330 kilowatt hours, as compared with 4,419,192 kilowatt hours a month for last year. The reduction in fuel consumption at the Miraflores plant, resulting from the increased capacity of the Gatun station, amounted to 391 barrels of fuel oil for the seven months of the year following the installation of the additional unit at Gatun.

The average cost of distributing the power was 0.8487 cent per kilowatt hour. The average cost of lighting, including lamp renewals, was 1.2942 cents per kilowatt hour. The principal loads in kilowatts added during during the year were as follows:

	Power.	Light.
Navy aero station.....		
Army aero station.....	30	50
Cold storage plant, Mount Hope.....	30	50
Pacific forts.....	1,800	40
Street lighting.....	245	150
Industrial school.....		50
Ancon Hospital.....	20	
Hotel, at Pedro Miguel.....	40	(6)
Water-supply pump station, Rio Grande.....	10	5
Ancon laundry.....	150	
Quarters for the cable company.....	20	
	30	10

The operation and maintenance of the machinery of the Gatun spillway is assigned to the electrical division, and the work performed by the force at the hydroelectric plant. There were 317 gate operations recorded, of which 271 were for lake regulations and 46 for inspection and testing of equipment. There were no failures of spillway equipment and no difficulties in operation.

There was an increase of 444 telephone installations during the year, 916 being installed and 472 removed. At the end of June, 1919, there were 2,967 telephones in service. The average number of telephone calls per day of 8 hours was 22,630. The average number of telephone trouble cases was 6 a day, as compared with  $9\frac{1}{2}$  a day for last year. There were in service at the close of the fiscal year 627,334 feet of cable, an increase of 35,095 feet during the year.

The electrical fire-alarm systems were maintained. Thirteen alarms were turned in, and no failures of alarm apparatus occurred.

In the railway-signal system there were 2,084,908 registered arm movements, with 97 failures of operation, as compared with 2,404,176 registered arm movements, with 131 failures, for the preceding year. There were 181 train-minutes' delay caused by signal failures, as compared with 556 train-minutes' delay for last year.

At the electrical repair shop 291 armatures were rewound, 120 transformers and compensators were repaired and rewound, 114 magnetos and fans were repaired and rewound, 93 miscellaneous electrical appliances were repaired, 108 switchboard panels manufactured, and 129 miscellaneous machines were repaired and rebuilt. The principal items of marine electrical work included the complete overhauling of electrical equipment, the installation of wireless apparatus on five ex-German ships, which were overhauled for the United States Shipping Board at Balbao, and the installation of all electrical equipment on the Coast Guard cutter *Manhattan*, which was built at the Balboa shops.

For further details, attention is invited to Appendix A.

#### MUNICIPAL ENGINEERING DIVISION.

The municipal engineer in charge of this division, Mr. D. E. Wright, resigned to accept a temporary commission in the United States Army on October 22, 1918, and upon receiving his honorable discharge from military service resumed his duties with the canal on March 22, 1919. During the absence of Mr. Wright the work of the division was supervised by Mr. Roy C. Hardman, as acting municipal engineer.

The usual work of operation and maintenance of water reservoirs, pumping stations, and filtration plants and the maintenance and repair of municipal improvements in the Canal Zone and the cities of Panama and Colon were performed.

New road-construction work included roads in the Ancon Hospital grounds, a road from Pedro Miguel to Paraiso, and one from Gatun to Mount Hope. Miscellaneous municipal work, including the construction of concrete roads, walks, sewers, etc., was performed for the submarine base and the naval air station at Coco Solo, and for the Army at the new aviation base at France Field and at the various posts throughout the Canal Zone. A large amount of miscellaneous municipal construction work was also performed for the various

departments of The Panama Canal and for the Panama Railroad. The amounts expended on this work at the different localities are indicated as follows:

Balboa terminals.....	\$7, 513. 00
Paraiso-Gamboa road.....	60, 345. 00
Resurfacing streets in Pedro Miguel.....	32, 258. 00
Resurfacing streets in Paraiso.....	18, 670. 00
Construction of roads in Ancon Hospital grounds.....	99, 676. 00
Reconstruction of roads in Ancon.....	17, 426. 00
Resurfacing main street, Gatun.....	22, 485. 00
Reconstruction of Mount Hope-Gatun road and municipal improve- ments at Mount Hope.....	149, 210. 00
Miscellaneous municipal work for United States Navy.....	84, 622. 00
Miscellaneous municipal work for United States Army.....	112, 098. 75
Miscellaneous municipal work for Panama Canal departments and for the Panama railroad.....	152, 191. 27

In addition to the above, an appropriation of \$842,000 was received for the construction of roads, streets, walks, sewer and water lines, and other general municipal work for the two new Army posts at Miraflores and Gatun. Work was commenced in May and by the end of June \$123,642.47 had been expended.

The usual maintenance work of the water and sewer systems and of the pavements in the cities of Panama and Colon was done. In the city of Panama 11,147 square yards of sheet asphalt were laid. The total expenditures in these two cities for the routine maintenance work was \$165,288.87. On account of the inadequacy of certain sewer mains in the city of Panama, as originally installed, work was begun on the construction of new sewer outfalls and the enlargement of a number of storm sewer drains. The details of the work thus far performed in this project are given in the report of the municipal engineer, Appendix A. The amount expended up to June 30, 1919, was \$52,455. This expenditure and all expenditures for municipal work in the cities of Panama and Colon are, under the agreement with Panama, to be reimbursed to the United States from the water revenues in the two cities.

The total number of gallons of water for all purposes pumped at the various pumping stations was as follows:

	Gallons.
At Gamboa.....	3, 691, 800, 000
Miraflores.....	421, 885, 000
Balboa.....	2, 655, 479, 000
Paraiso.....	74, 640, 000
Cucaracha.....	148, 961, 651
Camacho tanks.....	72, 261
Camacho mains.....	76, 745, 000
Mount Hope.....	1, 647, 850, 000
Agua Clara.....	424, 798
Frijoles.....	10, 138, 000
Monte Lirio.....	3, 523, 000

The divisional cost of water delivered in the several districts was as follows per 1,000 gallons:

Cristobal.....	\$0.07
Gatun.....	.11
Gamboa.....	.14
Paraiso.....	.07
Pedro Miguel.....	.07
Miraflores.....	.06
Ancon-Balboa.....	.07

The sale of water to vessels was as follows: At Cristobal, 1,589 vessels received 75,536,354 gallons; at Balboa, 1,290 vessels received 27,048,500 gallons.

The water consumption in the city of Panama was 915,047,000 gallons, and in the city of Colon, including the canal hospital and the Panama Railroad projects in Colon, 558,546,450 gallons. The filtration and purification plants at Miraflores, Gatun, and Mount Hope provided water of the usual high standard. The expense of operation of these plants is included in the cost per gallon, above stated.

For further details, attention is invited to the report of the municipal engineer, Appendix A.

#### METEOROLOGY AND HYDROGRAPHY.

The operation of this division remained in the charge of Mr. H. G. Cornthwaite, as chief hydrographer, until February 21, 1919, when Mr. R. Z. Kirkpatrick, who had left the service of the canal to enter the military service, returned to his former position with the canal. The observation stations, enumerated in last year's report, continued in operation, and several new stations were established, as follows:

A rain gage was installed on the Cocoli arm of Miraflores Lake on August 16, 1918.

An evaporation station was established in Gamboa in September, 1918, and also on Miraflores Lake on December 24, 1918.

A standard rain gage was installed on the Pequini branch of the Chagres River on December 21, 1918.

These stations are used in determining the rainfall and evaporation affecting Gatun and Miraflores lakes.

An anemoscope and quadruple register were installed on Soso Hill on August 21, 1918, for registering the velocity and direction of the wind.

A fully equipped weather station was established at Cape Mala on March 14, 1919, in charge of the chief electrician, naval radio station.

Weather reports are received by radio from this station at 8 a. m. and 1 p. m. daily, and are of value in advising shipping interests of the conditions of weather and sea at the entrance of the Gulf of Panama.

The rainfall for the calendar year 1918 was below normal at all stations except Empire and Bocas del Toro. The deficiencies were 3.77 inches at Colon and 39.59 at Bohio. October was the month of heaviest rainfall, and February the month of lightest. The average rainfall recorded at the various stations in the Pacific section was 62.20 inches, in the central section 85.08 inches, and in the Atlantic section 117.86 inches. The greatest precipitation in 24 consecutive hours occurred on October 16-17, 1918, amounting to 8.12 inches.

During the first three months of 1919 the rainfall was the lowest on record at several stations, but the dry season was terminated about two weeks earlier than usual, and the rainy-season conditions were well established before the middle of April.

The air temperatures for the calendar year 1918 were normal. Wind movement in the Canal Zone was above normal. Northwest, north, and northeast winds prevailed at all stations. The maximum wind velocity during the year 1918 occurred at Gamboa on June 5 and attained a velocity of 39 miles per hour.



Evaporation from Gatun Lake exceeded the highest annual evaporation since the filling of the lake. Fog conditions, as usual, were absent at the Atlantic entrance of the canal, and there were but few fogs at the Pacific entrance. Fogs occurred frequently at the interior stations during the rainy season, and, as usual, were dissipated by 8.30 a. m.

There were 46 seismic disturbances recorded, all slight and none resulting in damage to any canal structures.

There was an abnormally high spring tide in Panama Bay on October 21-22, 1918. The high-water stage of +11.2 feet was recorded at Balboa. The prevalence of fresh southerly winds on these two dates assisted in producing an abnormal height of water.

The maximum momentary discharge of the Chagres River was 61,200 c. f. s., and the minimum momentary discharge was 446 c. f. s. on April 7, 8, 9, and 10, 1918. Of the total yield of the Gatun Lake watershed, 12 per cent was absorbed by evaporation, 20 per cent by the hydraulic plant at Gatun, 9 per cent by lockages and miscellaneous uses, and 59 per cent by the necessary spillway discharge to maintain the lake at the standard level during the wet season. On December 15, 1918, the elevation of Gatun Lake was 86.98 feet above sea level, and on April 12, 1919, the elevation had been reduced to 83.70 feet above sea level.

Investigations were made of currents in the Gaillard Cut section of the canal, with the following results: During the dry season, with the prevailing northerly winds, there is an almost continual drift toward Pedro Miguel. The maximum current velocity recorded was 0.94 knot per hour toward Pedro Miguel, occurring in the canal channel opposite Gold Hill eight minutes after both chambers were filled simultaneously. With the canal prism at its present full width at Culebra, the drift due to lock operations at Pedro Miguel will produce an estimated maximum current velocity of not more than 1 knot per hour.

For further details attention is invited to Appendix A.

#### SECTION OF SURVEYS.

Mr. Fred R. Fitch continued as assistant engineer in charge of this section until February 1, 1919, when Mr. O. E. Malsbury, who had left the canal service to enter the military service during the war, received his discharge from the Army and resumed his duties with the canal. The duties of this section included surveys of all Panama Railroad lands and lots as required, the maintenance of canal boundary monuments, triangulation stations, and bench marks, and also such surveys and maps as were required from time to time by the various departments and divisions of the canal, by the Army and Navy, and the joint commission.

Colon corner and grade stakes were set on 33 lots, and in the Folks River district corner and grade stakes were set on 2 lots. Corner stakes were set on 4 lots in the city of Panama.

Observations were continued on Gatun dam, indicating normal settlement. Twenty-four monuments were set on the isolated 100-foot contour line in the Rio Trinidad Valley. One hundred stations in the Canal Zone triangulation system were repaired and cleared.

Maps were made embracing Colon, Cristobal, New Cristobal, Folks River, and Mount Hope, showing all Panama Railroad and canal buildings, fire alarms, sewer manholes, hydrants, and electrical manholes. The tracings are in four sections on a scale of  $\frac{1}{1000}$ . Surveys and maps were made in connection with the plantations and pastures of the supply department. A survey was made locating the boundary lines of the Fort Randolph military reservation. A large map of the Coco Solo naval reservation was made by pantograph from various maps and measurements taken on the ground. A survey was made and a map prepared showing the boundary lines, towers, and buildings of the Cape Mala radio station.

For further details attention is invited to Appendix A.

#### SECTION OF OFFICE ENGINEER.

Mr. C. J. Embree remained in charge of this section until his resignation on October 31, 1918, for service in the Army, when he was succeeded by Mr. F. W. Blackwood. Mr. Embree resumed his duties on January 5, 1919, having received his discharge from the Army.

This section continued the engineering, architectural, electrical, and miscellaneous design work required for all divisions of the canal except the mechanical division. A total of 672 working drawings were issued during the year. The most important designing work was in connection with the building construction programs of the Army and Navy establishments on the Isthmus and for the building and electrical divisions of The Panama Canal.

There were issued from the blue-print room 250,928 square feet of blue prints, 28,331 square feet of white prints, and 7,444 square feet of brown prints, at an average cost of 1.085 cents per square foot.

For further details attention is invited to Appendix A.

#### MARINE DIVISION.

Capt. L. R. Sargent, United States Navy, continued in charge of this division as marine superintendent. The various restrictions covering pilotages and movements of vessels in defensive areas were progressively relaxed after the suspension of hostilities on November 11, 1918, with the corresponding progressive return to normal procedure in the handling of shipping within the canal. The local procedure in such matters as trade control and travel control, requiring the inspection of vessels during canal transit, was gradually restored to normal as the war-time precautions were relaxed by the governmental authorities in Washington.

On September 30, 1918, the San Jose Island light was established, completing the contemplated system of navigation aids for the Pacific approach to the canal. Panama Canal craft loaned to the local naval establishment during the war were returned. At the request of the United States Shipping Board, under the direction of the marine division, and with canal equipment, five ex-German vessels acquired from the Peruvian Government were towed to the canal. In the local steamboat-inspection service the board of local inspectors, under the supervision of the marine superintendent, performed the following duties:

Semi-annual inspection of all floating plant of The Panama Canal and Panama Railroad Company on the Isthmus were made and reports submitted.

Annual inspections were made and certificates of seaworthiness issued to 5 American steamers, 18 foreign steamers, 60 motor boats of the canal, 3 motor boats of the Panama Railroad Company, and 58 privately owned motor boats.

Inspection and hydrostatic tests were made of 46 boilers on floating equipment of the canal and railroad.

Inspection and appraisals were made from time to time of floating plant for sale or transfer.

Licenses were issued to 8 pilots, 31 masters, 11 mates, 18 engineers, and 59 motor-boat operators.

The board of admeasurement, of which the marine superintendent is chairman, made the necessary measurements and furnished the necessary data for fixing the tolls of ships that transited the canal. The necessary remedial legislation fixing the canal system of measurement as the basis for tolls was again brought to the attention of the Secretary of War, and by him presented to proper committees of Congress, with the urgent request for appropriate action by Congress. The tolls collected during the year amounted to \$6,149,598.54. On the basis of the Panama Canal rules, tolls would have been \$7,017,125.02, an increase to the revenues of the canal of \$867,526.48.

The total number of ships making the transit of the canal was 2,025, of which 860 passed from the Atlantic to the Pacific, and 1,165 in the contrary direction. Their aggregate net tonnage, according to Panama Canal rules of measurement, was 6,131,575 tons. Cargo carried through the canal was 6,877,649 long tons. Of this total 2,705,091 tons passed from the Atlantic to the Pacific, and 4,172,558 tons in the contrary direction. A total of 249 ships passed through the canal in ballast, 138 from the Atlantic to the Pacific, and 111 from the Pacific to the Atlantic. A total of 186 United States Navy vessels passed through the canal, 102 southbound and 84 northbound. The average net tonnage of commercial ships transiting the canal was 3,337 tons. The average net tonnage of ships carrying cargo was 3,404.

The traffic for the fiscal year showed a decrease in the number of ships and in the tonnage and cargo amounting, respectively, to 4.93 per cent, 7.92 per cent, and 9.05 per cent, as compared with the preceding year. Classified according to nationality, the ships entering the canal were as follows: United States, 786; British, 602; Norwegian, 128; French, 104; Chilean, 93; Japanese, 87; Danish, 79; Peruvian, 65; Swedish, 29; Dutch, 19; Costa Rican, 12; Spanish, 5; Chinese, 4; Greek, 3; Russian, 3; Canadian, 2; Belgian, Colombian, Ecuadorian, and Mexican, 1 each.

For the purpose of bringing to the attention of shipping interests the facilities of the canal and the advantage of the Panama Canal route, correspondence has been initiated with shipping agencies in England, France, the United States, Australia, New Zealand, and Japan. Data and information of interest affecting the canal have been furnished from time to time to the United States consuls and commercial agents in various cities of the world. At a time when the nations are making preparations for the resumption and extension of the world's commerce, it has been deemed proper and expedient to disseminate accurate information, in order that the preparedness of

the canal to serve the interests of commerce may be generally known and understood, and that those charged with the routing of ships might be in a position to avail themselves of the canal if it should be of benefit to their interests so to do. It should be emphasized that the canal is now in condition to operate at its full capacity, and that it will be prepared to meet the demands of increasing traffic as they arise.

For further details, attention is invited to Appendix C.

#### DREDGING DIVISION.

This division continued to maintain the canal prism throughout, and in addition performed work as requested by the Navy, in connection with the submarine base at Coco Solo. The division remained in charge of Mr. J. M. Pratt, as superintendent, under supervision of the engineer of maintenance.

The various units of the dredging plant were engaged upon the following work:

The 15-yard dipper dredge *Paraiso* was operated for 7 months on general maintenance work in the Gaillard Cut in completing the channel near Gamboa, in widening the prism at the Paraiso point of intersection, and in the Pacific entrance channel.

The 15-yard dipper dredge *Gamboa* was operated for about 10 months in maintenance work in Gaillard Cut, and in the improvement at Paraiso and Miraflores points of intersection.

The 15-yard dipper dredge *Cascadas* was at work throughout the year in widening the approach channels to Cristobal Harbor and the west slip at the Cristobal coaling plant, in removing the shoal along the face of Pier No. 10 at Cristobal, maintenance work in the vicinity of Culebra, the channel improvements at the Paraiso point of intersection, and in rock excavation at Balboa inner harbor and the Pacific entrance.

The ladder dredge *Corozal* was engaged in deepening and removing rock shoals in the Pacific entrance channel until March 6, 1919, on which date she was retired from the service.

The ladder dredge *Marmot* was operated in the Miraflores point of intersection improvement work until September 23, when she was retired and laid up.

The 20-inch pipe-line suction dredge No. 83 was retired on July 10, 1918.

The 20-inch pipe line suction dredge No. 84 was worked throughout the year on maintenance work at the Pacific entrance, Balboa inner harbor, and at the Miraflores improvements.

The 20-inch pipe line suction dredge No. 86 was operated throughout the year in the approaches of Cristobal harbor, at the Cristobal coaling station, at the submarine basin at Coco Solo, in filling swamp areas for the Navy Department at Coco Solo, deepening the Pacific entrance and Balboa inner harbor channels, and reclaiming sand and gravel at Point Chamé and in the Chagres River at Gamboa.

Drill boat *Teredo* No. 2 was operated for eight months in subaqueous blasting work on Paraiso and Miraflores channel improvements, and in the Pacific entrance channel.

Hydraulic grader No. 1 maintained the drainage ditches in the Culebra slides. Hydraulic grader No. 2 was engaged in maintaining drainage ditches in the Culebra slides until September 12, on which date she was retired.

Hydraulic grader No. 3 was at work in maintaining drainage ditches in the Culebra slides until December 24, when she was retired.

The floating air compressor No. 27 was operated until January 24, 1919, when she was retired from the service.

Two of the tugboats which were loaned to the Navy Department during the war were returned to canal service. The tug *Alliance* was lost at sea on August 2, 1918. Two tugs were retired, and there remained in the service on June 30, 1919, four tugboats.

This dredging plant excavated a grand total of 4,460,665 cubic yards of material, at an average unit cost of 0.4733 cent per yard.

Of this quantity, 2,473,200 cubic yards, of which 1,616,300 were earth and 856,900 were rock, were removed from the canal prism; the yardage removed from Gaillard Cut was 753,800, of which 157,400 were earth and 596,400 rock; and the yardage removed in the maintenance of the prism in the Culebra slide region was 448,600, as compared with 1,316,315 cubic yards during the preceding year.

On June 30, 1919, the amount remaining to be removed from the canal prism was 3,454,800 cubic yards, of which 173,200 are chargeable to construction and 3,281,600 chargeable to maintenance. The amount chargeable to construction represents the remaining material to be removed in order to complete the original excavation for the full width of the canal prism throughout its length. The yardage removed from the canal prism during the year was 2,473,200, of which 280,000 were original excavation chargeable to construction and 2,193,200 were maintenance work. During the year a total of 264,500 cubic yards of material was removed in the project for widening the channel at the Paraiso point of intersection, leaving 18,100 cubic yards of earth and 56,300 cubic yards of rock to be removed to complete the project. In the widening of the canal prism along the west bank of the canal immediately south of Miraflores locks, 354,200 cubic yards of earth and rock were removed, leaving a total of 51,700 cubic yards of earth and 142,900 cubic yards of rock to be removed to complete the project.

At no time during the year was there difficulty in maintaining full width and depth of the channel in the Culebra slide region, and the diminished amount of excavation required to maintain the channel is an indication of gradually improving conditions. Observations periodically made of the fixed points established in 1916 on Gold, Zion, Contractors, and Purple hills indicated no movement of the banks in their vicinity.

In the sand and gravel production 6,755 cubic yards were excavated from the Chagres River beds and 5,310 cubic yards for special purposes from Point Chame. With these exceptions, all sand and gravel necessary for constructional purposes was taken from the stock piles heretofore deposited at the Gamboa gravel plant.

The dikes and groins along the beach at the south of Limon Bay and west of the canal were maintained. No new dikes or groins were constructed or required. The usual work of extermination of the water hyacinth was conducted. Nine thousand four hundred and sixty-seven old plants and 922,510 young plants were pulled and deposited on shore, and 22,192 square yards of hyacinths were destroyed by spraying with arsenic solution. Necessary progress surveys were made of the dredged areas in the canal prism and in the various auxiliary dredging works.

For further details, attention is invited to Appendix A.

#### MECHANICAL DIVISION.

The work of this division was under the supervision of Commander R. D. Gatewood, United States Navy, as superintendent, until February 21, 1919, on which date Commander E. G. Kintner, United States Navy, succeeded to the position. No important additions or improvements or important changes in the organization were made to the mechanical shops during the year. The average force em-

ployed per month was 583 men on the gold roll and 1,296 men on the silver roll at the Balboa shops, and 113 gold and 362 silver at the Cristobal shops; the corresponding figures for last year were 620 gold and 1,278 silver employees at the Balboa shops, and 133 gold and 372 silver at the Cristobal shops.

Of the total work done at the shops 30.77 per cent was for The Panama Canal, 10.08 per cent for the United States Navy, 1.81 per cent for the United States Army, 2.37 per cent for other governmental departments, 18.92 per cent for the Panama Railroad, and 36.05 per cent for private individuals and companies. Fifty-four and fourteen-hundredths per cent of the work done was marine work, 26.56 per cent was railroad work, 10.50 per cent manufacturing work, and 8.80 per cent unclassified.

The principal items of work at the Balboa shops included:

- The extensive overhaul and repairs of five ex-German merchant ships, which had been chartered by the United States Shipping Board from the Peruvian Government and which had been considerably damaged by the deliberate acts of the German crews during their internment in Peruvian waters, and had suffered general deterioration while lying in Peruvian ports. In some cases new boilers were required and were furnished from the United States, and in other cases the shell and parts of the boilers were retained, the remaining parts being renewed. Several new cylinders were manufactured for the main engines, and practically all the auxiliary machinery had to be rebuilt.
- An item of construction work completed during the year was the building of the coast guard cutter *Manhattan*, which was built at these shops on account of the congested conditions of shipping yards in the United States. The vessel as constructed was 120 feet 3 inches long over all, 24 foot beam, 14 foot depth, 10 foot 6 inches draft, and had a displacement of 383 tons.
- Work on the *Konigin der Nederlanden*, which was begun in the previous year, was completed.
- Work on the overhauling, reboiling, and modification of the S. S. *Cristobal*, of the Panama Railroad steamship line, was begun on May 3, 1919, and is now in progress.
- The S. S. *Circassian Prince* was given a general overhauling, including the renewal of several shell plates of the hull, parts of the bottom plating and bulkheads, and extensive repairs to the boilers.
- The S. S. *Middlebury*, chartered from the United States Shipping Board by the Panama Railroad Company for use as a cattle carrier, was modified so as to adapt it to such service.
- The S. S. *Santa Isabel*, which had grounded on a reef, received extensive repairs to keel and bottom, and at the same time repairs were made to the propelling machinery.
- The S. S. *Heina* was repaired, involving the renewal of several bottom plates and straightening several plates and frames which had been damaged by the grounding of the vessel.
- Old boilers were removed and new boilers installed on the S. S. *Quoque*.
- The U. S. S. *Yorktown* had three new furnaces installed.
- The motor schooner *Elizabeth Ruth* had extensive work done on the gas engines.
- The motor schooner *Evelyn* received repairs to its propelling machinery and auxiliaries.
- The Army tug *Cocoli* and the S. S. *Balboa* received extensive repairs.
- Fifty 1,800-pound standard Navy cast-steel anchors were manufactured on order for the Navy Department and shipped to Mare Island Navy Yard.
- For the Alaskan Engineering Commission, 167 Lidgerwood cars, formerly in use in the construction of the canal, were repaired and prepared for shipment.
- For the United States Army, 140 Rodger ballast cars, 92 Western dump cars, and 30 301-class locomotives, formerly in the service of the canal, were repaired and prepared for shipment.

### At the Cristobal shops:

Extensive repairs were made to the steamers *Allianca*, *Balboa*, *Panama*, *Advance*, *Colon*, and the Panama Canal pipe-line dredges 83 and 86. Forty-six pieces of canal equipment were placed in the dry dock for repairs, and 50 vessels other than canal equipment were dry docked and repaired.

### At the Cristobal dry dock:

Forty-one pieces of canal equipment were dry docked, and 36 vessels other than canal equipment were dry docked.

Other than tugs, barges, and dredges, the total number of vessels on which repairs were made was 1,329, of which 558 were handled at the Balboa shops and 771 at the Cristobal shops.

The increase in the number of repairs to ships visiting the canal makes necessary the construction and equipment in the near future of a light repair shop adjacent to the piers at Cristobal to avoid the delay and expense of transportation of men and material from the dry-dock shops one and one-half miles away. For several years it has been obvious that the dry-dock and shop facilities at Cristobal, which are left over from the early construction days of the canal, will not be adequate to care for the increased commercial work that is to be expected with increasing traffic in the canal. The project, which was originated four years ago, of rebuilding the old Cristobal shops has been held in abeyance during the period of the war, and for the additional reason that connected therewith a larger and deeper dry dock should be constructed. The Navy Department is interested in a project for its needs on a larger scale than what would be required for the commercial needs of the canal. If the two interests can be combined and funds secured for the larger project without delay, an independent estimate by the canal for its purposes will not be made. If, for any reason, the joint project can not be determined upon, it will be necessary for the canal to make preparations for its independent needs and for estimates to be submitted for funds in time for the construction to be completed when traffic demands require.

For further details, attention is invited to Appendix D.

## SUPPLY DEPARTMENT.

This department continued in the charge of Mr. R. K. Morris, as chief quartermaster. The organization of the department remained as stated in last year's report.

*Labor.*—On June 30, 1919, the total force employed by The Panama Canal and Panama Railroad Company on the Isthmus was 20,361, of which 3,290 were on the gold roll and 17,071 on the silver roll, as compared with the total of 19,265 on June 30, 1918, with 3,108 on the gold roll and 16,157 on the silver roll. The increase of silver employees was due to increased work in the operation of the docks at Cristobal and to the beginning of the construction of the new Army posts at Miraflores and Gatun. The increase of 182 on the gold roll was due to the same causes and to the additional mechanics required in the mechanical division on account of the increased work on ships. Throughout the year there was a large fluctuation in the number of silver employees, the maximum number, 18,238, having

been employed in February, 1919, and the minimum, 14,870, in September, 1918.

One of the difficulties in the control of the common labor on the Isthmus is the necessary fluctuation in the number employed and the lack of employment on the Isthmus otherwise than by the canal. Any construction projects conducted in the Republic of Panama by the Panaman Government or by the Army in connection with the defense of the canal would be of advantage in controlling the labor situation, as it would provide work for those necessarily discharged from employment with the canal or Panama Railroad.

*Quarters.*—No new quarters were built for gold employees except on the cattle plantations, which were financed by the Panama Railroad. The number of quarters available for both gold and silver employees is still short of the number to be provided for. On June 30, 1919, 306 applications for married quarters for gold employees were on file. There were 1,535 applications for silver married quarters on file on June 30, 1919. The removal of all gold employees from the town of Paraiso, made possible by the largely reduced dredging operations in Gaillard Cut, made available for silver employees the former gold quarters at Paraiso. Ten 12-apartment houses at Cristobal for silver employees were under construction and were 95 per cent complete on June 30, 1919.

*Transportation facilities.*—Transportation by animal-drawn vehicles is being gradually reduced and replaced by motor transportation. On June 30, 1919, there were in service 39 horses and 194 mules, as compared with 44 horses and 219 mules on July 1, 1918. The motor vehicles in the service on June 30, 1919, and on June 30, 1918, are shown in the following table:

	1918	1919
Ford cars, ½-ton delivery.....	77	78
1-ton trucks.....	2	47
1½-ton trucks.....	7	7
3½-ton trucks.....	15	15
2½-ton trucks.....	3	3
Ford passenger cars.....	15	11
Combination (passenger and delivery).....	1	4
Hearse.....	1	1
Ambulances.....	7	7
Motor cycles.....	47	56

In the operation of the pastures and plantations for the supply department, there were in service on June 30, 1919, 190 horses and 137 mules, as compared with 136 horses and 157 mules on July 1, 1918.

*Materials and supplies.*—The total value of material received during the fiscal year was \$7,832,845.61, as compared with \$8,700,356.62 for the preceding year. Local purchases amounted to \$1,452,153.35, as compared with \$1,349,783.84 for last year. Exclusive of obsolete material and scrap, the value of material in stock in the department storehouses was \$6,001,451.24 on June 30, 1919, as against \$6,511,392.86 on June 30, 1918. There were issued from the storehouses materials of all classes aggregating in value \$12,157,090.24.

Sales were made to 2,156 steamships, at a total price of \$1,777,516.33, showing an increase of \$248,413.91, as compared with the previous year. Sales to the United States Army totaled \$287,256.82, and to



the United States Navy \$141,329.68. The principal items included in these sales were lumber, building material, general hardware, rope, cable, gasoline, kerosene, and lubricating oils.

A total of 223,027 requisitions and foremen's orders were handled, of which 150,802 were from the general storehouse at Balboa, 59,184 from the Cristobal storehouse, and 13,041 from the Paraiso storehouse. The consumption of cement for the year was 170,466 barrels.

*Obsolete material.*—The obsolete storehouse at Mount Hope was operated as a concentration point for obsolete and surplus material, equipment, and scrap. Obsolete material was shipped to the United States and disposed of to the value of \$127,609.75. Material to the value of \$678,349.72 in addition was sold, and material of \$184,059.49 valuation was reissued for service and to the value of \$52,827.25 was surveyed and scrapped. There remained on hand on June 30, 1919, material to the value of \$161,472.69, as compared with material to the value of \$359,903.58 on hand on July 1, 1918. Scrapped material, other than old French scrap, was on hand on June 30, 1919, in the total amount of 19,398,368 tons, with a total valuation of \$100,952.65. There were on hand on July 1, 1918, 13,427.02 tons of French scrap; 3,997.17 tons were shipped on the Rovetta contract, leaving a balance on the Isthmus on June 30, 1919, of 9,429.85 tons. The sales from the obsolete general storehouse of material, equipment, and supplies, the original cost of which was over \$500, are reported in detail in Table No. 5, accompanying the report of the chief quartermaster, Appendix E.

*Fuel-oil plants.*—Contracts for supplying fuel oil for the canal were entered into with the Anglo-Mexican Petroleum Company (Ltd.) for 500,000 barrels f. o. b. steamer Mexican ports, at \$0.7875 per barrel, and with the Huasteca Petroleum Company for 600,000 barrels, f. o. b. steamers at Tampico, Mexico, at \$0.7875. On June 30, 1919, there remained to be delivered under these contracts 345,251 barrels and 370,051 barrels, respectively. The construction of the 55,000-barrel capacity concrete fuel-oil tank at Mount Hope was completed on March 22, 1919. The Balboa and Mount Hope fuel-oil plants served 396 vessels with 2,649,868 barrels.

Two 55,000-barrel capacity fuel-oil tanks were erected by the West India Oil Company at the Mount Hope tank farm, being practically completed at the end of the fiscal year.

Storage of bulk gasoline in tanks at Balboa and Mount Hope was continued, the principal issues therefrom having been made to Navy vessels and to the Army establishments on the Isthmus.

*The Panama Canal Press.*—The value of the stock on hand on June 30, 1919, was \$98,103.52, as against \$86,542.96 for the preceding fiscal year. The total value of material issued from the plant was \$147,627.39, as compared with \$107,302.55 for the previous year. The total value of material used in manufacture was \$63,634.43, as compared with \$51,096.31 for the previous year.

*Subsistence.*—The revenue from restaurants and messes was \$745,192.75, and the total cost of operation was \$749,147.60, netting a loss of \$3,954.85. The Hotel Tivoli showed a net profit of \$2,130.98 for the year, compared with a net loss of \$6,936.06 for the preceding year; the Hotel Washington, financed by the Panama Railroad Company, showed a net profit of \$11,132.26, as compared with a loss of \$15,465.92 for the preceding year. The increase in South American

travel, with resulting increases in patronage of the hotels, accounts for the difference. The new Tivoli kitchen was occupied in December, 1918. This is of concrete construction, and is designed to be a part of the new hotel, which will be made necessary at some future date on account of the increasing deterioration of the old frame structure.

#### COMMISSARY DIVISION.

The industries involved in the operation of this division are financed by the Panama Railroad and are conducted under the supervision of the chief quartermaster of the canal. The detailed operations will be given in the annual report of the Panama Railroad Company, but the following summary is appropriate in this place:

The local enterprises maintained for the purpose of decreasing the dependence for certain food products upon outside sources, as referred to in the last annual report, were continued. The largest and most successful of these enterprises was the importation, pasturing, and slaughter of Colombian beef. The number of cattle killed at the abattoir showed an increase of 43 per cent over last year's figures, and the value of products showed an increase of over \$1,000,000. This increase in revenue is largely accounted for by increases in prices received and the sale of by-products, particularly in hides. Under arrangements with the commissary branch of the United States Army 41,659 quarters of beef, valued at \$678,364.11, were shipped from the abattoir to the depot quartermaster, United States Army, New York. There was an increase in the amount of beef sold to steamships. During the year 11,830 acres were cleared for pastures, making a total for pasturage purposes of 42,347 acres.

The number of cattle on hand July 1, 1918, was 9,455; the number slaughtered during the fiscal year ended June 30, 1919, was 31,361; the number received during this period was 34,848, of which 29,353 were purchased under contract; and the number remaining on hand on July 1, 1919, was 12,822.

The raising of hogs was continued, and the facilities for curing and pickling pork were extended.

Purchasing agencies for vegetables and fruits were maintained in Costa Rica, from which source practically all of the potatoes imported were derived. The agency at Haiti was discontinued in January on account of the lack of adequate transportation facilities and difficulties in the purchase of any large quantities.

The Food Administration regulations restricting the sale of wheat flour and of fine sugar imported from the United States were continued on the Canal Zone until relaxed in the United States.

The new Mount Hope cold-storage plant was used for the first time on February 25, 1919, when 300 sides of beef were put in for cooling. On May 18 the plant was in complete operation. Space is provided in this plant for refrigeration of over 5,000 carcasses of beef.

At the poultry farm the egg production for the year amounted to 33,662 $\frac{1}{3}$  dozen hen eggs and 830 $\frac{1}{2}$  dozen duck eggs, delivered and placed on sale at the commissaries.

At the dairy farm the monthly production in milk reached the maximum in May, when 8,645½ gallons were produced. The total production for the year amounted to 59,178 gallons, of which 49,443½ gallons of milk and 1,298 gallons of cream were shipped to the commissaries for sale, 46¾ gallons sold to individuals at the dairy, and 9,688 gallons were fed to calves.

In March a cream separator was installed and placed in operation, and daily shipments of cream made to the commissaries.

For further details, attention is invited to the report of the chief quartermaster, Appendix E.

#### ACCOUNTING DEPARTMENT.

This department continued under the charge of Mr. H. A. A. Smith, as auditor; Mr. J. H. McLean, as paymaster; Mr. T. L. Clear, as collector, until September, 1918, when he resigned to enter the service of the Army overseas, and was succeeded by Mr. Elwood P. Sine; Mr. Elwyn Greene continued as assistant auditor on the Isthmus; Judge B. F. Harrah continued as assistant auditor in charge of the accounting department of the Washington office of the canal, with Mr. H. P. Merrill as disbursing clerk.

The paymaster disbursed a total of \$32,488,481.97, of which the sum of \$13,383,128.18 was on account of the Panama Railroad. Employees on the gold roll of the canal were paid \$6,911,566.56 and those on the silver roll \$5,557,963.88. The sum of \$6,635,823.35 was paid on miscellaneous vouchers. Collections by pay-roll deduction amounted to \$4,708,625.02, of which amount \$3,391,685.29 was collected for coupon books for purchases by employees at the commissaries. Of the total collections by pay-roll deduction, \$4,474,814.79 were disbursed directly by the paymaster, the balance, \$232,810.23, being transferred to the collector's accounts.

On account of the discontinuance of the use of gold and Panaman silver money in making payments, United States paper money was used in large quantities. The sum of \$754,500 was brought from the States during the year.

Collections during the year repaid to appropriations amounted to \$10,364,875.07. The sum of \$6,442,981.67 was collected for deposit in the United States Treasury as miscellaneous receipts. Of these amounts the disbursing clerk at Washington received the sum of \$464,903.24 in credit for appropriations and \$37,797.57 as miscellaneous receipts.

Deposits for the payments of tolls and bills for supplies and services rendered shipping were made with the assistant treasurers of the United States to the credit of the collector. The Panama Canal, in the sum of \$4,362,252. Deposits for the same purpose were made with the collector on the Isthmus in the sum of \$12,081,122.03. These deposits were \$2,583,906.98 in excess of the corresponding total for last year. The sum of \$609,415.87 was refunded upon settlement of accounts.

Money-order funds to the amount of \$1,671,000 were transferred to the Postmaster General of the United States in payment for money orders drawn on the United States. Collections were made on ac-

count of the Panama Railroad Company in the sum of \$19,540,944.96, an increase of \$2,369,277.26 over the corresponding total for the preceding year.

Actual collection of tolls on vessels transiting the canal amounted to \$6,149,306.04; in addition, the sum of \$292.50 was collected for a vessel which passed through the canal during the last fiscal year, making the total amount collected \$6,149,598.54.

Referring again to the loss of revenue on account of the present rulings as to measurement of vessels for collections of tolls, had the Panama Canal rules been applied the sum of \$7,017,125.02 would have been collected, a difference of \$867,526.48. On account of the lack of legal authority to apply canal rules of measurement in levying tolls, the total loss of revenue to the canal since its opening to traffic in August, 1914, is \$3,664,786.74. The beneficiaries have been chiefly vessels engaged in foreign trade, and especially vessels under foreign register. Vessels engaged in American trade, of both American and foreign register, have been as follows:

American vessels plying between American ports.....	\$103,980.35
Foreign vessels plying between American ports.....	36,155.05
American vessels plying between American ports and canal ports..	80,329.05
Foreign vessels plying between American ports and canal ports.....	114.55
American vessels plying between American possessions and American ports.....	6,546.85
Foreign vessels plying between American possessions and American ports.....	20,226.00

Under the provisions of Section V of the Panama Canal act claims for damages to vessels passing through the locks settled during the year amounted to \$16,739.19. No claimants thus far have sought adjustment through the courts.

The work of checking pay rolls under the provisions of the act of August 23, 1919, was continued satisfactorily. A total of 363,467 pay-roll items were audited, among which 74 errors, involving \$406.22 out of a total payment of \$13,700,000, were found on final examination by the Auditor for the War Department. Exceptional monthly pay-roll deductions, involving additional work in preparation and auditing of the pay rolls, were handled for the objects, amounts, and periods as follows:

Object.	Amount.	Period (months).
American Red Cross war relief fund.....	\$53,276.12	12
British Red Cross.....	278.55	8
United war work fund.....	8,900.25	8
War savings stamps.....	7,743.35	5
Third Liberty loan bonds.....	356,288.77	3
Fourth Liberty loan bonds.....	758,988.94	5
Victory loan notes.....	164,991.68	1

The total appropriated by Congress for the canal and its fortifications to June 30, 1919, aggregated \$459,443,105.99. Of this amount \$36,931,896.85 were for fortifications, \$2,000,000 to cover eight annual payments of \$250,000 each to the Republic of Panama for Canal Zone rights, and \$170,000 for regulating commerce and for the censorship of foreign mail during the fiscal year. The sum

of \$34,716,006.22 has been specifically appropriated for operation and maintenance, sanitation, and civil government of The Panama Canal and Canal Zone. The amount appropriated for the construction of the canal and its immediate adjuncts totaled \$379,111,043.92; of this total \$3,600,000 were for colliers and coal barges, \$2,093,190 for Pier No. 6 at Cristobal, \$300,000 for work on the colliers *Ulysses* and *Achilles*, \$720,000 for reboiling and repairing the exempted by laws as a charge against the authorized bond issue, steamships *Ancon* and *Cristobal*, all of which items were specifically leaving the sum of \$372,397,853.92 so chargeable. Of the \$375,000,000 authorized bond issue, there is therefore available for appropriation within the limit of the cost of the construction of the canal \$2,825,302.08.

Under the agreement with the Republic of Panama, which requires reimbursement within 50 years of July 1, 1907, for the expenditures incurred by the United States for the construction, operation, and maintenance of waterworks, sewers, and pavements in the cities of Panama and Colon, the expenditures for construction to June 30, 1919, have amounted to \$1,325,276.27 in Panama and \$1,217,993.44 in Colon. The total expenditures for operation and maintenance are \$784,660.37 for Panama and \$721,761.43 for Colon. Under agreement, the United States currently reimburses itself from water-rental collections for the expenses for operation and maintenance, and gradually liquidates the expenditures for construction by a quarterly charge based on the amortization of the funds expended within the period of years fixed by the contract. In addition, the Republic of Panama pays interest at the rate of 2 per cent per annum on the capital-cost balances and on the proportionate cost of the waterworks in the Canal Zone used for supplying water to the two cities, based upon the quantity of water consumed. These items reached the following totals: For interest, \$272,404.52 for Panama, and \$229,309.41 for Colon; and for the proportionate cost of the waterworks in the Canal Zone, \$110,198.08. The amount paid to the United States, or immediately due, in the agreement with Panama, is \$2,627,522.41, leaving a balance of \$2,034,081.11, payable in installments during the contract period. Of this latter amount \$1,030,070.31 is for work in Panama and \$1,004,010.80 for work in Colon. The Panama Canal continues to maintain the pavements in the two cities under agreement reached in the fiscal year 1918, whereby reimbursement is still obtained from the water-rental collections.

The expenses for the actual operation and maintenance of the canal, including civil government and sanitation, amounted to \$6,112,194.77, as compared with \$5,903,719.69 expended in 1918 and \$6,788,047.67 during 1917. Offsetting these expenses for operation and maintenance is the amount of annual tolls collected from vessels, \$6,156,118.95; amounts collected as licenses and taxes, court fees and fines, \$136,870.77; and as profits on business operations, \$61,027.26; making a total of \$6,354,016.98. The revenues were thus in excess of current expenses by an amount of \$241,822.21.

The expenditures chargeable to canal construction accounts totaled \$2,406,832.29. Charges to capital additions, covering expenditures for permanent improvements, the cost of which is payable from

maintenance and operation appropriations, amounted to \$634,472.72. The principal items chargeable to construction were:

Dredging from Gatun to Pedro Miguel.....	\$33, 892. 19
Dredging at the Pacific entrance.....	149, 297. 54
Dredging inner harbor, Balboa.....	331, 951. 65
Sanitary fills and ditches.....	83, 996. 66
Roadways.....	43, 027. 93
Settlement of claims for private properties in the Canal Zone.....	127, 004. 77
Buildings (including quarters for gold employees, \$177,180.14; continuation of construction of Ancon hospital, \$144,668.80).....	370, 480. 68
Pier No. 6, Cristobal.....	827, 330. 19

The main items under capital additions chargeable to maintenance and operation were:

Dredging Cristobal Harbor to increase width of channel.....	\$108, 450. 94
Extension to power and lighting systems.....	171, 776. 56
Additions to fuel-oil plant, Cristobal.....	23, 153. 41
Quarters for silver employees.....	118, 212. 25
Quarters for gold employees.....	41, 415. 88
Roads, streets, and walks.....	265, 732. 02

Since July 1, 1915, the revenues derived from licenses and taxes, court fees and fines, postal receipts, etc., which had theretofore been appropriated separately for the support of the Canal Zone government, have been deposited in the Treasury of the United States and credited to miscellaneous receipts. Collections for licenses and taxes amounted to \$11,033.23; court fees and fines, \$19,849.62; postal receipts, \$104,932.34; and miscellaneous items, \$1,061.10, making a total collected of \$136,876.29. The corresponding figures for the previous year were \$140,690.91. All the expenses of the Canal Zone government were paid out of the regular appropriations for civil government, as contemplated in the appropriation acts.

During the year 140,618 money orders to the value of \$3,108,678.27 were issued, as against 168,022 to the value of \$3,382,663.69 within the previous year. The decrease is accounted for by the fact that employees have diverted their savings from money orders to Liberty loan bonds and war savings stamps.

The revenues derived from the operation of the various clubhouses amounted to \$463,409.39, as compared with \$365,701.50 for the previous year. The expenditures were \$414,895.93.

In the disbursement of claims for injuries and deaths there were reported 3,308 accidental injuries and 23 accidental deaths, as compared with 3,413 accidental injuries and 35 accidental deaths during the previous year. Compensation was allowed in 1,521 cases of injury and 10 cases of death. In 113 injury cases no compensation was allowed, for the following reasons: In 1 case disability commenced over one year after the injury, in 16 the injuries were found not to have been received in the performance of duty, in 55 there was insufficient evidence to sustain the claims, in 37 disability was not caused by the injury described, and in 4 notice of injury was not given as required by the compensation act. In nine cases compensation on account of death was disapproved, one because the person on account of whom the claim was made was not an employee of the canal or railroad company, in one case death did not result from the injury received while in the performance of duty, in two cases death was not the result of the injury claimed, and in five cases there were no dependents. Four claims were pending at the close of the fiscal

year. The total amount paid by The Panama Canal for injuries and deaths of employees from August 1, 1908, the effective date of the act of May 30, 1908, to June 30, 1919, was \$1,577,037.33. Under the law applicable to such cases, 15 cripples injured during the construction of the canal, who had become a charge on the canal, were granted an allowance and, with their families, were furnished transportation to their homes.

The use of coupon books in lieu of cash has been continued at the commissaries, restaurants, and clubhouses. Coupon books to the value of \$4,527,330 were issued to employees on pay-roll deductions and to the value of \$1,978,455 were sold for cash. Meal tickets for silver employees were issued to the value of \$67,916.40, as compared with \$132,766 for the previous year.

The accounts of all officers and employees charged with the collection, disbursement, and custody of Panama Canal, Canal Zone, and Panama Railroad funds or with other funds which are semipublic, such as clubhouses, Liberty loan collection organizations, etc., have been examined by the accounting department at frequent and irregular periods, as contemplated by the regulations. A total of 553 examinations were made during the year. One case of embezzlement was discovered, and the guilty party was sentenced to a term in the Gamboa penitentiary.

Inspection of time books and methods of time keeping were continued, without modifications. The inspectors checked 10,132 gangs, involving 541,310 employees.

The bonds of certain employees of The Panama Canal and Panama Railroad executed to insure the faithful performance of their duties were continued with the Maryland Casualty Co. The total liability for Panama Canal employees was \$467,000 and for Panama Railroad employees \$349,000.

For further details attention is invited to Appendix F.

#### EXECUTIVE DEPARTMENT.

This department continued under the Governor, assisted by Mr. C. A. McIlvaine as executive secretary. On account of the suspension of hostilities and as authorized from time to time by the heads of the appropriate departments in Washington, the work of enforcing special laws and regulations involving war-time restrictions was suspended. Mail censorship was not discontinued until June 24, and travel restrictions were not entirely relaxed at the close of the fiscal year.

On June 30, 1919, the employees of the executive department on the gold roll numbered 547, as compared with 539 on June 30, 1918. A reduction in force on account of the discontinuance of mail censorship and the removal of restrictions to travel will reduce the number of employees to about 520.

#### BUREAU OF STATISTICS.

The work of the bureau of statistics in connection with the compilation of data for wage adjustments was unusually heavy, on account of the frequent adjustments of pay in the United States. The prin-

cipal adjustments, and the reasons therefor, made during the year were as follows:

A bonus of \$10 a month was granted by act of Congress to certain classes of Government employees in the United States, effective on July 1, 1918, increasing the base pay of the corresponding classes in the canal service. The change affected clerks and related positions, construction and engineering foremen, and civil engineers and related positions, increasing the pay of approximately 1,000 positions by \$12.50 per month. The bonus referred to did not apply to navy yard mechanics, and the 5 or 10 per cent bonus of the fiscal year 1918 expired by the end of that year, it being necessary, therefore, to reduce the pay of Panama Canal mechanics and the positions coordinated with mechanics, effective July 1, in accordance with the reduction made in base rates. In the main the reductions were 2 or 3 cents an hour, affecting approximately 1,000 men.

Building-trades rates were adjusted as of July 1 to keep pace with the increases in the United States. The schedule of the Chicago Builders' Association was used as a base, because no comparable work was being done by the Government in the United States at that time. In May, 1918, the schedule of rates for employees in various marine callings in the United States went into effect, resulting in the reduction in canal rates of employees on dredging, towing, and other floating craft. The navy yards in the United States made an adjustment effective November 1, 1918, resulting in the corresponding adjustment by The Panama Canal effective the same date. The adjustment here increased the rate for metal trades 9 cents per hour, and for woodworking trades 10 cents per hour. These increases necessitated increases for certain supervisory positions at the locks, coaling plants, and in power plants, effective December 1. Increases in pay of the supervisory force in the navy yards resulted in corresponding increases in the mechanical division of the Canal Zone, effective February 15, 1919.

The general conditions of labor unrest that have developed in many countries since the suspension of hostilities have not thus far assumed a serious phase in the Canal Zone. The canal administration has not denied the privilege of collective bargaining to its employees, and has received committees appointed by labor organizations as representatives of the crafts by which they were delegated. Complaints and requests of individuals have been given the same consideration as that accorded to those emanating from the organizations, whether or not the individuals concerned were members of labor organizations. An effort has been consistently made to impress upon all concerned the facts that the interests of the canal and its employees are common, and not opposed, and that moderation, sound reason, and common sense should guide the action of employer and employed in all matters of apparent conflict.

One of the constantly recurring questions is, naturally, the rate of compensation. It has been argued that the salaries and wages maintained during the construction work, originally established to afford necessary inducement to men to seek employment in an unhealthy tropical country under conditions of recognized hardship, are unnecessarily high for the work of operation and maintenance, after the work of sanitation has converted the Isthmus into a health



resort, and after many other improvements have increased the attractiveness of the Canal Zone as a place of residence. It is true that many causes of unhealthfulness have been removed; that yellow fever has been entirely eliminated as a menace to the Canal Zone population; that the malarial rate has been kept down to a remarkably low figure; and that the residents of the Canal Zone may be as free from anxiety about their health as they would be in many parts of the continental United States. This was indeed the fact for a considerable part of the construction period. But from personal experience and observation during 10 years' residence here, I am convinced that, in general, the employees from the United States and their families can not live in the tropics continuously without impairment of health and lowering of physical tone unless the monotony of uniform high atmospheric temperature is relieved by a change of climate for two months or so every year. This change involves extra expense, in most cases absorbing the greater part of an employee's savings from his income for the year. While it is also true that the comforts of life in the Canal Zone are greatly increased over those of a construction camp, and there are, indeed, some advantages as compared with conditions in many localities in the United States, the fact remains nevertheless that our American employees would not leave their homes and their normal modes of life in the United States to enter the canal service, or to remain in it, without an inducement in the way of additional compensation. It is apparent that constant changes in the force would reduce the efficiency of the canal organization. Congress has recognized these facts, and in the Panama Canal act of August 24, 1912, has placed the compensation within the discretion of the President, except that a maximum of 25 per cent above rates paid by the United States Government in continental United States for similar employment is prescribed. Under the authority of this law the canal administration, with the approval of the Secretary of War, has, since July 1, 1916, established the wage scale of the canal to all employees drawn from the United States upon Government rates for similar employment in continental United States, and has applied the full allowance of 25 per cent increase above those rates. In cases where no similar employment by the Government existed, average commercial rates in continental United States have been used as a basis where applicable; and in the relatively few remaining cases, where no similar employments, Government or commercial, were found, the canal rates have been established by coordination with other canal rates regularly determined for positions of like responsibility.

The adoption of the general policy above outlined has greatly simplified the problem of wage adjustment on the canal. The men understand the limits fixed by law, and while they insist upon the full allowance under the law they do not attempt to go beyond it. Issues between employer and labor on the wage question are made and settled in the United States, and when settled there the results are reflected here. Local issues are thus avoided, and the adoption of a fixed policy with an act of Congress as its basis has been responsible for the comparative freedom from labor troubles on the canal.

On account of increases in necessary living costs, it was necessary to effect increases in the pay of West Indian labor. This increase took effect November 1, 1918, involving for all grades up to \$75 a month.

an increase of 2 cents an hour, but no increase in the grades of \$75 or above; and further increase in the hourly rate of pay was made to the laborers at the docks operated by the Panama Railroad Company on May 1, 1919, in order to prevent a reduction in earnings of the laborers, due to the adoption of the eight-hour rule. In May and June, 1919, careful investigation was made of numerous complaints as to insufficient earnings to meet necessary expenses, received from West Indian laborers, by a board composed of the heads of departments and divisions of the canal organization, as a result of which the board recommended, effective July 1, an increase to West Indian labor as follows:

Rates of 20 cents an hour or less, increased 2 cents an hour.

Rates of 21 cents to 28 cents an hour, inclusive, increased 1 cent an hour.

Rates of \$40 a month or less, increased \$5 a month.

Rates of \$42.50 to \$57.50, inclusive, increased \$2.50 a month.

The above rates apply only to male silver help.

In connection with the publicity work for the benefit of the canal the bureau of statistics has compiled and prepared reports, circulars, and pamphlets for free distribution to all especially interested.

#### BUREAU OF CLUBS AND PLAYGROUNDS.

This bureau was conducted with little change in activities, personnel, or organization during the year. The clubhouses and playgrounds are for the purpose of providing on the Canal Zone centers of social life and healthful recreational facilities for the employees of the canal and their families. The clubhouses have been maintained and urgent improvements made as funds have been available. At the Balboa clubhouse a moving-picture room was added to take care of the increasing patronage, which had grown beyond the capacity of the original hall. A new clubhouse for silver employees at Red Tank was erected and opened to use in June. The clubhouse at Paraiso, originally built for gold employees, was turned over to the silver employees in October, on account of the abandonment of Paraiso as a place of residence for gold employees. New soda fountains and serving tables were installed in all the five gold clubhouses.

The playgrounds at Balboa, Aneon, Cristobal, Gatun, and Pedro Miguel were maintained and operated. Competent instructors are engaged in the work of directing playground activities, a daily program being arranged to provide for different ages and classes of children.

While conditions with respect to the entertainment of the Army and Navy forces at the clubhouses have been greatly relieved by the establishment of eight similar clubhouses by the Army and Navy Y. M. C. A. at post and garrison points, both soldiers and sailors continued to have unrestricted privileges at the Canal Zone clubhouses.

The Balboa stadium and baseball ground was fully utilized during the year, not only for baseball and other sports, but for the various entertainments given in connection with the loan campaigns and other patriotic demonstrations.

The swimming pools at Balboa and Cristobal have been widely patronized, with good results. Competent instructors have been provided and numerous children and adults have been sufficiently trained in the art of swimming and also in the rescue of drowning persons.

Every member of the 1919 graduating class of the high school passed a satisfactory swimming test.

#### DIVISION OF CIVIL AFFAIRS.

*Bureau of posts.*—Postal receipts decreased for the year, due principally to war restrictions and the removal of troops from the Canal Zone. The total receipts were \$136,627.50, as compared with \$145,231.81 for the previous year. The subsidy to the Panaman Government of 40 per cent of all stamp sales amounted to \$32,950.69. The financial returns from the post offices were considerably affected by the free handling of all official mail of The Panama Canal, the Army, and Navy. The post office at Las Cascadas was abolished February 28, 1919, when the troops were removed from that post. An office was opened at Coco Solo on March 1. The number of post offices in operation thus remained 16, of which 13 were money-order offices. Box rents collected during the year amounted to \$8,268.20, as compared with \$8,147.30 last year.

On March 31, 1919, a C. O. D. and parcel-post convention was ratified between the Republic of Panama and the Canal Zone, effective April 15, 1919. Prior to June 30, under this arrangement, 6,217 insured parcels were mailed at Canal Zone post offices. In the registry division 292,698 parcels and letters were handled, of which 136,355 were dispatched, including 32,942 domestic letters, 1,028 domestic parcels, 16,716 foreign letters, 2,320 foreign parcels, 77,086 official letters and parcels registered free, and 6,263 domestic parcels insured. There were delivered at all post offices 156,343 registered, insured, and C. O. D. parcel-post packages. Canal employees, under their privilege of importing merchandise for their personal use free of Panaman duties, received 14,640 parcels during the year. Duties were paid the Republic of Panama in the amount of \$25,289.71 on 9,591 mail parcels for nonemployees and dutiable articles imported by employees.

Violations of the postal laws and regulations consisted in the sending of lottery matter through the mails, of which three cases were discovered; the misuse of the official penalty envelope, of which there were three cases; and the misuse of canceled postage stamps, of which there was only one case. One arrest was made for the rifling of mail by a postal employee, and the offender was convicted.

Mail facilities for ships in transit through the canal included the selling of stamps, acceptance of letters for registry, and the receiving of applications for money orders from passengers and crews of vessels, receipts in each case being given and the business transacted through the Canal Zone post offices. There was received and dispatched a total of 91,091 sacks of transit mail from New York and New Orleans, of which 77,962 originated in the United States and 13,129 in foreign countries. This mail was received from 146 steamers and dispatched on 211 connecting steamers; 4,445 sacks were forwarded by rail from Cristobal to Balboa to connect with vessels at that point.

*Bureau of Customs.*—A total of 4,604 vessels entered and 4,590 were cleared from Cristobal and Balboa. There were 1,959 American vessels entering and 1,940 clearing. A total of 251 prohibited aliens arrived at Canal Zone ports, of which number 138 were ad-

mitted to the Republic of Panama by authority of that Government, the others proceeding to their destination or returning to their port of embarkation.

Eight arrests were made for violation of the espionage act, Section II, and convictions secured in each case.

This bureau certifies invoices covering ordinary shipments from the Canal Zone to the United States in the same manner and form prescribed for certification by American consuls in foreign ports. There were 1,323 invoices thus certified, in addition to those covering the shipment of employees' effects who were returning to the United States.

The work of the shipping commissioner and deputies was increased, both on account of the increase in the number of ships handled, the increased handling of shipping papers under war regulations, and the care necessary to be exercised in the enforcement of the seaman's act. A total of 4,182 seamen were shipped on American vessels and 3,453 were discharged. Seamen's wages received for deposit at Balboa amounted to \$27,027.43, of which all but \$422.17 were disbursed. The estates of 11 American seamen whose deaths occurred on the Canal Zone were handled for settlement by the shipping commissioner, the proceeds of such estates, together with such wages as may have been due in each case, being remitted to the district courts in the United States having jurisdiction.

A total of 161 estates of deceased and insane employees of the canal and railroad were settled. Of this number 86 were delivered to the consular or diplomatic representatives in the Republic of Panama or the United States of the countries of which the deceased owners were citizens or subjects, 56 were settled directly with heirs, 3 with administrators, and 1 delivered to an employee who had recovered his sanity. The amount involved in the settlement of 161 estates was \$8,121.63, of which \$189.34 belonged to the estates of insane persons.

There were issued 1,274 licenses for motor vehicles, 725 for bicycles, 443 for hunting and the keeping or carrying of firearms, and 500 for the peddling of foodstuffs. The fees collected for the year were \$7,681.94.

As a representative of the Governor, the division of civil affairs was charged with the enforcement of regulations of the following special bureaus and boards in Washington:

War Trade Board, bureau of exports.

War Trade Board, bureau of enemy trade.

War Trade Board, bureau of imports.

Treasury Department (the inspection of passengers and baggage).

Treasury Department (war risk and insurance).

Federal Reserve Board (exportation of money).

State Department (travel control).

Mail Censorship Board.

National War Savings Committee.

There were 2,370 export licenses issued, and various regulations of the War Trade Board covering special export licenses were carried out. No licenses to trade with the enemy were issued locally, but Washington licenses were recognized here in connection with export control. Copies of the enemy trading list were supplied to the local merchants in Panama and to all steamship companies. The enemy

trading lists were withdrawn effective April 29, 1919, and all cargo which had been detained at Cristobal was ordered released on May 10.

In the regulation of the exportation of coin, bullion, and currency from the Canal Zone, 116 permits were granted, covering \$724,099.74 in American gold coin; \$14,200 in English gold coin; \$310 in gold certificates; \$2,622 in English paper currency and silver money; \$37.50 in miscellaneous silver money; \$105,860 in United States notes, Federal-reserve notes, or national-bank notes; \$24,808 in gold dust or ore; and \$1,194.50 in other gold coin.

Under the President's proclamation of August 8, 1918, establishing rules and regulations governing the granting of permits to enter and depart from the Canal Zone, the passports, departure permits, etc., of all outgoing passengers were examined in detail, and the crews of all vessels departing from Balboa or Cristobal were mustered for examination prior to the sailing of the vessel. Seamen's identification certificates were furnished all members of crews requesting them, there being 2,059 such identification cards issued at Balboa and 6,477 at Cristobal.

In enforcing the mail censorship regulations 544,434 letters and 788,521 other pieces of mail matter were examined.

For further details, see appendix to Appendix F.

#### POLICE AND FIRE DIVISIONS.

In addition to their normal duties the police division assisted in the enforcement of the special regulations issued on account of the state of war. The total number of arrests was 3,982, of whom 3,657 were males and 325 females. A monthly average of 102.83 served sentences in the common jails during the year. There were six suicides and two homicides; six arrests for the violation of the opium act were made and there were two convictions.

A continuous patrol of the harbors of Balboa and Cristobal and of Gatun Lake and the Chagres River was maintained throughout the year. Monthly patrols of the interior section of the Zone were made to detect violations of the depopulation order. Three arrests for trespass on Zone lands were made and three convictions secured.

For the enforcement of automobile and other vehicular speed and operation regulations and for special emergency police service two motorcycle patrolmen were continued in service, one at Cristobal and one at Balboa.

There were 84 deportations of persons from the Zone, of whom 53 were convicts who had completed terms of imprisonment and 31 were persons who had been convicted of misdemeanor charges or who were deemed undesirable persons to be permitted to remain. Forty-nine convicts were received at the penitentiary, the aggregate sentences amounting to 39 years and 11 months. Sixty-four convicts completed terms from the prison and were discharged. At the close of the year 39 convicts remained in custody, as compared with 54 at the close of the previous year.

Investigations by the coroner were made in 50 cases of death, of which 11 were due to accidental drowning and 19 to accidental traumatism.

The status of the funds prevented the erection of any new buildings for the police division or the extensive repairs to those in use. The

only new equipment provided was one patrol wagon for the Ancon-Balboa district, placed in service May 20, 1919. The old wooden penitentiary buildings at Gamboa were maintained in as good condition as possible, and new buildings are urgently required.

Thirty-five firemen were appointed and 34 separated from the service. Fifteen volunteer fire companies, each composed of 20 men as a minimum, employees of The Panama Canal and Railroad, were maintained. The usual inspection of all Government buildings, docks, storehouses, etc., was conducted; fire hose and extinguishers maintained in good condition where installed for special protection, and installations made in the new buildings constructed. The total losses sustained by fire aggregated \$40,805.13, of which \$25,000 represents loss on the schooner *Evelyn* at Balboa docks; \$3,000 to fire on the schooner *Tacoma*, also at Balboa docks; and \$10,000 caused by the burning of a United States Navy aviation speed launch in Limon Bay.

No new buildings were constructed or changes made in existing buildings, except slight alterations to the Pedro Miguel fire station to accommodate a Ford motor hose wagon.

#### DIVISION OF SCHOOLS.

The total number of white teachers employed during the year was 72, an increase of seven over the preceding year. Twelve white teachers resigned between July 1 and September 30, 1918, six resigned during the school year, and at the close of the year 70 teachers were in actual employment. There were 20 colored teachers employed. The attendance at the schools at the time of opening was 2,307, of whom 1,491 were white and 816 colored. The average daily attendance during the school year was 2,179.5, of which 1,423.3 were in the white schools and 756.2 in the colored schools. The corresponding figures for the preceding year were 1,963.2, of which 1,322.9 were white and 640.3 colored. The following new positions were authorized and filled: One teacher of household arts, \$150 monthly; and one supervisor of penmanship, \$150 monthly. Sixteen buildings were used for school purposes, of which 10 were for white schools, including one room in the Balboa lodge hall, and the lower floor of the Washington House at Colon Beach for domestic-science classes.

The return of the Porto Rican Regiment of Infantry to Porto Rico made it unnecessary to maintain the white school at Empire, and it was accordingly closed on March 12. Industrial instruction was extended to every pupil in the white schools above the fifth grade, a total of 424 pupils being enrolled in this department during the last quarter of the year, an addition of 174 over the enrollment in the corresponding period last year.

Physical training and athletics for the white schools were under the charge of the director of physical education, the activities being carried on through the coordination of the bureau of clubs and playgrounds.

Night classes for instruction in Spanish, English grammar, stenography, bookkeeping, mathematics, and mechanical drawing were continued at Cristobal and Balboa.

There were 20 graduates from the two high schools, 16 from Balboa and 4 from Cristobal. Up to the close of the fiscal year, 109 pupils have been graduated from the Canal Zone high schools.

### COURTS.

In the district courts there were 222 cases pending at the beginning of the year, and 1,097 were filed, 960 settled, and 359 were pending on June 30, 1919. Of the cases pending at the beginning of the year, 100 were civil, 107 probate, and 15 criminal. In the cases filed there were 134 civil, 273 probate, and 690 criminal. Those settled included 77 civil, 62 of which were decided and 15 dismissed, 261 probate cases, and 622 criminal actions, 110 of which were acquitted, 389 convicted, 20 forfeited, 56 dismissed, and 47 nol. proseed.

A total of 961 marriage licenses was issued and 12 deeds recorded.

In the magistrate's courts, one each at Cristobal and Balboa, there were 3,850 cases on the docket during the year—3,671 criminal and 179 civil. Three thousand eight hundred and forty cases were disposed of, leaving 13 civil and 4 criminal actions pending at the close of the year. Petitions were issued during the year from the magistrate's court to the district judge for the commitment of 86 persons to the Corozal Asylum for observation, including 45 male whites and 2 female whites, 31 male negroes and 8 female negroes.

The report of the district attorney is printed as Appendix H.

The marshal for the Canal Zone received 494 writs, subpoenas, and other processes for service, of which 434 were served, the remaining parties concerned not being located on the Zone. The marshal or his deputy attended at the Balboa district court 107 days and at the Cristobal district court 34 days.

### RELATIONS WITH PANAMA.

Negotiations by correspondence or personal conference between the executive secretary of The Panama Canal and the secretary of foreign relations of the Republic of Panama included the following subjects in addition to routine matters:

Repatriation of certain insane French subjects.

Request to have boat service resumed with Palo Seco on visiting days.

Japanese subjects delivered to port captain, Balboa, after passing quarantine inspection.

Panama Canal to refuse to issue export licenses on rice, wheat flour, sugar, etc., unless sufficient stock to last 30 days.

Question of excluding West Indian soldiers returning to the Isthmus.

Insanitary conditions conducive to malaria at Taboga; possibility of yellow fever, etc.

Cession of land to the United States by the Republic of Panama for permanent lights in the Bay of Panama.

Request that the Republic of Panama have uniform procedure and rates for issuance of chauffeur licenses in the Republic and the Canal Zone.

Anchorage for French sailing vessels in nitrate trade in the Bay of Panama.

Special license to the National Navigation Co. to operate boats across the restricted area to Palo Seco.

Decree No. 140 of the Republic of Panama authorizing use of postal service inviolable registry envelopes.

Handling of the fourth Liberty loan by Panaman authorities in Panama and Colon.

- Exportation of Panaman silver by Panama Canal employees.
- Establishment of postal censorship and requiring passengers departing from Colon to have permission from American authorities at Cristobal.
- Purchase of house in Colon as allowed by treaty for use of Army quartermaster.
- Request of the municipality of Colon for certain land adjacent to the slaughterhouse at Folks River.
- Report of the assistant chief health officer on trip of medical commission to the San Blas coast.
- Report that food supplies were being smuggled out of Panama through the Canal Zone.
- Report of the chief health officer regarding health conditions at New Providence, Republic of Panama.
- Proposed inspection of slaughterhouse at Colon, etc.
- Question of recognizing signatures of certain notaries in the Canal Zone in connection with refunds of duties by Panaman Government to the West India Oil Co.
- Report of inspection made of old Panama experiment station.
- Proposed amendment to Panaman sanitary regulations in so far as building regulations are concerned.
- Property required for military purposes at Taboga.
- Request for list of consular representatives of foreign Governments accredited to Panama.
- Request for permission to deliver Christmas presents to employees, waiving the usual formalities.
- Reported sickness, malaria, etc., at El Vigia and San Juan, Republic of Panama.
- Alleged strike of West Indian laborers of the United Fruit Co. at Bocas del Toro, Republic of Panama.
- Information regarding commissary sales, number of employees, etc.
- Proposed sewer extension for the city of Panama.
- Appointment of H. A. A. Smith as a member of the board of directors of Santo Tomas Hospital.
- List of Canal Zone automobiles bearing Panaman license tags, etc.
- Alleged interference with passage of cattle from the interior via Arrijan over the pontoon bridge at Paraiso.
- Complaint of the Republic of Panama regarding difficulties of the natives in navigating the Chagres River at Gamboa.
- Measures to prevent misuse of commissary privilege by residents of Panama and Colon not entitled to it.
- Appointment of Lieut. William J. Burke as quarantine officer at Bocas del Toro, Republic of Panama.
- Proposed extension of C. O. D. parcel-post service with the Republic of Panama.
- Authority for increasing the number of beds at Santo Tomas Hospital over the 300 originally agreed upon in 1905.
- Deposit to cover cost of design of powder magazine for the Republic of Panama.
- List of diplomats granted charge accounts at Panama Canal commissaries.
- Request for copies of various new codes adopted by the Republic of Panama.
- Question of the Republic of Panama standing half the cost of proposed incinerator at Cristobal (Colon).
- Notification of return from the United States of 27 alien enemies and suspects who had been interned.
- List of outstanding bills against the Republic of Panama.
- List of persons from whom commissary books were confiscated.
- Request of the Republic of Panama for statement of the cost of public improvements in streets that form the dividing line between Panama and Ancon and Colon and Cristobal.
- Report of the health department on the health conditions in the province of Chiriqui.
- Alleged export of native products from Balboa and Cristobal without the payment of duty.
- Clearing the channel of Rio Cama Quebrada.
- Request for information as to the status of the Continental Bank's liquidation for the use of the administrator of estates, etc.
- Protest of the Panama Association of Commerce against leasing of the Panama Railroad stables for other than stable purposes.



Request of the Republic of Panama regarding securing their approval before shipping inflammables or explosives.

Plans of proposed new Canal Zone penitentiary to be located at Darien.

Panama Railroad Company exempt from taxes on property in Panama by virtue of provisions of treaty.

Method of handling and making record of inflammables and explosives.

Regulations in force in Canal Zone prisons.

No legal authority in the Canal Zone to compel one to testify in connection with rogatory letters issued by a court of Colon.

Question of amount of bond required by the Republic of Panama to permit Chinese to enter the Republic to secure passport from the Chinese consul general.

Information requested regarding decree requiring monthly inspection of all vehicles in Panama.

Policy followed in granting clearing permits to residents along the shore of Gatun Lake.

Modification of tariff regulations covering public passenger vehicles.

For further details attention is invited to the report of the executive secretary, Appendix G.

#### OFFICE OF THE SPECIAL ATTORNEY.

Judge Frank Feuille, as special attorney, continued to represent the Government's interests before the joint commission for adjusting land claims in addition to serving as counsel for the Panama Railroad Company on the Isthmus. He also advised the Governor on certain legal matters affecting the administration of the office.

During the year 74 land and improvement claims, aggregating \$49,099.40, were settled by agreement with the claimants without recourse to the land commission. Up to June 30, 1919, a total of 5,554 claims for damages to land and improvements taken over by the United States for canal and railroad purposes have been settled directly with the claimants. Authority for settlement in this manner was by virtue of the Executive order of the President until April 7, 1914, on which date the authority was continued by Congress.

During the fiscal year just ended the joint commission disposed of 18 claims in 19 awards, 3 awards being for improvements and 16 for lands. The awards aggregated the sum of \$79,971.80. The total amount claimed in these cases was \$1,487,537.05. The umpire for the joint commission, appointed under the provisions of Article No. XV of the Panama Canal treaty of November 18, 1903, disposed of four claims by four awards during the year, the four awards by him aggregating the sum of \$11,433. A grand total of 913 claims have been settled and paid for under awards made by all of the joint commissions and umpires appointed under the treaty, aggregating the sum of \$1,486,646.82. Including the settlements made directly with claimants through the law department of the special attorney's office, the aggregate amount paid by the United States for land and improvements to June 30, 1919, was \$2,856,886.72, covering 6,366 claims. During the fiscal year 1919 the joint commission dismissed six claims on account of adjustment by direct settlement, three because of the nonappearance of the claimants, five for lack of sufficient evidence to support the claims, and two on motion by the attorneys for the claimants. Fifteen claims were certified to the umpire by the joint commission. At the end of the fiscal year 1918 there were four claims before the umpire for his consideration. There were 13 claims before him at the end of the fiscal year. On June 30, 1919, there were 104

claims, aggregating \$5,591,448.17, on the dockets of the joint commission and the umpire. Forty-eight of these claims were based upon Panama Railroad leases which have been withdrawn from the jurisdiction of the joint commission by Section II of the act of July 1, 1916. There remained 46 claims for adjudication and settlement by the joint commission on June 30, 1919, which aggregated the sum of \$1,679,296.56.

On June 30, 1919, there were 51 revocable licenses in effect for the occupation of lots within the Canal Zone, of which number 4 were issued during the fiscal year. These licenses were granted to steamship companies, oil companies, and the cable company for office buildings and oil tanks, as well as residences for their employees. The licenses also included lots for churches and lodge halls. Revenues collected on these licenses for the year aggregated \$14,290.02.

For further details concerning the settlement of land claims, attention is invited to the report of the special attorney, Appendix I.

#### HEALTH DEPARTMENT.

Following the relief by War Department's orders of Lieut. Col. A. T. McCormack, Medical Reserve Corps, from duty with the canal, on January 23, 1919, the position of chief health officer was vacant until the appointment of Col. H. C. Fisher, Medical Corps, United States Army, who was detailed by the War Department's orders for duty with the canal, and who was appointed as chief health officer on March 31, 1919. In the interim the duties of the position were performed by Maj. R. L. Loughren, Medical Reserve Corps, as acting chief health officer.

The general health conditions of the Canal Zone and the terminal cities of Panama and Colon have continued good. One case of yellow fever arrived at the Balboa quarantine station from Guayaquil, Ecuador, on January 30, 1919, with no secondary cases. Seventeen cases of leprosy were admitted to the Palo Seco Leper Asylum. A mild epidemic of smallpox, originating in the interior of the Republic of Panama, occurred during the year; there were 187 cases and no deaths. The last case was admitted to the hospital May 22, 1919. In controlling this epidemic, the entire population of the terminal cities and many residents of interior towns were vaccinated, where no recent vaccination was shown or where the individual was not immune from having had the disease. No other cases of maritime quarantinable diseases arrived or originated on the Isthmus during the year.

The average civil population of the Canal Zone for the year was 21,707, as compared with 24,032 for the previous year. In this population the death rate was 9.40 for disease, as compared with 10.61 for the previous year. The death rate for tuberculosis was 1.34, as compared with 1.79 for the previous year.

*City of Panama.*—The average population was 61,369. The death rate for disease alone was 21.85, as compared with 24.18 for the previous year. The death rate from tuberculosis was 4.30, as compared with 4.53 for the previous year.

*City of Colon.*—The average population was 26,078, of which population the death rate for disease was 23.02, as compared with 24.96 for the preceding year.

## DIVISION OF HOSPITALS.

*Ancon Hospital.*—The permanent buildings of the new plant were completed and occupied during the year. The equipment is complete, modern, and conforms with tropical requirements. The total capacity of the hospital for patients in case of necessity, by placing cots on protected porches and utilizing all the available space in wards, is 1,400 patients. All of the former hospital buildings have been cleared of patients, section E remaining vacant, and section F being utilized by the supply department as temporary quarters for white bachelors.

A total of 12,461 patients was admitted to the hospital during the year. In the surgical clinic there were 3,922 major operations and 2,010 minor operations, 3,646 cases visited the out-patient department. In the medical clinic out-patient department 2,301 cases were treated. In the eye and ear clinic 7,440 cases were treated and 1,121 operations performed.

*Corozal Hospital.*—On account of the congestion in the male wards and the impossibility of isolating tubercular insane patients, the construction of a new two-story male ward was begun during the year. The number of insane patients in this hospital at the end of the year was 393. Occupational treatment has been successfully continued, and success has been met in encouraging certain classes of patients to do some manual labor. Various forms of amusement have been provided, as in former years. In connection with the management of this hospital, a dairy, piggery, and garden have been operated as heretofore. The dairy herd consists of 64 cows and 1 registered Jersey bull. The products of the dairy are available for the use of the patients in the Ancon Hospital. The garden has provided fresh vegetables for hospital patients.

Chronic patients, citizens of the United States, for whom the responsibility of their home States can not be fixed, are sent from time to time to the Saint Elizabeths Hospital, in the District of Columbia. Patients from the Republic of Panama are cared for in this hospital, the charity patients being paid for by the Panaman Government.

*Colon Hospital.*—The work of this hospital was considerably increased during the year on account of the antivenereal disease campaign by arrangement with the Republic of Panama. There were 1,031 major and 97 minor operations performed of all kinds during the year; 2,629 patients were admitted for treatment.

The Colon Hospital is considered as an emergency institution to take care of cases arising in Colon and vicinity that would suffer from the delay incident to transportation to Ancon Hospital. The cases operated upon included skull fractures, appendicitis, hernias, fractures, and traumatic amputations.

*Santo Tomas Hospital.*—The work at this hospital was greatly increased by the antivenereal disease campaign, this institution performing in Panama in this respect the same functions as those performed by the Colon Hospital at Colon. This hospital is owned by the Government of Panama, but is operated by agreement under the general supervision of the chief health officer of the canal.

*Palo Seco Leper Asylum.*—At the end of the year there were 74 patients as compared with 70 at the beginning of the year. Seventeen cases were admitted, 6 deaths occurred, and 7 individuals escaped

from the institution. Before admission to the institution patients are passed through the Ancon Hospital in order to guarantee the diagnosis. The immediate supervision of the institution is under the chief health officer.

#### SANITATION.

For the purposes of sanitation the Canal Zone is divided into four sanitary districts, all being supervised by the chief sanitary inspector, reporting to the chief health officer of the canal.

The Gatun sanitary district extends from Mindi dairy on the north to Darien on the south and includes the town of Gatun, the locks and dam, a portion of Gatun Lake, and the large areas of swamps and cattle pastures north and west of Gatun. The Pedro Miguel district contains the town and locks of Pedro Miguel, the villages of Paraiso and Red Tank, the villages on the west side of the canal, the south end of Gatun Lake and the Chagres River, and the cattle pastures on both sides of the canal from Darien to Miraflores. The Ancon district includes the eastern part of the Pacific end of the Canal Zone from Miraflores to the boundary of Panama City. The Balboa district includes the town of Balboa and the docks and shops along the water front and large cattle pastures on the west bank of the canal south of Miraflores.

In the Gatun, Pedro Miguel, and Colon-Cristobal districts there was a marked increase in the malarial rate after the setting in of the wet season in April. In the vicinity of Gatun a breeding place of the *Anopheles* mosquitos was located in a swamp between the spillway and the old French Canal. Breeding is also going on in the swamps and wet pasture lands north of Gatun near Mindi and Mount Hope and on Telfer's Island near the Cristobal coaling plant. Special care is exercised in sanitating the vicinities of coaling plants, docks, and locks, at which night work is required. The malarial incidence was greatest, as heretofore, among the employees whose work required them to frequent unsanitated districts, particularly those employed in the clearing of pastures for cattle. During the first quarter of the calendar year 1919 there were admitted at the hospitals for treatment for malaria 182 employees from the cattle camps and plantations and but 28 from the sanitized areas of the Zone. The jungle-cutting gangs are largely recruited from native Panamans, many of whom are affected with chronic malaria. Extensive sanitation was not attempted in the vicinity of the cattle camps, because of their temporary nature, and the routine administration of quinine solution to all cattle camp and plantatiton employees was begun, with immediate beneficial results. The tendency of the *Anopheles* mosquito to breed in the hoof prints of cattle in which water is gathered makes necessary their restriction in the location of pastures so as to prevent their being too near inhabited towns.

#### QUARANTINE DIVISION.

During the year the situation has improved in regard to yellow fever in nearby ports, but practically all ports in Columbia, Venezuela, Ecuador, and the Pacific ports of Central and South America are still under suspicion, and quarantine regulations have been maintained against them. There has been no change in the plague situa-

tion, and active work has been done in the fumigation of vessels for the destruction of rats. On April 1, 1919, on the recommendation of the chief quarantine officer, procedure was instituted to fumigate every three months every vessel from the west coast which makes Cristobal its terminal port. At the time of fumigation the vessels must be entirely empty and have all dead spaces opened up; experience has shown that fumigation of vessels with cargo is not efficacious in destroying rats.

On April 1, 1919, the hours of quarantine inspection at Cristobal were extended from sunset to 10 p. m., except in cases of suspected yellow fever, which can not be thoroughly examined by artificial light. The object has been to prevent unnecessary delays to shipping and the resulting congestion at the locks and coaling piers.

For further details see the report of the chief health officer, Appendix J.

#### WASHINGTON OFFICE.

The office remained in charge of Mr. A. L. Flint as general purchasing officer and chief of office. His organization is divided into administration, including the appointment division and the correspondence and record division, office of the assistant auditor, and the purchasing department.

The demands in the United States for workers at high rates of pay increased the difficulty of filling requisitions from the Isthmus for employees. In the shipbuilding trades especially it has been practically impossible to establish and maintain waiting lists. Sixteen hundred and ten persons were tendered employment in grades above that of laborer, of which 962 accepted. Thirty-one hundred and thirty-three persons, including new appointees, those returning from leave of absence, and members of employees' families, were provided with transportation to the Isthmus.

The work of the correspondence and record divisions included the preparation and submission to Congress of estimates of appropriations and special items of legislation desired by the canal, as requested by the Governor of the canal; and the dissemination of canal literature and information, the demand for which has increased on the part of shipbuilding and shipping concerns since the signing of the armistice.

In the assistant auditor's office, including the work of the disbursing clerk, 14,787 claims for payment were received during the year, and in addition 382 were on hand on July 1, 1918. There were passed for payment during the year 14,871, leaving on hand June 30, 1919, 298. During the year 12,473 disbursement vouchers, amounting to \$8,756,004.38, and 264 collection vouchers, amounting to \$540,248.65, were passed; 2,103 settlements by transfer of appropriations, aggregating \$1,329,299.85, were given the required administrative examination. Reports were made upon 34 claims submitted to the Auditor for the War Department for direct settlement or for settlement by the auditor after the claims had been filed by the contractors. During the year 84 contracts were prepared, amounting to \$3,452,637.58. The assistant auditor, as legal adviser in the United States for The Panama Canal, has continued to render assistance to the Department of Justice in connection with the preparation for trial and

at the trial in the courts of all cases in connection with action brought by or against the canal. During the year suits have been pending involving unclosed claims of the amount of \$156,392.91 against the canal. No new suits were brought against the canal during the year.

During the first five months of the fiscal year the same practice relative to methods of purchase as outlined in the reports of previous years has been continued. After the signing of the armistice on November 11, 1918, considerable quantities of material hitherto required in connection with the prosecution of war have been released by the War Department as surplus material. Endeavor has been made to cooperate with other government departments having surplus material on hand, with a view to acquiring from such sources material required for the canal. It is nevertheless still necessary to secure the bulk of canal supplies by purchase under the usual methods. This is due to the fact that frequently the surplus material available does not meet the canal requirements, and, furthermore, there are no surplus stocks of many articles and materials which the canal must buy.

The principal purchases have been made by the Washington office, but assistant purchasing agents have been continued at New York, New Orleans, and San Francisco. A small force of employees has been continued in the Medical Supply Depot, United States Army, New York City, for the purchase of medical and hospital supplies. In the work of inspection of materials purchased, assistance has been rendered, as heretofore, by district officers of the Corps of Engineers, United States Army, by the Bureau of Standards, the Bureau of Mines, the Bureau of Chemistry, the Medical Department, the Ordnance Department, the Signal Corps, and the Quartermaster Corps of the United States Army.

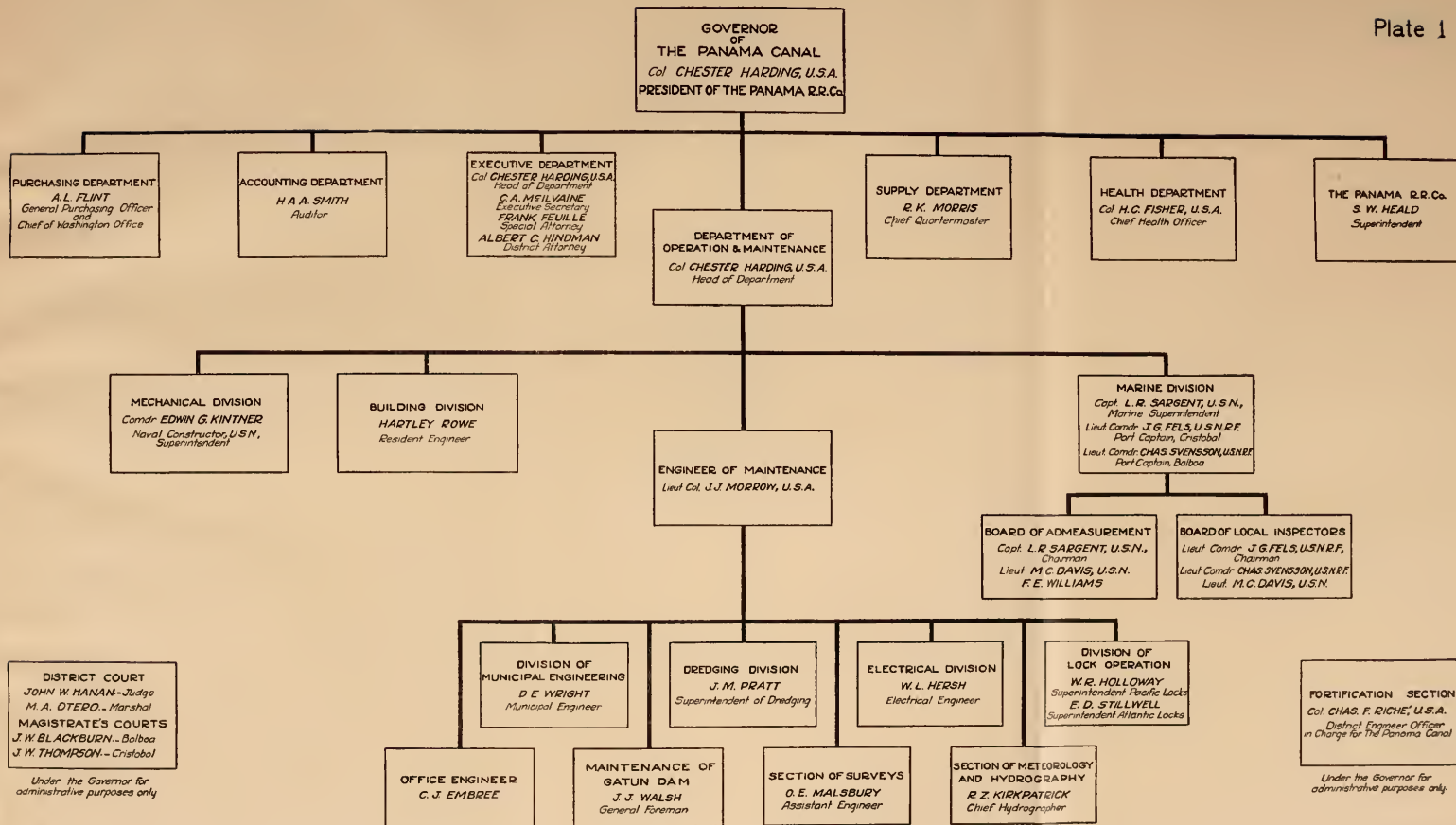
The number of purchase orders issued during the fiscal year was 7,469, as compared with 6,608 for the previous year. The total value of orders placed by the Washington office was \$6,764,278.62, as compared with \$8,019,608.90 for the previous year. The figure given for the fiscal year 1919 does not include the sum of \$277,042.70 paid during the year for cement ordered under continuing contract with the Atlas Portland Cement Co., entered into in 1909.

For further details, attention is invited to Appendix K.

Respectfully submitted.

CHESTER HARDING,  
*Governor, The Panama Canal.*

HON. NEWTON D. BAKER,  
*Secretary of War, Washington, D. C.*







## APPENDIX A.

### REPORT OF THE ENGINEER OF MAINTENANCE.

THE PANAMA CANAL,  
OFFICE OF THE ENGINEER OF MAINTENANCE,  
*Balboa Heights, Canal Zone, July 29, 1919.*

SIR: The following is a report of the work done under the jurisdiction of this office during the fiscal year ended June 30, 1919:

#### ORGANIZATION.

The duties of the engineer of maintenance were not changed during the year, except that an order was issued by you, effective August 1, 1918, providing that all changes involving maintenance, improvement, replacement, or new construction of Panama Railroad plants should be carried out under his supervision.

Effective July 1, 1918, Mr. W. J. Douglas was appointed engineer of maintenance. Mr. Douglas continued in this office until April 30, 1919, when he resigned from the service, and instructions were issued by you on May 1, 1919, to the effect that all divisions formerly reporting to the engineer of maintenance should report direct to the Governor. Effective May 31, 1919, the undersigned resumed the duties of engineer of maintenance, vacated under War Department orders 21 months earlier.

During the year the personnel in charge of the various divisions and sections reporting to this office were as follows:

*Electrical division.*—Mr. Walter L. Hersh, electrical engineer, continued in charge of the electrical division.

*Locks division.*—Mr. E. D. Stillwell continued as superintendent of the Atlantic locks and Mr. W. R. Holloway continued as superintendent of the Pacific locks.

*Municipal division.*—Mr. D. E. Wright, municipal engineer, resigned for service in the United States Army on October 22, 1918, and Mr. Roy C. Hardman was appointed acting municipal engineer. Mr. Wright resumed these duties on March 22, 1919.

*Section of meteorology and hydrography.*—Mr. H. G. Cornthwaite continued as chief hydrographer until February 21, 1919, when Mr. R. Z. Kirkpatrick received his discharge from the United States Army and resumed his former duties as chief hydrographer.

*Section of office engineer.*—Mr. C. J. Embree continued in charge of this section until his resignation on October 31, 1918, for service in the Army, and was succeeded by Mr. F. W. Blackwood. Mr. Embree resumed these duties on January 5, 1919.

*Dredging division.*—Mr. J. M. Pratt, superintendent of dredging, continued in charge of this division.

*Section of surveys.*—Mr. Fred R. Fitch continued as assistant engineer in charge of this section until February 1, 1919, when Mr. O. E. Malsbury received his discharge from the Army and resumed his duties in charge of this section.

## LOCKS DIVISION.

## LOCKAGES.

The following table gives the total number of commercial and noncommercial lockages for the year:

	Gatun.			Pedro Miguel.			Mirafleres.		
	To July 1, 1918.	During year.	To July 1, 1919.	To July 1, 1918.	During year.	To July 1, 1919.	To July 1, 1918.	During year.	To July 1, 1919.
All lockages.....	6,426	2,161	8,587	6,805	2,444	9,249	6,645	2,333	8,978
Commercial lockages.....	5,456	1,918	7,374	5,663	2,019	7,682	5,651	1,946	7,597
Noncommercial lockages United States Army and Navy.....	111	104	215	91	117	208	88	99	187
Noncommercial lockages canal equipment.....	960	139	1,099	1,051	308	1,359	906	288	1,194
Commercial vessels and launches.....	5,985	2,061	8,046	5,946	2,045	7,991	5,937	2,048	7,985
Noncommercial vessels and launches, United States Army and Navy.....	179	282	461	133	243	376	133	242	375

The average number of lockages for the Atlantic side was  $180\frac{1}{2}$  per month, the Pacific side having an average of  $203\frac{2}{3}$  per month, throughout the year. The maximum number on the Atlantic side occurred during the month of November, 1918, when they made 202 lockages. The maximum for the Pacific side was for the month of October, when 226 lockages were made.

## WATER CONSUMPTION—GATUN LAKE.

Complete data regarding the hydrography of Gatun Lake for the calendar year have been included in the report of the chief hydrographer given hereinafter. The following table has been compiled to give complete information regarding the average monthly supply and demand of water for the past fiscal year:

Average quantity per month.	Millions of cubic feet of water.	Percent lost or used.	Percent of total.
WATER LOST.			
By evaporation.....	1,807.695	18.1156	11.7306
By wastage over Gatun spillway.....	8,094.020	81.1134	52.7204
By leakage, Gatun spillway.....	9.635	.0966	.0625
By transfer, Mirafleres Lake.....	33.135	.3321	.2150
By leakage, all locks.....	34.153	.3423	.2216
Total water lost.....	9,978.638	100.0000	64.9501
WATER USED.			
For pumping.....	63.885	1.1763	.4146
For lockages, Atlantic.....	739.009	13.6072	4.7957
For lockages, Pacific.....	683.631	12.5876	4.1443
For hydroelectric station.....	3,611.175	66.4918	25.5324
Gain in storage, Gatun Lake.....	333.300	6.1371	2.1629
Total water used.....	5,431.000	100.0000	35.0499
Total water lost and used.....	15,409.638		100.0000

$$\text{Useful water} = \frac{5431}{15,409.638} = 35.24 \text{ percent.}$$

$$\text{Water used for lockages} = \frac{1422.64}{15,409.638} = 9.232 \text{ percent.}$$

The average elevation of Gatun Lake for the entire fiscal year has been 85.56 feet. The maximum elevation occurred in January, when we had an average elevation of 86.75 feet. The minimum elevation occurred in April, when the lake was at 84.15 feet. The average amount of water required for one complete through lockage from the Atlantic to the Pacific Ocean has averaged 7,472,000 cubic feet for the entire fiscal year. Of this total the Atlantic has used 4,115,000 cubic feet, and the Pacific locks have averaged 3,357,000 cubic feet per lockage.

#### GATUN DAM.

The installation of additional penstocks for units 4, 5, and 6 at the hydroelectric station was satisfactorily completed without disturbance of the surface of the dam in the vicinity of the excavation. Earth has been backfilled over the installation of the penstocks and the grass surface of the dam restored.

#### TOWING LOCOMOTIVES.

The towing locomotives have continued to render very satisfactory service in the handling of the ships in the locks, although two accidents occurred during the year, one on September 21, when locomotive No. 644 ran down two steep inclines on the center wall towing track, Atlantic locks, shearing off the bumper at the end of the approach wall, and coming to rest upon the wooden crib fender, with comparatively little damage, except for the destruction of the cab at one end of the machine. This locomotive was repaired and put back into service and continued in operation until February 14, when it again descended one of the steep inclines, out of control, and hit the bumping post at the end of the approach wall, without serious damage. Neither accident involved any injury to operator. Both of these accidents occurred as a result of the fact that the machine is out of control when the clutch lever is on the neutral point, and arrangements have been made to install electric bells in both cabs of each locomotive on the Atlantic side, these bells ringing whenever both clutch lever latches are out of their quadrant notches, in both the north and south cabs of the machine. The bells will continue to ring until the clutch lever is latched in either the 2 or 5 mile positions. We have also arranged to construct a brake, which has been tried with success on one of the locomotives on the Pacific side, this brake being applicable regardless of the position of the clutch lever.

#### SPARE PARTS.

The storehouse for spare parts at Corozal continues in operation. Here are stored all supplies for the locks, except the electrical spare parts which are kept at Balboa electrical storehouse. Forty-nine requisitions on the States have been issued during the fiscal year. These orders included 35 for the locks division, the balance being for the office engineer, chief hydrographer, and the assistant engineer of surveys. At the beginning of the fiscal year the locks had six United States requisitions in process of manufacture, and these have been completed during the past fiscal year. Of the 35 lock division requi-

sitions which have been issued during the year, 18 have been completed to date, the material on the balance being in process of manufacture.

#### APPROACH WALL FENDER CRIBS.

The fender cribs at the ends of all approach walls have continued in service, except the upper fender at Miraflores locks and the lower fender at Pedro Miguel, both of which were found to have been seriously attacked by the teredo, and it was necessary to build entirely new fenders to replace the ones destroyed. New fenders have been constructed of creosoted piles to resist the attack of the teredo which has been found to exist in the waters of Miraflores Lake, which is rapidly becoming more saline.

#### PAINTING LOCK GATES.

The maintenance work on the lock gate surfaces, fixed irons, and valves, has continued in accordance with contract with the American Bitumastic Enamels Company, dated November 24, 1917.

The maintenance work on the Atlantic lock gates was completed April 15, 1918, but on July 24, 1918, it was reported that the submerged enamel was peeling off the lock gates. On January 10, 1919, Gatun locks were again unwatered and work started in the west chamber. February 10, 1919, the caisson was placed at the upper end of the east chamber and the reenameling of the gates and valves continued until March 10, when the repair work was completed.

Maintenance work on Miraflores lock gates and valves was started March 22, 1919, when the caisson was sunk in place in the west chamber. Work in the east chamber at Miraflores is delayed pending overhaul of the caisson pumps and valves.

#### POWER AND CONTROL.

In August, 1918, at the Atlantic locks there was started the construction of a new service oil-switch bank room on the east side wall opposite the control house. All work on the room was completed, and the power cables to all transformer rooms were reconnected in a closed ring system by November, 1918.

The trouble with control cables, which was described in last year's report, has not interfered with the operation of the locks during the past fiscal year. It is hoped that the precautions taken in installing control cables away from the outside wall of ducts have proved to be a satisfactory solution of the trouble.

#### LOCK OPERATION.

The first serious accident to the locks occurred on June 14, when the east chamber of the lower level of locks at Miraflores was flooded, causing a five-hour delay in traffic. This accident flooded the tunnels on both the center and side walls of the east chamber to a depth of approximately 4 feet, and as the transformer rooms are on a lower level than the tunnels these rooms were flooded to a depth of approximately 6 feet, enough to submerge the lighting transformer and all oil switches, as well as the end bells and busses on the low-

tension switchboard. It was necessary to remove all oil from the lighting transformer and oil switches, as well as drain the motor frames of water, but in spite of the difficulties to be overcome the center-wall machines and transformer rooms were back in operating condition within five hours' time. The accident resulted from the control-house operator opening upper valves under the impression that the rising stem valves in center wall culvert had been closed, thus connecting lower chamber with Miraflores Lake level.

#### MAINTENANCE WORK.

During the year all machines and equipment have been examined thoroughly and put in first-class condition.

The manufacture of all oil paints with the paint machine at Pedro Miguel locks has continued, the product of the machine being on a par with the paint which was formerly purchased. The saving has amounted to approximately \$1 per gallon for the material used in painting all of the steel superstructures of the locks.

Following are extracts from reports of the lock superintendents, covering details of operation and maintenance of the locks:

#### PACIFIC LOCKS.

##### ORGANIZATION AND PERSONNEL.

Mr. W. R. Holloway continued as superintendent throughout the year and Mr. J. C. Myrick continued as assistant superintendent. During the absence of the superintendent on leave in the United States, from August 22, 1918, to November 21, 1918, his duties were assumed by Mr. Myrick, as acting superintendent. Mr. R. S. Mills continued as electrical supervisor throughout the year. Mr. G. L. Viberg, mechanical supervisor, resigned, effective October 29, 1918, and this position was filled by the appointment of Mr. A. E. Meigs, who was formerly assistant supervisor and who resigned to enter the United States Navy. Mr. Meigs was honorably discharged from the Navy and was appointed mechanical supervisor, effective December 20, 1918.

The general organization remained the same as throughout the previous year, there being very few changes in the personnel, with the exception of men resigning to enter the Army or Navy during the war emergency.

Following is a complete list of employees of the Pacific locks in the United States Army and Navy during the World War:

Challis C. Carr,  
Vesper C. Dillon,  
Samuel M. Foust,  
William A. Gray,  
Edward N. Jerry,

William Kinsey,  
Alexander E. Meigs,  
William A. Morgan,  
William H. Needham,  
Nathaniel J. Owen.

Of the above, Mr. William H. Needham and Mr. Alexander E. Meigs were in the Navy and the remainder in the Army.

Mr. Nathaniel J. Owen and Mr. Challis C. Carr were killed in action, the former by enemy gas and the latter by shell fire.

Messrs. William Kinsey, Alexander E. Meigs, William A. Morgan, and William H. Needham have been honorably discharged from the service and have returned to duty at the locks.

#### OPERATION.

The locks were operated throughout the year on a two-shift basis, the shifts overlapping at Pedro Miguel to cover the period from 7 a. m. to 6 p. m. and at Miraflores from 7 a. m. to 8 p. m. It is seldom necessary to hold the men beyond this period.

A total of 2,444 lockages were made at Pedro Miguel during the year, or an average of 6.69 per day, and 2,333 at Miraflores, or an average of 6.39 per day. Tabulations are attached showing the lockages by months.

The *S. S. Faith*, the first concrete ship to pass through the canal, was locked northbound on October 3, 1918. This ship was 326 feet in length, with a beam of 41 feet and a draft of 24 feet.

The first accident at the Pacific locks that resulted in delaying traffic occurred on June 14, 1919, when the lower level at Miraflores was flooded, causing traffic to be delayed five hours. No serious damage to the operating machinery and equipment resulted from the accident.

Practice operations of the emergency dams were made monthly, but no emergency operations were necessary.

Operations of the spillway at Miraflores were made to maintain Miraflores Lake at the proper elevation, which is 54 feet above sea level.

#### MAINTENANCE.

The six top panels on the downstream side of gates Nos. 104 and 105 at Miraflores were coated with Navy solution and hermetic enamel in September, 1918, and the six top panels, both up and downstream sides, of gates Nos. 108 and 109 at Miraflores were also coated with Navy solution and hermetic enamel the same month. Inspection was made of gates Nos. 112, 113, 116, and 117 in August, 1918. These gates had been coated with enamel in August, 1917, and the enamel was found to be in good condition, touching up only being necessary.

The seven top sheets on the downstream side of gates Nos. 54 and 55 at Pedro Miguel and the seven top sheets on both up and downstream sides of gates Nos. 58, 59, 62, 63, 66, and 67 were scraped and given one coat of "Tockolith" and one coat of black paint, this work being completed in December, 1918.

The handrails and top structures of all the gates were painted with battleship-gray paint during the year.

The seven top sheets on the downstream side of gates Nos. 56 and 57 and the seven top sheets on both the up and downstream sides of gates Nos. 60, 61, 64, 65, 68, and 69 were all painted with one coat of "Tockolith," except the upstream side of Nos. 60 and 61 and the downstream side of 56, which were given one coat of locally-mixed red lead. All the above-mentioned gates were given a second coat of locally-manufactured black paint. The eighth sheets, or the sheets at the normal elevation of the water, were scraped and coated with bitumastic solution, which was put on temporarily as a protection while waiting for the caisson. The eighth sheets were the only ones that showed signs of pitting or deterioration. This work was completed in January, 1919.

Rising stem-valve machines Nos. 418, 419, 422, 423, 430, 431, 436, 437, 440, 441, 442, 443, 448, and 449 were cleaned and painted, including the pits and machine rooms, walls, and floors, in connection with the other overhauling work being done while the west chamber at Miraflores was out of service.

All four emergency dams were painted during the year, battleship-gray paint being used. The dams were coated in their entirety, with the exception of the wicket girders and gates, which required touching up only.

All towing locomotives were painted during the year with battleship-gray paint manufactured at the locks.

Both control and power cables were inspected and found in good condition, and no cable failures occurred during the year.

The oil in all oil switches and power and lighting transformers was tested and refiltered or replaced where necessary.

All lock-gate spares stored at Paraiso, with the exception of the girders, have been moved to Corozal storehouse, where they were scraped, painted, and renumbered before being stored. The girders are still at Paraiso and will be moved later on. This work was all done by the lock forces.

The necessary painting of all operating machinery, tunnel floors, etc., was kept up during the year.

Part of the contract with the American Bitumestic Enamels Company expired in January, 1919.

The back fills and dams at both sets of locks have been maintained throughout the year.

The crib fender at the south approach wall at Pedro Miguel was repaired, this work being completed in April, 1919.

The crib fender at the north approach wall at Miraflores had to be replaced. This work was started in February, 1919, when the old timbers were removed

and new piles were driven. The work on the new fender was completed in June, 1919.

Necessary repairs were made to the fender timbers from time to time and timbers were renewed where necessary.

After removing the floating caisson from the west chamber at Miraflores upon completion of the overhauling work in that chamber, it was found necessary to give the caisson a general overhauling, which work was started in June, 1919, and is in progress at the present time.

#### PAIN'T MACHINE.

The paint machine installed last year was found to meet all the requirements we had anticipated. All necessary painting to the machinery, tunnels, etc., has been done during the year with paint manufactured by us. A considerable saving is effected in this manner and amounts to about \$1 on each gallon of paint used. On the painting of the emergency dams alone there was a saving of about \$1,200.

#### LAUNCHES, BOATS, ETC.

The launch *Dora V* was completed in September, 1918, and put in service. This launch was purchased in the United States, knocked down, and was assembled at the locks.

Four round-bottom pilot boats were made during the year and one flat-bottom boat for removing débris from the forebay was also made.

A new boathouse was built at Pedro Miguel locks for the launch *Dora V*.

#### COCOLI SHED.

The Cocoli shed, located near Cocoli Hill on the west side of the canal at Miraflores locks, was moved to a point on the west back fill at Miraflores opposite the control house, the work being completed in March, 1919. The excavating and handling of material in connection with this work was done by the lock forces, the remainder of the work being done by the building division.

#### OVERHAULING WEST CHAMBER, MIRAFLORES LOCKS.

The caisson was sunk in the lower west chamber on March 22, 1919, and after completion of the inspection and overhauling work in that chamber was raised on June 12, 1919. The following covers the work in detail, all of which was done by the lock forces:

*Miter gates.*—All the miter gates in the west chamber, except Nos. 102 and 103, had the water compartments inspected and necessary touching up of the enamel done. The enamel was touched up in the submerged portions of all the gates in the west chamber, with the exception of the upper side of Nos. 102 and 103. Hermastic enamel was used on the above work.

The fender timbers on miter gate No. 102 were renewed complete, almendra, a native wood, being used instead of greenheart, as originally used.

The fixed seal timbers forming the bottom sills for the miter gates were renewed on gates Nos. 106, 107, 118, 119, 122, and 123, almendra being used. Inspection showed that the seals for all the gates had been attacked by teredos, but their action was confined largely to a small area about the beveled edges of the seal. A patch was installed in the fixed seal timber for miter gate No. 127.

The iron conduit running from the top to the bottom of the gates for the sump pump wiring was found to be badly corroded and pitted in the water compartments. In some cases this action had gone far enough to penetrate the conduit, which allowed water to enter and saturate the wires and run down to the air compartments. The conduit was renewed in gates Nos. 106, 110, 111, 114, 115, 118, 119, 122, 123, 126, and 127. The wires for the sump pump in gate No. 127 had deteriorated to such an extent that it was necessary to replace them.

*Cylindrical valves.*—Rubber seals were installed in place of the leather seals on cylindrical valves Nos. 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, and 739. The leather had become hard and brittle and in many places was badly deteriorated.

All of these valves were carefully inspected and necessary adjustments made. Except for the leather seals, they were found to be in very good condition. All stems were repacked and necessary touching up of the bitumastic enamel was done.

*Nonoperating valves.*—The suspension chain was painted on the west wall valve.

*Bulkheads.*—The seals on both the upper and lower west center culvert entrance bulkheads had been destroyed by teredos and were renewed, almendra being used. The bitumastic enamel was found to be in very good condition and only touching up was done.

The following shows the dates the bulkheads were removed and installed:

Upper center wall, east side, removed March 19, 1919, and replaced July 11, 1919.

Upper center wall, west side, removed March 20, 1919, and replaced June 11, 1919.

Upper end west wall culvert, removed March 19, 1919, and replaced May 23, 1919.

Lower end west wall culvert, removed March 20, 1919, and replaced June 12, 1919.

Lower center wall, east side, removed March 21, 1919, and replaced June 14, 1919.

Lower center wall, west side, removed March 21, 1919, and replaced June 13, 1919.

*Intake screens.*—The intake screens, which protect the culverts from débris, logs, etc., were removed from the west-wall culvert on March 17, 1919, and were replaced on May 23, 1919. The screens had been treated with red lead and were badly deteriorated, making it necessary to rebuild them.

The screens in the center-wall culvert were removed March 19, 1919, and were replaced on June 11, 1919. These screens had been treated with bitumastic enamel and were found to be in very good condition, requiring very little touching up.

*Rising stem valves—general.*—The valves were found to be in fairly good condition. The bitumastic enamel had served as a very good protection from corrosion and pitting. There were some spots where the enamel had broken down, but this was confined principally to rivet heads. The bottom of the valves was found to be pitted, which indicates that the wooden bottom seal is no better than the babbitt seal. The wooden seals were installed about two years ago, thinking it would prevent action between the babbitt, as formerly used for seals, and the metal of the valve.

The lignum-vitæ side seal strips had been attacked by teredos, in some cases to such an extent that the strips had become so weakened that sections were carried away. This indicates that the wooden side seal strips can probably be replaced by strips of some other material to advantage. The lignum-vitæ strips were installed to replace steel strips about two years ago and have proven a success so far as wear is concerned, but due to the fact that they were attacked by teredos it will be necessary to experiment with other material. Two bronze strips were installed in different locations for experimental purposes. The wooden strips that were replaced were treated with creosote or a poison solution to prevent attack by teredos. Two valves were also fitted with bronze strips on the bottom to see if they would prevent pitting.

The roller trains in general were badly pitted and eaten away. The bearings of the rollers were greatly reduced in size, while the bearing holes were considerably enlarged. Those in the lower level, where they are always submerged in sea water, were found to be in much better condition than those in the upper level. The same condition applies to all parts of the valves, which indicates that there is some chemical action peculiar to conditions as found in the upper chamber or water entering from Miraflores Lake.

The fixed irons were in very good condition, with the exception of the roller tracks, which were pitted and worn. These will need replacing or having new wearing strips installed in the near future or during the next overhauling period.

The wearing pads on the valves were worn and will have to be replaced during the next overhauling period.

As there were not enough roller train channel irons to replace all those that were needed, straight bar iron, 1 inch by 5½ inches, was used and drilled to take the rollers.

*Guard valves Nos. 409, 410, and 411.*—The valves were removed as follows: No. 409, March 19; No. 410, March 17; No. 411, March 20. The valves were replaced as follows: Nos. 409 and 410, May 22, and No. 411, May 20. All three valves were in very good condition. The roller trains were in very good condition and were used to replace unusable trains in other locations. Special roller



trains, containing 33 new rollers each, were made up and installed. The top seals were in good condition. The side seal strips, which are formed by Z bars which are anchored in the concrete, were pitted and should be replaced with a renewable type of strip during the next overhauling period. The bottom of the valves was pitted very little, not enough to necessitate planing off. The bronze side seals were in very good condition, and were scraped and adjusted where necessary. The end rollers were overhauled. These valves were given one coat of red lead and one coat of No. 30 marine paint.

*Rising stem valve 412.*—The valve was removed on May 26, 1919, and was replaced on June 8, 1919. The valve was in very good condition. The roller trains had begun to deteriorate, but it was not necessary to renew them. The top seal was in good condition. The side seal strips and bottom seals had been attacked by teredos and were renewed, creosoted lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled and bolts renewed where necessary. The end rollers were freed and put in good condition.

*Rising stem valve 413.*—The valve was removed on May 27, 1919, and replaced on June 9, 1919. The valve was in very good condition. The roller trains had begun to deteriorate, but were in good enough condition to be used again. The top seal casting was badly corroded and pitted and was replaced with a new one. The side seal strips and bottom seals had been attacked by teredos and were renewed, creosoted lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, and bolts were renewed where necessary. The end rollers were freed and put in good condition.

*Rising stem valve 416.*—The valve was removed on May 23, 1919, and replaced on June 2, 1919. The valve was found to be in very good condition. The roller trains had deteriorated considerably, but not enough to require renewal. The top seal was in good condition. The side seal strips and bottom seals had been attacked by teredos and had to be renewed, creosoted, lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, bolts being renewed where necessary. The end rollers were freed and put in good condition.

*Rising stem valve 417.*—The valve was removed May 24, 1919, and replaced June 4, 1919. The valve was in very good condition. The roller trains had begun to deteriorate, but not enough to require renewal. The top seal was in good condition. The side seal strips and bottom seals had been attacked by teredos and were renewed, creosoted lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, three sections of spring and bolts being renewed where necessary. The end rollers were freed and put in good condition.

*Rising stem valve 418.*—The valve was removed on April 4, 1919, and replaced on May 20, 1919. The valve was badly corroded on the upstream side. The rivet heads had been attacked worse than the other parts of the valve, and 24 rivets had to be renewed. The roller trains were not in good enough condition to be used again, and were replaced by those from guard valve No. 409. The top seal was in good condition. The side seal strips and bottom seals had been attacked by teredos and were renewed, poison-treated lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, bolts being renewed where necessary. The end rollers were overhauled.

*Rising stem valve 419.*—The valve was removed on April 3, 1919, and replaced on May 6, 1919. The valve was badly pitted and corroded in spots. The action was especially noticeable around the rivet heads and butt straps. Twenty rivets were renewed. The roller trains were too badly deteriorated to be used again, and were replaced by those from guard valve No. 410. The top seal was in good condition. The side seal strips and bottom seals had been attacked by teredos and were replaced, using one experimental bronze side seal strip on the east side, poison-treated lignum-vitæ on the west side, and greenheart for the bottom seal. The bottom of the valve was planed off and a  $\frac{3}{4}$ -inch by 3-inch bronze strip used as an experiment to stop pitting. The bronze side seals were

scraped and overhauled, bolts being renewed where necessary. The end rollers were overhauled.

*Rising stem valve 422.*—The valve was removed on April 2, 1919, and replaced on May 10, 1919. The valve was in fair condition, but there were some signs of corrosion and pitting. Six rivets were renewed. The roller trains had begun to deteriorate, but not to such an extent that they had to be renewed. The top seal was in good condition. The side seal strips and bottom seal had been attacked by teredos and were renewed, poison-treated lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off and a bronze strip installed for experimental purposes. The bronze side seals were scraped and overhauled, new bolts being used throughout. The end rollers were overhauled.

*Rising stem valve 423.*—The valve was removed on April 1, 1919, and replaced May 15, 1919. The valve was in good condition. There was a small amount of pitting where the enamel had failed. The roller trains had begun to deteriorate, but not enough to require renewal. The top seal was in good condition. The side seal strips and bottom seals had been attacked by teredos and were renewed, poison-treated lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, and bolts were renewed where necessary. The end rollers were overhauled.

*Rising stem valves 428, 429, 434, and 435.*—These valves were in very good condition and were not removed. The seals were in very good condition. Necessary touching up of the bitumastic enamel was done with the valves in place.

*Rising stem valve 430.*—The valve was removed March 31, 1919, and replaced April 18, 1919. The valve was found to be considerably corroded, especially around the rivet heads and butt straps. Thirteen rivets were renewed. The roller trains were in very bad condition, and were replaced with those from guard valve No. 411. The top seal was found to have the casting pitted and the iron bolts eaten away. These bolts, six in number, were replaced with brass bolts. The side seal strips and bottom seals had been attacked by teredos and were renewed, using poison-treated lignum-vitæ for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, using four sections of spring and twenty-eight brass bolts. The end rollers were overhauled.

*Rising stem valve 431.*—The valve was removed March 29, 1919, and replaced April 25, 1919. The valve was found to be considerably corroded and pitted. Thirty-two rivets were renewed. The roller trains were in bad condition, but were overhauled and used again. The top seal was in good condition. The side seal strips had been attacked by teredos and were renewed, poison-treated lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, seven new sections of spring being used. The end rollers were overhauled.

*Rising stem valve 437.*—The valve was removed March 31, 1919, and replaced April 22, 1919. The valve was considerably corroded and pitted. Thirteen rivets were renewed. The roller trains were deteriorated to such an extent that they were of no further use, and were replaced by trains made up with new channel irons and rollers. The top seal was in good condition, but it was necessary to renew six bolts. The side seal strips and bottom seal had been attacked by teredos and were replaced, poison-treated lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, five sections of spring and fourteen new bolts being used. The end rollers were overhauled.

*Rising stem valve 440.*—The valve was removed April 28, 1919, and replaced May 14, 1919. The valve was in very good condition. The roller trains had begun to deteriorate, but were in good enough condition to use over. The top seal was in good condition. The side seal strips and bottom seal had been attacked by teredos and were replaced, using poison-treated lignum-vitæ for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, three new sections of spring being used. The end rollers were overhauled.

*Rising stem valve 441.*—The valve was removed April 30, 1919, and replaced May 22, 1919. The valve was found in very good condition. The roller trains

had begun to deteriorate, but were used again. The top seal was in good condition. The side seal strips and bottom seal had been attacked by teredos and were replaced, creosoted lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled. The end rollers were overhauled.

*Rising stem valve 442.*—The valve was removed April 27, 1919, and replaced May 8, 1919. The valve was found in very good condition. The roller trains had begun to deteriorate, but were used over. The top seal was in good condition. The side seal strips and bottom seal had been attacked by teredos and were renewed, poison-treated lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled. The end rollers were overhauled.

*Rising stem valve 443.*—The valve was removed April 28, 1919, and replaced May 12, 1919. The valve was found in very good condition. The roller trains had begun to deteriorate, but were used again. The top seal was in good condition. The side seal strips and bottom seal had been attacked by teredos and were renewed, creosoted lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, using two sections of new spring. The end rollers were overhauled.

*Rising stem valves 446 and 447.*—These valves were inspected and found in very good condition. They were not removed, but necessary repairs were made with them in place. The side seal strips and bottom seals were in very good condition, except the middle section, west side, of No. 447, which was renewed, using poison-treated lignum-vitæ. The bottom seals were pitted, but not enough to justify renewal.

*Rising stem valve 448.*—The valve was removed April 30, 1919, and replaced May 8, 1919. The valve was in very good condition. The roller trains had begun to deteriorate, but were used over. The top seal was found in good condition. The side seal strips and bottom seals had been attacked by teredos, and were replaced, using poison-treated lignum-vitæ for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, using one section of new spring. The end rollers were overhauled.

*Rising stem valve 449.*—The valve was removed May 1, 1919, and replaced May 14, 1919. The valve was in very good condition. The roller trains had begun to deteriorate, but were used over. The top seal was in good condition. The side seal strips and bottom seal had been attacked by teredos and were replaced, creosoted lignum-vitæ being used for the side seals and greenheart for the bottom seals. The bottom of the valve was planed off. The bronze side seals were scraped and overhauled, using one section of new spring. The end rollers were overhauled.

#### ATLANTIC LOCKS.

##### ORGANIZATION AND PERSONNEL.

Mr. E. D. Stillwell continued as superintendent throughout the year. The supervisory force is the same as of last report.

Due to resignations and transfers, eight new men were secured by transfer or appointment from the States, and two men who had resigned to enter military service were reinstated in their old positions.

##### OPERATION.

The same system of operation continued in effect as during the previous year. No change of working hours has been necessary, as the canal traffic has not changed appreciably since the signing of the armistice.

Delays to canal traffic due to faulty operation or failure of operating equipment have been few and of negligible magnitude.

Damage to vessels during the passage through the locks has been small and consisted chiefly of breaking chocks and bits too light or not suitable for towing purposes.

A report of the lockages by months is as follows:

Month.	Northbound.			Southbound.			Grand total.
	Commer- cial.	Noncom- mercial.	Total.	Commer- cial.	Noncom- mercial.	Total.	
1918.							
July.....	105	14	119	57	7	64	183
August.....	92	8	100	58	7	65	165
September.....	89	12	101	80	5	85	186
October.....	109	13	122	68	8	76	198
November.....	112	12	124	65	13	78	202
December.....	104	16	120	59	18	77	197
1919.							
January.....	88	9	97	77	10	87	184
February.....	67	9	76	73	5	78	154
March.....	72	14	86	72	13	85	171
April.....	96	8	104	61	10	71	175
May.....	96	9	105	67	9	76	181
June.....	96	5	101	55	9	64	165
Total.....	1,126	129	1,255	792	114	906	2,161

Total amount of water drawn from Gatun Lake for lockages, 8,867,480,000 cubic feet.

Average number of lockages per day, 5.9.

Average amount of water drawn from Gatun Lake per lockage, 4,103,000 cubic feet.

The emergency dams were operated each month for instruction of operators, except during January and February. No emergency operations were necessary.

No operation of a chain fender due to ship striking the chain occurred during the year.

There were two accidents, one serious and one minor, to towing locomotives, caused by the operators losing control of machines, due to the traction clutch getting into the neutral position with the machine in motion. In neither case was the operator injured.

On account of overhauling the valves and painting the lock gates the west chamber was out of service from January 10 to February 9, and the east chamber from February 10 to March 9.

#### MAINTENANCE.

All operating machines and equipment were maintained in good condition. A few changes of minor nature were made in order to improve operating conditions and reduce the work of maintenance.

*Emergency dams.*—Anti-rebounding devices have been installed on the gate and girder contactors.

*Fenders.*—Seven new fenders of native hardwood (almendra) were installed on the upper section on four gates in the upper west chamber.

Forty-three pieces of 12 inches by 16 inches by 16 feet almendra fenders were placed on east and west side of south approach wall.

Twenty-six almendra fenders, 12 inches by 12 inches by 12 feet, were installed between gate No. 36 and chain fender No. 812.

Twenty-seven piece pine fenders, 12 inches by 12 inches by 12 feet, were installed between gate No. 40 and chain fender No. 815.

*Locomotives and tracks.*—Extensive repairs were made twice on locomotive No. 644, which was badly damaged by crashing into the bumping post at north end of center wall.

Plow shoe pits on the north and south approaches, center wall, were rearranged to facilitate changing of plow shoes for east or west chamber operation.

A bell-alarm system was installed on the traction clutch levers of all locomotives to indicate to the operator when the clutch levers are properly latched.

One light has been installed in the interior of each locomotive, each end, to facilitate inspection and oiling of machine at night.

New foundations were placed for the spur tracks leading to the return tracks on the upper level, east wall, and lower level, west wall.

Work of realigning the towing tracks at the rail joints was commenced and about 35 per cent complete at the end of the year.

The electrical connections to the tracks at the north crossovers, center wall, have been changed so as to cut off power quickly in case of plow-shoe trouble. On the center wall, south end, work was started but not completed.

*Lighting system.*—The lighting of the emergency dams, range lights, center and west walls, range lights on east side of canal and beacon lights in channel north of the locks has been changed so as to operate from the control house from the lighting bench board.

*Telephones.*—Approximately 6,000 feet of the jute-covered telephone cable have been replaced by lead-covered conductor.

*Painting lock gates.*—All of the gates which are alternately exposed to water and air have been painted with hermetic or Navy solution and enamel, excepting the downstream side of gates Nos. 9 and 10.

*Transformer rooms.*—All high-tension busses and switch studs in rooms on center wall have been retaped. This was done on account of the insulating compound on old tape running and getting into the switches and requiring excessive work to maintain equipment in proper condition.

*Miscellaneous.*—The cross-under rooms at upper and lower cross-under shafts, east and west walls, were floored over with concrete slabs.

A new flagpole was made and erected on the east wall in front of the store-room building.

Approximately 1,000 yards of dirt were placed on back fills between the towing and return tracks in order to bring grade to level with walls.

Iron ladders, placed in a recess clear of the side of walls, have been installed on all approach and wing walls.

*Construction and new equipment.*—A band saw has been installed in carpenter shop.

Two new rowboats for use in handling lines to ships were constructed.

A toilet was constructed under the arch at north end of center approach wall.

Extensive changes were made in the incoming power feeders and high tension system on the locks. In brief, the changes are as follows:

1. The incoming power feeders and switch bank rooms were moved from the upper end of the east and west walls to a new room built between the store-room building opposite the east end of intermediate cross-under tunnel.

2. All incoming power feeders now come from the Gatun substation instead of the hydroelectric station.

3. Incoming power feeders are equipped with oil switches in the switch bank rooms.

4. From the switch bank rooms the high-tension feeders loop into all transformer rooms in a closed ring system.

The new arrangement permits less trouble and greater safety in switching and releases oil switches and three-conductor lead-covered cable for other use.

*General overhauling.*—During the period from January 10, 1919, to March 9, the west and then the east chamber were unwatered to allow painting of the gates below sea level and inspection and overhauling of the rising stem valves in the upper level.

The caisson was placed at the north end, west chamber, on January 10, and removed on January 29. The work in the west chamber was completed on February 8, and chamber placed in service on the 9th.

On February 10 the caisson was placed at the north end, east chamber, removed on February 21, and the chamber placed in service on March 9.

*Valves.*—All the rising stem, guard, and nonoperating valves in the upper east and west chambers were taken out of the pits, overhauled, cleaned, and touched up with hermetic solution and enamel where necessary and then replaced.

Babbitt floor seals on all rising stem valves, except the intermediate valves, were removed and replaced with lignum-vitæ seals. Steel side seal wearing strips were removed and replaced with lignum-vitæ strips on all rising stem valves.

The removable side seal box castings on 10 valves were removed, and after being machined at Balboa shops, were installed and fitted with lignum-vitæ side seals.

The removable side-seal box castings on the intermediate rising stem valves were installed in the pits on valves Nos. 258 and 259, and 262 and 263 in the center wall. The L castings removed from these pits were not standard. New castings have been ordered for the intermediate valve pits.

The valves themselves were in good condition, the principal work done being to replace broken and corroded bolts, align the side and top seals, reshape the seal points, replace broken side seal springs, and align the side rollers.

The roller trains were found to be badly worn. The rollers were worn down from  $\frac{1}{4}$  inch to  $\frac{1}{8}$  inch in diameter, and the spools were also badly worn. The holes in the channel iron, which carry the rollers, were greatly enlarged.

The roller train tracks on the valves and in the pits showed a wear from  $\frac{3}{8}$  inch to  $\frac{1}{8}$  inch. The face of the track is not smooth but wavy, the greatest wear being where the rollers stop with the valve in the closed position.

During the next overhauling new roller trains complete, roller train tracks, and front wearing pads on the valve will have to be installed on most of the valves.

An inspection was made of the cylindrical valves in the upper level, but no work was done on them other than painting of valves Nos. 257, 258, and 259.

An inspection was made of the valves in the middle and lower levels, which were overhauled in 1918, and these were found in good condition, except for the roller trains and tracks, which showed considerable wear.

*Intake screens.*—All intake screens on the center and side walls were removed, cleaned, and painted. Four of the screen sections were considerably bent and the necessary repairs were made.

*Zinc strips on pintle castings of miter gates.*—An examination of the zinc strips around the pintle in the lower lock showed no noticeable action between the zinc and the steel pintle. The pintle appeared to be in good condition, as did those around which there were no zinc strips.

*Painting gates.*—The hermetic solution and enamel applied to the gates below sea level in the middle and lower locks early in 1918 by The Panama Canal under contract with the American Bitumastic Enamel Co. had peeled off and was in such condition as to require extensive renewal. The work of touching up all defective surface on both interior and exterior of gates and valves which were under guaranty by the contractor was carried on with the overhauling of the valves.

The guaranty for the work by the American Bitumastic Enamel Co. for the painting of the interior of the gates expired on January 26, 1919.

The following summary shows the work accomplished:

		Square feet sur- face cov- ered.	Gallons hermas- tic solu- tion.	Pounds hermas- tic enamel.
1	Gates, outside.....	66, 140	258½	51, 100
2	Gates, inside, before Jan. 27, 1919.....	10, 550	48	8, 400
3	Gates, inside, after Jan. 26, 1919.....	13, 830	47	10, 400
4	Valves.....	4, 000	30	3, 000
	Total.....	94, 520	383½	72, 900

## ELECTRICAL DIVISION.

The details of the operations of the electrical division during the fiscal year are covered in the report of the electrical engineer, which follows:

### ELECTRICAL DIVISION.

*W. L. Hersh, Electrical Engineer.*

#### ORGANIZATION AND PERSONNEL.

The personnel as reported in last year's report was continued throughout the year. The position of estimator and designer was authorized as an additional position, and the appointment of Mr. William T. O'Connell was made May 1 to fill this position. The six divisions into which the work of this division is divided are listed as follows:

Office and requisitions, M. P. Benninger, electrical recorder.  
Power and transmission system, B. R. Grier, superintendent.

Construction and maintenance, A. C. Garlington, superintendent.  
Designing and estimating, W. T. O'Connell, estimator and designer.  
Telephone and telegraph, C. L. Bleakley, supervisor.  
Railway signal system, E. C. McDonald, supervisor.

The organization of the electrical division consisted of a total of 236 gold and 404 silver employees, of whom 206 gold and 360 silver employees were actually at work on June 30, there being 28 gold employees on leave, 2 gold employees absent on account of sickness, and 44 silver employees absent for miscellaneous reasons. The average monthly pay roll for the division was \$60,687.

#### CHARACTER AND EXTENT OF WORK.

The duties of the electrical division remained unchanged during the year and consisted of operating and maintaining the steam and hydroelectric power plants, substations, transmission lines, and power-distribution systems; the maintenance of street, shop, dock, public building, and residence lighting systems; the maintenance of telephone, telegraph, fire alarm, and railway signal systems and railway interlocking plants; the charging and maintaining of storage-battery cargo-handling trucks at the terminal docks and warehouses; and the installation and maintenance of such electrical equipment as required by other divisions of the canal or other departments of the Government and such commercial vessels as might require this class of work while transitting the canal.

The handling of the foregoing work required the issuing of a total of 4,319 work orders with the attendant reports, estimates, and miscellaneous correspondence. There was a total of 23 requisitions for material prepared, which included specifications for 1,578 items and totaling in value \$701,215. The average monthly expenditure was about \$120,000, of which 90 per cent was for work performed for other departments and divisions.

The work of checking and mapping of duct lines and of preparing feeder connection diagrams for the underground power distribution system was started and reached a state of about 30 per cent complete by the end of June.

#### POWER PLANTS AND IMPROVEMENTS.

The project of installing at the Gatun hydroelectric station generator unit No. 4, of 4,500 kw. capacity, with its governor, switchboard additions, oil switch installations, and the change in bus potential from 2,200 to 6,600 volts, which was reported in an incomplete state in last year's report, was completed and placed in operation during the month of November.

Specifications were prepared and requisition was submitted for generating unit No. 5, of 4,500 kw. capacity, for future installation at this plant.

The trouble of maintaining the hardened-steel roller-type thrust bearings in units Nos. 1, 2, and 3 at the hydroelectric station, mentioned in report of last year, has been remedied by the installation of spring-supported segmental thrust bearings of an improved type, with satisfactory results.

The governors of turbine units Nos. 1, 2, and 3 at the hydroelectric station were rebuilt and changed from direct gear drive to belt drive, which has resulted in improving the operating characteristics.

Generating unit No. 3 of the hydroelectric station was completely dismantled and main shaft was realigned in completely rebabbitted bearings.

The penstocks of units Nos. 1, 2, and 3 at the hydroelectric station were inspected and the bituminastic enameling was found to be in very good condition.

The Miraflores steam-power plant was continued to be operated on a stand-by basis and the necessary maintenance work was performed. The principal improvement to this plant was the addition of an auxiliary fuel burner to the boilers. The installation of this burner makes it possible to maintain stand-by pressure by a continuous small fire instead of by an intermittent larger fire by the use of the main burners. This results in a saving of fuel oil, as well as reduced maintenance of boilers.

#### SUBSTATIONS AND IMPROVEMENTS.

The changing of Gatun substation from 2,200-volt to 6,600-volt bus potential and the installation of one 8,400 KVA. water-cooled transformer and two 1,500 KVA. water-cooled transformers, mentioned in last year's report as being under construction, was completed and placed in operation during the

month of November. The rearrangement of tie line cables between the hydroelectric station and the Gatun substation, as required by the change in bus potential at these two stations, was also completed during the month of November.

Specifications were prepared and requisition was submitted covering an additional 8,400 KVA. water-cooled transformer unit, with necessary control equipment and 30-ton hoisting equipment for handling same, for future installation at the Gatun substation.

One additional 2,200-volt feeder equipment was installed in Gatun substation for supplying power and lighting current to the new Army post at Gatun. There was received from the States a 60,000-volt testing transformer with its control equipment, and at the end of the year preparations were under way for its installation at Gatun substation.

At Cristobal substation a second 2,667 KVA., 44,000-2,200-volt transformer which was removed from Gatun substation, was rebuilt and rerated at 2,500 KVA., 44,000-11,000-volts and completely installed. By this improvement there resulted at Cristobal substation a capacity of 5,334 KVA. for 2,200-volt distribution, and 5,000 KVA. for 11,000-volt distribution. There were two 11,000-volt feeders connected to the Cristobal substation for serving the new cold storage plant and the vicinity to the east of Manzanillo Bay.

At Cristobal substation there were two 2,200-volt feeder equipments installed, material for which was recovered from equipment of this type which was abandoned at the hydroelectric station. These two feeder equipments replaced temporary switch gear which had previously been in use at this substation.

At Miraflores substation one 2,200-volt feeder equipment was installed, using material which was abandoned at the hydroelectric station. This feeder equipment is to serve the new Army post near Miraflores.

At Balboa substation one 2,200 volt-feeder equipment was installed, using material recovered from the hydroelectric station, this installation being made to supply additional light and power to Ancon Hospital.

A 400 KVA. autotransformer was reconnected and rerated at 400 KVA., 2,200-6,600 volts and installed at the Balboa substation for supplying service to the nearby Pacific islands.

At each of the Gatun, Cristobal, Miraflores, and Balboa substations work was started of providing new tile-covered concrete shelving for the storage-battery installations at these points, but the work was only partially completed by June 30.

#### TRANSMISSION LINE AND IMPROVEMENTS.

The most important improvement in the 44,000-volt transmission line has been the addition of a fourth unit to the insulators of the line. This work was completed during March, and required a total of 5,940 new insulator units. At the time of placing this fourth unit, tests were made of all insulator units on the line and all defective ones were replaced, requiring 1,475 new insulator units. The installation of these new insulator units has had a very satisfactory result of practically eliminating transmission-line interruptions due to faulty insulators, as will be seen from the following:

From defective porcelain insulators there resulted power interruptions in 1917 a total of 17 failures, in 1918 a total of 29 failures, in 1919, up to the month of February, 32 failures, and since the month of February up to June 30 there resulted no transmission-line interruptions due to this cause.

During March four sets of sectionalizing switches were installed in the two circuits of the transmission line at Darien. These switches are an improved-type disconnecting switch arranged for steel-tower suspension mounting with facilities for operating from the ground.

During the dry season all steel-tower structures of the transmission line were spot painted by cleaning all rusted spots and giving them a coat of red lead and a finishing coat of gray graphite paint.

#### DISTRIBUTION SYSTEM AND IMPROVEMENTS.

Extensions and improvements to the underground power systems included the laying of approximately 82,740 duct feet of vitrified-tile duct, 40,460 feet of fiber duct, and about 218,840 feet lead-covered cable of all sizes and voltages. The principal items of work included in these figures are the underground



feeder circuits to the Army post, Miraflores, an additional feeder to Ancon Hospital, and a 6,600-volt feeder to the near-by Pacific islands, and the complete distribution systems in the newly developed areas to the east of Manzanillo Bay.

The principal additions to street-lighting systems were those at Coco Solo, New Cristobal, Ancon, Quarry Heights, and Red Tank, and there were some minor additions to the existing installations, for which there was required a total of 173 additional standard-type lighting posts and approximately 53,000 feet of armored lead-covered cable.

#### OPERATION OF POWER SYSTEM.

The power system was operated throughout the year with an average net generated output of 4,478,330 kilowatt hours per month, as compared with 4,419,192 kilowatt hours a month last year. Previous to the installation of unit No. 4 at the hydroelectric station part of the peak-load power demand was generated at the Miraflores steam plant, where fuel was consumed at an average rate of 3,497 barrels a month; but after December 1 the Miraflores steam plant was operated on a strictly stand-by basis, and the average rate of fuel consumption for the remaining seven months of the year was 2,515 barrels a month, as compared with an average consumption of 2,906 barrels of fuel oil a month last year.

The average cost of distributed power for the year was 0.8087 cents a kilowatt hour, as compared with 0.7782 cents a kilowatt hour last year.

This increase in the unit cost of power has been caused largely by the increased cost of maintenance of the equipment at the Miraflores steam plant and by the increase in the cost of labor for operation of all plants and substations.

Plate No. 2 shows typical curves of Sunday and week-day loads carried in the hydroelectric station. The Miraflores steam plant is operated on a strictly stand-by basis, and is required to carry load only for short periods of time during some power-system emergency. The power used to motor the two or more generators at Miraflores, operated as synchronous condensers for improving the power factor, exceeds the power generated at this plant, and this accounts for the negative output for this plant as tabulated in the following outline showing the monthly output at both plants.

Plate No. 3 shows the growth of the peak demand and the gross generated output of the power system from 1914 to the end of June, 1919.

*Table showing output in kilowatt hours, by months.*

Month.	Net output in kilowatt hours.		Total net generated power.	System losses include transmission, transformation, and 220-volt distribution losses.
	Gatun hydro station.	Miraflores steam station.		
1918				
July.....	4,522,600	— 65,110	4,457,490	15.0
August.....	4,520,638	—111,720	4,408,918	16.0
September.....	4,367,000	— 69,130	4,297,870	16.0
October.....	3,965,151	285,900	4,191,051	10.0
November.....	4,169,277	10,260	4,179,537	13.0
December.....	4,446,700	—151,730	4,294,970	12.3
1919.				
January.....	4,653,300	— 85,850	4,567,450	11.4
February.....	4,325,500	—159,400	4,166,100	10.8
March.....	4,598,400	—175,980	4,822,420	12.4
April.....	4,997,200	—175,940	4,821,260	10.2
May.....	5,080,200	—111,590	4,968,610	10.11
June.....	5,011,333	—183,470	4,824,883	10.6
Average this year.....	4,583,060	— 83,063	4,499,997	12.3
Average last year.....	4,519,589	—104,519	4,419,192	11.7

The following table shows the cost of power in its various states of distribution. Cost figures are based on delivery to consumer and not on the net amount actually generated.

	Totals, fiscal year 1919.	Average per month.	Average cost per kilowatt hour.	
			This year.	Last year.
Net consumption (kilowatt hours).....	47,467,280	3,955,607	.....	.....
Cost of operation and maintenance, hydrostation.....	\$49,989.96	\$4,165.83	\$0.001053	\$0.000853
Cost of operation and maintenance, Miraflores steam plant.....	113,034.18	9,419.52	.002381	.001732
Cost of operation and maintenance of substations.....	75,864.40	6,322.03	.001597	.001416
Cost of maintenance, transmission lines.....	25,109.37	2,092.45	.000528	.000624
Cost of maintenance, distribution lines.....	23,815.09	1,984.59	.000502	.001034
Depreciation, power system.....	96,000.00	8,000.00	.002022	.002123
Total cost of current for power distribution.....	383,813.00	31,984.42	.008083	.007782
Net consumption, lighting current (kilowatt hours)....	11,303.418	941,943	.....	.....
Cost of maintenance, house lighting system, including lamp renewals.....	\$55,150.12	\$4,595.84	\$0.00488	\$0.005397
Cost of lighting current per kilowatt hour.....	.....	.....	.012963	.013179

The principal loads in KW. added during the past year are tabulated as follows:

	Power.	Light.		Power.	Light.			
Navy aero station.....	30	50	Municipal pumping station, Rio Grande.....	150	.....			
Army aero station.....	30	50						
Cold storage plant, Mount Hope..	1,800	40				Ancon laundry, new machinery..	20	.....
Pacific forts.....	245	150				Central and South American		
Series street lighting.....	.....	50				Cable Co., living quarters.....	30	10
Industrial school.....	20	.....	Total.....	2,375	415			
New Ancon Hospital.....	40	60						
New hotel, Pedro Miguel.....	10	5						

The principal loads which may be added during the coming year are tabulated as follows:

	Power.	Light.		Power.	Light.			
Army post, Gatun.....	.....	170	Battery charging station, additional M. G. set.....	100	.....			
Army post, Miraflores.....	.....	170						
Fort Amador, additional.....	40	10				Series street lighting.....	.....	60
Air compressor, Mount Hope.....	1,020	.....				Submarine base.....	2,000	100
Fuel-oil handling plant, Balboa.....	200	.....				New Pier No. 6.....	200	300
Central and South American Cable Co., headquarters.....	30	5				Iron and steel scrap handling.....	50	.....
Water heaters in bachelor quarters.....	50	.....				Total.....	3,600	815

#### GATUN SPILLWAY.

The operation and maintenance at Gatun spillway was performed by the forces of the electrical division throughout the year. There were 317 gate operations recorded, 271 of which were for lake regulation and 46 for inspecting or testing of equipment.

There were no failures of spillway equipment and no difficulties were experienced in the operation of the gates.

All gates were inspected and both up and down stream sides were spot painted where necessary. The steel superstructure was completely repainted and all operating machinery was overhauled and repainted. The interior of the spillway tunnel was completely repainted.

## TELEPHONE AND TELEGRAPH.

The electrical division continued to operate and maintain the telephone system and to maintain the telegraph system of the Panama Railroad Company throughout the year.

During the fiscal year 848 telephones were installed and 472 telephones were removed, leaving 2,967 telephones in service at the end of June, 1919, an increase of 444 telephone installations for the year.

The average number of telephone calls during a day of eight hours, as determined by peg count, was 22,630, or 2,829 calls in an hour. The average number of telephone trouble cases was six a day as compared with nine and a half a day recorded last year.

During the year 55,335 feet of lead-covered, paper-insulated telephone cable of all sizes, varying from 5 to 200 pairs, were installed, and 20,240 feet of cable were removed, leaving 627,334 feet of cable in service at the end of June, 1919, an increase of 35,095 feet of cable for the year.

On this entire cable installation there occurred 12 cases of cable failure, as compared with 14 cases last year.

The principal items of new telephone work were: The installation of cables and telephone switchboard at Coco Solo, the installation of telephones and annunciators at the cold storage plant at Mount Hope, the installation of telephones and annunciators at the new section of Ancon Hospital, and the installation of four additional operating positions at the Balboa Heights exchange.

There are indications that in the near future the transisthmian telephone traffic will so increase as to require the constant use of all the existing circuits, with possible congestion during the hours of maximum traffic, and studies have been started to determine the advisability of considering the installation of additional transisthmian cable facilities during 1921.

The following outline of statistics has been compiled in a condensed form in order to show the growth of telephone equipment and installations on the Canal Zone up to the end of June, 1919:

*Canal Zone telephone system.*

	June 30, 1907.	June 30, 1910.	June 30, 1915.	June 30, 1916.	June 30, 1917.	June 30, 1918.	June 30, 1919.
Miles of pole line.....	48	140	60	51	43	36	36
Miles of underground conduit, Panama Railroad.....			212	212	212	212	212
Miles of underground conduit, Panama Canal, occupied by Panama Railroad.....				10	20	26	34
<b>Total miles of conduit.....</b>			212	222	232	238	246
Miles of cable in duct.....			75	79	101	111	118
Miles of cable, aerial.....	7	12	9	9	2	2	2
<b>Total miles of cable.....</b>	7	12	84	88	103	113	120
Miles of wire in duct.....			4,007	8,282	9,989	11,457	11,856
Miles of wire in submarine cable.....			24	26	55	55	55
Miles of wire in aerial cable.....	210	746	470	470	124	124	124
Miles of wire, bare and insulated, aerial lines..	920	2,643	789	522	508	515	526
<b>Total.....</b>	1,130	3,389	5,290	9,300	10,676	12,151	12,561
Miles of wire, trunk circuits.....	768	1,200	2,880	2,002	2,810	4,040	4,259
Miles of wire, subscribers' circuits.....	218	1,921	2,160	7,048	7,561	7,753	7,898
Miles of wire, telegraph circuits.....	144	268	250	250	305	358	404
<b>Total.....</b>	1,130	3,389	5,290	9,300	10,676	12,151	12,561
Miles of phantom circuits.....				576	576	576	672
Miles of simplex circuits.....				96	96	96	132
<b>Total.....</b>				672	672	672	804
Telephone exchanges, Panama Railroad.....	10	22	11	16	10	9	9
Telephone exchanges, Panama Canal.....			3	3	3	3	3
Telephone exchanges, Army and Navy.....	1	1	1	10	10	10	10
<b>Total.....</b>	11	23	15	29	23	22	22

*Canal Zone telephone system—Continued.*

	June 30, 1907.	June 30, 1910.	June 30, 1915.	June 30, 1916.	June 30, 1917.	June 30, 1918.	June 30, 1919.
Telephones, Panama Railroad.....	610	1,213	1,609	1,878	2,154	2,523	2,967
Telephones, Panama Canal.....			98	104	110	114	114
Telephones, Army and Navy.....		15		400	578	670	703
Total telephones.....	610	1,228	1,707	2,382	2,842	3,307	3,784
Exchange connections daily <sup>1</sup> .....		6,342	9,328	12,165	17,801	21,816	21,415
Trunk connections daily <sup>1</sup> .....		2,809	2,366	2,954	3,241	3,924	6,396
Total.....		9,151	11,694	15,119	21,042	25,740	27,811

<sup>1</sup> Exchange and trunk connections are those handled in the four main exchanges only.

## FIRE-ALARM SYSTEM.

The work of inspecting and maintaining the fire-alarm system has been continued under the supervision of the telephone subdivision. The principal work of the year was the cleaning, rewiring, and repainting of all fire-alarm boxes in the Ancon-Balboa district. There were 13 alarms turned in, and no failure of any alarm apparatus occurred during the year.

## RAILWAY SIGNAL SYSTEM.

There were practically no changes made in the installation of railway signals during the year. Considerable maintenance work was done to improve the insulation of splices in the underground signal circuits and of renewing local wiring at many signal locations.

There were 2,084,908 registered arm movements and 97 responsible signal failures, as compared with 2,404,176 registered arm movements and 131 responsible signal failures last year and with 2,474,210 registered arm movements and 115 signal failures for the previous year.

From the above figures there results an average of 21,495 arm movements for each responsible signal failure, as compared with 18,352 arm movements for each signal failure last year.

There were 181 train-minutes delay caused by signal failures, as compared with 556 train-minutes delay last year and with 431 train-minutes delay the previous year.

There was an average delay of 1.87 minutes per train for each signal failure.

There were four reported false clear and one false caution aspect during the year on the entire signal system. This is unusual, as previous reports show that seldom has there occurred more than one false clear aspect during any one year, which was the case last year.

In the following outline there is tabulated the responsible and nonresponsible signal failures, total arm movements, and train minutes delay for each month of the year:

*Responsible signal interruptions for fiscal year ending June 30, 1919*

Month.	Responsible signal failures.	Non-responsible signal failures.	Total arm movements.	Delay, train minutes.
1918.				
July.....	10	1	159,148	24
August.....	8		174,817	5
September.....	3		166,060	10
October.....	13	1	173,591	20
November.....	13		164,825	40
December.....	6	1	168,175	13
1919.				
January.....	4		175,906	4
February.....	7		165,606	10
March.....	6	1	186,212	2
April.....	4		185,179	15
May.....	11		180,808	28
June.....	12	1	184,581	10
Total.....	97	5	2,084,908	181

There was an average of 15 train-minutes delay and 8 responsible signal failures each month.

There was but one derailment at the interlocking plants during the year, as compared with three cases last year. This lone case occurred during September at Diablo cabin.

There were 36 reported signal failures resulting from all causes at the five interlocking plants during the year, as compared with 60 such failures for last year. About two-thirds of these failures occurred at the pontoon bridge at Paraiso.

In the following outline there is tabulated an analysis of the responsible signal failures for each month of the year:

*Responsible signal interruptions for fiscal year ending June 30, 1919.*

	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Summary.	Per cent.
Poor or defective track battery, dirty zincs, poor connection, etc. <sup>1</sup>					4						8		12	12.3
Leakage due to low resistance, crossties, roadbed, drainage <sup>1</sup>	2												2	2.06
Switch box connection rod bent by hand cars <sup>1</sup>												2	2	2.06
Bad relay contact <sup>1</sup>				1									1	1.03
Bad track wire connection, bootleg <sup>1</sup>	1												1	1.03
Broken bond wire <sup>1</sup>		2			1								3	3.12
Relay out of adjustment <sup>1</sup>	2	1		1	3								7	7.21
Cotter pin missing from switch-box connection <sup>1</sup>												2	2	2.06
Defective bonding <sup>1</sup>				1									1	1.03
Exhausted track battery <sup>1</sup>				2									2	2.06
Tie-plates under insulated joint <sup>1</sup>									3				3	6.12
Worn filler block on insulated joint <sup>1</sup>								1					1	1.03
Switch-point lug loose <sup>1</sup>										2			2	2.06
Discharged storage battery					2			1					3	3.12
Signallight out	2	1						1	1				5	5.15
Signallight out, poor kerosene oil				6									6	6.21
Unknown	1	1				3	4			1			10	10.3
Open coil on control relay					1								1	1.03
Open coil on signal slot arm				2									2	2.06
Open wire from signal in cable connection			2		1	1		2				5	11	11.3
Commutator sticking, brush sticking, sanded	1	1	1		1			1		1	2		8	8.25
Fuse broken—defective												3	3	3.12
Open circuit account renewing battery	1										1		2	2.06
Broken primary battery jar		2											2	2.06
Broken cotter in 458 slot arm						1							1	1.03
Open connection on account rewiring signal						1		3					4	4.12
Total	10	8	3	13	13	6	4	7	6	4	11	12	97	99.99

<sup>1</sup> Track circuits—40.17 per cent.

MISCELLANEOUS ELECTRICAL WORK.

The principal items of electrical work not otherwise classified or mentioned include: The installation of a 75-kilowatt motor generator set, some 14,000 feet of 3-conductor 8,500-volt cable, and certain accessory transformers and miscellaneous equipment for the division of fortifications; the installation of electric lighting and heating appliances in the new section of Ancon Hospital; the installation of motor, transformer, and switchboard equipment in and the illumination of the new cold-storage plant at Mount Hope; the installation of underground distribution system and the illumination of buildings at France Field; the installation of underground distribution system and the illumination of buildings at Coco Solo; and the starting of the installation of the motor generator and switchboard equipment which was received from the States during June for the power house at Coco Solo.

The work at the electrical repair shop, exclusive of work done in the field or which required the men to leave the shop, is here briefly summarized, and includes the following:

Armatures rewound, motors and generators.....	291
Transformers and compensators repaired and rewound.....	120
Magnetos and fans repaired and rewound.....	114
Miscellaneous electric appliances repaired.....	93
Switchboard panels manufactured.....	108
Miscellaneous machines repaired and rebuilt.....	129

The work at the marine electric shop included miscellaneous classes of repair work, new installations and additions or repairs to existing installations on commercial and Government vessels, and was covered by the completion of 437 different work orders.

The principal items of marine electrical work were the complete overhauling of all electrical equipment, the renewal or repair of all lighting circuits, and the installation of complete wireless installations on each of five ex-German ships; the installation of all electrical equipment on the coast guard cutter *Manhattan*, and the equipping of two 25-kilowatt portable-motor generator sets for supplying direct current to ships at Balboa docks.

Some items of miscellaneous electrical material and supplies consumed in the work done by the electrical division during the year are briefly expressed in the following tabulation:

Wire, rubber-covered twin, total, all sizes.....	feet	232, 206
Wire, rubber-covered single, total, all sizes.....	do	683, 972
Wire, bare, total, all sizes.....	do	21, 996
Wire, magnet, total, all sizes.....	pounds	6, 861
Wire, telephone, total, all sizes.....	feet	405, 942
Cord, flexible, all sizes.....	do	202, 442
Cable, lead covered, total sizes and types.....	do	213, 838
Conduit, all sizes.....	do	339, 173
Condulet fittings.....	units	343, 667
Outlet boxes and covers.....	do	27, 812
Electric lamps, all sizes.....	do	260, 000
Sockets and receptacles, all types.....	do	29, 914
Fuses, all kinds and sizes.....	do	72, 891
Lighting fixtures, house.....	do	2, 812
Lighting fixtures and fittings, marine.....	do	11, 427
Reflectors, glass and metal.....	do	16, 788
Meters, watt-hour, all kinds.....	do	242
Meters.....	do	31
Panel boards.....	do	128
Distribution transformers, total 103, all sizes.....	KW	980
Distance traveled by motor vehicles.....	miles	50, 715

### MUNICIPAL ENGINEERING DIVISION.

The details of the operations of the municipal engineering division during the fiscal year are covered in the report of the municipal engineer, which follows:

#### MUNICIPAL ENGINEERING DIVISION.

*D. E. Wright, Municipal Engineer.*

The municipal division continued the design, maintenance, and operation of all roads, water pumping and purification plants, pipe lines, and such building construction work as directly concerned this division. The principal items of new construction were the Ancon Hospital roads, concrete base, and sheet-asphalt wearing surface; the reconstruction of the streets in Pedro Miguel of concrete base, asphalt wearing surface; the road from Pedro Miguel to Paraiso of concrete; the relocation of the Gatun-Mount Hope road of concrete; the installation of concrete streets, gutters, and sewers for the Coco Solo submarine base; the construction of concrete roads, sewage pump station, water, and

sewers for the France Field aviation base. During the year the amount of water handled by the municipal division pumping plants was 9,228,080,651 gallons.

## ORGANIZATION.

The municipal division is divided into three sections, viz: The Southern district, including all points in the Canal Zone from Darien south and including the city of Panama. The Northern district, comprising all points in the Canal Zone from Darien north and including the city of Colon; and the operation of purification plants, testing laboratories, and reservoirs.

## PERSONNEL.

W. J. Spalding, superintendent of the Southern district, resigned August 12, 1918, and was succeeded by Mr. R. C. Hardman.

The Northern district continued under the supervision of E. H. Chandler, superintendent.

G. C. Bunker, physiologist, continued in charge of the purification plants, laboratories, etc.

## SOUTHERN DISTRICT.

The maintenance work carried on in this district consisted of the maintenance of water and sewer lines, streets, sidewalks, and roads, the upkeep of equipment, the operation of pump stations, and various items of new construction for the municipal division and other divisions of The Panama Canal. The report of operations of pumping stations in the Southern district is given in the following statement:

Pumping station.	Total gallons pumped during year.	Average number gallons per month.	Average cost per 1,000 gallons for pumping.
Gamboa, U. S. No. 1.....	3,691,800,000	307,650,000	\$0.0140
Miraflores, U. S. No. 2.....	421,885,000	35,157,083	.0157
Balboa, U. S. No. 3.....	2,655,479,000	221,289,917	.0137
Paraiso.....	74,640,000	6,220,000	.0417
Cucaracha (Mount Zion).....	148,961,651	12,413,471	.....
Camacho tanks <sup>1</sup> .....	72,261,000	8,029,000	.....
Camacho (into mains) <sup>1</sup> .....	76,745,000	8,527,222	.....

<sup>1</sup> Nine months only. No water pumped in April, May, and June on account of low water in Camacho reservoir.

In the city of Panama the usual maintenance work was performed by the municipal division on the water and sewer systems and pavements. The work of maintenance and operation in the city included the installation of water meters on new connections, the repair and maintenance of all water meters installed on previous connections, and the preparation and collection of water-rent bills for water consumed. The following table shows the quantity of water used in Panama during the fiscal year by quarters, together with the amount of water rentals:

*Consumption per quarter.*

Quarter ended.—	Paying connections.	Private.	Public hydrant and taps.	Total.	Daily average consumption.
		<i>Gallons.</i>	<i>Gallons.</i>	<i>Gallons.</i>	<i>Gallons.</i>
Sept. 30, 1918.....	2,441	148,917,000	65,294,000	214,211,000	2,380,000
Dec. 31, 1918.....	2,414	139,136,000	83,454,000	222,590,000	2,473,000
Mar. 31, 1919.....	2,425	149,574,000	84,956,000	234,530,000	2,606,000
June 30, 1919.....	2,444	152,342,000	91,374,000	243,716,000	2,708,000
Total for year.....		589,969,000	325,078,000	915,047,000	2,541,797

## Collections.

Quarter ended—	Amount collected from private consumers. <sup>1</sup>	Average consumption per private connection per quarter.	Average private quarterly bill.
		Gallons.	
Sept. 30, 1918.....	\$38, 220. 75	61, 000	\$15. 66
Dec. 31, 1918.....	35, 649. 35	57, 000	14. 77
Mar. 31, 1919.....	38, 259. 90	61, 000	15. 77
June 30, 1919 <sup>2</sup> .....	38, 823. 25	62, 000	15. 88
Total for year.....	150, 953. 25	241, 000	62. 08

<sup>1</sup> Includes all bills rendered against Panaman Government for water consumed in public buildings in Panama City.

<sup>2</sup> Net amount of bills due (not yet collected).

There were 11,147 square yards of sheet asphalt laid in the city during the year. Inspection of all plumbing work in the city of Panama, as well as in the Canal Zone, was handled by employees of this division.

A summary of the more important items of construction work performed in the Southern district during the year follows:

Lot improvement around the terminals at Balboa (at a cost of \$2,100). This work consisted of—			
Grading .....	square yards	17, 111	
Excavation .....	cubic yards	763	
Fill .....	do	959	
Catch basins .....		2	
Resurfacing of Paraiso-Gamboa road (at a cost of \$60,345) :			
Grading .....	square yards	8, 437	
Excavation .....	cubic yards	72	
Road repair.....	square yards	22, 182	
Concrete placed.....	do	238	
Road oiled and sanded.....	do	29, 006	
Telford base placed.....	do	10, 098	
Resurfacing of streets, Pedro Miguel (at a cost of \$32,258) :			
Grading .....	square yards	2, 280	
Excavation .....	cubic yards	116	
Concrete base placed.....	square yards	3, 933	
Tarviaing paint coat on concrete.....	do	11, 085	
Sheet-asphalt wearing surface.....	do	11, 085	
Curb and gutter.....	linear feet	983	
Sidewalk built.....	square yards	395	
Macadam road repaired.....	do	400	
Resurfacing streets, Paraiso (at a cost of \$18,370) :			
Excavation.....	cubic yards	1, 415	
Grading.....	square yards	346	
Concrete base placed.....	do	7, 305	
Back fill.....	cubic yards	341	
Curb and gutter.....	linear feet	2, 752	
Retaining wall.....	do	550	
Roadside ditches cleaned.....	do	3, 000	
Construction of roads in hospital grounds (at a cost of \$46,880) :			
Grading.....	square yards	4, 556	
Excavation.....	cubic yards	3, 350	
Fill.....	do	1, 478	
Concrete base laid.....	square yards	4, 928	
Sheet-asphalt wearing surface.....	do	7, 046	
Concrete road constructed.....	do	1, 478	
Drain pipe laid.....	linear feet	599	
Manholes built.....		11	
Catch basins constructed.....		12	
Curb and gutter constructed.....	linear feet	2, 329	

The above under A. F. E. No. 1392.



Under A. F. E. No. 1585, the following work was done in the hospital grounds (at a cost of \$25,850) :

Grading	square yards	25,918
Excavation	cubic yards	3,088
Fill	do	1,777
Back fill	do	1,770
Drain pipe laid	linear feet	2,004
Concrete walks constructed	do	1,350
Grass planted	square yards	21,840
Manholes built		11
Catch basins built		20
Construction of sidewalks and steps (at a cost of \$26,946) :		
Grading	square yards	10,057
Excavation	cubic yards	297
Fill	do	133
Concrete walks laid	square yards	24,164
Asphalt walks laid	do	401
Curb wall constructed	linear feet	1,411
Drain pipe laid	do	202
Catch basins installed		7
Construction of concrete approach to new garage, Pedro Miguel (at a cost of \$1,301) :		
Grading	square yards	1,054
Fill	cubic yards	218
Concrete placed	square yards	500
Cast-iron pipe laid	linear feet	40
Construction of section of road to steel pier, Balboa (at a cost of \$5,413) :		
Excavation	cubic yards	23
Grading	square yards	2,435
Fill	cubic yards	160
Concrete road constructed	square yards	2,125
Manholes built		1
Catch basins constructed		4
Concrete curb built	linear feet	1,581
Drain pipe laid	do	70

At the radio station, Punta Mala, the sum of \$8,396 was spent for municipal work and the construction and digging of a well for the Navy Department. Aside from this work, a total of \$574 for miscellaneous jobs for the Navy Department, Southern district, was spent.

Under special authority work was started in Panama City on the construction of new sewer outfalls and the enlarging of a number of storm sewer drains. The work done to date under this authority consists of the extending of the sewer lines on the south side of Higinio Duran Street (at a cost of \$708) :

Excavation	cubic yards	75
Back fill	do	75
Pipe laid	linear feet	413
Manholes built		2
Catch basins built		2
Concrete pavement replaced	square yards	61
The extension of storm and sanitary sewer on the 15th of February Street (at a cost of \$4,092) :		
Excavation	cubic yards	710
Back fill	do	367
Storm sewer constructed	linear feet	370
Sewer pipe laid	do	108
Catch basins built		6
Manholes built		5
Extension of storm sewer on the south side of Maria Arosemena Street (at a cost of \$1,195) :		
Excavation	cubic yards	186
Back fill	do	186
Concrete pipe laid	linear feet	237
Vitrified pipe laid	do	123
Manholes built		4

## Extension of storm sewer, etc.—Continued.

Catch basins built.....	7
Concrete pavement replaced.....square yards.....	85
Extension of storm sewer along the north side of Calidonia Street (at a cost of \$608) :	
Excavation.....cubic yards.....	78
Back fill.....do.....	78
Storm sewer built.....linear feet.....	265
Catch basins built.....	2
Manholes built.....	2
Concrete pavement replaced.....square yards.....	40
Extension of storm sewer on west side of Twenty-fourth Street (at a cost of \$899) :	
Excavation.....cubic yards.....	110
Back fill.....do.....	110
Storm sewer built.....linear feet.....	440
Concrete sidewalk laid.....square yards.....	88
Manholes built.....	2
Catch basins built.....	4
Concrete gutter laid.....linear feet.....	34
Installation of vitrified pipe for drainage on 3d of November Street (at a cost of \$101) :	
15-inch vitrified pipe laid.....linear feet.....	46
Catch basins built.....	2
Installation of 3 by 3 box sewer on Twenty-fifth Street (at a cost of \$14,905) :	
Excavation.....square yards.....	2,585
Back fill.....cubic yards.....	752
Box sewer constructed.....linear feet.....	1,769
Manholes built.....	5
Extension of sewer for the Hatillo district: This consisted of placing 100 linear feet of 4 by 4 box sewer at a cost of \$1,862.	
Extension of sewer on Southern Avenue (at a cost of \$6,843) :	
Excavation.....cubic yards.....	1,373
Back fill.....do.....	1,050
Grading.....square yards.....	111
Concrete box sewer laid.....linear feet.....	80
Concrete pipe laid.....do.....	150
Catch basins built.....	2
Manholes constructed.....	6
Asphalt laid on repaired streets.....square yards.....	2,398
Construction of sewer line from Northern Avenue to beach, Panama City (at a cost of \$9,962) :	
Excavation.....cubic yards.....	2,878
3 by 3 box sewer laid.....linear feet.....	312
Manholes constructed.....	2
Installation of storm-sewer line from Market Street to Northern Avenue, Panama City (at a cost of \$10,957) :	
Excavation.....cubic yards.....	2,113
Concrete pavement replaced.....square yards.....	36
Brick pavement replaced.....do.....	57
Catch basins built.....	1
3 by 3 box sewer constructed.....linear feet.....	701

Reversing the grade of sewer outfalls on Sixteenth, Seventeenth, Nineteenth, and Twentieth Streets, Panama City: This consisted of excavating 533 cubic yards and the laying of 895 linear feet of 8-inch vitrified pipe, at a cost of \$2,085.

The above items of work were done out of the special \$200,000 appropriation made for Panama City and represent work done during the fiscal year.

Miscellaneous work for the United States Army to the amount of \$9,144 was done.

For other departments of The Panama Canal, Southern district, miscellaneous jobs amounting to \$16,813 were performed.

Work was started on the new Army post at Miraflores, for which a total of \$375,200 was allotted for municipal work. To July 1 there were \$79,029.11 spent of this allotment, the principal work done being preliminary surveys,

mapping, grading, and the installation of 5,241 linear feet of cast-iron water pipe, 5,762 linear feet of vitrified sewer pipe, 405 linear feet of vitrified pipe for storm sewers and 320 linear feet of concrete pipe for storm sewers, the laying of 6,708 linear feet of railroad track for construction purposes, and grading to the amount of 37,689 square yards.

Under the head of miscellaneous work for the supply department, the municipal division spent a total of \$17,762 for work in connection with the hog farm, cattle industry, gardens, depressed track and loading platforms around storehouses, Balboa, work around their silver markets, Hotel Tivoli, Hotel Tivoli kitchen, local buyers' building in Panama City, and fuel-oil plants, Balboa.

On December 1, 1918, the incinerator plant for the disposal of all garbage from the city of Panama, Ancon, Balboa, and Fort Amador was turned over to the municipal division by the health department for operation and maintenance. The average amount of garbage handled by this plant a day amounted to 60 tons. The cost of operating this plant from December 1 to June 30 amounted to \$17,884.64.

Under authority for construction in the vicinity of the Corozal ordinance department of the Army the following work was done at a total cost of \$16,474:

Land cleared	square yards	13,763
Excavation	cubic yards	13,998
Grading	square yards	993
Fill	cubic yards	33,214
Drain pipe laid	linear feet	120
Railroad track for construction purposes	do	1,356

In Ancon townsite reconstruction of roads under A. F. E. No. 1728 was done as follows (at a cost of \$17,426, including work done in the same district under A. F. E. No. 1728-1):

Excavation	cubic yards	289
Grading	square yards	3,182
Fill	cubic yards	259
Concrete road foundation	square yards	2,574
Sheet-asphalt wearing surface	do	2,596
Curb and gutter constructed	linear feet	2,784
Drainpipe laid	do	449
Catch basins installed		14
Manholes built		5
Subsoil drain laid	linear feet	144

In this same district, under A. F. E. No. 1728-1:

Excavation	cubic yards	96
Fill	do	90
Grading	square yards	51
Concrete road constructed	do	927

Under A. F. E. No. 1766, for the Army, road repair work at Fort Amador was done as follows (at a cost of \$4,790):

Grading	square yards	1,618
Sheet asphalt laid	do	3,270
Tarvia "B" applied to macadam roads	do	17,295
Crude oil applied to macadam roads	do	8,130

Concrete sidewalks were constructed for the mechanical division, Balboa shops district, as follows (at a cost of \$18,099):

Excavation	cubic yards	804
Grading	square yards	455
Concrete walks laid	do	5,600
Concrete drainage ditches laid	linear feet	2,192
Vitrified drainpipe laid	do	134
Concrete drains for roof drip	do	117

Under A. F. E. No. 1821 repair work was done for the Panama Railroad around their warehouse in Panama City to the amount of \$3,945.

The following amounts were spent for maintenance in the Southern district during the year:

Macadam roads and concrete roadside ditches	\$14,872.50
Sheet asphalt roads and sheet asphalt roadside ditches	22,521.00
Concrete asphalt roads and roadside ditches	5,513.69
Concrete roads	21,918.00
Asphalt walks	3,497.16

Concrete walks.....	755.82
Water and sewer lines in the town of Las Cascadas.....	6,319.76
Water and sewer lines in the town of Empire, and the operation of the Camacho pump station.....	22,314.91
Rio Grande reservoir.....	9,389.81
Sewers in Ancon-Balboa district, Corozal, Pedro Miguel, and Paraiso townsites.....	13,113.08
Water and sewer systems, Culebra townsite.....	3,596.65
Sweeping and cleaning of 90,086,650 sq. yds. of streets.....	21,014.35

The following table shows material received, expended, and on hand in the Southern district as of July 1, 1919:

Material.	On hand June 30, 1918.	Received 1918-19.	On hand and received.	Expended 1918-19.	Balance on hand June 30, 1919.
Cement.....barrels.....		19,662 $\frac{1}{4}$	19,662 $\frac{1}{4}$	19,357 $\frac{1}{2}$	304 $\frac{3}{4}$
Sand.....cubic yards.....	252 $\frac{1}{2}$	7,269	7,494 $\frac{1}{2}$	6,971 $\frac{1}{4}$	523 $\frac{1}{2}$
Rock.....do.....	2,136 $\frac{1}{2}$		2,136 $\frac{1}{2}$	409 $\frac{1}{2}$	1,727
Screening.....do.....	256 $\frac{1}{4}$		256 $\frac{1}{4}$	189	67 $\frac{3}{4}$
Gravel.....do.....	62	10,630	10,694	10,392 $\frac{3}{4}$	301 $\frac{1}{4}$
Gravel (storage).....do.....	8,638 $\frac{1}{2}$		8,638 $\frac{1}{2}$	1,899 $\frac{1}{2}$	6,739
Lumber.....feet.....	24,273	220,397	244,670	212,544	32,126
Lumber (native).....do.....	3,523	7,822	11,345	8,692	2,653
Reinforcing.....pounds.....	371	137,913	138,284	112,096	26,248
Pipe, vitrified, 6-inch.....feet.....	2,695	9,022	11,717	9,151	2,566
Pipe, vitrified, 8-inch.....do.....	1,609 $\frac{1}{2}$	8,259	9,868 $\frac{1}{2}$	5,286 $\frac{1}{2}$	4,582
Pipe, vitrified, 10-inch.....do.....		5,109	5,109	3,318	1,791
Pipe, vitrified, 12-inch.....do.....		3,253	3,253	2,164	1,089
Pipe, vitrified, 15-inch.....do.....	64 $\frac{1}{2}$	441	505 $\frac{1}{2}$	505 $\frac{1}{2}$	
Pipe, galvanized iron, $\frac{1}{2}$ -inch.....do.....		288	288	238	50
Pipe, galvanized iron, $\frac{3}{4}$ -inch.....do.....		63	63		63
Pipe, galvanized iron, 1-inch.....do.....		244	244	120	124
Pipe, galvanized iron, $\frac{1}{2}$ -inch.....do.....	971	10,502	11,473	10,595	878
Pipe, galvanized iron, 1 $\frac{1}{2}$ -inch.....do.....	1,254	6,310	7,564	5,872	1,692
Pipe, galvanized iron, 1 $\frac{1}{4}$ -inch.....do.....	60	362	422	320	102
Pipe, galvanized iron, 1 $\frac{1}{2}$ -inch.....do.....	648	1,801	2,449	1,887	562
Pipe, galvanized iron, 2-inch.....do.....	853	8,995	9,848	8,692	1,156
Pipe, galvanized iron, 2 $\frac{1}{2}$ -inch.....do.....	187	245	432	253	179
Pipe, galvanized iron, 3-inch.....do.....	128	1,847	1,975	1,934	41
Pipe, galvanized iron, 3 $\frac{1}{2}$ -inch.....do.....		42	42		42
Pipe, galvanized iron, 4-inch.....do.....		244	244	200	44
Pipe, cast iron, 4-inch.....do.....	37	1,536	1,573	1,453	120
Pipe, cast iron, 6-inch.....do.....		4,500	4,500	3,840	660
Pipe, cast iron, 8-inch.....do.....	60	2,004	2,064	1,616	448
Oil, fuel.....barrels.....	163.43	2,261.44	2,424.87	1,935.66	489.21
Meters, water, $\frac{1}{2}$ -inch.....each.....	10		10	10	
Meters, water, $\frac{3}{4}$ -inch.....do.....	232		232	80	152
Meters, water, 1-inch.....do.....	75		75	10	65
Meters, water, 4-inch.....do.....	1		1	1	
Pipe, concrete, 15-inch.....feet.....		2,943	2,943	165	2,778
Pipe, concrete, 20-inch.....do.....		1,002	1,002	282	720
Pipe, concrete, 24-inch.....do.....		222	222	192	30
Leadite.....pounds.....	805		805	747	58
Jute.....do.....	3,600		3,600	552	3,048
Lead.....do.....	18,343	32,647	50,990	23,949	27,041
Hydrants.....each.....	4	55	59	36	23
Bricks.....do.....	14,777	100,000	114,777	22,677	92,100
Meter parts.....lot.....	\$400.17	\$1,400.76	\$1,800.93	\$1,095.98	\$704.95
Valves, 4-inch.....each.....	2	12	14	9	5
Valves, 6-inch.....do.....		8	8	7	1
Valves, 8-inch.....do.....	3	6	9	3	6
Valves, 10-inch.....do.....	2	1	3		3
Valves, 12-inch.....do.....		2	2		2
Muralite.....pounds.....	3,010		3,010		3,010
Asphalt.....do.....	1,077,575	1,010,234	2,087,809	1,752,009	3,335,800
Tarvia.....gallons.....	1,330	33,844	35,174	34,227	947

## NORTHERN DISTRICT.

Under new construction and municipal improvements there was a total of \$149,210 spent in the Northern district and consisted of the completion of re-surfacing of Main Street, Gatun, the relocation and construction of the Mount Hope-Gatun road, water and sewer lines for ten 12-family silver quarters at Mount Hope. This work comprised the laying of 46,713 square yards of pavement, 214 square yards of sidewalk, 30,175 linear feet of curb and gutter, 1,261

linear feet of 20-inch and 960 linear feet of 24-inch concrete drain pipe, 963 linear feet of 6-inch galvanized-iron pipe, 341 linear feet of 6-inch cast-iron water pipe, 304 linear feet of 6-inch vitrified pipe, and 21 linear feet of 12-inch vitrified pipe.

For the United States Army the sum of \$77,470 was expended and consisted of the following work: Construction of roads, sewer, and water lines to officers' and noncommissioned officers' quarters, construction of concrete drip gutters around hangars, machine shop, and storehouse, Army aviation base, France Field, the lowering of 10,564 linear feet of 8-inch and 10-inch water pipe line to Margarita, and the tarviing of the Margarita road. At France Field 4,392 square yards of pavement were laid, 67 square yards of sidewalks, 1,615 linear feet of curb, 1,420 linear feet of roof gutter, the construction of one concrete sump-pump station, the laying of 2,322 linear feet of 6-inch cast-iron pipe, 5,508 linear feet of 3-inch galvanized-iron pipe, and 1,257 linear feet of 6-inch vitrified pipe. Two motor-driven sewer pumps and one motor-driven fire pump were installed.

Work was started on the new Army post at Gatun and consisted of grading, draining, diverting of streams, and the laying of 1,539 linear feet of 20-inch concrete pipe and 72 linear feet of 24-inch concrete pipe. There were 64 acres of land cleared and burnt.

For the United States Navy the sum of \$75,650.97 was expended and consisted of the following work: Completing the draining and filling of grounds and the construction of road at the Colon radio station; the construction of two double tennis courts, road, and paving for garage, roads, water and sewer lines for two type EE-2 and four type E-4 houses, 200 linear feet of sea wall, the extension of road, water, and sewer lines for the four type E-4 houses, connecting walks for new buildings along beach, construction of road to ammunition storehouse, grading and draining of area for baseball park, installation of fire protection for dirigible hangar, fire protection for 100-man barracks and 300-man mess hall, the installation of water line for 5-stall seaplane hangar, submarine base, Coco Solo. This work consisted of the placing of 6,799 square yards of pavement, 1,642 square yards of sidewalk, 7,586 linear feet of curb, 220 linear feet of sea wall, 105 linear feet of drip gutter, 24-inch, 486 linear feet of drip gutter, 30-inch, the laying of 880 linear feet of 6-inch cast-iron pipe, 3,988 linear feet of 8-inch cast-iron pipe, 1,867 linear feet of 6-inch galvanized pipe, 140 linear feet of 8-inch galvanized pipe, 1,696 linear feet of 6-inch vitrified pipe, 138 linear feet of 10-inch vitrified pipe, 592 linear feet of 20-inch concrete pipe, 400 linear feet of 6-inch subsoil drain, and the installation of two motor-driven sewage pumps and one motor-driven fire pump.

Under special authorities from the Panama Railroad the sum of \$29,151.76 was expended. The work under these authorities consisted of the installation of 987 linear feet of 4-inch water line to the hog farm, the laying of 600 linear feet of 6-inch cast-iron pipe, 12 linear feet of 10-inch cast-iron pipe, 144 linear feet of 12-inch cast-iron pipe for Colon townsite extension, the excavation for and the laying of 116 linear feet of 20-inch concrete pipe for draining swamp area in the vicinity of Mindi, the placing of 10,190 square yards of concrete in 18-foot roadway from Mount Hope cold-storage plant to the Mindi road, the construction of a culvert for the Mindi diversion, and the placing of 900 square yards of concrete for approaches to dock No. 7.

For outsiders a total of \$698.12 was expended. This consisted of deposits made for the connection of sewers and water to private houses, the laying of concrete in alleyways, and the grading and rolling of baseball grounds.

Under special authority from the building division the sum of \$18,302.41 was expended, the principal work being in the vicinity of the new cold-storage plant erected at Mount Hope. A circulating water system was installed for this plant, 3,075 square yards of pavement and 2,054 linear feet of curb and gutter were laid around same. In the circulating system 735 linear feet of 24-inch concrete pipe were laid.

Under special authority from the supply department the sum of \$14,065 was expended, this covering a number of miscellaneous jobs, the more important of which were the laying of concrete approaches to garages, the laying of 6,858 linear feet of 10-inch galvanized-iron pipe to the oil-storage tanks, and the laying of 1,842 linear feet of 4-inch galvanized-iron pipe for oil supply.

Under special authority from the health department the sum of \$5,013.40 was expended, the principal items of which were the excavation of 2,031 cubic yards of earth for draining the Mindi swamp, the laying of 393 linear feet of 20-inch concrete pipe for drainage purposes, and the placing of 13 cubic yards of concrete in the culvert.

Under the head of miscellaneous work performed, the sum of \$7,918.39 was expended. This covered miscellaneous jobs for the Panama Railroad, cattle industry, supply department, and United States Army.

Under the head of maintenance there were expended in the Northern District the following sums:

Brazos Brook reservoir.....	\$9,666
Agua Clara reservoir.....	9,658
Maintenance of water system, Cristobal district.....	31,514
Maintenance of water system, Brazos Brook to Colon line.....	1,100
Margarita water line.....	3,368
Toro Point water line.....	4,740
Water lines in Gatun district.....	5,732
Water lines in Monte Lirio district.....	719
Water lines, Frijoles district.....	157
Sewer maintenance for entire Northern district.....	5,839
Road maintenance for the entire Northern district.....	31,992

Following is a list of more important items of material used on construction and maintenance work:

Cement.....	barrels.....	19,757
Sand.....	cubic yards.....	4,962
Gravel.....	do.....	12,845
Screenings.....	do.....	5½
Lumber.....	feet, board measure.....	325,347
Reinforcing steel.....	pounds.....	197,835
6, 8, 10, and 12 inch vitreous sewer pipe.....	linear feet.....	7,730
20-inch concrete pipe.....	do.....	4,238
24-inch concrete pipe.....	do.....	612
Galvanized-iron pipe, ¼, ⅜, ½, ¾, 1, 1¼, 1½, 1¾, 2, 2½, 3, 4, 5, 6, 8, and 10 inch.....	linear feet.....	44,508
Second-hand galvanized pipe, 1, 3, 4, 5, 6, 8, and 10 inch.....	do.....	3,051
Extra heavy black-iron pipe, 10-inch.....	do.....	484
C. I. B. & S. water pipe, 4, 6, 8, 10, and 12 inch.....	do.....	10,514
Crude oil.....	barrels.....	204
Water meters.....	.....	181
Pig lead.....	pounds.....	22,321
Three-way fire hydrants.....	.....	23
Asphalt.....	pounds.....	9,315
Tarvia.....	gallons.....	26,994
Coal.....	tons.....	167
Water meter repair parts.....	.....	\$534.92

The municipal division continued to perform maintenance work on streets, water and sewer systems in the city of Colon, \$64,999.23 being spent. The following table shows the amount of water used in Colon during the fiscal year, by quarters, together with amount of water rentals.

*Consumption of water.*

Quarter ended—	Paying connections.	Consumption per quarter.				Total consumption.	Average daily consumption.
		Private connections.	Panama Railroad reservation.	Panama Canal hospital and quarantine.	Public fire hydrants and taps.		
Sept. 30, 1918.....	970	<i>Gallons.</i> 67,858,750	<i>Gallons.</i> 5,739,500	<i>Gallons.</i> 5,708,250	<i>Gallons.</i> 66,693,675	<i>Gallons.</i> 146,000,175	<i>Gallons.</i> 1,622,224
Dec. 31, 1918.....	965	57,250,500	6,486,000	6,733,500	69,788,625	140,258,625	1,447,318
Mar. 31, 1919.....	971	68,732,750	5,900,250	11,914,500	53,974,000	140,521,500	1,561,350
June 30, 1919.....	977	68,455,750	6,368,750	10,433,500	46,508,150	131,766,150	1,464,068
Total for year.....	.....	262,297,750	24,494,500	34,789,750	236,964,450	558,546,450	1,523,740

*Water rental collections.*

Quarter ended—	Amount collected from private consumers.	Amount collected from Panama Railroad.	Amount collected from Panama Canal.	Amount paid or to be paid by Panaman Government.	Total revenue per quarter.	Average consumption per private connection per quarter.	Average private quarterly bill.	Cost per hydrant.
Sept. 30, 1918.....	\$27,758.00	\$1,722.00	\$1,712.70	.....	\$31,192.70	<i>Gallons.</i> 69,957	\$28.62	.....
Dec. 31, 1918.....	25,639.05	1,946.40	2,020.50	.....	29,605.95	59,327	26.57	.....
Mar. 31, 1919.....	27,593.35	1,770.30	3,574.80	\$1,384.49	34,322.94	70,786	28.42	\$11.93
June 30, 1919.....	27,655.90	1,913.10	3,102.60	.....	32,671.60	70,067	28.31	.....
Total for year....	108,646.30	7,351.80	10,410.60	1,384.49	.....	67,536	27.98	.....

*Report of operation of pumping stations in the northern district.*

Pumping station.	Total gallons pumped during year.	Average number of gallons per month.	Average cost per thousand gallons for pumping.
Mount Hope.....	1,647,850,000	137,320,833	\$0.0185
Agua Clara.....	424,798,000	35,399,860	.0419
Frijoles.....	10,138,000	844,833	.2551
Monte Lirio.....	3,523,000	293,583	.5714

The following statement shows the division cost of water delivered in the various districts of the Canal Zone during the fiscal year ended June 30, 1919:

District.	Cost per thousand gallons.	District.	Cost per thousand gallons.
Cristobal.....	\$0.07	Pedro Miguel.....	\$0.07
Gatun.....	.11	Miraflores.....	.06
Gamboa.....	.14	Ancón-Balboa.....	.07
Paraiso.....	.07		

The sale of water to vessels at the docks at Cristobal and Balboa was handled by the municipal division. The rate charged for water was 50 cents per thousand gallons, with a minimum charge of \$3. The following table shows total quantity of water sold at each of the two ports in the Canal Zone and the total number of vessels taking water during the year:

Port.	Vessels supplied with water.	Gallons water sold.
Cristobal.....	1,589	75,536,354
Balboa.....	1,290	27,048,500

The following statement shows the status of capital cost account for municipal improvements in Panama and Colon:

Items.	Panama.	Colon.
Cost of original water and sewer system within city prior to July 1, 1910.....	\$504,911.57	\$314,760.99
Cost of original pavements within city prior to July 1, 1910.....	447,966.60	221,070.29
Cost of extensions to water and sewer systems within city prior to July 1, 1910.....	122,165.92	169,581.52
Cost of extensions to pavements prior to July 1, 1910.....	92,193.08	88,967.20
Interest on capital cost water and sewer systems and pavements prior to July 1, 1910.....	77,742.27	48,314.47
Proportion interest on capital cost reservoirs, pumping stations, and pipe lines prior to July 1, 1910.....	6,216.66	6,125.16
Cost of maintenance water and sewer systems and pavements and proportion cost of maintenance reservoirs, pumping stations, and pipelines prior to July 1, 1910.....	99,617.17	145,025.27
Water-rental collections prior to July 1, 1910.....	212,375.20	200,410.74
Capital cost water and sewer systems and pavements July 1, 1919 <sup>1</sup> .....	1,030,070.31	1,004,010.80
Capital cost reservoirs, pipe lines, pump stations, and filter plants in Zone July 1, 1919 <sup>1</sup> .....	1,765,222.58	585,642.89

<sup>1</sup> Panaman Government pays a proportion of interest on these sums at 2 per cent, based on relation of total quantity of water used in Panama and Colon to total quantity produced by system.

## PANAMA.

Fiscal year ending—	New construction in city.	Maintenance work.	Interest.	Applied in amortization of capital cost.	Water rentals, including deficiencies.
June 30, 1911.....	\$54,609.74	\$30,121.03	\$25,759.26	\$26,611.99	\$78,467.71
June 30, 1912.....	38,745.05	35,563.86	26,532.29	31,651.54	97,772.26
June 30, 1913.....	11,815.77	38,470.70	27,468.14	48,937.71	114,876.55
June 30, 1914.....	1,505.37	104,469.25	29,086.29	32,648.88	166,204.42
June 30, 1915.....	5,034.13	88,414.68	24,505.45	25,247.78	138,167.91
June 30, 1916.....	.....	84,543.88	32,094.21	25,283.10	141,921.19
June 30, 1917.....	.....	97,744.09	30,404.15	25,283.07	153,431.31
June 30, 1918.....	.....	94,966.25	29,632.23	25,283.04	149,881.52
June 30, 1919.....	59,960.58	110,749.46	29,166.31	25,459.76	165,375.53
Total.....	158,039.10	685,043.20	254,648.33	266,406.87	1,206,098.40

## COLON.

June 30, 1911.....	\$188,114.24	\$43,111.09	\$19,041.25	\$18,019.80	\$78,870.28
June 30, 1912.....	84,528.41	54,470.85	21,774.37	20,994.40	98,541.48
June 30, 1913.....	88,071.07	51,161.60	24,101.66	23,553.23	98,816.49
June 30, 1914.....	14,302.97	61,542.71	26,292.38	24,388.65	112,223.74
June 30, 1915.....	1,413.33	64,125.55	26,611.47	24,513.22	115,250.24
June 30, 1916.....	1,908.82	85,171.60	26,256.02	24,569.28	135,996.90
June 30, 1917.....	54,876.54	69,774.81	25,062.22	24,868.25	119,705.28
June 30, 1918.....	4,799.90	75,490.70	25,463.52	15,992.66	126,946.88
June 30, 1919.....	3,787.14	71,887.25	24,262.22	26,137.31	122,286.78
Total.....	441,802.42	576,736.16	218,865.11	203,036.80	1,008,638.07

<sup>1</sup>Indicates credit by adjustment.

## OPERATION OF WATER-PURIFICATION PLANTS AND TESTING LABORATORIES.

The following is a report of work performed by chemical section of the testing laboratories at Miraflores during the fiscal year ended June 30, 1919:

	Number of samples analyzed.
Tarvia .....	3
Asphalt wearing surface.....	50
Asphalt wearing-surface mixtures.....	6
Miscellaneous work, including samples of paints, asphaltic enamels, oils, cement, sand, lime, alum, coal, ores, rocks, boiler scales, alloys, gas, air, and chemicals, etc.....	143



The following is a summary of the report of work performed in connection with the operation of water-purification plants during the year:

	Agua Clara.	Mount Hope.	Miraflores.
Placed in service.....	Dec. 29, 1911.....	Feb. 23, 1914.....	Mar. 14, 1915.
District supplied.....	Gatun, Toro Point.	Colon, Mount Hope, Margarina Point, Cristobal.	Pedro Miguel, Co, rozal, Aneon, Balboa, Panama-Paraiso.
Source of supply.....	Agua Clara reservoir.	Brazos Brook reservoir.	Chagres River.
Rated capacity, gallons per day.....	2,500,000	8,000,000	15,000,000
Method of purification.....	Aeration, sedimentation, rapid sand filtration.	Aeration, sedimentation, rapid sand filtration.	Aeration, sedimentation, rapid sand filtration.
Aeration basin:			
Size.....feet.....	14 by 8	60 by 66	86 by 130
Number of nozzles.....		85	105
Sedimentation basin:			
Size.....feet.....	70.5 by 71	171 by 171	300 by 125
Depth.....do.....	10.5	12.25	16.5
Capacity.....gallons.....	350,000	2,500,000	4,500,000
Period of sedimentation.....hours.....	10	14	12
Rapid sand filters:			
Number of units.....	4	6	14
Total sand area.....square feet.....	1,156	3,078	5,950
Depth of filtering material—			
Sand.....inches.....	30	30	30
Gravel.....do.....	24	22	24
Size of filtering materials:			
Sand, effective size.....	0.44	0.41	0.41
Sand, uniformity coefficient.....	1.81	1.70	1.70
Gravel, size.....inches.....	$\frac{3}{8}$ to $1\frac{1}{2}$	$\frac{3}{8}$ to $1\frac{1}{2}$	$\frac{3}{8}$ to $1\frac{1}{2}$
Per cent of sand area covered by horizontal area of troughs.....	22.3	32.0	32.8
Washing of filters:			
Vertical rise per minute.....inches.....	19	20	24
Gallons per square foot of sand area.....	12	12.5	15
Filter bottom, type.....	Harrisburg, Pa....	Harrisburg, Pa....	Concrete false bottom.
Loss of head:			
Average initial.....feet.....	0.5	1.3	1.0
Average final.....do.....	6.5	12.5	11.5
Length of filter runs, hours, yearly average.....	79.3	26.4	31.6
Volumes of water, average gallons per day:			
Raw.....	1,186,000	4,633,000	9,466,000
Filtered.....	1,164,000	4,515,000	9,371,000
Delivered to mains.....	1,151,000	4,395,000	9,120,000
Wash water.....	13,000	120,000	267,000
Per cent of filtered water.....	1.13	2.66	2.85
Chemicals, yearly averages:			
Alum, pounds per million gallons.....	147	182	132
Lime, pounds per million gallons.....	49		
Liquid chlorine, parts per million, available chlorine.....		0.386	0.40
Physical and chemical characteristics of filtered water, parts per million:			
Color.....	3	4	0
Turbidity.....	0	0	0
Free carbonic acid (CO <sub>2</sub> ).....	0	2.5	3.6
Carbonate (CO <sub>3</sub> ).....	0.94	0	0
Alkalinity, orycthosine (CaCO <sub>3</sub> ).....	18.9	28.9	46.8
Hardness, soap (CaCO <sub>3</sub> ).....	26.2	39.7	46.5
Oxygen consumed.....	1.57	1.7	0.9
Chlorine (Cl).....	6.8	6.0	6.6
Iron (Fe).....	0.11	0.11	0.12
Solids, total.....	75	85	101
Nitrogen as—			
Nitrites (NO <sub>2</sub> ).....	0.0001	0.0000	0.0000
Nitrates (NO <sub>3</sub> ).....	0.039	0.005	0.026
Colonies of bacteria per c. c. in water from distribution system:			
Nutrient agar at 37.5° C., 24 hours.....	269	16	46.4
B. coli index, number per liter.....	155	12.9	12.1

<sup>1</sup> Aerator box.

Concrete test specimens made and broken during the fiscal year ended June 30, 1919.

(Cylinders 6 inches in diameter and 12 inches high.)

Location.	Runs sampled.	Cylinders.		Age of concrete in days.						
		Made.	Broken.	7	28	60	90	120	180	365
Pacific roads.....	34	690	793	.....	500	.....	54	204	19	16
Pacific sidewalks.....	3	16	40	.....	20	.....	.....	20	.....	.....
Atlantic roads.....	17	200	197	.....	101	4	20	72	.....	.....
Ancon Hospital.....	16	83	266	9	114	.....	4	131	4	4
Cold storage plant.....	1	8	84	.....	20	.....	.....	64	.....	.....
Pier No. 6, Cristobal.....	84	.....	638	.....	557	13	68	.....	.....	.....
Larvacide factory.....	1	1	13	.....	.....	5	4	4	.....	.....
Oil tanks.....	.....	.....	19	.....	.....	4	4	11	.....	.....
Ice plant.....	1	8	8	.....	4	.....	.....	4	.....	.....
Abattoir.....	1	8	8	.....	4	.....	.....	4	.....	.....
Tivoli Hotel kitchen.....	2	14	14	6	8	.....	.....	.....	.....	.....
Miraflores dump <sup>1</sup> .....	6	72	.....	.....	.....	.....	.....	.....	.....	.....
Experimental work.....	16	406	337	56	153	44	40	44	.....	.....
Total.....	182	1,506	2,417	71	1,481	70	194	558	23	20

<sup>1</sup> Army post, building construction.

The 133,738 square yards of concrete highways laid during the past year were inspected by the laboratory and several suggestions for the improvement of the quality of the concrete were made.

Since December 18, 1918, the roads have been finished by means of an iron roller 6 feet long, 10 inches in diameter, and weighing 80 pounds, operated by a light handle. The roller is made of sheet iron United States gauge No. 12. This roller compacts the concrete and brings sufficient mortar to the top so that a smooth hard-wearing surface is obtained. The final finish is made by the use of a flexible push board with a length equal to the width of the pavement, 10 inches wide and 1 inch thick, fitted to operate with high handles on each end.

In order to increase the daily output of the concrete mixers and yet retain the quality of the concrete, time studies which show the following results have been made upon the operation of the mixers.

A characteristic time study made on a batch mixer:

Operations.	Time in seconds.	Operations.	Time in seconds.
Raising skip.....	8	Emptying mixer.....	30
Putting in water (additional).....	20	Preparing to raise skip.....	2
Mixing concrete.....	60	Total period of mix.....	120

Since the water is added from the time the mixer is empty, the total length of time required to add water is 2+8+20, or 30 seconds. It is very evident that the length of time required to add the water (30 seconds) and the length of time required to empty the mixer (30 seconds) should be reduced.

The samples of the concrete taken from the highway and treated in compression gave the following results:

Mix.	The average ultimate compressive strength in pounds per square inch based upon the total number of test specimens for the year, 28-day period.	Mix.	The average ultimate compressive strength in pounds per square inch based upon the total number of test specimens for the year, 28-day period.
1:4.....	2,165	1:6.....	1,173
1:5.....	1,599	1:2.4.....	1,949

The test specimens have in the past been broken by the municipal engineering division's engineer of test, using a Riehle 100,000-pound machine located in the mechanical division laboratory. In April a laboratory was equipped in Ancon, with an Olsen 200,000-pound compression testing machine, especially designed for breaking concrete specimens.

The 1:4, 1:5, and 1:6 concrete was made, against general practice, with the run-of-bank material, which is shown in the following analysis.

The values given below were obtained while separating 10 tons of sun-dried Chagres River run-of-bank into nine different sizes to be used in connection with some experimental work:

Size of screen.	Per cent passing each screen.	Size of screen.	Per cent passing each screen.
2½-inch.....	100.0	No. 16.....	119.0
2-inch.....	93.5	No. 20.....	117.9
1½-inch.....	85.7	No. 30.....	114.4
1¼-inch.....	79.0	No. 40.....	110.9
1-inch.....	72.0	No. 50.....	106.9
¾-inch.....	62.2	No. 80.....	106.2
½-inch.....	50.9	No. 100.....	102.3
¼-inch.....	35.2	No. 150.....	101.1
No. 10.....	22.4	No. 200.....	100.6

<sup>1</sup>Per cent obtained by sifting selected samples of the portion passing the No. 10 sieve through sieves of the corresponding sizes.

The 1:2:4 concrete was made by using the material from the same source which had been separated into two grades.

The analysis which follows gives good average values for this material:

Size of sieve.	Chagres River gravel.	Chagres River sand.	Size of sieve.	Chagres River gravel.	Chagres River sand.
	Per cent passing each sieve.			Per cent passing each sieve.	
3-inch.....	100.0		No. 16.....	7.4	50.0
2½-inch.....	99.0		No. 20.....	6.9	44.6
2-inch.....	98.0		No. 30.....	5.5	34.7
1½-inch.....	91.6		No. 40.....	4.3	24.5
1¼-inch.....	84.0		No. 50.....	3.0	17.2
1-inch.....	74.6		No. 80.....	2.1	8.8
¾-inch.....	62.0		No. 100.....	1.5	5.9
½-inch.....	41.9	100.0	No. 150.....	.8	2.8
¼-inch.....	16.8	87.4	No. 200.....	.4	1.5
No. 10.....	8.7	58.5			

An investigation to determine the effect that the moisture content of concrete has upon its ultimate compressive strength was undertaken in order to explain discordant results obtained in June, 1918, when from test specimens taken at the same time the set which was broken immediately upon being removed from the moist sand storage (standard method of procedure) showed 68 per cent of the strength in compression that another set showed which had been exposed, by mistake, to the air for 4 days before breaking.

The curve, shown on plate No. 4, fig. 1, was obtained by plotting values of the compressive strengths of sets of uniformly prepared test cylinders (6 by 12 inches), which varied only in their treatment after being made. One set was removed from the moist sand and immediately broken, other sets were removed from the moist sand and exposed to the air for 1, 3, 5, 7, etc., days before being broken. All of the cylinders were broken at the age of 28 days.

In the figure the abscissas represent the number of days exposed to the drying effects of the tropical air after being buried in moist sand and before being broken, and the ordinates give the per cent of the ultimate compressive strength which the average of the sets of specimens (exposed for the indicated number of days) was found to have, assuming as 100 per cent the ultimate compressive strength of the specimens cured according to standard conditions—that is, buried in moist sand until ready to be broken.

Thus in the figure at the extreme left the strength of the specimens that have been buried in moist sand for the total length of time, 28 days, is represented as 100 per cent; and at the extreme right the per cent of this strength is represented for the specimens that have been exposed to the air 27 days after being buried for 1 day in moist sand.

The curve shows that the compressive strength of the concrete exposed to the air after being buried in moist sand for one day is reduced to less than 60 per cent of the strength it would have attained if stored in moist sand for the total of 28 days—i. e., if treated under standard conditions, or, in other words, saturated with water.

The term "saturated with water" is used here because it has been found that by drying out the concrete the strength has been increased considerably. For example, from the curve it can be seen that if the concrete is kept in a saturated condition for 27 days and dried for 1 day, it is 15 per cent stronger than it would have been if broken when saturated with water. If, however, it is allowed to dry for 3 days, it would be about 25 per cent stronger. Longer drying seems to cause no appreciable increase, and as it has been found that this period (3 days) coincides practically with the length of time required for the water to dry out from even the middle of the specimen the concrete may be said to contain free water unless dried for at least 3 days.

The maximum compressive strength at 28 days which is obtained by removing the test specimen from the moist sand storage after 23 days and allowing it to dry out is 212 per cent of what it would have been if the test specimen had been exposed to the air after being buried for but 1 day.

The shape of the curve shown indicates that a chemical action takes place for about 20 days in the presence of excess water, and that a considerable increase in the strength results from this action.

The decrease in strength when the specimen is wet is believed to be due to the physical action of lubrication, or perhaps to the noncompressibility of water.

It might be supposed by some that even though there was a very large variation in the compressive strength between the specimen buried for the total period previous to breaking and the specimen buried for only 1 or 2 days when both specimens were broken in 28 days that the compressive strength would be more nearly equal if a longer period had elapsed. This has been found to be a false supposition, for in sets broken in 4 months there have been found to be larger differences between the specimens buried for 1 day and those buried for the total time than there are in 28 days.

The application to road construction of the findings as shown in the above curve are as follows:

1. Concrete pavements should be kept continually moist for as long a period of time as is possible.
2. Concrete pavements should be allowed to dry out for at least 4 days before being opened to traffic.
3. The curing of concrete test specimens should always be described when any results on the ultimate compressive strength of concrete are published. The length of time that specimens are drying in the laboratory prior to breaking should also be stated.

A series of specimens were made by varying the time of mixing the concrete in order to obtain the curve shown on Plate No. 4, Figure 2, which demonstrates the advantage of using at least a minute-mix.

Series of experimental test specimens were made that proved the consistency of mix or the amount of mixing water used affected the ultimate compressive strength much more than the ordinary variations in the amount of cement used.

The drier the mix, within reasonable limits, the higher the ultimate compressive strength and the greater the resistance to abrasion.

## SECTION OF METEOROLOGY AND HYDROGRAPHY.

The section of meteorology and hydrography continued to keep the permanent records of weather conditions on the Canal Zone, the hydrology of Gatun Lake watershed, and the hydrographic conditions at the Atlantic and Pacific ports of the canal. Special investigations were carried to conclusion and report as indicated in the report of the chief hydrographer, which follows:

## SECTION OF METEOROLOGY AND HYDROGRAPHY.

*R. Z. Kirkpatrick, Chief Hydrographer.*

Report on meteorological and hydrographic work and conditions for the fiscal year ended June 30, 1919, is submitted herewith:

The section of meteorology and hydrography continued to keep the permanent records of weather conditions on the Canal Zone, the hydrography of Gatun Lake watershed, and the hydrographic conditions at the Atlantic and Pacific ports of the canal. Special investigations were concluded and reported upon as outlined in the report of the chief hydrographer.

## PERSONNEL.

Mr. Geo. J. Bentley, meteorologist, was reemployed, effective August 15, 1918, vice Mr. G. E. Matthew, resigned to enter the military service.

Mr. L. T. Chapel, meteorologist, resigned to enter the military service, effective October 20, 1918, and returned to his former position January 27, 1919.

Mr. H. G. Cornthwaite, chief hydrographer, was in charge of the work of the section up to February 21, 1919, when he assumed the assistant chief hydrographer's position.

Mr. R. Z. Kirkpatrick returned from military service and resumed his former position as chief hydrographer on February 21, 1919.

Mr. R. L. Mitchell returned from military service and resumed his former position as hydrographer, effective March 22, 1919.

Mr. Geo. Johnson, hydrographer, transferred to the mechanical division on April 1, 1919.

Several changes were made during the year in the position of computer.

## METEOROLOGY.

*General.*—Few changes were made during the year in the meteorological stations. All stations enumerated in the 1918 annual report were continued in operation and the following new stations were established:

A standard rain gauge was installed on the Cocoli arm of Miraflores Lake watershed on August 16, 1918. Rainfall measurements at this station are made twice monthly, and the records are used in connection with estimating the average rainfall over the Miraflores Lake drainage area.

An anemoscope and quadruple register were installed on Sosa Hill on August 21, 1918, for registering the velocity and direction of the wind. This station was previously equipped to record wind velocity only.

An evaporation station was established at Gamboa in September, 1918. Records from this station are used in connection with the Gatun evaporation record in computing the evaporation loss from Gatun Lake.

An evaporation station was installed on Miraflores Lake on December 24, 1918, for use in measuring the evaporation loss from this lake.

A standard rain gauge was installed on the Pequeni branch of the Chagres River at the mouth of the Rio Boqueron on December 21, 1918. Rainfall measurements are made twice monthly. The records are used in connection with estimating the average rainfall over the Gatun Lake drainage basin.

The rainfall station at Porto Bello was reestablished on December 23, 1918, after having been closed since August, 1914. Porto Bello is favorably located on the Atlantic coast, near the headwaters of the Boqueron branch of the Chagres River. During the seven years that rainfall records were kept at Porto Bello the average annual rainfall amounted approximately to 169 inches. This is the heaviest average rainfall of any station on the Isthmus.

A fully equipped weather station was established at Cape Mala on March 14, 1919, in charge of the chief electrician, naval radio station. Radio weather reports are received from this station at 8 a. m. and 1 p. m. daily, advising the canal and shipping interests of the daily conditions of weather and sea at the entrance to the Gulf of Panama.

*Precipitation.*—Rainfall for the calendar year 1918 was below normal at all stations in the Canal Zone and vicinity, except Empire and Bocas del Toro. The deficiencies ranged from 3.77 inches at Colon to 39.59 inches at Bohio.

The rainfall was unequally distributed throughout the year, being unusually heavy in May and October and generally deficient during the remainder of the year. October was the month of heaviest rainfall at most stations, and February was the month of lightest rainfall.

Annual totals ranged from 30.09 inches at Taboga to 127.12 inches at Brazos Brook.

The average rainfall in the Pacific section was 62.20 inches, in the central section, 85.08 inches; and in the Atlantic section, 117.86 inches.

The greatest precipitation recorded during the year in 24 consecutive hours was 8.12 inches at Brazos Brook on October 16-17, 1918. Daily quantities of 4 inches or more were recorded as follows:

Station.	Date.	Rainfall.	Station.	Date.	Rainfall.
		<i>Inches.</i>			<i>Inches.</i>
Trinidad.....	May 4.....	6.00	Monte Lirio.....	Oct. 18.....	4.77
Bocas del Toro.....	May 15.....	4.49	Do.....	Oct. 1.....	4.33
Do.....	Aug. 6.....	5.19	Gatun.....	Oct. 16-17.....	5.42
Río Grande.....	Oct. 21-22.....	4.61	Agua Clara.....	Oct. 17.....	4.90
Culebra.....	Oct. 21.....	4.30	Brazos Brook.....	Oct. 16-17.....	8.12
Empire.....	Oct. 21-22.....	5.10	Colon.....	Oct. 16-17.....	7.56
Darien.....	Oct. 18.....	4.86	Bocas Del Toro.....	Nov. 10.....	4.21

Rainfall during the first three months of 1919 was extremely deficient—the lowest of record at several stations—but the 1919 dry season terminated approximately two weeks earlier than usual, and rainy season conditions were well established over the Isthmus before the middle of April.

The monthly rainfall for 1918 and the first half of 1919 and the station averages are presented in table No. 1. The maximum rainfall of record for periods of 5 minutes, 1 hour, and 24 hours is shown in table No. 2. The monthly distribution of rainfall in 1918 at selected stations, compared with monthly normals, is shown graphically on plate No. 8, and the distribution of annual rainfall in the Canal Zone is shown on plate No. 9.

*Air temperatures.*—Average air temperatures for the year 1918 were approximately normal. The highest temperatures in the year occurred in April and the lowest in January and March.

The means and extremes in air temperature for the year 1918 are presented in the following table:

Station.	Maximum.		Minimum.		Annual mean.
	° F.	Date.	° F.	Date.	
Balboa Heights.....	92	Nov. 3	66	Jan. 6	80.2
Gamboa.....	94	Apr. 28	64	Mar. 26	79.5
Alhajuela.....	93	Apr. 27	61	Mar. 24	78.5
Gatun.....	92	Apr. 25	68	Jan. 4	80.5
Colon.....	90	Apr. 25	70	Jan. 2	79.6

The maximum and minimum temperatures of record at the various stations are given below (records revised to June 30, 1919):

Station.	Maximum.		Minimum.		Annual average.	Years' records.
	° F.	Date.	° F.	Date.		
Balboa Heights.....	97	Apr. 7, 1912	63	Jan. 27, 1910	80.1	13
Gamboa.....	94	Apr. 28, 1918	63	Feb. 5, 1917	79.0	2
Alhajuela.....	96	Apr. 18, 1912	60	Feb. 5, 1917	78.8	8
Gatun.....	92	May 30, 1915	66	Aug. 7, 1912	80.4	8
Colon.....	92	June 3, 1909	66	Dec. 3, 1909	79.7	11

<sup>1</sup> Other dates also.

NOTE.—The lowest temperature of record on the Isthmus since the American occupation is 59° F., recorded at Bas Obispo (near Gamboa) on February 9, 1907.

The minimum temperature of record at Alhajacla should read 60° F. instead of 58° F., recorded in the 1918 Annual Report.

The highest temperature of record on the Isthmus, 97° F., was recorded at Ancon on April 7, 1912, but the same maximum temperature was reached at Naos Island on February 13, 1906.

The temperature during the first six months of 1919 averaged slightly above normal.

Monthly temperature records and other meteorological data at the two principal stations are presented in Tables Nos. 3 and 4.

*Winds.*—The annual wind movement in the Canal Zone for the year 1918 was generally above normal. February was the windiest month at all stations, and September was the month of least wind movement. Northwest, north, or northeast winds prevailed at all stations, although there was a considerable percentage of southeast and variable winds during the rainy season months.

The average hourly wind movement, prevailing direction, and maximum velocities at the various stations for the year 1918 are presented in the following table:

Station.	Average wind movement (miles per hour).		Year 1918.			
	1918	Annual average.	Prevailing direction.	Maximum velocity.		
				Miles.	Direction.	Date.
Balboa Heights.....	8.0	7.5	North.....	36	Northwest....	Aug. 1
Pedro Miguel.....	5.7	5.5	Northwest....	26	Northeast....	Aug. 28
Gamboa.....	5.4	4.9	Northeast....	39	do.....	June 5
Gatun.....	5.5	7.2	North.....	33	East.....	Aug. 28
Colon.....	11.1	10.4	do.....	36	do.....	Oct. 1

The following table, revised to June 30, 1919, gives the maximum wind velocities of record at stations in the Canal Zone:

Stations.	Maximum velocity.			Years of record.
	Miles per hour.	Direction.	Date.	
Sosa Hill.....	48	South.....	June 11, 1913	2
Balboa Heights.....	59	do.....	July 10, 1909	11
Pedro Miguel.....	30	Northeast....	Sept. 23, 1912	9
Gamboa.....	39	do.....	June 6, 1918	5
Gatun.....	50	South.....	June 17, 1919	8
Colon.....	46	North.....	Apr. 4, 1915	11

The wind movement during the first six months of 1919 was generally above normal, being highest in January and March.

*Atmospheric pressure.*—The mean atmospheric pressure for the year 1918 was slightly below normal on both coasts. March was the month of highest pressure and July was the month of lowest average pressure.

*Relative humidity.*—The mean relative humidity of the atmosphere for the year 1918 was about 83 per cent on both coasts. February and March were the months of lowest average humidity; August and October were the months of greatest humidity.

*Cloudiness.*—The average daytime cloudiness for the year 1918 was below normal on the Pacific coast and slightly above normal on the Atlantic side. February and March were the months of least cloudiness, while the highest degree of cloudiness occurred in May, August, and October.

*Evaporation.*—Evaporation from the Lake surface at Gatun for the year 1918 was the highest annual evaporation of record since the filling of Gatun Lake. The total annual evaporation was the highest of record at the coast stations also.

During the first six months of 1919 the evaporation averaged above normal, being highest in January, February, and March.

Evaporation records at the various stations are shown in Table No. 5.

*Fogs.*—No fogs were observed during the year at the Atlantic entrance and but few on the Pacific coast. The usual conditions of frequent night and early morning foginess prevailed at interior stations during the rainy season. Practically all fogs observed lifted or were dissipated by 8.30 a. m.

*Sea temperature.*—The surface temperature for the sea water was approximately normal on both coasts. Records for the year 1918 are given in the following table:

*Temperature of sea water.*

Station.	Maximum.		Minimum.		1918 mean.	Annual average.
	°F.	Date.	°F.	Date.		
Balboa.....	87	Several..	69	<sup>1</sup> Mar. 2	80.3	79.8
Colon.....	87	June 23	77	<sup>1</sup> Jan. 2	82.2	82.1

<sup>1</sup> Other dates also.

*Seismology.*—Forty-six seismic disturbances were recorded at the Balboa Heights seismological station during the fiscal year 1919. Most of these disturbances were slight tremors from shocks of distant origin; they were too feeble here to cause damage to buildings or other canal structures.

The disturbances recorded on July 17, 1918, October 11, 1918, and November 29, 1918, were classed as force II on the Rossi-Forel scale. All other shocks were classed as intensity I (very feeble).

The number of seismic disturbances recorded by months, during the past fiscal year are shown in the following table:

1918		1919	
Month.	Number of shocks. <sup>1</sup>	Month.	Number of shocks. <sup>1</sup>
July.....	5	January.....	2
August.....	4	February.....	1
September.....	4	March.....	2
October.....	6	April.....	3
November.....	7	May.....	1
December.....	10	June.....	1

<sup>1</sup> Total, 46.

The following plates and tables accompany the meteorological section of this report:

Plate No. 8.—Monthly rainfall, 1918, and station averages.

Plate No. 9.—Distribution of rainfall in Canal Zone, maximum, minimum, current, and average years.

Table No. 1.—Monthly rainfall in Canal Zone and station averages.

Table No. 2.—Maximum rainfall in Canal Zone and vicinity.

Table No. 3.—Monthly meteorological data, Balboa Heights, Canal Zone, year 1918.

Table No. 4.—Monthly meteorological data, Colon, year 1918.

Table No. 5.—Monthly evaporation in Canal Zone.



TABLE NO. 1.—Monthly rainfall in Canal Zone, 1918-19, and station averages.

[Values in inches.]

Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Balboa:													
1918.....	1.02	0	1.32	4.33	6.45	4.57	4.32	3.75	6.58	8.52	8.62	1.42	50.90
1919.....	.13	.06	T.	6.32	5.92	7.75							
Average 20 years	1.07	.63	.67	3.80	8.18	7.30	8.06	7.62	6.97	9.32	9.31	5.51	68.44
Balboa Heights:													
1918.....	1.78	T.	1.25	4.52	6.75	5.20	5.13	3.84	7.03	9.16	9.61	.55	54.82
1919.....	.28	T.	T.	6.42	5.21	8.93							
Average 21 years	1.03	.84	.68	2.92	8.62	7.50	7.82	7.81	7.75	10.25	10.33	4.28	69.83
Miraflores:													
1918.....	3.37	0	.20	10.89	8.36	5.70	5.21	5.70	6.97	10.01	5.88	1.93	64.22
1919.....	.16	0	0	5.79	6.07	4.60							
Average 10 years	1.88	1.11	.46	4.17	9.99	8.65	8.15	8.57	9.22	12.05	10.87	6.56	81.68
Pedro Miguel:													
1918.....	3.08	.02	.03	11.01	9.36	6.55	5.54	4.41	7.27	10.57	7.16	1.09	66.09
1919.....	.48	T.	T.	6.58	7.37	3.99							
Average 11 years	1.22	.74	.34	4.24	10.88	9.44	8.87	8.32	8.83	11.84	11.26	5.62	81.60
Rio Grande:													
1918.....	1.48	.12	0	7.77	13.68	7.33	7.18	5.52	7.81	16.02	7.75	.31	74.97
1919.....	.64	.02	0	6.44	6.35	6.23							
Average 14 years	1.19	.73	.29	3.46	10.83	9.15	9.98	9.40	10.36	12.48	11.59	5.31	84.77
Culebra:													
1918.....	1.75	.10	.02	6.91	16.20	8.07	8.49	4.91	10.01	16.81	7.28	.39	80.94
1919.....	.62	.05	T.	7.41	6.90	5.73							
Average 28 years	1.60	.67	.58	3.69	11.14	8.84	9.43	10.05	10.74	11.43	12.42	6.90	87.49
Camacho:													
1918.....	1.04	.02	.16	6.69	15.30	10.92	7.79	6.81	9.12	16.66	8.63	.35	83.49
1919.....	1.03	.21	.08	8.52	5.08	5.08							
Average 12 years	1.02	.89	.43	3.41	11.57	9.77	9.72	9.49	10.31	13.20	13.40	5.60	88.81
Empire:													
1918.....	1.50	.02	.20	6.91	13.56	9.31	9.24	5.18	9.25	20.15	7.19	.38	82.89
1919.....	.50	.24	.05	7.52	7.01	5.57							
Average 14 years	.80	.77	.35	3.44	10.13	8.70	8.98	9.16	8.78	13.28	11.88	4.97	81.24
Gambo:													
1918.....	3.07	.07	.54	3.16	11.45	10.12	6.51	8.59	7.60	17.25	5.86	1.25	75.47
1919.....	.55	.21	.03	7.02	5.82	6.02							
Average 36 years	1.77	.86	.74	3.60	10.83	9.78	10.21	11.90	10.41	12.79	12.10	6.62	91.61
Juan Mina:													
1918.....	1.35	.96	0	3.80	10.29	13.56	5.25	11.36	11.53	16.77	6.78	.48	82.13
1919.....	.97	.04	13.62	7.77	5.50								
Average 8 years.	.69	1.33	.24	3.36	10.92	11.13	9.48	11.92	11.85	14.83	12.96	4.73	93.44
Alhajuela:													
1918.....	.93	.14	.02	6.80	11.34	15.76	8.79	9.16	11.07	12.03	6.94	.27	83.25
1919.....	.75	.04	.07	9.06	6.11	6.87							
Average 19 years	1.03	.78	.49	3.68	12.25	12.51	12.44	12.51	11.69	14.01	14.35	5.94	101.68
Vigia:													
1918.....	1.37	.30	.17	4.91	11.46	15.58	11.96	10.25	13.24	13.81	8.40	.13	91.58
1919.....	.93	0	.01	10.02	4.30	7.07							
Average 10 years	.80	1.66	.43	3.20	12.01	13.50	12.20	12.67	13.13	16.22	14.89	4.57	105.28
Frijoles:													
1918.....	3.03	.24	.31	5.27	11.29	8.06	6.37	8.91	12.87	19.36	14.14	1.35	91.20
1919.....	1.61	.52	.47	10.07	8.28	5.85							
Average 7 years.	1.93	2.41	.58	4.44	11.93	10.24	9.84	10.27	11.03	15.91	16.64	5.62	100.84
Trinidad:													
1918.....	3.96	.37	.39	4.75	15.10	5.39	4.78	5.81	9.04	15.71	7.73	.91	73.94
1919.....	2.47	.34	.38	6.34	7.28	12.30							
Average 11 years	2.79	2.70	2.04	4.98	13.55	10.14	9.24	10.51	11.23	14.49	17.90	7.95	107.52
Monte Lirio:													
1918.....	3.92	.76	1.34	4.20	14.51	9.43	7.83	11.82	12.10	23.57	15.37	1.04	105.89
1919.....	4.03	1.15	.59	11.66	5.20	8.16							
Average 11 years	2.76	3.30	2.37	5.21	13.16	12.68	11.82	11.87	12.82	16.80	21.52	8.87	123.18
Gatun:													
1918.....	4.03	.53	.55	6.66	11.64	8.29	8.15	17.93	7.27	22.73	11.49	1.92	101.19
1919.....	1.42	.54	.59	12.04	7.16	12.54							
Average 14 years	3.20	2.83	2.18	5.58	14.40	12.63	11.96	14.34	10.17	16.50	20.53	10.33	124.65
Brazos Brook:													
1918.....	4.72	1.00	.92	5.50	16.99	10.11	10.82	19.20	13.79	27.30	15.04	1.73	127.12
1919.....	2.48	.70	.73	12.48	8.71	11.70							
Average 12 years	3.18	3.25	2.22	5.04	13.71	14.62	15.46	14.71	12.37	16.98	22.39	11.11	135.04
Colon:													
1918.....	3.28	.67	.41	5.34	19.26	8.56	10.36	18.85	15.34	27.07	14.23	1.90	125.27
1919.....	1.82	.36	.61	10.95	6.95	12.08							
Average 48 years	3.85	1.67	1.61	4.21	12.71	13.38	16.02	15.00	12.67	14.89	21.34	11.69	129.04

NOTE.—Station averages do not include 1919 records.

TABLE NO. 2.—Maximum rainfall in Canal Zone and vicinity, Oct. 1, 1905, to June 30, 1919.

[Values in inches.]

Stations.	Maximum rainfall.					
	5 minutes.		1 hour.		24 hours. <sup>1</sup>	
	Inches.	Date.	Inches.	Date.	Inches.	Date.
Balboa (June 10, 1906).....	0.90	May 12, 1912	5.86	June 2, 1906	7.57	Nov. 16-17, 1906.
Balboa Heights (Oct. 1, 1905). <sup>2</sup>	.64	Aug. 7, 1908	3.98	Oct. 9, 1911	7.23	May 12-13, 1912.
Miraflores (June 19, 1914)....	.50	Sept. 6, 1917	4.09	Sept. 6, 1917	4.75	Sept. 6, 1917.
Pedro Miguel (Jan. 1, 1908) .	.60	Nov. 11, 1908	3.46	do.....	5.45	Nov. 19-20, 1917.
Río Grande (Dec. 29, 1905)...	.75	July 24, 1908	4.14	Nov. 20, 1917	8.24	Do.
Empire (July 18, 1906).....	.60	July 25, 1906 Oct. 21, 1918	4.19	Oct. 21, 1918	6.15	Dec. 3, 1906. <sup>3</sup>
Gamboa (Nov. 18, 1905).....	.59	July 27, 1908	3.32	May 11, 1911	6.56	Dec. 2-3, 1906.
Alhajuela (Mar. 31, 1907)....	.60	July 20, 1909	4.19	July 8, 1915	8.19	Dec. 2-3, 1906. <sup>3</sup>
Gatun (Oct. 1, 1905).....	.62	Aug. 3, 1912 Aug. 12, 1914	4.72	Aug. 12, 1914	10.48	Do.
Bobio (Oct. 1, 1905) <sup>4</sup> .....	.67	June 16, 1909	4.51	Aug. 7, 1908	8.85	Aug. 7-8, 1908.
Colon (Oct. 1, 1905).....	.64	Aug. 25, 1909	4.90	Oct. 8, 1909	8.53	Dec. 2-3, 1906.
Porto Bello (May 1, 1908) <sup>5</sup> ..	6 2.45	Nov. 29, 1911	4.53	Nov. 29, 1911	10.86	Dec. 28-29, 1909.

<sup>1</sup> Maximum fall in 24 consecutive hours.<sup>2</sup> Formerly Ancon. Station moved to Balboa Heights Oct. 1, 1914.<sup>3</sup> No automatic record on this date. Total for 24 hours ending at noon.<sup>4</sup> Station closed January, 1912.<sup>5</sup> Station closed Aug. 31, 1914, and reopened in December, 1918.<sup>6</sup> Approximate; automatic record indistinct, due to unusually excessive rate of fall.

NOTE.—Dates in parentheses opposite station names refer to installation of automatic registers.

TABLE NO. 3.—Monthly meteorological data, year 1918, Balboa Heights, Canal Zone.

Month.	Atmospheric pressure (inches).		Air temperature (°F.).								Mean relative per cent humidity (bhourly).	
	Station. <sup>1</sup>	Sea level.	Monthly mean.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Maximum daily range.		Mean wet thermometer.
January.....	29.742	29.865	78.4	90	26	86.0	66	6	70.8	20	72.1	81.4
February.....	29.747	29.869	79.6	90	19	87.9	67	24	71.4	21	71.4	76.0
March.....	29.777	29.899	79.4	90	16	88.3	67	26	70.4	22	71.1	76.1
April.....	29.714	29.836	80.4	91	17	87.7	70	5	73.2	19	74.0	82.0
May.....	29.702	29.824	80.6	90	27	86.8	71	13	74.3	16	75.5	86.8
June.....	29.694	29.814	80.3	91	24	86.4	72	13	74.2	16	75.1	86.7
July.....	29.688	29.809	81.6	91	5	88.1	73	22	75.0	17	75.7	85.7
August.....	29.714	29.833	80.8	91	10	87.1	72	29	74.5	17	75.6	86.0
September.....	29.730	29.851	80.8	91	29	87.2	72	14	74.5	17	75.4	86.4
October.....	29.712	29.834	79.8	91	5	85.9	71	1	73.8	17	74.8	87.5
November.....	29.714	29.835	80.2	92	3	87.2	70	11	73.1	20	74.6	86.1
December.....	29.695	29.816	81.0	91	14	88.5	71	30	73.6	17	74.4	81.0
Year.....	29.719	29.840	80.2	92	43	87.3	66	6	73.2	22	74.1	83.5

TABLE No. 3.—*Monthly meteorological data, year, 1918, etc.*—Continued.

Month.	Precipitation (inches).			Wind.					Number of days.				Average cloudiness. <sup>3</sup>
	Monthly total.	Normal. <sup>2</sup>	Rainy days.	Prevailing direction.	Total movement (miles).	Maximum velocity.			Clear.	Partly cloudy.	Cloudy.	Thunderstorms.	
						Miles per hour.	Direction.	Date.					
January.....	1.78	1.03	7	NW.	6,254	27	N.	13	7	22	2	2	4.5
February.....	T.	.84	0	N.	7,990	32	N.	21	21	7	0	0	3.0
March.....	1.25	.68	2	N.	7,888	35	N.	11	17	14	0	1	3.5
April.....	4.52	2.92	11	N.	6,077	32	NE.	15	4	20	6	7	5.2
May.....	6.75	8.62	21	N.	4,863	28	N.	14	0	16	15	16	7.3
June.....	5.20	7.50	17	N.	4,752	23	N.	23	0	20	10	9	6.9
July.....	5.13	7.82	13	NW.	5,618	26	NW.	8	0	21	10	14	6.8
August.....	3.84	7.81	14	NW.	5,698	36	NW.	1	0	19	12	12	7.1
September.....	7.03	7.75	13	NW.	4,050	27	N.	9	0	21	9	8	6.9
October.....	9.16	10.25	19	NW.	5,367	28	SW.	22	1	14	16	15	7.3
November.....	9.61	10.33	16	NW.	4,533	28	NW.	15	2	14	14	8	6.8
December.....	.55	4.28	5	N.	6,986	28	NW.	16	5	26	0	2	4.6
Year.....	54.82	69.83	138	N.	70,076	36	NW.	61	57	214	94	94	5.8

<sup>1</sup> Elevation of barometer 118 feet above mean sea level.

<sup>2</sup> Average for 21 years' record.

<sup>3</sup> Tenths of sky obscured during daytime.

<sup>4</sup> November.

<sup>5</sup> January.

<sup>6</sup> August.

TABLE No. 4.—*Monthly meteorological data, year 1918, Colon (Cristobal).*

Month.	Atmospheric pressure (inches).		Air temperature (°F.).								Mean per cent relative humidity (bihourly).	
	Station. <sup>1</sup>	Sea level.	Monthly mean.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Maximum daily range.		Mean wet thermometer.
January.....	29.841	29.878	78.0	84	26	81.3	70	2	74.8	9	74.2	83.4
February.....	29.850	29.887	78.7	82	2	81.5	74	1	75.9	8	73.6	77.3
March.....	29.872	29.910	78.7	84	28	81.9	72	13	75.5	11	73.2	76.3
April.....	29.800	29.838	79.8	90	25	83.8	73	23	75.9	16	75.3	81.3
May.....	29.789	29.826	79.6	89	31	83.5	72	18	75.6	13	76.0	85.5
June.....	29.776	29.814	80.0	87	17	84.2	73	11	75.9	11	76.1	85.1
July.....	29.778	29.814	80.2	86	25	84.0	70	18	76.5	15	77.0	86.5
August.....	29.800	29.838	80.0	86	19	83.9	73	26	76.0	11	76.8	87.0
September.....	29.816	29.854	80.0	87	19	84.3	72	10	75.8	12	76.8	85.7
October.....	29.794	29.832	79.4	89	23	84.3	72	1	74.5	14	76.2	85.5
November.....	29.806	29.843	79.8	86	4	83.8	72	20	75.8	10	76.0	83.3
December.....	29.798	29.835	80.6	85	29	83.9	72	31	77.3	12	76.1	80.8
Year.....	29.810	29.847	79.6	90	425	83.4	70	52	75.8	16	75.6	83.1

TABLE No. 4.—*Monthly meteorological data, year 1918, etc.—Continued.*

Month.	Precipitation (inches).			Wind.					Number of days.				Average cloudiness. <sup>3</sup>
	Monthly total.	Normal. <sup>2</sup>	Rainy days.	Total movement (miles).	Prevailing direction.	Maximum velocity.			Clear.	Partly cloudy.	Cloudy.	Thunderstorms.	
						Miles per hour.	Direction.	Date.					
January.....	3.28	3.85	12	9,462	N.E.	35	NW.	8	5	23	3	0	4.9
February.....	0.67	1.67	14	11,838	N.	30	N.E.	21	3	22	3	0	5.1
March.....	0.41	1.61	6	11,141	N.	30	N.E.	12	7	23	1	0	4.6
April.....	5.34	4.21	17	8,393	N.	29	N.	11	2	20	8	1	6.5
May.....	19.26	12.71	25	7,238	N.	26	N.E.	4	0	8	23	12	8.4
June.....	8.56	13.38	19	5,438	N.	28	NW.	9	1	9	20	11	8.0
July.....	10.36	16.02	25	7,199	N.	32	SW.	18	0	6	25	16	8.4
August.....	18.85	15.00	26	7,128	N.	27	SW.	3	0	4	27	15	8.8
September.....	15.34	12.67	20	4,988	W.	26	SW.	6	0	9	21	18	8.3
October.....	27.07	14.89	25	5,676	W.	36	E.	1	1	5	25	22	8.5
November.....	14.23	21.34	24	6,783	N.	27	NW.	15	4	7	19	6	7.3
December.....	1.90	11.69	19	11,269	N.	28	N.E.	5	4	22	5	2	5.6
Year.....	125.27	129.04	232	96,553	N.	36	E.	61	27	158	180	103	7.0

<sup>1</sup> Elevation of barometer 36 feet above mean sea level.<sup>2</sup> Average for 48 years' record.<sup>3</sup> Tenths of sky obscured during daytime.<sup>4</sup> April.<sup>5</sup> January.<sup>6</sup> October.TABLE No. 5.—*Monthly evaporation, Canal Zone, years 1918 and 1919.*

[Values in inches.]

Month.	Balboa Heights.			Gatun.			Colon.		
	1918	1919	Average (11 years).	1918	1919	Average (8 years).	1918	1919	Average (10 years).
January.....	5.495	7.970	5.826	5.548	5.874	5.970	4.858	5.476	6.113
February.....	7.732	7.704	6.274	7.231	5.876	6.248	7.871	6.230	6.406
March.....	8.242	9.813	7.456	8.475	7.253	7.481	8.960	9.020	7.225
April.....	5.201	5.478	5.443	6.502	4.625	6.404	6.960	6.156	5.989
May.....	3.513	3.737	3.517	4.901	5.359	5.127	3.949	5.079	3.860
June.....	3.234	3.063	2.988	4.859	4.110	4.268	3.492	3.721	3.227
July.....	4.170	.....	3.263	4.690	.....	4.478	3.433	.....	3.116
August.....	3.813	.....	3.198	3.991	.....	4.390	2.981	.....	3.008
September.....	3.420	.....	3.195	4.577	.....	4.460	2.906	.....	3.171
October.....	3.220	.....	3.315	4.127	.....	4.273	3.309	.....	3.278
November.....	4.360	.....	3.070	4.621	.....	3.671	3.753	.....	3.001
December.....	7.189	.....	4.641	5.881	.....	4.982	5.587	.....	4.434
Year.....	59.589	.....	52.186	65.403	.....	61.752	58.059	.....	52.928

## HYDROGRAPHY.

No new hydrographic stations were established during the year.

The lake station at San Pablo was discontinued on December 31, 1918, sufficient records having been obtained to determine approximately the amount of heaping up of the water at San Pablo Narrows, due to strong northerly winds or Chagres River floods.

The tidal station at Morro Island (Taboga) was discontinued at the close of business June 30, 1919. It is considered the two years' record already obtained gives a sufficient determination of tidal range and mean tide levels for purposes of later construction.

## TIDAL CONDITIONS.

Automatic tide registers were continued in operation at Balboa, Morro Island (Taboga), and Colon. The tidal extremes of record at these stations are given in the following table, revised to June 30, 1919:

Station.	Maximum (feet).	High-water date.	Extreme (feet).	Low-water date.	Maximum (feet).	Daily range date. <sup>1</sup>	Minimum (feet).	Daily range date. <sup>1</sup>
Balboa.....	11.2	Oct. 2, 1909 Oct. 22, 1918	-11.0	Feb. 13, 1918 Mar. 14, 1918	21.1	Feb. 14, 1918 Mar. 14, 1918	4.9	Feb. 24, 1915
Morro.....	10.8	Sept. 22, 1918	-10.6	Feb. 14, 1918	20.8	Feb. 14, 1918	5.8	Jan. 26, 1919 Feb. 25, 1919
Colon.....	1.68	Feb. 11, 1915	-1.01	June 9, 1910	2.17	Feb. 28, 1911 <sup>2</sup>	.....	

<sup>1</sup> For consecutive tides.

<sup>2</sup> One tidal fluctuation is often absent at Colon.

NOTE.—Elevations are referred to zero of gage rods, approximately mean sea level.

Abnormally high spring tides occurred in Panama Bay on October 21 and 22, 1918, causing considerable damage along the beach in Panama City and at nearby points. A high-water stage of +11.2 feet was recorded at Balboa on October 22. Fresh southerly winds prevailed during this period, and the wind action probably had some influence in raising the water level by heaping the water up against the shore, but there was no tidal wave, and most of the loss suffered was due to the coincidence of the abnormally high spring tides and the fresh southerly winds.

Mean tide levels for the year at Balboa and Morro Island (Taboga) were practically the same, but the tidal range averaged 0.4 feet to 0.5 feet greater at Balboa than at Morro Island.

Monthly tide data at Balboa, Morro Island, and Colon for the year 1918 are presented in Table No. 6.

*Chagres River.*—The mean discharge of the Chagres River at Alhajuela for the year 1918 was slightly below normal, or 2,582 c. f. s., against a 17-year average of 2,659 c. f. s. The Chagres River furnished 40 per cent of the Gatun Lake total yield. The maximum monthly discharge at Alhajuela was 4,191 c. f. s. in May, and the minimum monthly discharge was 751 c. f. s. in March. The maximum momentary discharge at Alhajuela during the year 1918 was 61,200 c. f. s. at elevation 110 during the flood of May 5, 1918, and the minimum momentary discharge was 446 c. f. s. on April 7, 8, 9, and 10, 1918.

*Freshets.*—There were 21 freshets in the Chagres River during the year 1918, with a rise of 5 feet or more at Alhajuela, occurring during the period from April 22 to November 5.

The largest flood of the year occurred on May 5. This freshet had the largest momentary discharge of any since the formation of Gatun Lake.

Data on the principal freshets for the year 1918 and January to June, 1919, are given in Table No. 8.

*Flood warnings.*—Vigia, Alhajuela, and Gatuncillo were continued as flood-warning stations. Timely warnings of all large freshets were issued to the Chagres River plantations management, the port captains, and other canal interests affected by flood conditions.

*Current-meter gagings.*—Fifty gagings were made at the Calle Larga gaging station (Chagres River) during the year 1918, covering a range from elevation 96.40 to 119.50. Five current-meter gagings were made during the year on each of the upper tributaries, the Pequení, the Chagres, and La Puente.

Scouring and erosion in the bed of the Chagres River during the year caused an error of approximately 300 c. f. s. to 600 c. f. s. in the station discharge curve for the lower river stages. The ordinary flow of the river causes little erosion, as most of the scouring and erosion occur during large freshets. A new discharge curve was made for the lower stages of the river.

*Gatun Lake.*—The Gatun Lake watershed total yield for the year 1918 was slightly above normal, amounting to 6,563 c. f. s. against an 8-year average of 6,398 c. f. s. The maximum monthly total yield was 14,036 c. f. s. during October. The minimum monthly total yield was 1,249 c. f. s. in March.

The total yield of the watershed amounted to 201.78 billion cubic feet, accounted for as follows:

	Billion cubic feet.
Run-off above Alhajuela (40 per cent)-----	81.44
Yield from land area below Alhajuela (44 per cent)-----	87.58
Direct rainfall on lake surface (16 per cent)-----	32.76
<b>Total (100 per cent)-----</b>	<b>201.78</b>

The uses and disposition of this water supply are as follows:

	Billion cubic feet.
Evaporation from lake surface (12 per cent)-----	25.13
Gatun Lake lockages and miscellaneous uses (9 per cent)-----	19.20
Hydro-electric power (20 per cent)-----	39.65
Spillway discharge (59 per cent)-----	118.65
<b>Total uses and losses<sup>1</sup> (100 per cent)-----</b>	<b>202.63</b>

If unlimited storage were possible and none of the usages of water had occurred, allowing for evaporation the total yield of the watershed was 92 per cent of the capacity of Gatun Lake; and it would have raised the lake from elevation 0 to approximately elevation 83.6. The water wasted through the spillway was 61 per cent of the lake's capacity.

*Storage depletion, 1919, dry season.*—The 1919 dry season began unusually early (about Dec. 1, 1918), and abnormally dry weather prevailed in the Canal Zone and vicinity up to April 12, when heavy general rains occurred, terminating the dry season approximately two weeks earlier than usual.

Gatun Lake began to fall on December 15, 1918, at elevation 86.98 and reached a minimum elevation of 83.70 on April 12, representing a storage depletion of 14.94 billion cubic feet, or 47 per cent of the total storage reserve in Gatun Lake above elevation 80. It would have been possible to have merely doubled the water consumption for canal uses without lowering the lake below elevation +80 by the end of the dry season. With canal lockages increased to 24 daily there would have been approximately 1,800 c. f. s. available for power development at the hydroelectric station. With canal lockages at the rate of 36 daily, it would have been necessary to cut the water consumption at the hydroelectric station to about 1,100 c. f. s. throughout the dry season.

#### BRANCH HYDROGRAPHIC OFFICE, CRISTOBAL.

The branch hydrographic office at Cristobal is operated in connection with the Cristobal meteorological station. Value of charts and other aids to navigation sold or issued for official use during the fiscal year 1918-19 amounted to \$2,725. Sales have increased approximately 23 per cent compared with the previous fiscal year.

#### SPECIAL INVESTIGATIONS.

*Canal currents.*—Investigations of the currents in the Gaillard Cut section of the canal were made on February 7, 1919. It was found that there is an almost continuous surface drift toward Pedro Miguel in the daytime during the dry season under the influence of the prevailing fresh northwesterly winds.

The strongest currents in the Gaillard Cut section of the canal flow toward Pedro Miguel and occur soon after the opening of the valves at Pedro Miguel to fill the lock chambers.

Return currents toward Gamboa due to surges in the canal are relatively feeble and of short duration compared with the currents toward Pedro Miguel, although the waves occasioned by them extend to the mouth of the Gatuncillo River.

The maximum current velocity recorded was 0.94 knot per hour toward Pedro Miguel, occurring in the canal channel opposite Gold Hill 8 minutes after all intake valves were opened at Pedro Miguel locks when filling both chambers simultaneously, and again 12 minutes after the valves were opened when drawing a third chamber of water.

Southbound ships with a following current are more likely to experience difficulty in navigating the Gaillard Cut section of the canal than northbound ships, due to the cumulative disturbing influence of the ships' momentum, the prevailing northerly winds, and the set of the current toward Pedro Miguel.

In the case of vessels northbound these forces oppose and tend to neutralize each other, rendering the ships' movements less difficult to control.

<sup>1</sup> Includes storage depletion of 0.85 billion cubic foot.

Canal currents tend to strike the bank at points where the canal changes its course and then deflect to the opposite bank of the canal, the angle of deflection being approximately equal to the angle of incidence.

With increase in the number of canal lockages the drift of the current in Gaillard Cut will be more persistently toward Pedro Miguel, due to the increased volume of water drawn through Pedro Miguel locks, but it is thought that approximately 1 knot per hour will represent the maximum current velocity that may be expected in Gaillard Cut with capacity canal traffic, provided the canal channel is not constricted by slides or other obstructions.

*Miraflores spillway discharge formula.*—The coefficient of the discharge formula used in computing the Miraflores spillway discharge was carefully checked against the lake capacity curve during the 1919 dry season. The lake capacity curve was checked also by locking down a measured quantity of water into the lake through Pedro Miguel locks.

The lake capacity between elevations 51.20 and 54.42 was found to be approximately 11.0 million cubic feet, or 8 per cent greater than shown by the lake capacity curve. This increase in lake capacity was caused by the breaking down of the dyke that separated Pedro Miguel Pond from the main body of the lake.

The spillway discharge formula heretofore used was found to give discharge figures approximately 32 per cent too low. The formula was corrected by changing the coefficient from 0.45 to 0.66.

The corrected formula is based on careful field tests and is thought to be accurate for the usual conditions of spillway discharge at Miraflores with gate opened 5.2 feet and water discharging through an orifice submerged on its upper face.

*Wave action, Colon Harbor.*—A report was submitted on wave action in Colon Harbor during stormy weather. The probable effects on waves and tidal currents at the harbor entrance resulting from extending the east breakwater to Coco Solo were investigated. Studies for additional harbor protection and the best locations for new docks and dry dock, so as to have the least wave action, were made. The maximum worst case to be expected, with the east breakwater closed, was found to be 20-foot waves off the harbor entrance, measured from crest to trough; they proceed southward, diminishing rapidly as they spread over the inner harbor.

The following plates and tables accompany the hydrographic section of this report:

Plate No. 10.—Operating uses of Gatun Lake water supply.

Plate No. 11.—Gatun Lake watershed, yields and losses, massed curves, year 1918.

Plate No. 12.—Gatun Lake watershed, total yields, by months.

Plate No. 13.—Chagres River drainage basin, massed curve, discharge at Alhajuela.

Plate No. 14.—Chagres River drainage basin, monthly mean discharge at Alhajuela.

Table No. 6.—Tidal conditions, calendar year 1918.

Table No. 7.—Monthly discharge, Chagres River at Alhajuela.

Table No. 8.—Principal freshets in the Chagres River, year 1918, and January to June, 1919.

Table No. 9.—Monthly hydrology, Gatun Lake, year 1918.

Table No. 10.—Hydrology of Gatun Lake watershed, year 1918.

Table No. 11.—Hydrology of Miraflores Lake watershed, year 1918.

TABLE NO. 6.—*Tidal conditions, year 1918.*

[Elevation in feet, referred to zero of rod approx. mean sea level.]

PACIFIC COAST—BALBOA, CANAL ZONE.

Month.	Maximum high water.	Date.	Extreme low water.	Date.	Maximum range.	Date.	Minimum range.	Date.	Average daily range.	Monthly mean tide level.
January.....	9.1	15-17	- 9.9	15-16	19.0	15-16	6.6	7	12.7	+0.332
February.....	10.2	14	-11.0	13	21.1	14	6.2	6	12.8	+ .017
March.....	10.1	14	-11.0	14	21.1	14	6.7	7	12.8	+ .128
April.....	10.3	12	-10.5	12	20.8	12	7.6	21	12.6	+ .743
May.....	9.9	11	- 9.1	11	19.0	11	7.4	19	12.4	+1.165

TABLE No. 6.—*Tidal conditions, year 1918—Continued.*

## PACIFIC COAST—BALBOA, CANAL ZONE—Continued.

Month.	Maximum high water.	Date.	Extreme low water.	Date.	Maximum range.	Date.	Minimum range.	Date.	Average daily range.	Monthly mean tide level.
June.....	9.0	9	- 8.3	9	17.3	9	7.0	19	12.6	+1.168
July.....	9.4	27	- 8.9	26	18.3	27	6.6	19	12.9	+ .992
August.....	10.6	24-25	- 9.1	24-25	19.7	25	6.2	17	12.8	+ .964
September.....	11.0	22	- 9.8	23	20.7	23	6.7	15	12.8	+1.106
October.....	11.2	22	- 9.9	21	20.9	21	7.7	14	12.7	+1.130
November.....	10.2	20	- 9.8	19	19.8	19-20	7.9	28	12.7	+1.110
December.....	9.2	18	- 9.2	19-20	18.3	20	7.0	27	12.5	+ .900
Year.....	11.2	Oct. 22	-11.0	{Feb. 13 Mar. 14}	21.1	{Feb. 14 Mar. 14}	6.2	Aug. 17	12.7	+ .813

## MORRO ISLAND (TOBOGA).

January.....	9.1	16	- 9.6	15	18.4	15-16	6.2	7	12.2	+0.410
February.....	10.2	14	-10.6	14	20.8	14	6.0	6	12.3	+ .102
March.....	10.0	14	-10.5	14	20.5	14	6.5	7	12.4	+ .151
April.....	9.7	12	-10.4	12	20.1	12	7.4	19-21	12.2	+ .600
May.....	9.4	10	- 9.0	11	18.3	11	7.3	19	12.0	+1.072
June.....	8.8	9	- 7.9	9	16.7	9	6.8	19	12.1	+1.304
July.....	9.1	27-28	- 8.8	26	17.9	27	6.4	19	12.4	+1.122
August.....	10.1	24-25	- 9.0	24	19.1	25	6.0	17	12.3	+1.067
September.....	10.8	22	- 9.5	23	20.1	22	6.5	15	12.3	+1.088
October.....	10.6	21	- 9.7	21	20.3	21	7.4	14	12.6	+1.068
November.....	9.8	20	- 9.7	19	19.1	19	7.7	27-28	12.2	+1.182
December.....	8.6	18	- 9.2	19	17.7	19	6.5	27	12.0	+ .835
Year.....	10.8	Sept. 22	-10.6	Feb. 14	20.8	Feb. 14	6.0	{Feb. 6 Aug. 17}	12.2	+ .833

## ATLANTIC COAST—CRISTOBAL, CANAL ZONE.

January.....	0.99	11-13	-0.69	23	1.53	23	0.21	4	0.90	+0.113
February.....	1.23	19	- .73	5	1.66	19	.21	27	.82	+ .074
March.....	.89	16-18	- .71	19	1.51	19	.20	5	.73	- .003
April.....	.92	15	- .65	27	1.54	15	.21	13	.84	+ .086
May.....	1.31	9	- .62	14	1.71	12	.22	10-14	.94	+ .244
June.....	1.12	7- 8	- .78	25	1.66	25	.24	12	1.00	+ .151
July.....	1.28	3- 4	- .52	18	1.70	5	.20	10	.90	+ .233
August.....	1.32	19	- .54	3	1.58	3	.22	18	.82	+ .349
September.....	1.12	1	- .55	24	1.61	27	.21	4- 9	.71	+ .262
October.....	1.40	22	- .53	24	1.75	24	.22	5-22	.80	+ .302
November.....	1.40	17	- .65	20	1.74	19	.20	28	.96	+ .285
December.....	1.50	15	- .72	4	1.74	17	.20	8	.93	+ .270
Year.....	1.50	Dec. 15	- .78	June 25	1.75	Oct. 24	.20	(1)	.86	+ .197

<sup>1</sup> Several dates.TABLE No. 7.—*Monthly discharge, Chagres River at Alhajueta, year 1918.*

[Drainage area, 427 square miles.]

Month.	Discharge in second-feet.				Mean.	Inches on watershed.	
	Maximum.	Date.	Minimum.	Date.		Rainfall.	Run-off.
January.....	6,270	2	1,147	31	1,693	1.83	4.56
February.....	2,502	1	784	26 and 27	994	.44	2.43
March.....	1,510	3	507	31	751	.22	2.03
April.....	11,967	22	466	7 to 10	1,015	5.38	2.66
May.....	61,200	5	998	2	4,191	16.16	11.31
June.....	38,500	9	1,356	24	3,603	13.75	9.42
July.....	34,000	14	1,411	9	3,398	12.08	9.18
August.....	23,500	6	1,444	23	3,517	13.98	9.50
September.....	13,378	2	1,422	30	3,706	15.29	9.68
October.....	34,100	17	1,400	1	3,800	20.86	10.26
November.....	13,773	5	1,356	30	2,527	10.74	6.60
December.....	2,401	1 and 2	1,380	31	1,658	1.62	4.47
Year.....	61,200	May 5	466	Apr. 7-10	2,582	112.35	82.10

NOTE.—The annual run-off equaled 73 per cent of the estimated rainfall.



TABLE No. 8.—Principal freshets in the Chagres River for the year 1918 and January to June, inclusive, 1919.

[Elevations are in feet above mean sea level.]

Date.	Vigia.		Alhajucla.				Gatuncillo.				
	Elevation of crest (feet).	Rise (feet).	Elevation of crest (feet).	Rise (feet).	Hours after Vigia.	Maximum discharge (c.f.s.).	Elevation of crest (feet).	Rise (feet).	Hours after Vigia.	Per cent Vigia (rise).	Per cent Alhajucla (rise).
1918.											
Apr. 22.....	133.40	6.4	97.47	5.2	1½	11,967	86.85	2.2	2	35	42
May 3.....	136.00	8.5	99.55	6.7	1½	18,420	88.94	3.7	2½	44	55
May 5.....	152.80	25.3	110.00	17.2	1½	61,200	95.70	9.5	2¼	41	57
May 5-16.....	140.40	11.9	101.90	9.0	1½	20,910	90.65	5.1	2	43	57
June 5.....	135.90	8.7	99.20	6.7	1½	17,290	89.25	3.9	1½	45	58
June 9-10.....	144.25	16.4	104.90	11.9	1	38,500	92.92	7.5	2	46	63
July 10.....	134.80	6.7	97.85	5.4	1½	13,082	87.80	2.5	?	37	46
July 14.....	142.45	14.6	103.75	11.0	1½	34,000	92.26	7.0	2	47	64
July 22.....	141.00	12.2	102.96	8.4	1½	30,900	91.58	4.6	2	41	55
July 29.....	135.90	8.1	98.75	6.0	1½	15,862	88.18	2.8	1½	35	47
Aug. 3.....	138.45	10.1	100.60	7.2	1½	22,060	89.75	4.0	1½	40	56
Aug. 6.....	138.95	10.8	101.00	7.9	1½	23,500	89.96	4.5	1½	42	57
Aug. 23.....	133.30	5.9	97.40	5.0	1	11,775	87.50	2.1	1½	36	42
Aug. 24.....	137.60	9.3	100.10	6.9	1½	20,300	89.25	3.7	1½	40	54
Aug. 31.....	135.10	7.3	98.55	5.8	1½	15,232	88.20	2.8	1½	38	48
Sept. 1.....											
Oct. 1.....	134.45	7.0	98.40	6.0	1	14,765	88.59	2.9	1½	41	48
Oct. 7.....	133.15	5.7	97.45	5.0	1½	11,912	87.90	2.0	1½	34	40
Oct. 15.....	134.90	6.9	98.58	6.1	1½	15,327	88.92	2.1	1½	31	34
Oct. 17.....	142.45	14.1	103.78	10.6	1½	34,100	92.32	5.8	2	41	55
Oct. 21.....	136.80	8.0	99.75	6.0	1	19,100	89.98	3.2	1½	40	53
Nov. 5.....	134.30	8.4	98.08	6.3	1½	13,773	88.87	2.4	1½	28	38
1919.											
Apr. 15.....	138.30	11.2	100.70	8.9	1½	21,200	89.72	5.7	1½	51	64
Apr. 23.....	135.80	9.3	98.90	7.4	1½	15,750	88.20	3.8	1½	41	51
*May 9-10.....	133.00	6.4	96.90	5.4	1½	10,150	87.18	2.1	1½	33	39
May 13-14.....	136.20	9.2	99.35	7.5	1½	17,210	88.80	3.6	1½	39	48
May 23-24.....	135.55	8.4	98.90	6.9	1½	15,750	88.18	3.0	Record lost.	?	47
June 30.....	133.40	6.4	97.50	5.6	1½	11,790					

\* Freshet had two crests.

TABLE No. 9.—Monthly hydrography, Gatun Lake, 1918.

[Drainage area, 1,320 square miles.]

1	2	3	4	5	6	7	8
Month.	Mean elevation above mean sea level (feet).	Operative and useful losses (c. f. s.).	Spillway discharge waste (c. f. s.).	Storage: +increase, -decrease (c. f. s.).	Evaporation from lake surface (c. f. s.).	Net yield 3+4±5 (c. f. s.).	Total yield 6+7 (c. f. s.).
January.....	86.99	1,917	1,132	- 26	804	3,023	3,827
February.....	86.66	1,824	0	-1,393	1,160	431	1,590
March.....	85.74	1,847	0	-1,811	1,213	36	1,249
April.....	84.79	1,832	13	- 725	950	1,119	2,069
May.....	85.06	1,880	5,636	+ 448	701	7,964	8,665
June.....	85.08	1,754	5,480	- 58	719	7,176	7,895
July.....	85.10	1,763	4,572	+ 220	671	6,556	7,227
August.....	85.12	1,707	5,530	- 75	571	7,162	7,733
September.....	85.18	1,810	7,018	+ 505	677	9,333	10,010
October.....	85.91	2,213	9,833	+1,396	594	13,442	14,036
November.....	86.54	1,890	5,596	+ 949	688	8,435	9,123
December.....	86.88	1,948	72	+ 138	847	2,158	3,005
Year.....	85.75	1,866	3,762	- 27	797	5,601	6,398

TABLE NO. 10.—*Hydrology of Gatun Lake watershed, year 1918.*

[Drainage area, 1,320 square miles.]

Gatun Lake.	Elevation (feet).	Date.
Maximum.....	87.06	Jan. 1
Minimum.....	84.52	Apr. 21

	Quantity.	
	Million cubic feet.	Second- feet.
Gatun spillway, waste .....	118,652	3,762.4
Gatun spillway, leakage.....	122.5	3.9
Gatun locks, lockages and tests.....	9,504.2	301.4
Gatun locks, leakage .....	187	5.9
Gatun hydroelectric plant.....	39,649.7	1,257.3
Pedro Miguel locks, lockages and tests <sup>1</sup> .....	8,317.2	263.7
Pedro Miguel locks, leakage <sup>1</sup> .....	157.3	5
Maintenance Miraflores Lake through Pedro Miguel locks <sup>1</sup> .....	178.9	5.7
Pumping at Gamboa.....	488.7	15.5
Brazos Brook reservoir.....	242.4	7.7
(a) Total outflow.....	177,499.9	5,628.5
(b) Storage (+ increase; - decrease).....	-850	-27
(c) Net yield ( $a \pm b$ ).....	176,649.9	5,601.5
(d) Evaporation (65.403 inches).....	25,133.9	797
(e) Total yield ( $c+d$ ).....	201,783.8	6,398.5
(f) Rainfall on lake (85.31 inches).....	32,762.7	1,038.9
(g) Yield from land area ( $e-f$ ).....	169,021.1	5,359.6
Transferred into Miraflores Lake <sup>1</sup> .....	8,653.4	274.4

<sup>1</sup> Transferred into Miraflores Lake.

	Mean area (square miles).	Rainfall (inches).	Run-off (inches).	Percentage run-off.
Lake surface .....	165	85.31	85.31	100
Land area .....	1,155	95.09	62.99	66
Total watershed.....	1,320	93.86	65.80	70

Gatun lockages .....	2,267
Pedro Miguel lockages.....	2,458

TABLE NO. 11.—*Hydrology of Miraflores Lake watershed, year 1918.*

[Drainage area, 38.5 square miles.]

Miraflores Lake.	Eleva- tion.	Date.
Maximum.....	54.58	Oct. 21
Minimum.....	50.98	Nov. 6

	Quantity.	
	Million cubic feet.	Second-feet.
Miraflores spillway, waste .....	2,832	89.8
Miraflores spillway, leakage.....	37.1	1.2
Miraflores locks, lockages, and tests.....	7,707.1	244.4
Miraflores locks, leakage.....	167.2	5.3
Miraflores power plant cooling water.....	735.3	23.3

TABLE No. 11.—Hydrology of Miraflores Lake watershed, year 1918—Continued.

	Quantity.	
	Million cubic feet.	Second-feet.
(a) Total outflow.....	11,478.7	364
(b) Total inflow from Gatun Lake <sup>1</sup> .....	8,663.2	274.7
(c) Storage (+increase; -decrease).....	-3	-0.1
(d) Net yield ( $a-b\pm c$ ).....	2,812.5	89.2
(e) Evaporation on lake (59,699 inches).....	221.9	7
(f) Total yield ( $d+e$ ).....	3,034.4	96.2
(g) Rainfall on lake (65.16 inches).....	242.2	7.7
(h) Yield from land area ( $f-g$ ).....	2,792.2	88.5
Includes filtration plant wash water <sup>1</sup> .....	9.8	0.3

<sup>1</sup> Includes filtration plant wash water.

	Mean area (square miles).	Rainfall (inches).	Run-off (inches).	Percentage run-off.
Lake surface.....	1.6	65.16	65.16	100
Land area.....	36.9	68.25	32.57	48
Total watershed.....	38.5	68.10	33.92	50

Miraflores lockages..... 2,411

## SECTION OF SURVEYS.

The section of surveys has continued to attend to all Panama Railroad land and lot surveys and has maintained the established Canal Zone monuments, triangulation stations, and bench marks. This section has also made surveys and prepared maps for the various departments and divisions of the canal, for the Army and Navy, and for the joint land commission. Attention has been given to the various features of the canal requiring precise observation.

The report of the assistant engineer gives the detail of the work accomplished.

## SECTION OF SURVEYS.

O. E. Malsbury, assistant engineer.

The following report of work done by the section of surveys during the fiscal year 1918-19 is submitted herewith:

## BUILDING LOTS.

*Colon.*—Corner and grade stakes were set on 33 lots in the city of Colon.

*Folks River.*—Corner and grade stakes were set on two lots in the Folks River district.

A tracing was made from two dredging division maps showing shore line and new streets.

A survey was made and a map drawn up on a scale of 1-360, showing lots 1 and 2 for lease to the Pacific Press Company.

*Cristobal.*—One lot was staked out in the Cristobal district.

*Panama.*—Corner stakes were set on four lots in the city of Panama.

A sketch was prepared showing the location of the sanitary department oil tank on lot 2, block 28, Santa Cruz.

An addition was staked out to lot 27 at the south end of the Panama Railroad yard, and a map prepared showing the new lines.

## MAINTENANCE RECORDS.

*Gatun dam.*—Y-level readings were taken on the settlement hubs once a month throughout the year, showing normal settlement.

Taking five widely distributed contours the average settlement was 0.20 of a foot. The contours used are as follows: In the east valley, the axis, contour +60 on the north slope, and contour +95 on the south slope; in the west valley the axis, and contour +90 on the south slope. Contour +60 on the north slope, west valley, showed an upheaval of 0.035 of a foot.

In May of this year a line of stakes was established 50 feet apart extending 1,050 feet from the west end of Contour +31 on the north slope of the east valley to the Army pigeon cote. The line crosses the bed of the old French Canal and is intended to detect any lateral movement in this section. To date no movement is apparent.

*South approach wall.*—Precise level readings were taken on the permanent points twice a month throughout the year, showing normal settlement.

The average settlement of the wall from point A-1 to point SE, at the outer end of the wall, was 0.14 of a foot, which is the same as last year.

The maximum settlement has always occurred from about half way down the wall at about point A-4 to the end of the wall, and the average settlement in this section for the year was 0.17 of a foot, or about 2 inches.

The original reference points were staggered down the wall. For the purpose of detecting any twist in the wall, seven new points were placed in July, 1918, opposite the old points.

The semimonthly readings are plotted up graphically on a scale of 1 inch to one-tenth of a foot vertically and 1 inch to 100 feet horizontally.

A graph covering the 5-year period from 1914 to 1919 at 6-month intervals was plotted up on a scale of 1 inch to one-tenth of a foot vertically and 1 inch to 50 feet horizontally.

*Cano Saddle.*—Y-level readings were taken over Cano Saddle in September and January, showing normal settlement.

*Cristobal coating plant.*—The spread between the piers was read once a month and found to be very slight, the average being 0.01 foot and the maximum being 0.02 foot at a point about 400 feet from the outer end of the coal pocket. The spread measurements are kept up to date on a graphic scale, the spread being shown in the ratio of 1 inch to  $\frac{1}{100}$  foot, and the distance along the coal pocket in the ratio of 1 inch to 50 feet.

The recorded distances between the ends of the east and west base lines were checked up with the Invar tape once during the year, and showed no change.

A new base line was laid out and monumented on the west wall, and a foresight painted onto the end of pier No. 8. It has a common point in the monument at the south end at station 18+01.2 and a slight angle with the original base line. This was done in order to get a distant foresight across the canal. Readings have been taken on the west wall from December, 1918, to May, 1919, inclusive.

## CANAL ZONE BOUNDARY.

*Clearing.*—In July, August, and September, 1918, the 5-mile line was cleared in the Escobal section from monument No. 106 on the Chagres River to monument No. 130 on Gatun Lake and from monument No. 138½ on the south shore of the lake opposite Escobal to monument No. 142. All monuments were stamped with their proper number.

In May and June, 1919, the line was cleared in the Paja-Arraijan section from monument No. 170 to monument No. 193. All débris was thrown to one side and the line cleaned to the ground, making an excellent hunting trail, with idea of its use by the natives, thereby keeping the line open. With this idea of the maintenance of the clearing as many overhanging trees as possible were left for shade to hold down the second growth.

In this section also 48 extra monuments were placed. They consist of 1 regular monument and 47 small monuments, consisting of 3-foot section of 1½-inch galvanized iron pipe, with the top 6 inches filled with concrete, and driven two feet into the ground. The numbers are stamped on as follows: 170-1, 170-2, etc., between the regular monuments 170 and 171, and in a corresponding manner between any two regular monuments.

A tie was made between  $\triangle$  Chinal and the boundary line.

Work is now in progress on the Arraijan-Cameron section from the slope of Cabra Mountain to the Pacific.

*100-foot contour.*—Twenty-four monuments were set on the isolated 100-foot contour line in the Rio Trinidad Valley.

Maps showing the 100-foot contour monuments relative to the shore of Gatun Lake were furnished to the mechanical division for use in connection with their timber industry.

*Canal Zone—City of Panama.*—One monument on the boundary line between the Canal Zone and the city of Panama was lowered to the sidewalk grade.

#### PRECISE TRIANGULATION STATIONS.

*Repairs.*—One hundred stations in the Canal Zone triangulation system were cleared and repaired. The clearing amounted to approximately 75 acres. Those stations located in the pastures of the supply department were fenced.

*Revised data.*—In the survey of Las Esplanadas, Panama, an error was discovered in the coordinates of some of the traverse points in the P. A. B. survey. A thorough investigation was made. Stations were reoccupied and angles reread. Triangulation control was carried into the city through a chain of triangles on the east and another chain on the west, as was originally done. By means of this check slight corrections were made in  $\Delta$  Market,  $\Delta$  Buzzard, and  $\Delta$  Punta Paítilla, but carefully chained traverses between  $\Delta$  Calle Trece and  $\Delta$  Market showed that the main difference still remained. The error was thus shown to be accumulative and due to the method employed, i. e., a chain of triangles as against quadrilaterals. The precise triangulation check placed the error in the west chain of triangles and the coordinates of  $\Delta$  Calle Trece were accordingly reduced by 0.9 of a foot in latitude and 0.7 of a foot in longitude, to agree with  $\Delta$  Market.

*New stations.*—Two new stations, Mount Hope and Dam, were established, the latter in connection with the antiaircraft guns on the Gatun dam.

#### COLON-CRISTOBAL SURVEY AND MAP.

*Method.*—The field work was done by the modified plane-table method, i. e., the transit and stadia, and drafting table on a tripod. Three widely distributed triangulation stations served as the initial and final points of carefully chained traverses covering the entire district. These traverses were computed and balanced and 385 stations permanently monumented. Y-level circuits were then run, establishing the elevations of all the traverse points.

*Area.*—The map embraces Colon, Cristobal, New Cristobal, Folks River, and Mount Hope, extending from latitude  $9^{\circ} 20'$  on the south to  $9^{\circ} 22'$  on the north and in longitude from  $79^{\circ} 53'$  to  $79^{\circ} 55'$ , or from the East Diversion to Limon Bay. This district was divided up into 18 field sheets.

*Scope.*—The map shows all Panama Railroad and Panama Canal buildings, and in the Republic of Panama it shows all churches, hospitals, theaters, consulates, clubs, schools, hotels, factories, and all public buildings, streets, railroads, bridges, docks, contour intervals, etc.

In addition it shows for the use of the electrical and municipal engineering divisions, the following things: Fire alarms, sewer manholes, hydrants, electrical manholes, pull holes, transformer houses, and street lights—the latter not being shown in Colon.

The tracings are in four sections on a scale of 1-1000. The field work and map are about 95 per cent complete. The attached index map (Plate No. 15) shows the general layout.

#### SUPPLY DEPARTMENT.

*Plantations.*—Surveys and maps were made covering contract areas on the following plantations: Las Guacas, Las Cascadas, and Summit.

A survey was made locating the fence lines on the Venada plantation.

*Pastures.*—Surveys were made locating division fences, boundaries, and areas of new clearings, and areas of contract clearings on 12 pastures.

A tie was made from triangulation station lake to the Bohío Ridge pasture. A survey was made locating the lake shore and a map prepared showing the area.

A reconnaissance survey was made from the Rio Farfan to the Rio Cocoli, and a central camp located in connection with clearing the Farfan pasture.

The western boundary line, extending N. 25° 00' W. from Bruja Point to the Cocoi River was traversed. A tie was made to triangulation station Victoria. The Sabanas, existing fence lines, and a trail to connect with the Venada plantation were located and plotted onto the map.

A large tracing was made on a scale of 1-10,000, incorporating all the pastures and plantations on the west side of the canal from the Rio Carabali to the Pacific. A tracing was also made on the same scale showing all the pastures and plantations on the east side of the canal from the Rio Chagres to the Rio Corundu.

Ten traverse monuments were set on the canal west pastures and 14 on the canal east pastures for use in future surveys.

#### LAND OFFICE.

Work was done at the request of the land office as follows:

*Las Esplanadas.*—Work was started on a consolidated map of the Las Esplanadas district. It was found, however, that the distances and areas as shown on the old maps and as recorded in the leases were so at variance with actual measurements on the ground that the map had to be discarded. A new map will be prepared, based on actual ground distances.

*Mount Hope.*—A map was prepared showing the limits of possible extensions to the Mount Hope cemetery, with special reference to the Panama Railroad steam-shovel borrow pit and fuel-oil lots.

A survey was made of a plot of ground between oil tanks 47, 48, and 8 and a lot staked out for use as a mixing-tank site by the Texas Oil Co. A sketch was prepared for incorporation with the lease.

*Military reservations.*—A survey was made and a map drawn up showing the boundary lines of the Punta Paitilla military reservation. Various areas were determined with reference to high and low water and the old and new city boundary lines. Permanent monuments were set and a description written up by metes and bounds.

A tracing was made of the map of the military reservation known as area "A".

#### ELECTRICAL DEPARTMENT.

*Hydroelectric.*—Measurement was made of the duct line from the substation to the hydroelectric station, Gatun.

A precise level circuit was run and four new bench marks were set in the power plant. The reported elevations of the old bench marks were checked and found to be O. K.

*Steam plant.*—In connection with the proposed extension of the Miraflores steam plant a topographical survey was made locating 1-foot contours in the immediate vicinity of the present plant and 5-foot contours elsewhere. The area covered lay between the spillway and the Panama Railroad with a width of about 600 feet north and south. The line of the old "Panama Railroad" was established in order to fix the locations of old test holes. A map was drawn up on a scale of 1-600.

#### HEALTH DEPARTMENT.

*Coco Solo.*—The topographical survey of the swamp area east of the Margarita railroad and between the Rio Majajual and the Rio Coco Solo was completed. A map of the area was prepared and an estimate made of the yardage required to make the fill desired.

*Palo Seco.*—The boundary lines of the Palo Seco leper colony reservation were cleared and traversed, and five of the old monuments uncovered. A location was made of a road from the colony farms to the beach.

*Mindi swamp.*—A transit and Y-level survey is in progress for the purpose of making a topographical map of the large swamp area to the north of Gatun dam between the French Canal and the Mindi Levee, with the purpose of devising a plan for its drainage.

#### VARIOUS DEPARTMENTS AND DIVISIONS.

Work was performed for the various departments and divisions of The Panama Canal, Panama Railroad, Army, and Navy as follows:

*Joint land commission.*—Maps were prepared in connection with cases pending before the joint land commission, over the lands on the slopes of Ancon Hill.

The areas above the 100-foot contour, below the 100-foot contour, and between

the 87-foot contour and the 100-foot contour on the Otro Lado estate were determined for the special attorney.

*Section of meteorology and hydrography.*—The elevation of the bench mark on the still box of the Cristobal tide gauge was checked by a circuit of precise levels through P. B. M. 1-A; the shoulder on the gauge rod was reset and its relative elevation to the bench mark determined.

The reported area of Miraflores Lake at elevation +55 feet was checked by planimeter from the 1-20,000 map of the Canal Zone.

The areas of 11 rainfall sections were determined by planimeter from the 1-80,000 map of the Canal Zone.

*Panama Railroad.*—The survey work of the Panama Railroad was handled by this section during the months of December and January, covering the absence on leave of assistant engineer, A. L. Prather. The work was done under the direct supervision of, and detailed report of same made to the roadmaster of the Panama Railroad.

Measurements were taken and computations made to determine the amount of material available at Mount Hope for use in the fill at New Cristobal. The computed amount available was found to be 2,521,000 cubic yards.

*Dredging division.*—A survey party was loaned to the dredging division for two months on cross-section work in the Gold Hill section.

*Police department.*—Maps were prepared for the chief of police, showing first, the present location of the penitentiary at Gamboa, and second, the proposed location of the penitentiary and farm on Tabernilla Island.

*Fortification division.*—Triangulation station "Dam" was read in and its geodetic position computed in connection with the installation of antiaircraft guns on Gatun dam.

The geodetic position of the antiaircraft gun on Cristobal mole was computed for the fortification division.

*Marine division.*—A survey was made of the lighthouse reservation on San Jose Island. All trails were cleared and traversed, and the boundary lines run out and monumented. A map was drawn up and the area of the reservation determined.

The mean sea-level datum plane was determined, permanent bench marks established, and the elevation of Cape Mala light determined and forwarded to Capt. Kariger, pilot in charge of the lighthouse service.

*Army.*—A survey was made locating the boundary lines of the Fort Randolph military reservation. The parallel of latitude  $9^{\circ} 22'$  was run east from the Coco Solo naval reservation to an intersection with the Canal Zone boundary between monuments No. 3 and No. 4, and a tie made between this point and triangulation station Seco. A survey was also made locating the Army reservoir and pipe lines within the naval reservation.

*Navy.*—An enlarged map of the Coco Solo naval reservation was made by pantograph from various maps and measurements taken on the ground. This work was done under the direction of the landscape gardener and at the request of the naval commander at Coco Solo.

A survey was made and a map prepared showing the boundary lines, towers, and buildings of the Cape Mala radio reservation.

#### MISCELLANEOUS.

*Panama Electric Co.*—Elevations of points along the upper Chagres and its branches were computed and a map made showing their location.

*Steamship lines.*—A map was made showing the routes of the various steamship lines plying between North and South America and the Isthmus of Panama, giving ports of call and number of sailings per month prior to the Great War.

*Cabulla-Paraiso trail.*—For the purpose of eliminating the use as a trail of a 2-mile section of the Panama Railroad, a survey was made locating and clearing two new trails leading to Paraiso, for the use of the natives living in Cabulla, Maria Eugenia, and vicinity. One trail comes out at Summit Station, and is for the use of native shippers and those desiring to entrain for Panama; the other trail crosses the track at tower 35-4 and is  $1\frac{1}{2}$  miles nearer Paraiso. A map was prepared showing the trail locations and the locations of necessary gates and bridges.

*Alhajucla Lake.*—A study was made of the Alhajucla dam and powerplant proposition, and a comparison made of the estimated costs of this proposition and that of an enlarged steam plant at Miraflores. The study was presented in several reports as an argument in favor of a survey of the basin for additional data.

*United States Geological Survey.*—The land and water areas of the Canal Zone and data concerning the boundary monuments were forwarded to the United States Geological Survey.

*Miles of line.*—Transit, 73.6; Y level, 210.6; precise level, 9.4; stadia, 157.4; stadia side shots, 316.4; pocket compass, 4.7; total miles of line, 772.1.

### SECTION OF OFFICE ENGINEER.

The details of the work accomplished by this section are given in the report of the office engineer, which follows:

#### SECTION OF OFFICE ENGINEER.

*C. J. Embree, office engineer.*

This section has continued to handle the engineering, architectural, electrical, and miscellaneous design work required for all divisions of the canal except the mechanical division. The most important design work has continued to be that in connection with the building and electrical divisions, which have handled large programs of construction for The Panama Canal, the United States Army and Navy. The various building and construction projects are described in full in the annual report of the divisions concerned, the most important work including the completion of designs for—

Pier No. 6 shed.  
Residence for superintendent, Ancon Hospital.  
Ice and cold-storage plant, Mount Hope.  
Manzanillo aviation base.  
Submarine base, Coco Solo.  
Meat-canning factory, Mount Hope.  
Abattoir, Mount Hope, etc.

A total of 672 working drawings has been issued during the year, the work being accomplished for the following divisions:

	Tracings.
Building division-----	359
Electrical division-----	226
Police and fire department-----	1
Marine division-----	1
Coaling plant, Panama Railroad-----	18
Municipal engineering division-----	12
Locks division-----	11
Pier No. 6-----	38
Panama Railroad Company-----	3
General-----	3

The average drafting force ranged between 14 and 15 men for the entire year, but we have had to increase the number of men lately in order to care for the building program of the United States Army, which has allotted funds to the canal for large camps at Gatun and Miraflores.

We have continued the operation of the blue-print room, issuing prints to the field and requisition bureau, as follows:

	Square feet.
Blue prints-----	250,928
White prints-----	28,331
Brown prints-----	7,444

The average cost per square foot of blue, white, and brown prints, including labor and material, has been 1.085 cents.

### DREDGING DIVISION.

The dredging division continued to maintain the canal prism and in addition performed such dredging work as was necessary in connection with widening the turning basin at the Cristobal coaling plant and other authorized harbor improvements at Balboa and Cristobal, particularly in connection with the submarine base at Coco Solo, where considerable dredging and filling were necessary.

There remains a grand total of 3,454,800 cubic yards to be removed from the canal prism, as compared with 4,171,640 cubic yards at the close of the past fiscal year.



The slides in Gaillard Cut have been fairly quiescent, except during the months of October, November, and March, when they were active to a limited extent, but the channel has at all times been maintained and there was no delay to shipping during the year on this account.

The details of the operations of the dredging division during the fiscal year are covered in the report of the superintendent of dredging, which follows:

#### DREDGING DIVISION.

*J. M. Pratt, Superintendent.*

The following report of operations in the dredging division during the fiscal year ended June 30, 1919, is submitted herewith.

#### DIVISION ORGANIZATION.

All dredging operations embracing Atlantic entrance, Gatun Lake, Gaillard Cut, Miraflores Lake, and Pacific entrance sections of the canal, with auxiliary dredging at the Atlantic and Pacific terminals, Coco Solo, and Chame Point, have been handled direct from the division headquarters at Paraiso for the entire year. Field offices were maintained at Balboa and Cristobal.

#### DREDGING PLANT.

The following dredges and other floating plant were in operation during the year:

The 15-yard dipper dredge *Paraiso* was operated for seven months of the year on general maintenance work at East and West Culebra, Cucaracha, and other small slides, excavating and deepening channel in Gatun Lake section near Gamboa, and at Paraiso P. I. improvement work, and in the Pacific entrance channel at Miraflores P. I. improvement work.

The 15-yard dipper dredge *Gamboa* was operated for nearly 10 months of the year in excavating various small slides and general maintenance work in Gaillard Cut at Culebra and Cucaracha, and widening channel at Paraiso and Miraflores P. I. improvement works.

The 15-yard dipper dredge *Cascadas* was engaged the entire year in widening the approach channels to Cristobal Harbor and west slip coaling station, removing a shoal along face of Pier No. 10, Cristobal, excavating slide material at Culebra, widening channel at Paraiso P. I. improvement work, and excavating rock and hard clay from Balboa Inner Harbor and Pacific entrance channel.

The sea-going ladder dredge *Corozal* was engaged in deepening and removing rock shoals in the Pacific entrance channel from July 1, 1918, to March 6, 1919, on which date she was retired from service.

The French ladder dredge *Marmot* was engaged during the fiscal year in removing the earth cover on Miraflores P. I. improvement work until September 23, on which date she was retired from active service.

The 20-inch pipe line dredge *No. 83* was engaged during the first 10 days of July in widening Cristobal approach channel and retired from dredging operations July 10, 1918.

The 20-inch pipe-line dredge *No. 84* was engaged during the year on general maintenance work in the Pacific entrance, Balboa Inner Harbor, and excavating at the Miraflores P. I. improvement work.

The 20-inch pipe-line dredge *No. 86* was engaged during the year widening and deepening approaches to Cristobal Harbor, the Cristobal coaling station, and Coco Solo submarine basin, excavating barge slip at coaling station and boat-house slip at Coco Solo, deepening anchorage slips north and south of Pier No. 6 and along face of south quay wall of submarine basin, making fills for the Navy Department in vicinity of new magazine and seaplane hangars, excavating and deepening Pacific entrance and Balboa Inner Harbor channels, reclaiming sand and gravel at Point Chame and in the Chagres River at Gamboa.

The drill boat *Teredo No. 2* was engaged for eight months of the year in mining operations at the Paraiso and the Miraflores P. I. channel improvement works and in the Pacific entrance channel opposite the old Panama Railroad steel wharf.

The hydraulic grader *No. 1* was engaged the entire year ditching and grading the East and West Culebra, Cucaracha, and East Empire slides.

The hydraulic grader *No. 2* was engaged in ditching and grading East Culebra and Contractor's slides until September 12, on which date she was retired from service.

The hydraulic grader *No. 3* was engaged in grading and ditching East Culebra slide and sluicing at Paraiso P. I. improvement work until December 24, on which date she was retired from service.

The floating air compressor *No. 27* was operated from July 1, 1918, to January 24, 1919, inclusive, supplying air for the drills at the Paraiso P. I. improvement work, and was retired from service on the latter date.

The United States tug *Reliance* sunk on August 2, 1918, in the Caribbean Sea about 60 miles northeast from Colon.

There were five tugboats in the dredging service on July 1, 1918. During the fiscal year two were returned to this division by the Navy. Later two were retired and one was lost at sea. Four tugboats were in the service on June 30, 1919.

A total of 12 launches was operated during the year.

The following table shows the number of days the dredges were retired from dredging service for repairs, alterations, or on detached service:

TABLE NO. 1.—*Number of days dredges were retired from dredging service.*

Dredge.	Type.	Days out of service.	Cause.	Remarks.
Paraiso.....	15-yard dipper.....	38	Repairs.	Tied up (not working) 133 days.
Gamboa.....	do.....	46	do.....	Tied up (not working) 71 days.
Cascadas.....	do.....	67	do.....	
Corozal.....	Sea-going ladder.....	36	do.....	Retired Mar. 6, 1919.
Marmot.....	French ladder.....	2	do.....	Retired Sept. 23, 1918.
No. 83.....	Pipe-line suction.....		do.....	Retired July 11, 1918.
No. 84.....	do.....	46	do.....	Including 18 hours assisting in putting out fire on sailing ship Evelyn.
No. 86.....	do.....	30	do.....	

#### DREDGING.

Dredges operating in the canal prism at the Atlantic and Pacific terminals and in the sand and gravel service removed a total of 4,460,665 cubic yards of material.

The following table, divided into canal prism and auxiliary dredging, shows the output of each dredge during the year, with the total and unit costs of same:

TABLE NO. 2.—*Output of all dredges, with total and unit costs.*

Dredges.	Months worked.	Canal prism dredging.				
		Earth.	Rock.	Total.	Cost.	Unit cost.
<b>Dipper:</b>						
Paraiso.....	7	89,900	293,100	383,000	\$319,984.19	\$0.8355
Gamboa.....	10	107,400	370,900	478,300	363,743.84	.7605
Cascadas.....	12	66,400	121,400	187,800	83,830.62	.4464
Total.....	29	263,700	785,400	1,049,100	767,558.65	.7316
<b>Ladder:</b>						
Corozal.....	9	112,700	45,000	157,700	182,221.90	1.1555
Marmot.....	3	82,400	4,500	86,900	48,762.23	.5611
Total.....	12	195,100	49,500	244,600	230,984.13	.9443
<b>Suction:</b>						
No. 83.....	12 $\frac{3}{4}$	1,054,600	14,100	1,068,700	154,396.95	.1445
No. 84.....	12	102,900	7,900	110,800	18,275.25	.1649
Total.....	24 $\frac{3}{4}$	1,157,500	22,000	1,179,500	172,672.20	.1464
Grand total.....	65 $\frac{1}{2}$	1,616,300	856,900	2,473,200	1,171,214.98	.4736

TABLE No. 2.—Output of all dredges, with total and unit costs—Continued.

Dredges.	Months worked.	Auxiliary dredging.				
		Earth.	Rock.	Total.	Cost.	Unit cost.
Dipper:						
Paraiso.....	7					
Gamboa.....	10	11,400	21,200	32,600	\$19,118.87	\$0.5865
Cascadas.....	12	239,000	308,500	547,500	265,703.24	.4833
Total.....	29	250,400	329,700	580,100	284,822.11	.4910
Ladder:						
Corozal.....	9					
Marmot.....	3					
Total.....	12					
Suction:						
No. 83.....	$\frac{1}{2}$	3,000	3,000	6,000	3,897.05	.6495
No. 84.....	12	156,900		156,900	29,946.72	.1909
No. 86.....	12	1,168,565	75,900	1,244,465	232,120.28	.1865
Total.....	24 $\frac{1}{2}$	1,328,465	78,900	1,407,365	265,964.05	.1889
Grand total.....	65 $\frac{1}{2}$	1,578,865	408,600	1,987,465	550,786.16	.2771

Dredges.	Months worked.	Canal prism and auxiliary dredging.				
		Earth.	Rock.	Total.	Cost.	Unit cost.
Dipper:						
Paraiso.....	7	89,900	293,100	383,000	\$319,984.19	\$0.8355
Gamboa.....	10	118,800	392,100	510,900	382,862.71	.7494
Cascadas.....	12	305,400	429,900	735,300	349,533.86	.4754
Total.....	29	514,100	1,115,100	1,629,200	1,052,380.76	.6459
Ladder:						
Corozal.....	9	112,700	45,000	157,700	182,221.90	1.1555
Marmot.....	3	82,400	4,500	86,900	48,762.23	.5611
Total.....	12	195,100	49,500	244,600	230,984.13	.9443
Suction:						
No. 83.....	$\frac{1}{2}$	3,000	3,000	6,000	3,897.05	.6495
No. 84.....	12	1,211,500	14,100	1,225,600	184,343.67	.1504
No. 86.....	12	1,271,465	83,800	1,355,265	250,395.53	.1848
Total.....	24 $\frac{1}{2}$	2,485,965	100,900	2,586,865	438,636.25	.1696
Grand total.....	65 $\frac{1}{2}$	3,195,165	1,265,500	4,460,665	1,722,001.14	.3860

## NOTE:

Dredging costs in the above table do not include that of mining 29,956 cubic yards of rock by drillboat Teredo No. 2 (at the Miraflores P. 1., as this material was not handled by dredges during the fiscal year), at a cost of.....	\$33,703.09
Dredging costs in the above table do not include that of mining 30,587 cubic yards of rock by drillboat Teredo No. 2 (at the Paraiso P. 1., as this material was not handled by dredges during the fiscal year), at a cost of.....	41,881.11
Dredging costs in the above table do not include that of grading, ditching, and sluicing in Gaillard Cut (which amount is not directly chargeable to dredging operations), at a cost of.....	57,314.60
Dredging costs in the above table do not include the costs for miscellaneous charges not connected with dredging operations in Gaillard Cut of.....	17,704.74
Total.....	150,603.54

While the preceding table shows the actual cost of the yardage removed, the cost of the total yardage handled by dredges would be a trifle less, as there were 1,800 cubic yards of material rehandled for which no credit was taken upon second handling.

With the exception of dredges No. 86 and No. 84, costs are for materials placed on the dump. Costs of dredge No. 86 are for sand and gravel delivered alongside the coaling station dock at Balboa and the gravel dock at Gamboa, and of No. 84

for material delivered to the first relay pump, which was about 3,300 feet from the dredge.

The following tables show the monthly output of all dredges, exclusive of the sand and gravel output, by geographical districts:

TABLE NO. 3.—Yardage removed to the -42-foot mean sea-level contour in the Atlantic Ocean to Gamboa Dike.

Month and year.	Canal prism.			Auxiliary.			Grand total.
	Earth.	Rock.	To tal.	Earth.	Rock.	Total.	
1918.							
July.....	10,300	18,900	29,200	121,800	52,800	174,600	203,800
August.....	18,800	16,100	34,900	68,400	12,700	81,100	116,000
September.....				103,500	78,000	181,500	181,500
October.....				102,100	86,900	189,000	189,000
November.....				143,700	12,900	156,600	156,600
December.....				38,600	3,600	42,200	42,200
1919.							
January.....				129,300	11,000	140,300	140,300
February.....				20,900	2,300	23,200	23,200
March.....							
April.....							
May.....				1,500		1,500	1,500
June.....				60,800	6,400	67,200	67,200
Total.....	29,100	35,000	64,100	790,600	266,600	1,057,200	1,121,300

TABLE NO. 4.—Yardage removed from Gaillard Cut, Gamboa Dike to Pedro Miguel locks.

Month and year.	Canal prism.			Auxiliary.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
1918.							
July.....	13,600	33,200	46,800				46,800
August.....	22,700	24,900	47,600				47,600
September.....	20,300	44,100	64,400				64,400
October.....	17,100	60,200	77,300				77,300
November.....	49,400	166,500	215,900				215,900
December.....	7,900	75,600	83,500				83,500
1919.							
January.....	6,100	68,500	74,600				74,600
February.....	8,800	63,200	72,000				72,000
March.....	11,500	60,200	71,700				71,700
April.....							
May.....							
June.....							
Total.....	157,400	596,400	753,800				753,800

TABLE NO. 5.—Yardage removed, Pedro Miguel locks to the -45-foot mean sea-level contour in the Pacific Ocean.

Month and year.	Canal prism.			Auxiliary.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
1918.							
July.....	39,900	4,100	44,000	38,400		38,400	82,400
August.....	117,400	4,000	121,400	16,500		16,500	137,900
September.....	171,600	9,400	181,000	2,000		2,000	183,000
October.....	56,600	44,700	101,300	7,000	7,100	14,100	115,400
November.....	62,700	5,200	67,900				67,900
December.....	129,200	9,600	138,800	44,300	19,200	63,500	202,300
1919.							
January.....	208,400	15,500	223,900	23,100	15,400	38,500	262,400
February.....	182,200	2,600	184,800	100,300	32,200	132,500	317,300
March.....	205,400	800	206,200	204,700	22,400	227,100	433,300
April.....	135,000	42,300	177,300	95,200	11,800	107,000	284,300
May.....	97,000	30,400	127,400	104,800	12,600	117,400	244,800
June.....	24,400	56,900	81,300	139,900	21,300	161,200	242,500
Total.....	1,429,800	225,500	1,655,300	776,200	142,000	918,200	2,573,500

## DREDGING CANAL PRISM.

Dredges were at work throughout the year dredging and maintaining the canal channel in Gatun Lake, Gaillard Cut, and the Pacific entrance, excavating a total of 2,473,200 cubic yards of construction and maintenance yardage as shown in the following table:

TABLE No. 6.—Number of cubic yards removed from the canal prism.

Location.	Construc- tion.	Mainte- nance.	Total.
Atlantic entrance.....			
Gatun Lake.....	50,000	14,100	64,100
Gaillard Cut.....		753,800	753,800
Miraflores Lake.....			
Pacific entrance.....	230,000	1,425,300	1,655,300
Total canal prism.....	280,000	2,193,200	2,473,200

At the close of the fiscal year ending June 30, 1918, there remained to be removed from the canal prism, including siltage, slides, and original material, 2,800,000 cubic yards of earth and 654,800 cubic yards of rock.

The following table shows the classification and location of all yardage remaining to be removed from the canal prism on June 30, 1919:

TABLE No. 7.—Yardage remaining to be removed from the canal prism.

Location.	Construction.			Maintenance.			Grand total.
	Earth.	Rock.	Total.	Earth.	Rock.	Total.	
Atlantic entrance.....				813,000		813,000	813,000
Gatun Lake.....				160,000		160,000	160,000
Gaillard Cut.....		25,000	25,000	354,000	400,000	754,000	779,000
Miraflores Lake.....				175,000		175,000	175,000
Pacific entrance.....	61,300	86,900	148,200	1,236,700	142,900	1,379,600	1,527,800
Total.....	61,300	111,900	173,200	2,738,700	542,900	3,281,600	3,454,800

It is estimated that during the present fiscal year ending June 30, 1920, the following shoaling will occur in the canal prism:

Location.	Earth.	Rock.	Total.
Atlantic entrance.....	75,000		75,000
Gaillard Cut.....	150,000	450,000	600,000
Pacific entrance.....	800,000		800,000
Total.....	1,025,000	450,000	1,475,000

Work under the project at Miraflores P. I. to widen the channel by cutting off the point of land on the west bank just south of Miraflores locks was prosecuted during the year. Three hundred and fifty-four thousand and two hundred cubic yards of earth and rock were removed during the year, making the total earth and rock excavated to July 1, 1919, 437,200 cubic yards. The total estimated quantities to complete this project are 51,700 cubic yards of earth and 142,900 cubic yards of rock.

The work of widening the channel at the Paraiso P. I. to give a better and more easy approach to the north end of the Pedro Miguel locks, was continued during the year. In this work 264,596 cubic yards of earth and rock were excavated making a total of 366,600 cubic yards of earth and rock removed to July 1, 1919. The estimated quantities to complete this project are 18,100 cubic yards of earth and 56,300 cubic yards of rock.

Of the material removed from Gaillard Cut 55 per cent was from Culebra slide, 1 per cent from Cucaracha slide, and 44 per cent from other slides and canal areas.

The following table shows the distribution of all material removed from Gaillard Cut during the year:

TABLE No. 8.—*Distribution of material removed from Gaillard Cut.*

Location.	Fiscal year.			Total to date.		
	Earth.	Rock.	Total.	Earth.	Rock.	Total.
Gamboa dike.....				23,856	59,505	83,361
Tower "R" incline.....					83,505	83,505
Haut Obispo slide, west.....				3,235		3,235
Buena Vista slide, west.....				5,470		5,470
Buena Vista slide, east.....	2,300	3,600	5,900	2,300	3,600	5,900
Cascadas slide, east.....				2,525	32,670	35,195
Whitehouse slide, east.....				9,928	17,132	27,060
Powderhouse slide, east.....				39,768	57,992	97,760
La Pita (lower) slide, east.....					59,803	59,803
Empire slide, east.....	4,800	6,000	10,800	28,745	212,217	240,962
Division office slide, west.....					6,280	6,280
Lirio slide, west.....	6,300	12,700	19,000	7,290	81,780	89,070
Culebra, new slide, east and west <sup>1</sup> .....	99,200	315,000	414,200	1,776,999	22,045,301	23,822,300
Culebra, old slide, east and west <sup>2</sup> .....				28,449	1,061,337	1,089,786
Contractors Hill, north.....				13,800	139,600	153,400
65-foot berm, west.....					73,430	73,430
Cucaracha slide, east.....	11,500	22,900	34,400	1,476,406	4,387,446	5,863,852
Contractors Hill slide, west.....	1,500	3,500	5,000	7,900	31,600	39,500
Paraiso incline, east.....					20,300	20,300
Paraiso P. I., west.....	31,800	232,700	264,500	52,900	313,700	366,600
Pedro Miguel slide, east.....				1,956	7,254	9,210
Miscellaneous <sup>3</sup> .....				2,853,578	157,860	3,011,438
Total.....	157,400	596,400	753,800	6,335,105	28,852,312	35,187,417

<sup>1</sup> Since Oct. 14, 1914.

<sup>2</sup> Prior to Oct. 14, 1914.

<sup>3</sup> Small slides and fills in the canal.

Cucaracha slide, which had been active during a part of last year, has been quiescent throughout the year, and at no time has it been a menace to safe navigation of the canal. A total of 5,863,852 cubic yards has been removed from this slide to date by dredges.

Culebra slides have been fairly quiescent most of the year, except through the months of October, November, and March, when they were active to a limited extent, but the channel has been maintained at all times and no delays to shipping have occurred. The slide areas have not materially increased during the year. There has been removed from the Culebra slides to date by dredges a total of 24,912,086 cubic yards of material, and it is estimated that 1,000,000 cubic yards more will have to be removed before slides become permanently quiescent.

A project for reducing the slope and weight of the west bank just south of Contractors' Hill was completed. The material was sluiced down by a hydraulic grader and removed by dredges. The smaller slides have been fairly quiescent during the year and at no time have they given serious trouble in affecting navigation.

The passage of commercial shipping through the canal was not delayed or suspended at any time during the year on account of slides in Gaillard Cut.

Dredge surveys were made daily in the vicinity of all active slides and all lumps or shoals found, which were considered a menace to navigation, have been removed by the dredges.

#### DUMPS.

The spoil from Gaillard Cut and Gatun Lake, near Gamboa, was disposed of on dumps located in Gatun Lake, from Tabernilla, mile 24 to mile 29 south of Mamei Curve. There was a total of 817,900 cubic yards of material deposited in these dumps during the year.

The material excavated in the Pacific entrance, including Miraflores P. I. improvement work, was deposited in San Juan fill, on flats along the west bank of the canal, in Diablo dump "A" on east side of canal—1,100 feet north of the Inner Harbor—and on the sea dump located to the westward of the canal entrance in Panama Bay. There were 424,700 cubic yards deposited in San Juan

fill, 664,000 cubic yards on flats west of canal, 473,100 cubic yards on the sea dump, and 92,200 cubic yards in the Diablo dump; 1,300 cubic yards were dumped in the canal prism and rehandled to San Juan Dike.

## SUBAQUEOUS ROCK EXCAVATION.

During the year 998,900 cubic yards of hard and soft rock were removed from the canal prism and Balboa Harbor as follows: 35,000 cubic yards from the Gatun Lake section, 315,000 cubic yards from Culebra slides, 22,900 cubic yards from Cucaracha slide, 232,700 cubic yards from the Paraiso, P. I. improvement work, 25,800 cubic yards from various small slides, 150,400 cubic yards from the Miraflores P. I. improvement work, 75,100 cubic yards from Pacific entrance channel, and 142,000 cubic yards from Balboa Harbor.

Of this amount, 61,777 cubic yards were drilled and blasted by drill boat *Tercdo No. 2*, and 213,869 cubic yards by well and tripod drills at the Paraiso P. I. There were 338,262.5 pounds of dynamite used during the year by the *Tercdo No. 2*, well and tripod drills, by dredges in dobbing large rocks, and a small amount on other jobs.

The following tables show the location, feet drilled, area covered, theoretical breakage, and costs of all rock mined by the *Tercdo No. 2*, well and tripod drills:

TABLE No. 9.—Performance of drill boat "Tercdo No. 2."

Month and year.	Location.	Number holes.	Total feet drilled.	Powder (number pounds.)	Area (square yards).	Breakage (cubic yards).	Cost.	Unit cost.
1918.								
July.....	Miraflores P. I., 2109+00 to 2111+00 W.	314	3,345	8,311	1,256	4,460	\$5,747.71	\$1.2887
August.....	Miraflores P. I., 2110+00 to 2106+90 W.	869	8,130	18,832	3,476	10,840	12,661.07	1.1679
September....	Miraflores P. I., 2106+90 to 2104+50 W.	893	8,573	21,034	3,572	11,431	12,035.93	1.0529
October.....	Miraflores P. I., 2104+50 to 2103+70 W.	329	3,169	7,819	1,316	4,225	4,547.06	1.0762
October.....	Pacific entrance, 2257+00-120 feet W. of C. L.	34	176	528	136	234	251.83	1.0762
1919.								
March.....	Paraiso P. I., 1893+50 to 1895+90 W.	257	3,623	10,792	9,252	4,830	7,698.85	1.5940
April.....	Paraiso P. I., 1895+90 to 1898+50 W.	557	5,641	16,321	20,052	7,521	10,184.59	1.3542
May.....	Paraiso P. I., 1896+70 to 1899+30 W.	383	6,853	20,146	13,788	9,137	12,655.29	1.3851
June.....	Paraiso P. I., 1898+50 to 1900+90 W.	479	6,824	19,956	17,244	9,099	11,342.38	1.2465
Total.....		4,115	46,334	123,739	70,092	61,777	77,124.71	1.2484

TABLE No. 10.—Performance of well and tripod drills.

Month and year.	Location.	Number holes.	Total feet drilled.	Powder (number pounds.)	Area (square yards).	Breakage (cubic yards).	Cost.	Unit cost.
1918.								
July.....	Paraiso P. I., 1896+50 to 1904+00 W.	342	15,531	16,570	1,660	37,527	\$12,156.93	\$0.3239
August.....	Paraiso P. I.; 1896+00 to 1900+60 W.	163	10,253	55,350	2,778	49,438	26,213.76	.5302
September....	Paraiso P. I., 1897+40 to 1899+75 W.	51	3,155	24,950	967	24,589	14,965.41	.6086
October.....	Paraiso P. I., 1898+20 to 1900+40 W.	185	11,128	27,050	1,017	21,241	17,329.27	.8158
November....	Paraiso P. I., 1899+60 to 1902+60 W.	145	9,897	31,320	1,223	26,000	18,869.28	.7257
December.....	Paraiso P. I., 1901+20 to 1903+60 W.	169	12,363	21,550	811	20,416	14,987.18	.7341
1919.								
January.....	Paraiso P. I., 1901+25 to 1903+65 W.	71	5,667	36,700	1,472	34,658	20,654.77	.5960
Total.....		1,126	67,994	213,490	9,928	213,869	125,176.60	.5853

## MISCELLANEOUS DREDGING.

*Atlantic terminals.*—During the year 790,600 cubic yards of earth and 266,600 cubic yards of rock were removed from the Atlantic terminals as follows: 240,100 cubic yards of earth and 114,300 cubic yards of rock removed from the approach channel extension, 75,700 cubic yards of earth and 96,100 cubic yards of rock from the extension to west coaling station slip, 19,200 cubic yards of earth and 5,500 cubic yards of rock from barge slip west side of coaling station, 1,000 cubic yards of earth from along the face of Pier No. 10, 55,200 cubic yards of earth and 2,000 cubic yards of rock (fill) north and south of Pier No. 6, 171,500 cubic yards of earth and 20,400 cubic yards of rock from the approach, and 500 cubic yards of earth and 1,000 cubic yards of rock along south quay wall of submarine basin at Coco Solo, 184,900 cubic yards of earth and 19,600 cubic yards of rock from Margarita Bay, 6,600 cubic yards of earth and 3,400 cubic yards of rock from boathouse slip to naval air station, and 35,900 cubic yards of earth and 4,300 cubic yards of rock from borrow pits in Manzanillo Bay for fills.

This material was disposed of as follows: 420,400 cubic yards in fills for the Navy at Coco Solo, 330,200 cubic yards in sanitary fills west of coaling station, 221,700 cubic yards were dumped between the land end of the East Breakwater and Margarita Point, 27,700 cubic yards in New Cristobal fill, and 57,200 cubic yards were deposited on the north side of Cristobal mole.

*Pacific terminals.*—During the year 776,200 cubic yards of earth and 142,000 cubic yards of rock were removed from Balboa Inner Harbor.

This material was disposed of as follows: 54,900 cubic yards of earth, excavated by a pipe-line dredge with two relays, was pumped to Corundu River and Corozal road fills, 502,900 cubic yards of earth to Diablo dump "A," 2,000 cubic yards of earth to Balboa relay fill, 216,400 cubic yards of earth and 142,000 cubic yards of rock, excavated by ladder and dipper dredges, were towed to sea and deposited on the sea dump.

## SAND AND GRAVEL PRODUCTION.

With the exception of 6,755 cubic yards of gravel excavated from Chagres River gravel beds and 5,310 cubic yards of sand excavated at Point Chame, Panama, by pipe-line dredge No. 86, all sand and gravel necessary for construction purposes was taken from stock piles at the Gamboa gravel plant. The following amounts were loaded and shipped from the plant during the year:

	Cubic yards sand.	Cubic yards run-of-bank gravel.	Cubic yards No. 2 gravel.	Cubic yards, total.
Shipped by cars.....	30,327	36,581	31,946	98,854
Shipped in barges.....	212	18,002	534	18,748
Total.....	30,539	54,583	32,480	117,602

## DIVERSION, DRAINAGE, AND DIKES.

Ditches were maintained at East and West Culebra, Cucaracha, and all other small slides by the hydraulic graders in order to provide the necessary drainage for surface and storm waters, which would otherwise collect in pools and keep sliding material constantly saturated, thereby tending to accelerate its movement toward the canal.

During the year two breaks occurred in the West Lirio levee, located just north of Lirio, P. I., on west side of canal at elevation +200 mean sea level. These breaks, during freshets, permitted the water running down West Lirio diversion to flow across into the canal at these points. The breaks were repaired, 1,800 cubic yards of material being used in this work.

The construction work on the San Juan dike, opposite Balboa Inner Harbor and fronting the west side of the canal, was completed during the year with the placing of 6,075 cubic yards of material. This dike embraces an area of approximately 90 acres of low swamp land, which is situated between the west bank of the canal and the San Juan hills to the westward and extends from station 2190 to 2225 along the canal. The basin thus formed will be used as a place for deposit of dredged material.



## SLIDE INSPECTION AND REPORTS.

Inspections were made of all slide areas from time to time, new breaks reported, and drainage conditions noted.

## MINDI DIKES AND GROINS.

The rock and timber dikes and groins along Mindi beach south of Limon Bay have been maintained throughout the year. No new dikes or groins have been built, and only minor repairs have been necessary to those previously constructed. The erosion of the beach, which in past years had been very heavy annually, has been practically checked, and during the past year the only noticeable change was where the beach had filled or eroded slightly in the gradual adjusting of the sands into a uniform shore line.

## WATER HYACINTHS.

Regular monthly inspections were made of the waters of the canal, Gatun Lake, and tributaries. The most of the hyacinths found were pulled, as they were scattered, but some were destroyed by spraying with an arsenic solution.

During the year 9,467 old plants and 922,510 young plants were pulled and deposited on shore, and 22,192 square yards of hyacinths were destroyed by spraying with the arsenic solution. In the upper reaches of the Pescado River a channel for small craft was cleared and boomed. So far as is known no plants were allowed to seed or grow to maturity during the year.

## SURVEYS.

The usual progress surveys were made of the dredged areas in the canal prism, Cristobal Harbor, Coco Solo, Gatun Lake, Gaillard Cut, and Balboa Inner Harbor. The Gatun Lake and Pacific sea dumps were surveyed and charted. Topographical cross sections were made of East and West Culebra and Cucaracha slides and profiles plotted. All surveys, estimates, and plans of all dredging projects proposed during the year were prepared. Borings, classifications, and estimates of borrow pits were made of material available on the east and west side of Manzanillo Bay to be used in completing all proposed fill projects for the Army and Navy. Dump inspection in Gatun Lake section was maintained to June 25, 1919, and in Pacific sea dump for the entire year.

## OFFICE.

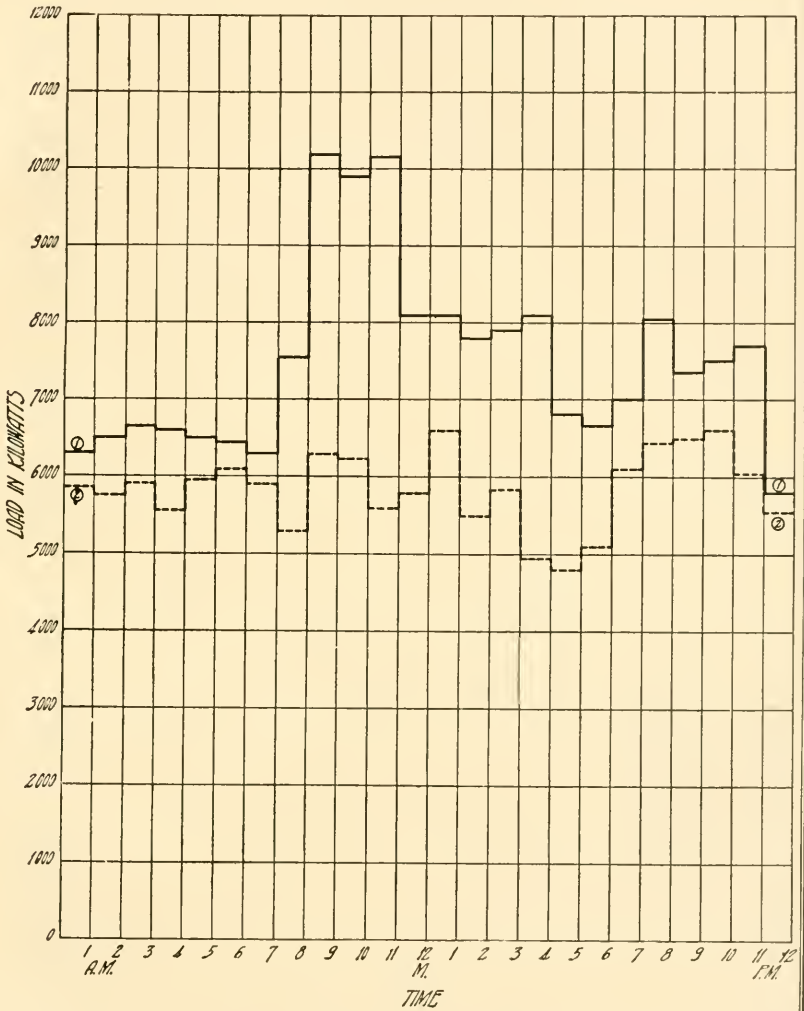
All clerical work, preparation of progress records, estimates, requisitions, etc., were satisfactorily performed during the year.

Respectfully submitted.

JAY J. MORROW,  
*Engineer of Maintenance.*

Col. CHESTER HARDING, United States Army,  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*



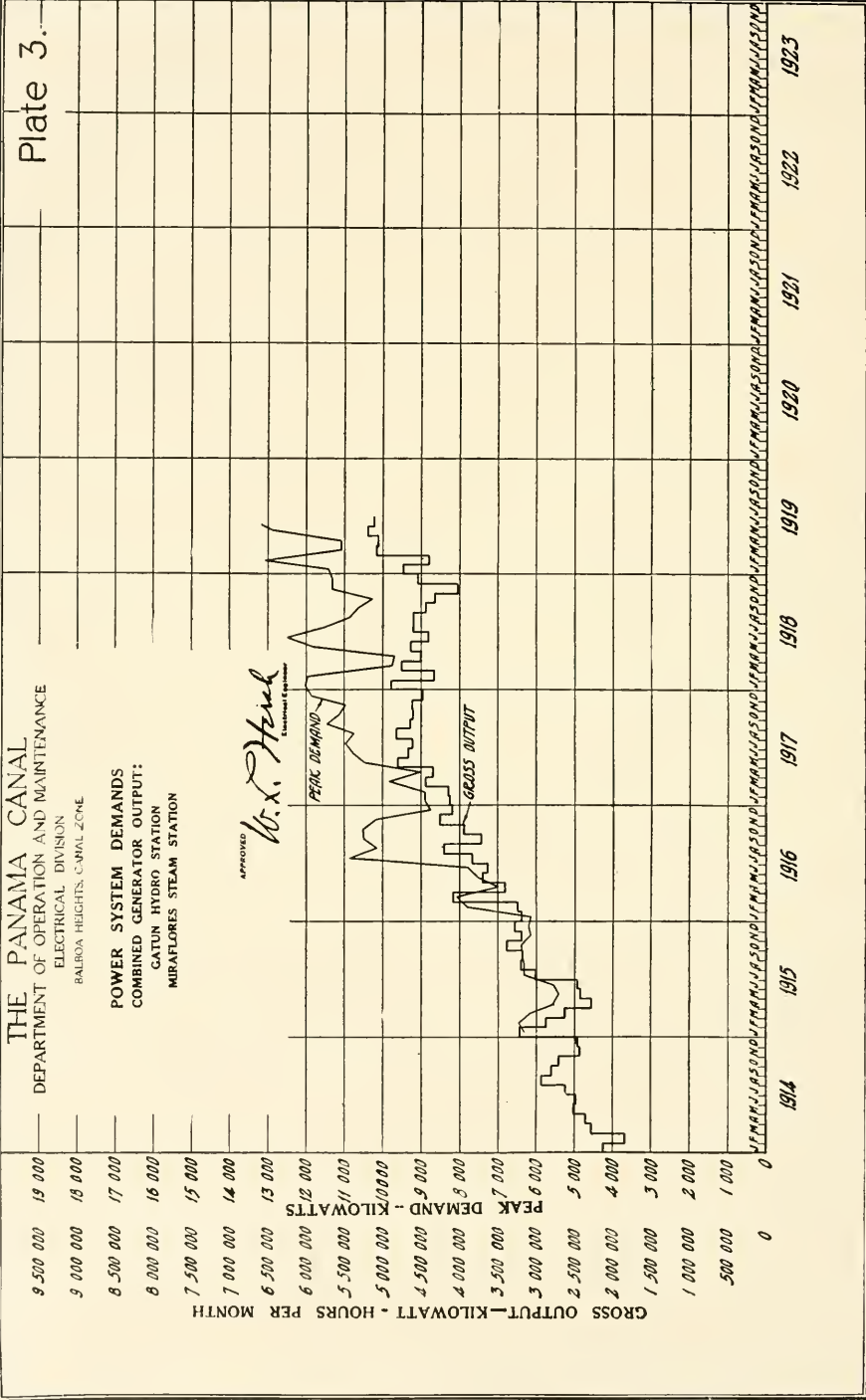


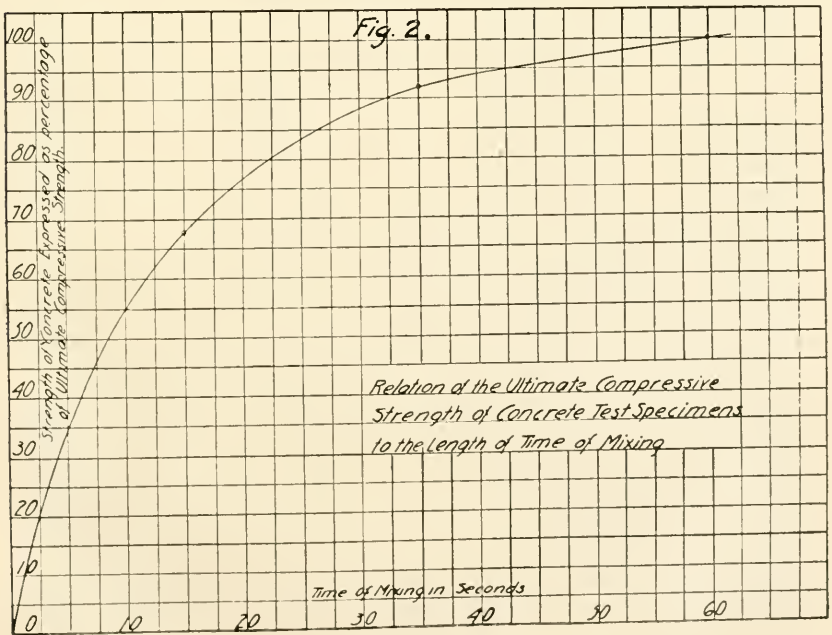
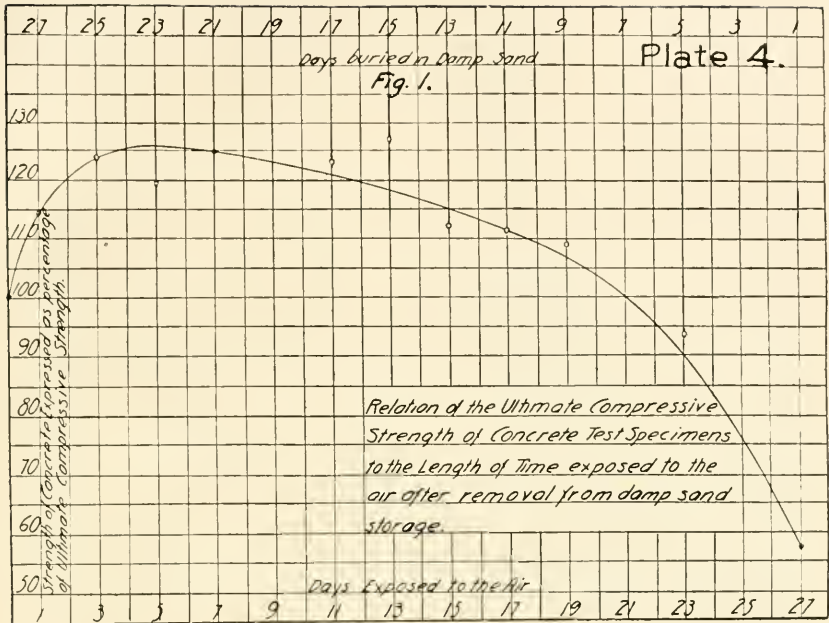
GATUN HYDRO-ELECTRIC STATION  
 TYPICAL DAILY LOAD CURVES  
 ○ WEEK DAY LOAD  
 ⊖ SUNDAY LOAD

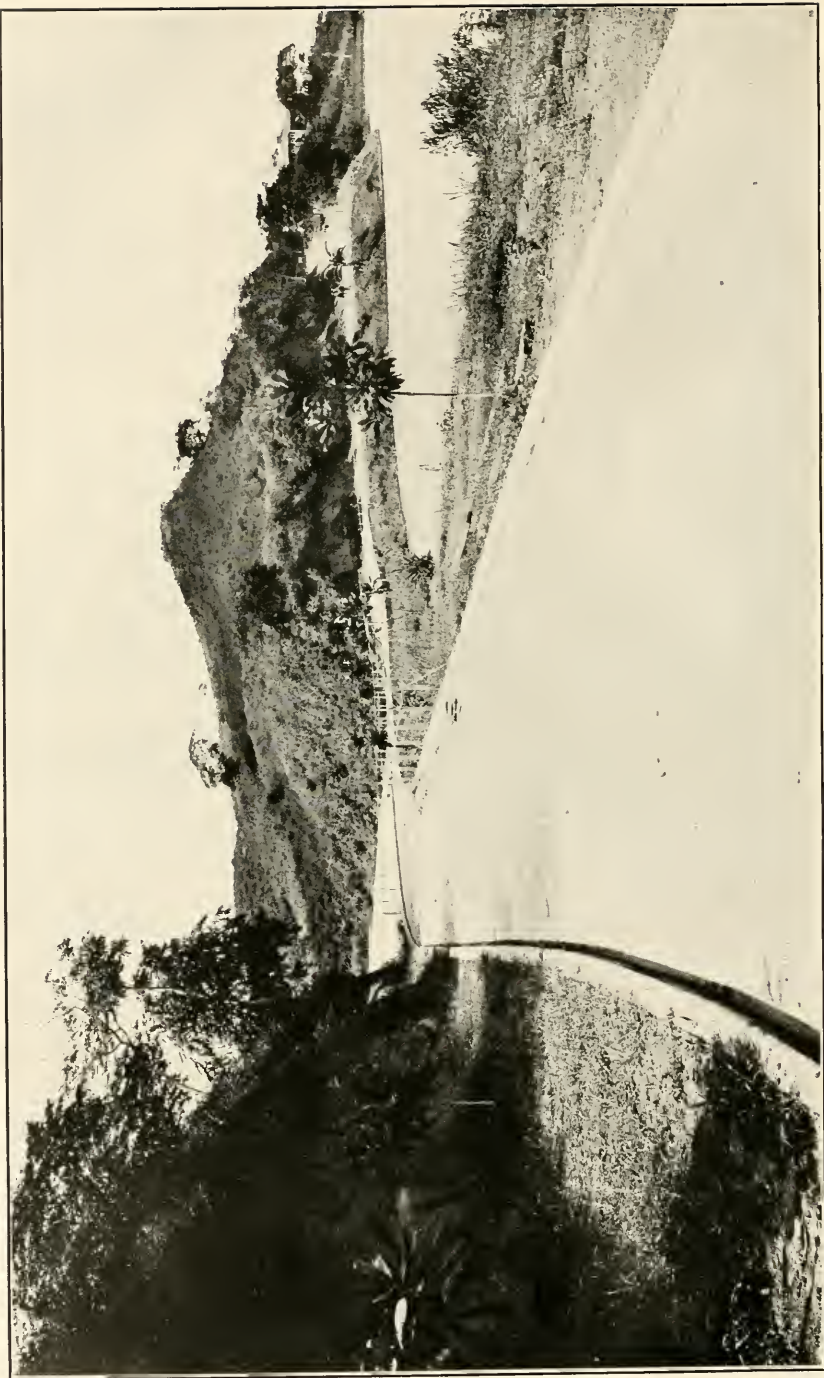
THE PANAMA CANAL  
DEPARTMENT OF OPERATION AND MAINTENANCE  
ELECTRICAL DIVISION  
BALBOA HEIGHTS, CANAL ZONE

POWER SYSTEM DEMANDS  
COMBINED GENERATOR OUTPUT:  
GATUN HYDRO STATION  
MIRAFLORES STEAM STATION

APPROVED  
*W. S. Hend*  
Assistant Engineer

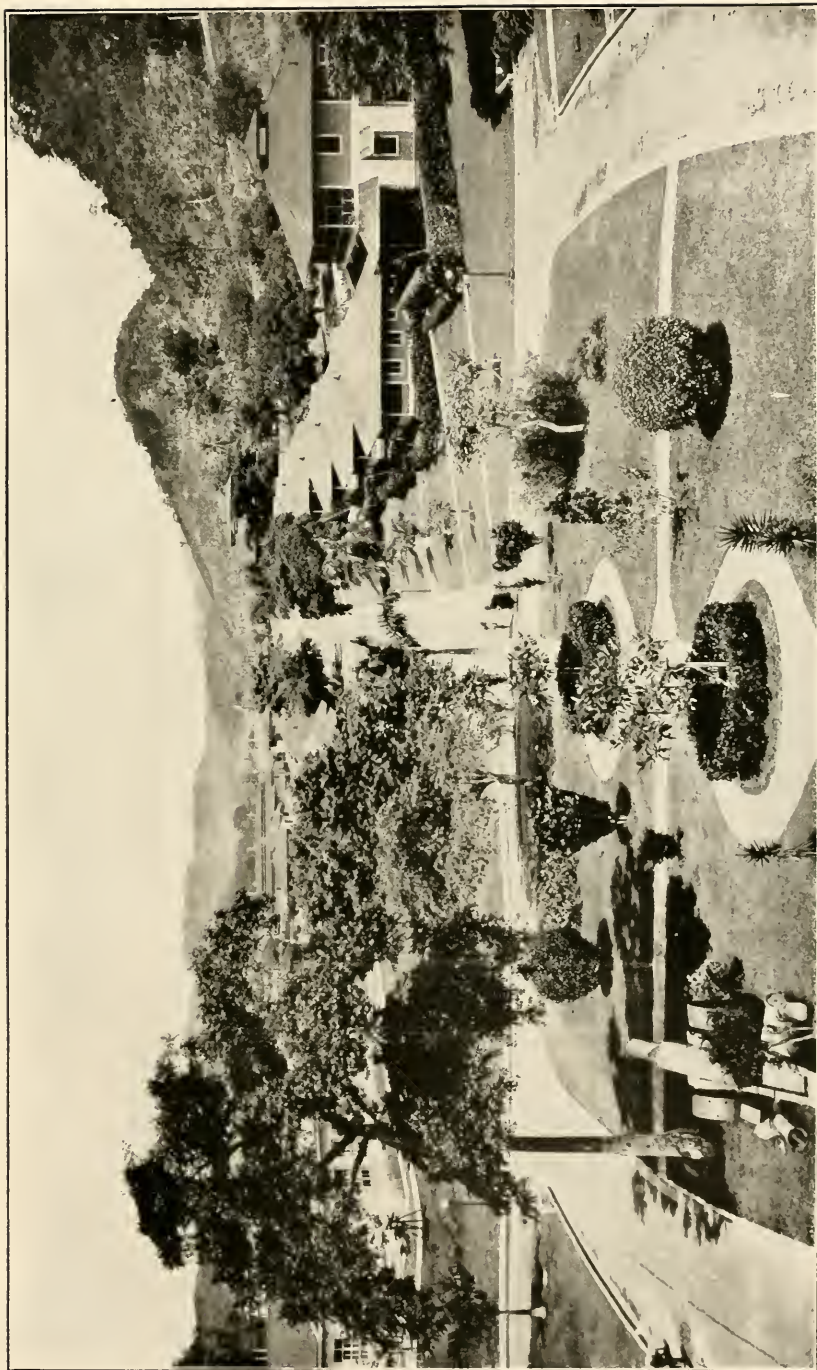




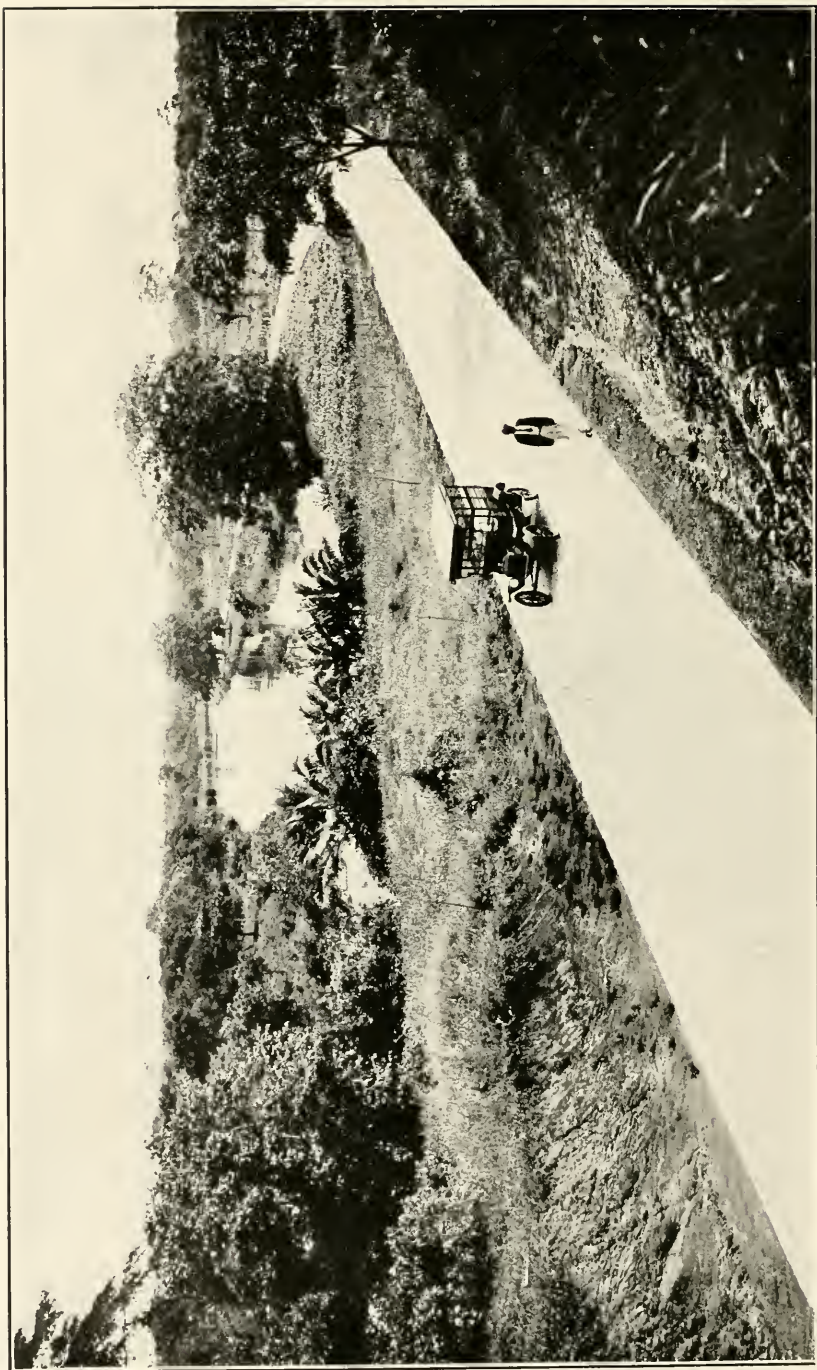


SECTION OF ANCON-PEDRO MIGUEL HIGHWAY. CONCRETE BASE, SHEET ASPHALT WEARING SURFACE. JUNE, 1919.

PLATE 6.



PEDRO MIGUEL, CANAL ZONE. MAIN STREET. JUNE, 1919.



GATUN TO MOUNT HOPE, CANAL ZONE. SECTION OF CONCRETE ROAD. JUNE, 1919.



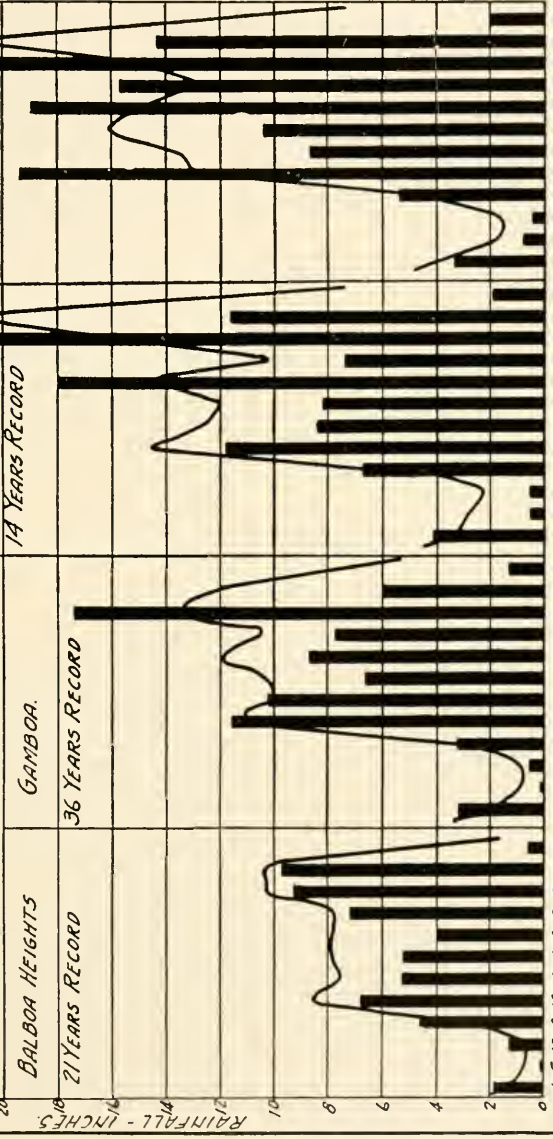
**THE PANAMA CANAL**  
 Department of Operation and Maintenance  
 Section of Meteorology and Hydrography  
 BALBOA HEIGHTS, CANAL ZONE.

**MONTHLY RAINFALL YEAR 1918  
 AND STATION AVERAGES**  
 Inches

(To accompany Annual Report 1919)

Approved  
*Jay Johnson*  
 Engineer of Maintenance.

**LEGEND**  
 YEAR 1918  
 STATION AVERAGE.



J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

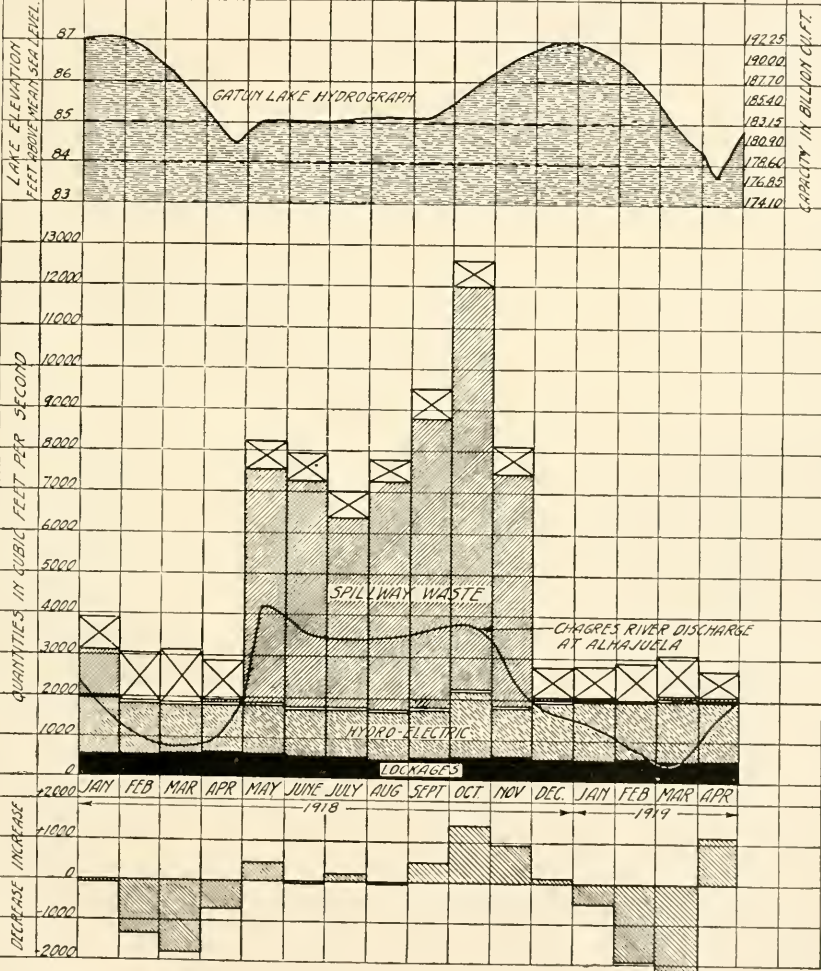


**THE PANAMA CANAL**  
 Department of Operation and Maintenance  
 Section of Meteorology and Hydrography  
 BALBOA HEIGHTS, CANAL ZONE.

**OPERATING USES OF GATUN LAKE**  
**WATER SUPPLY**  
 Year 1918 - Dry Season 1919  
 (To accompany Annual Report 1919)

Approved *J. J. Moore*  
 Engineer of Maintenance.

- LEGEND**
- STORAGE.
  - LOCKAGES.
  - HYDRO-ELECTRIC.
  - LEAKAGES & MUNICIPAL USES.
  - SPILLWAY WASTE.
  - EVAPORATION.



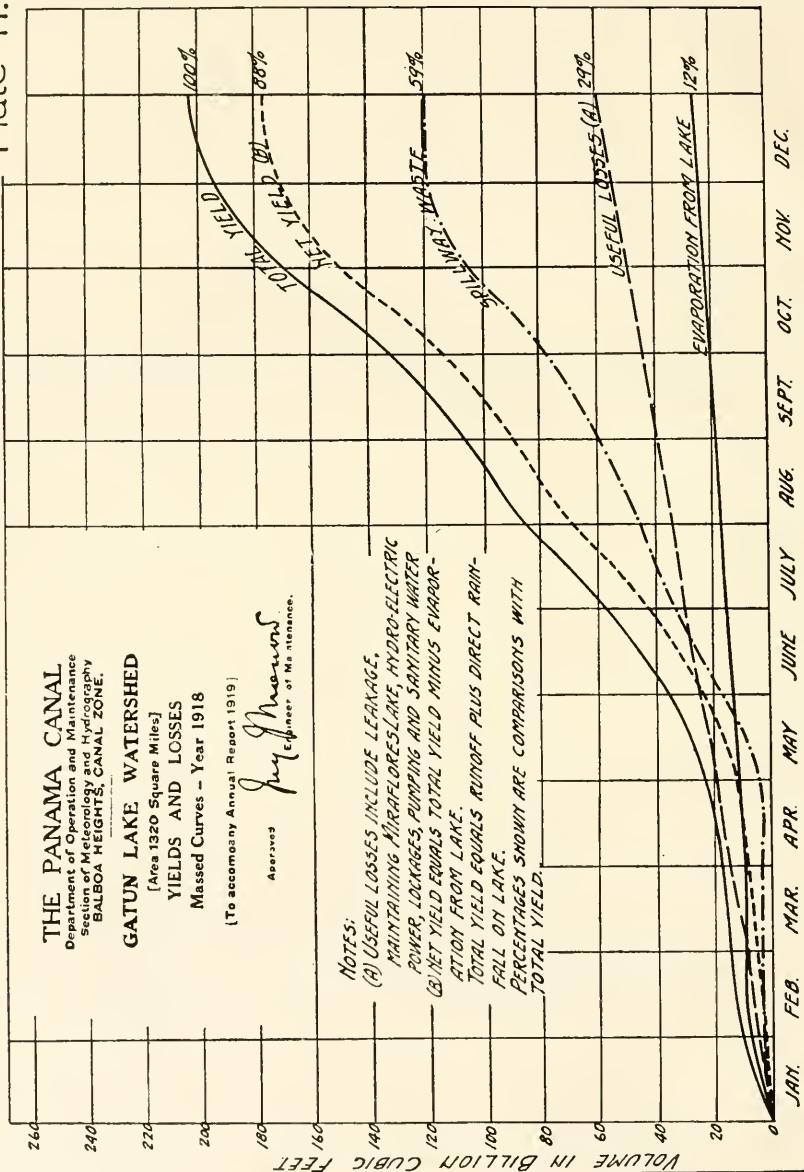
**THE PANAMA CANAL**  
 Department of Operation and Maintenance  
 Section of Meteorology and Hydrography  
 BALBOA HEIGHTS, CANAL ZONE.

**GATUN LAKE WATERSHED**  
 [Area 1320 Square Miles]  
**YIELDS AND LOSSES**  
 Massed Curves - Year 1918

(To accompany Annual Report 1919)

Approved *Jay J. Manservigi*  
 Engineer of Maintenance.

NOTES:  
 (A) USEFUL LOSSES INCLUDE LEAKAGE,  
 MAINTAINING MIRAFLORES LAKE, HYDRO-ELECTRIC  
 POWER, DRAINAGES, PUMPING AND SANITARY WATER  
 (B) NET YIELD EQUALS TOTAL YIELD MINUS EVAPORATION  
 TOTAL YIELD EQUALS RUNOFF PLUS DIRECT RAIN-  
 FALL ON LAKE.  
 PERCENTAGES SHOWN ARE COMPARISONS WITH  
 TOTAL YIELD.



THE PANAMA CANAL  
 Department of Operation and Maintenance  
 Section of Meteorology and Hydrography  
 BALBOA HEIGHTS, CANAL ZONE.

GATUN LAKE WATERSHED

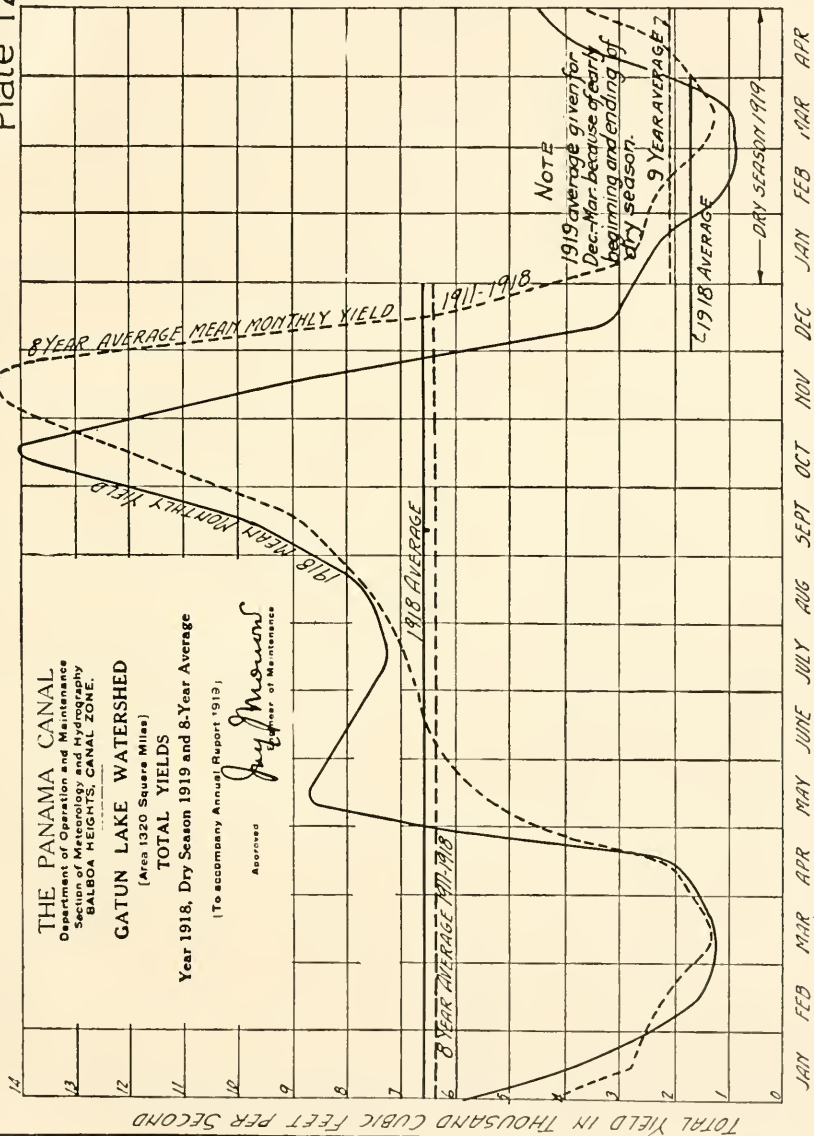
(Area 1320 Square Miles)

TOTAL YIELDS

Year 1918, Dry Season 1919 and 8-Year Average

(To accompany Annual Report 1919)

Approved  
*Jay Mowbray*  
 Chief Engineer of Maintenance



TOTAL YIELD IN THOUSAND CUBIC FEET PER SECOND

JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC JAN FEB MAR APR

**THE PANAMA CANAL**  
 Department of Operation and Maintenance  
 Section of Meteorology and Hydrography  
 BALBOA HEIGHTS, CANAL ZONE.

**CHAGRES RIVER DRAINAGE BASIN**  
 (Area 427 Square Miles)

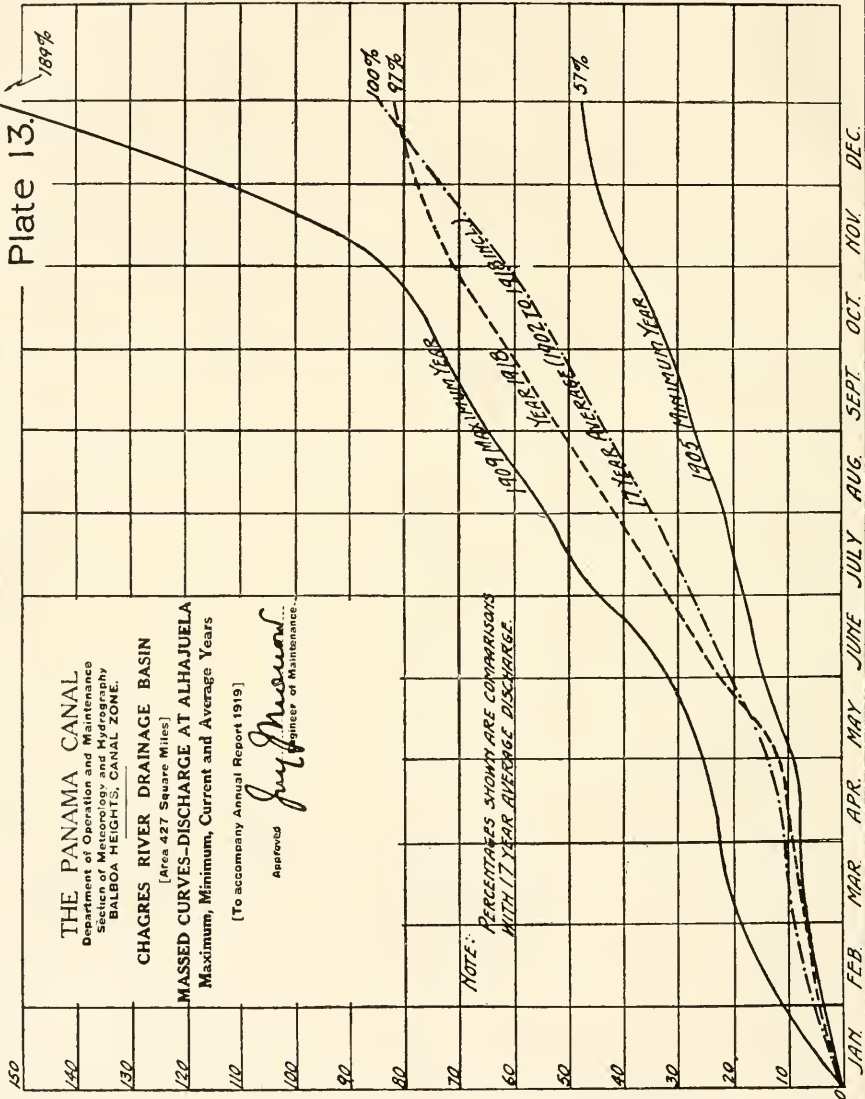
**MASSED CURVES-DISCHARGE AT ALHAJUELA**  
 Maximum, Minimum, Current and Average Years

(To accompany Annual Report 1919)

Approved  
*J. J. Mendenhall*  
 Engineer of Maintenance

NOTE:  
 PERCENTAGES SHOWN ARE COMPARISONS  
 WITH 17 YEAR AVERAGE DISCHARGE.

DISCHARGE IN BILLION CUBIC FEET.



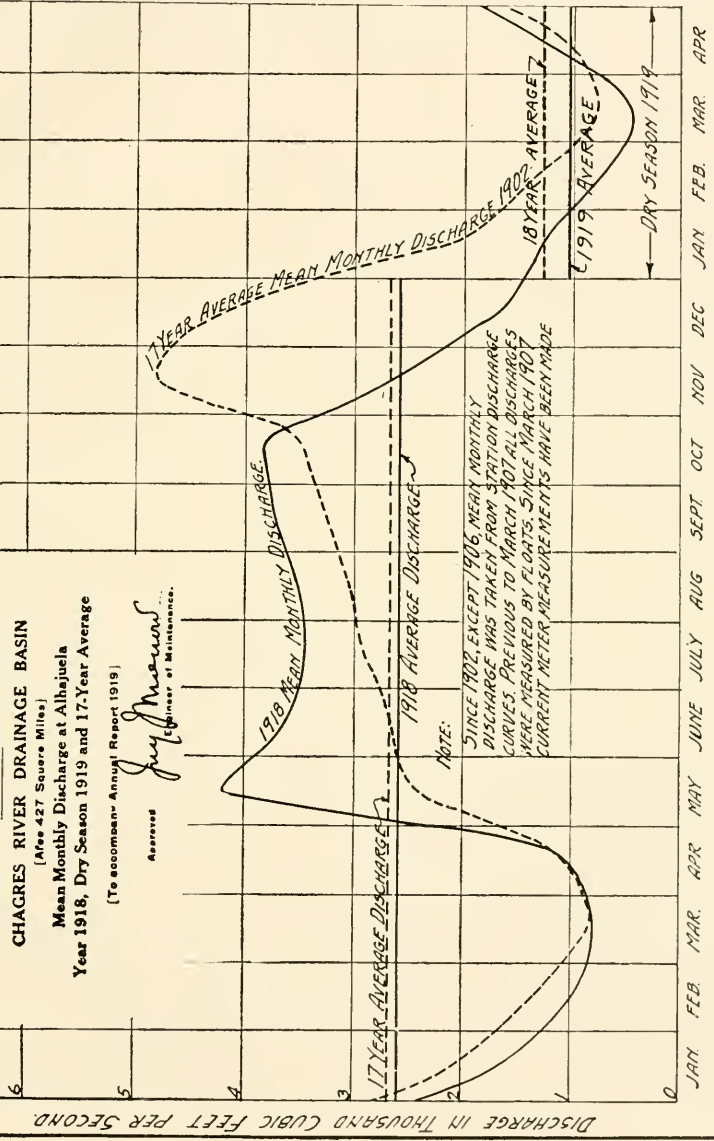
**THE PANAMA CANAL**  
 Department of Operation and Maintenance  
 Section of Meteorology and Hydrography  
 BALBOA HEIGHTS, CANAL ZONE.

**CHAGRES RIVER DRAINAGE BASIN**  
 (Area 427 Square Miles)

Mean Monthly Discharge at Alhajuela  
 Year 1918, Dry Season 1919 and 17-Year Average

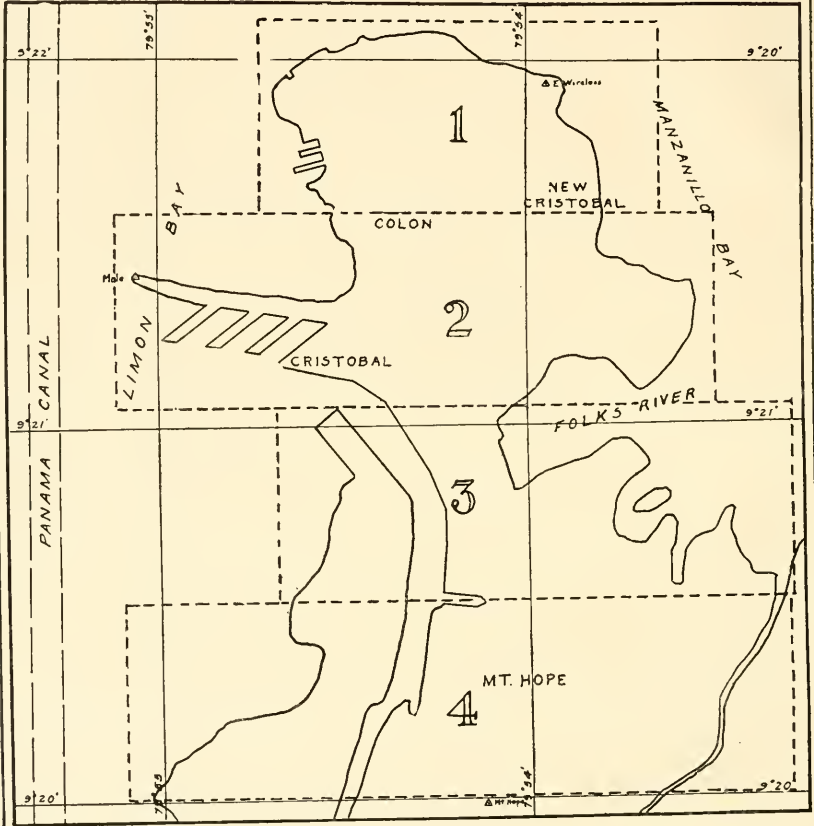
(To accompany Annual Report 1919)

Approved  
*J. J. Maxwell*  
 Engineer of Maintenance.



NOTE:  
 SINCE 1902, EXCEPT 1906, MEAN MONTHLY DISCHARGE WAS TAKEN FROM STATION DISCHARGE CURVES, PREVIOUS TO MARCH 1907 ALL DISCHARGES WERE MEASURED BY FLOATS. SINCE MARCH 1907 CURRENT METER MEASUREMENTS HAVE BEEN MADE

DISCHARGE IN THOUSAND CUBIC FEET PER SECOND



THE PANAMA CANAL  
DEPARTMENT OF OPERATION AND MAINTENANCE  
Section of Surveys  
Balboa Heights, Canal Zone

**COLON-CRISTOBAL**

To Accompany Annual Report

*O. E. Malsbury*  
Assistant Engineer



## APPENDIX B.

### REPORT OF THE RESIDENT ENGINEER, BUILDING DIVISION.

BALBOA HEIGHTS, CANAL ZONE, *July 29, 1919.*

SIR: I have the honor to submit the following report of operations of this division for the fiscal year ended June 30, 1919:

#### ORGANIZATION.

On August 1, 1918, the Northern and Southern districts were consolidated and placed under the supervision of Mr. J. B. Fields, as superintendent of construction.

On September 17, 1918, the construction work at the submarine base and Naval air station, Coco Solo, was discontinued as a separate district and was placed under the supervision of the superintendent of construction.

#### PERSONNEL.

Mr. H. Rowe continued as resident engineer. Mr. S. M. Hitt continued as architect.

Mr. C. A. Nelson continued as superintendent of construction, Pier No. 6.

Mr. R. C. Hardman, acting superintendent of the northern division, transferred to the municipal division on August 1, 1918.

Mr. C. C. Snedeker, superintendent of construction at the submarine base and naval air station, Coco Solo, resigned on September 17, 1918.

#### BUILDING OPERATIONS.

Work was continued on Pier No. 6, Ancon Hospital buildings, ice and cold-storage plant, abattoir, Coco Solo submarine base, naval air station, and Army aviation base, France Field.

New projects started during the year were: Meat canning plant, Mount Hope; machine shop, carpenter shop, boiler house and garage as a part of the new industrial layout at Mount Hope; 10 sets of one-family quarters for Central & South American Telegraph Company; ten 12-family silver quarters at Mount Hope; silver club-houses at Red Tank and Gatun; Lighthouse subdivision office building, Gatun; tuberculosis ward, Corozal; storage building, section of surveys, Balboa Heights; and miscellaneous work as outlined in the accompanying tables.

#### PIER NO. 6.

The construction of Pier No. 6 was completed with the exception of the installation of the steel doors and millwork. The reinforced concrete roof trusses mentioned in the annual report of 1918 were successfully used as a substitute for the steel trusses.

## ICE AND COLD-STORAGE PLANT.

Work was completed on the new ice and cold-storage plant, and all machinery, with the exception of that for milk treating and ice-cream manufacture was installed. The refrigerating apparatus was installed sufficiently to commence refrigeration of the building on February 13, and on February 20 the first fresh-killed beef was placed in the chill rooms. The various systems of refrigeration as used, namely, the direct expansion, the cold-air blast, and salt-brine spray, operated successfully. Acceptance tests were conducted on all of the apparatus.

## ANCON HOSPITAL.

The construction of the Ancon Hospital group of buildings, which commenced in 1915, was completed. The building units under construction during the past fiscal year were two ward groups having a capacity of 192 patients each, with central administrative units. There was also completed as a part of this project the residence of the superintendent of the hospital.

## NAVAL SUBMARINE BASE AND NAVAL AIR STATION.

Work was continued on these projects in accordance with original plans and subsequent requests of the Navy Department. Total expenditure during the year for the naval submarine base was \$630,627.39, and for the naval air station, \$275,173.93.

## ARMY AVIATION BASE, FRANCE FIELD.

Work was completed on the original appropriation of \$468,000 and work was 90 per cent completed on officers' quarters and barracks as covered by the \$335,400 appropriation. Total expenditure during the year was \$393,981.54.

## CANTONMENT CONSTRUCTION.

Work was commenced on the expenditure of the \$500,000 appropriation for cantonment construction and repairs to barracks and quarters. One 276-man barrack, three 250-man barracks, and one 132-man barrack were completed at the camp at Empire, and various miscellaneous repair jobs completed, involving an expenditure of \$155,000, when orders were received to suspend operations.

## INDIVIDUALS AND COMPANIES.

During the fiscal year the following work was done for individuals and companies:

For the Central & South American Telegraph Co. eight type-17 quarters and two 1-family quarters of their design were constructed. Also work was begun on an office building and bachelor quarters in Balboa.

One type-17 1-family house was constructed for the West India Oil Co. at Balboa, and one for the seamen's home at Cristobal.

Work was commenced on the construction of the permanent Army posts at Miraflores and Gatun, and also on the construction of two captains' quarters, one 2-family lieutenants' quarters, and two 150-man barracks at Fort Sherman.

## ARMY POSTS, MIRAFLORES AND GATUN.

The Army building program for the 1919-20 fiscal year provides buildings to accommodate one Infantry regiment at Miraflores, located east of the main-line track of the Panama Railroad, on the opposite side from the locks, and buildings for one Infantry regiment at Gatun, located north of the town, on the same side of the track. The buildings of each of the two groups and their allotments are as listed herewith:

1 colonel's quarters.....	\$12, 000
1 6-set lieutenants' bachelor quarters.....	35, 000
5 2-set field officers' quarters.....	105, 000
7 2-set captains' quarters.....	126, 000
6 4-family lieutenants' quarters.....	132, 000
6 4-family noncommissioned officers' quarters.....	111, 000
3 battalion barracks.....	598, 000
1 special barrack.....	102, 100
1 headquarters building.....	97, 000
2 62-stall stables.....	30, 750
1 54-stall stable.....	6, 750
1 35-stall stable.....	4, 375
1 wagon shed.....	5, 800
1 incinerator.....	20, 000

These buildings are of a uniform type of construction and embody features, consistent with economy, that past experience has taught the climate required for permanency and for comfort. All buildings except the stables and wagon shed (described below) and incinerator have a first-floor elevation of 4 feet above the average grade. The buildings are all a skeleton frame of reinforced concrete columns and beams. Exterior walls are hollow cement blocks, 6 inches thick in the dwellings and 4 inches thick in the barracks and the headquarters buildings, cement stuccoed on the outside and lime plastered on the inside. The roofs, except those of the stables and wagon shed, are Spanish tile on wood framing, at a one-sixth pitch. Interior partitions of the quarters are generally 4-inch cement blocks, lime plastered, except the noncommissioned officers' quarters, which are single thickness, matched and beaded partitions to the ceiling. Barracks partitions, except the company separation walls and bounding walls of toilets, the kitchen wing in the battalion barracks, and the ordnance repair shop and the magazine of the special barracks, which are 4-inch cement blocks, lime plastered both sides, are 6 feet 8 inches high, one thickness matched, and beaded partitions. The kitchens, kitchen exterior platforms, and toilets of the battalion barracks, the kitchens, kitchen exterior platforms, toilets, kitchen storerooms, general storerooms, the ordnance repair shop, and the magazine (also its ceiling) of the special barracks, and all porches of quarters have concrete floors. All windows of the barracks not sheltered by porches and the roof overhead have 4-foot tile hoods. All buildings, including porches, are copper screened.

*The 6-set lieutenants' quarters.*—This building is two stories high and contains apartments for six bachelor lieutenants and for one inspector. Each apartment extends the depth of the building and consists of a front porch, a living room, and a bedroom and private bath. In addition, the building has, in common to all the occupants, a library, a combined living and dining room, a kitchen and pantry,

and a rear wing containing two servants' rooms, with toilet and shower.

*The 2-set field officers' quarters.*—This building is two stories high and contains one apartment on each floor. The over-all dimensions of the building (the allotment to each family) are 40 feet by 55 feet, giving each apartment a 7-foot 6-inch by 22-foot porch, a combined living and dining room 16 feet 9 inches by 30 feet, a columned opening making two divisions of the room, a kitchen, pantry, and three bedrooms (each with a dry closet), and two toilet rooms, one containing tub and separate shower, the other shower only. On the rear of the building is a one-story servants' and laundry wing, each of the same dimensions as that of the colonel's quarters, but housing the servants for the two families.

*The 2-set captains' quarters.*—This is exactly the same building as the 2-set field officers' quarters, except the 3-foot 6-inch projecting hood that shelters the first-story windows of the latter building does not occur in the former.

*The 4-family lieutenants' quarters.*—This is a rectangular 2-story building 36 feet by 90 feet, containing two apartments on each floor. Each apartment has a porch 8 feet 2 inches by 40 feet, a combined living and dining room similar to that in the field officers' house, but of 13-foot 9-inch by 26-foot 6-inch dimensions. Except the pantry and exterior shower bath, these apartments contain the same rooms (but individually smaller) and closets as the 2-set field officers' and captains' quarters. In the rear of the apartment building, as a separate structure, is a 11-foot by 26-foot servants' quarters, containing two rooms for the four servants and toilet and shower bath. The laundry tubs of these apartments are in the kitchens.

In all of the above official quarters servants are housed two to a room. The colonel is allowed four servants, field officers and captains have two servants, and lieutenants one servant.

*The 4-family noncommissioned officers' quarters.*—This is a rectangular 2-story building, 30 feet 5 inches by 75 feet 7 inches, containing two apartments on each floor. Each apartment has a porch 7 feet by 32 feet, a combined living and dining room (one room) 14 feet by 24 feet, a kitchen (containing with its equipment the laundry tubs), two bedrooms, a toilet and bathroom, and one dry closet.

*Battalion barracks.*—These barracks at each post are placed facing inward on three sides of a hollow square, the fourth side being occupied by the headquarters building. Each of the three buildings under this title is three stories high and is built of uniform bays 12 feet wide from center to center of columns on the front elevation. The building proper is 480 feet long and 44 feet deep, accommodating four companies. Lengthwise it is divided into four equal parts by cement block walls, completely separating the several companies. Behind each company section is a wing, three of the 12-foot bays wide and projecting 33 feet. A 9-foot-wide porch extends the entire length of the building on all floors. One row of columns midway between the porch and rear wall of the building proper divides each company's space into 20 units, two deep, each 12 feet by 17 feet 6 inches (including exterior walls and partitions). The first floor of each company's section of the building is partitioned off into the following rooms of the unit sizes given, viz:

Mess hall.....	8 units
Day room.....	4 units
General stores.....	2 units

and the following rooms of one unit each: Office, first sergeant, mess and supply sergeant, tailor, barber, and pantry.

On the first floor the rear wing is partitioned into a 21-foot 6-inch by 35-foot 6-inch kitchen, a kitchen storeroom, and a cooks' room.

The second and third floor plans of both the building proper and the rear wing are alike. All but 2 of the 20 units, which are partitioned into two noncommissioned rooms, form a squad room, which extends 10 feet into the rear wing. This squad room accommodates 70 men, which allots one man 57 square feet. The end of the rear wing on the two upper floors is the toilet and washroom. It is equipped with fixtures that allow one toilet to each 10 men, one wash basin to 5 men, one shower head to 10 men, one laundry tub to 20 men, and 1 foot of urinal trough to 5 men.

*Special barracks.*—This building is uniform in design with the battalion barracks, but two stories high. The width of the building is the same, so that the 12-foot bays behind the continuous porch form units of the same size and arrangement as that described for the battalion barracks. No rear wings exist. The total length of the building is 33 bays, or 396 feet, irregularly divided by cement-block cross walls. On the first floor the party cross walls subdivide the 33 bays of the building into sections from left to right, as follows:

Headquarters company.....	9 bays, or 18 units (2 deep)
Magazine.....	4 units
Ordnance store and repair shop.....	12 units
Machine-gun company.....	20 units
Supply company.....	12 units

The headquarters company is subdivided as follows on the first floor:

Mess.....	4 units
Day room.....	2 units
Kitchen.....	2 units

and the following rooms of one unit each, viz: Office, first sergeant, mess and supply sergeant, cooks, barber shop, office and music room, dry room for music and instruments, pantry, kitchen stores, and general stores.

The magazine and the ordnance store and repair shop are not subdivided.

The machine-gun section is subdivided as follows on the first floor:

Mess.....	4 units
Kitchen.....	2 units
Machine-gun stores.....	2 units
Reading and day room.....	3 units

and the following rooms of one unit each, viz: Office, first sergeant, mess and supply sergeant, cooks, barber shop, tailor, pantry, kitchen stores, and general stores.

The supply section is subdivided as follows:

Mess.....	2 units
Kitchen.....	2 units
Day room.....	2 units

and the following rooms of one unit each, viz: Office, first sergeant, cooks, mess and supply sergeant, kitchen stores, and general stores.

On the second floor this building is subdivided differently by cross walls as follows, from left to right:

Band practice room, 2 bays, or 4 units.

Headquarters company, 20 units (4 units are allotted to the toilet room, and 2 units to two noncommissioned rooms of 3 men each. The remaining 14 units form the squad room for 52 men, which allots 62 square feet to a man).

The machine-gun company, 28 units (the same space is allotted to toilets and noncommissioned rooms as in the headquarters company, leaving 22 units for 68 men in the squad room, or 60 square feet to a man).

Supply company, 14 units (2 units are allotted to the toilet room and 2 units to two noncommissioned rooms of 3 men each. The remaining 10 units form the squad room for 30 men, which allots 65 square feet to a man).

There is a flight of stairs at each end of the common porch and a third flight in the center.

*Headquarters building.*—This building harmonizes in design with the general scheme of the barracks, there being a continuous two-story porch on the front with a column spacing of 12 feet. This building is 28 bays, or 336 feet, long, but in width it is 7 feet wider than the barracks, being 51 feet. No rear wings exist. A row of columns down the center of the building behind the porch lays out the same unit scheme as the barracks, but the units are 12 feet by 20 feet 3 inches (including exterior walls and partitions); the front porch is wider than the barracks porch, being 10 feet 6 inches.

The first floor of the building is partitioned into the following rooms of unit sizes as given below:

Post exchange	12 units
Stock room	4 units
Lunch room	6 units
Prison	3 units
Guardroom	2 units
Kitchen	2 units

and the following rooms of one unit each, viz: Prison bathroom, sergeant (and guardroom toilet), officer (off the guardroom), barber, shoemaker, tailor, pantry, office (for post exchange), post-exchange toilet.

The remaining 18 units of the first floor of the building are allotted to the hospital, as follows:

12-bed ward	4 units.
Mess	2 units.
Kitchen	2 units.

and the following rooms of one unit each, viz: Ward bathroom, ward attendant, dispensary, surgeon, assistant surgeon, dressing room, waiting room, dentist, linen stores, and medical stores (and private toilet).

On the second floor of the building are the following allotments: Auditorium, including stage and dressing rooms, 24 units (this room is 39 feet wide in the clear by 120 feet long to the front of the stage); personnel dormitory of 26 beds, 8 units; court-martial, 4 units; commandant, 2 units; adjutant, 2 units; field officer, 2 units; field clerks, 2 units; quartermaster clerks, 2 units; and the following rooms of 1 unit each, viz: Quartermaster, supply officer, adjutant's sergeant, summary court, noncommissioned room (off the personnel dormitory), personnel dormitory bath, mailing room, court-martial waiting room, printing room, and officers' toilet.

*Stables and wagon shed.*—The stables all have 5 feet 6 inches wide stalls, in two rows that face each other on opposite sides of a 4-foot wide central passageway. Besides the stalls, each stable contains a saddle room, forage room, saddle-repair room, machine shop, blacksmith shop, guardroom, stable sergeant, sergeant of guard, and toilet and shower bath. All floors are cement, extending to and including the surrounding roads and water-trough areas. All posts (6 by 6 inches on cement base), mangers, feed boxes, walls, and partitions of rooms, and roof construction are wood. Roofs are corrugated iron, one-sixth pitch.

The over-all stable width is 27 feet.

The 62-stall, 54-stall, and 35-stall stables are, respectively, 256 feet, 234 feet, and 160 feet long.

The wagon shed is 276 feet by 16 feet and accommodates 29 wagons. It is of the same general type of construction as the stables and is open on the side facing them.

*Incinerator.*—The incinerator will be designed to care for one brigade.

The following table shows the principal buildings on which construction work was performed during the fiscal year:

PANAMA CANAL BUILDINGS.

Item.	Description.	Number of buildings.	Class.	Date started.	Per cent completed June 30, 1919.	Cost to June 30, 1919.
1	12 family silver quarters, Mount Hope.	10	A, 2-story.....	Dec., 1918	90	\$99,362.79
2	Restaurant, Pedro Miguel.....	1	J, 2-story.....	Mar., 1918	100	32,604.21
3	Ancon Hospital—Ward Group 7.....	1	I, 4-story.....	do.....	100	229,930.68
4	Ancon Hospital—Ward Group 8.....	1	do.....	do.....	100	207,567.13
5	Ancon Hospital, superintendent's residence.	1	B, 2-story.....	June, 1918	100	28,593.28
6	Crude-oil tank, Mount Hope.....	1	Special.....	Jan., 1918	100	54,065.60
7	Silver clubhouse, Red Tank.....	1	A, 1-story.....	Mar., 1919	100	10,489.28
8	Silver clubhouse, Gatun.....	1	do.....	do.....	90	6,937.57
9	Lighthouse subdivision office, Gatun.	1	B, 2-story.....	Dec., 1918	45	11,855.60
10	Storage building, section of surveys, Balboa Heights.	1	G, 1-story.....	Oct., 1918	100	4,739.36
11	Tuberculosis ward, Corozal.....	1	A, 2-story.....	Apr., 1919	85	20,394.85
12	12-stall boathouse, Gatun.....	1	A, 1-story.....	Mar., 1919	100	7,201.11
13	Storehouse for printing plant, Mount Hope.	1	C, 1-story.....	Feb., 1919	100	2,824.98

PANAMA RAILROAD BUILDINGS.

1	Ice and cold-storage plant, Cristobal.	1	Q, 3-story.....	Aug., 1917	100	\$530,648.25
2	Slaughterhouse, Cristobal.....	1	Q, 4-story.....	June, 1918	100	149,443.14
3	Meat-canning plant, Cristobal.....	1	Q, 3-story.....	Sept., 1918	100	70,685.73
4	Machine shop, Cristobal.....	1	D, 1-story.....	Mar., 1919	90	7,400.91
5	Carpenter shop, Cristobal.....	1	do.....	do.....	90	5,461.07
6	Boiler house, Cristobal.....	1	do.....	Jan., 1919	95	24,630.94
7	Garage, Cristobal.....	1	do.....	Mar. 1919	97	7,587.22
8	Temporary bone mill and fertilizer plant, Cristobal.	1	A, 2-story.....	do.....	100	2,155.58

The following table gives the comparative unit costs of completed buildings of the various types:

## COMPARATIVE UNIT COSTS OF BUILDINGS.

Item.	Name of building.	Class.	Division cost of project.	Handling material.	Plumbing.	Electrical work.	Municipal work.	Elevators.	Miscellaneous.	Cost of building proper.	Cubical contents (feet).	Cost per cubic foot.
		1	2	3	4	5	6	7	8	9	10	11
1	12 family silver quarters, Mount Hope, for Panama Canal.	A, 2 story.	\$10,563.65	\$390.91	\$1,464.90	\$422.56			\$335.31	\$7,949.97	87,500	\$0.0909
2	Restaurant, Pedro Miguel, for Panama Canal.	J, 2 story.	22,604.21	2,179.54	1,491.46	1,407.47	\$1,594.81		2,796.48	23,134.45	90,000	.2570
3	Ancon Hospital ward, group 7, for Panama Canal.	L, 4 story.	229,930.68	11,774.19	15,032.25	13,511.67	58.98	\$5,158.38	19,584.27	164,810.94	830,000	.1986
4	Ancon Hospital ward, group 8, for Panama Canal.	do.	8,273.19	19,517.82	12,523.88	45.53	5,086.79	12,102.22	150,017.94	774,000	1,918	.1938
5	Ancon Hospital, superintendent's residence.	B, 2 story.	28,593.28	990.87	2,015.11	1,357.02	130.45		2,305.89	21,793.94	61,800	.3527
6	Crude-oil tank, Mount Hope, for Panama Canal.	Special.	54,065.60	2,355.87	9.12				27,211.43	21,439.18	85,000	.2881
7	Silver clubhouse, Red Tank, for Panama Canal.	A, 1 story.	10,489.28	498.44	799.59	1,322.61	62.92		443.72	7,362.00	84,600	.0870
8	Storage building, section of surveys, Balboa Heights.	G, 1 story.	4,739.36	( )	( )	( )	( )	( )	( )	( )	20,400	2.2323
9	12-stall boat-house, Gatun.	A, 1 story.	7,201.11	( )	( )	( )	( )	( )	( )	( )	185,000	2.0389
10	Ice and cold storage plant, Mount Hope, for Panama Railroad.	L, 3 story.	530,648.25	12,971.76	8,242.68	33,250.93			35,710.40	3440,472.48	2,319,960	.1899
11	Slaughterhouse, Mount Hope, for Panama Railroad.	L, 4 story.	149,443.14	3,440.34	15,106.18	4,851.85		35.51	9,673.60	116,335.66	703,953	.1652
12	Meat-canning plant, Mount Hope, for Panama Railroad.	L, 3 story.	70,685.73	2,817.37	5,116.91	3,385.86			5,333.44	54,032.15	412,000	.1311
13	Machine shop, Mount Hope, for Panama Railroad.	D, 1 story.	7,400.91	419.93	116.06	160.90			532.82	6,171.20	86,000	.0718
14	Temporary bone mill and fertilizer plant, Mount Hope.	A, 2 story.	2,155.58	( )	( )	( )	( )	( )	( )	( )	16,760	2.1286
15	276-man barracks, cantonment construction, United States Army.	do.	21,177.54	( )	( )	( )	( )	( )	( )	( )	319,000	2.0664
16	250-man barracks, cantonment construction, United States Army.	do.	20,741.98	( )	( )	( )	( )	( )	( )	( )	295,000	2.0703
17	132-man barracks, cantonment construction, United States Army.	do.	8,883.46	( )	( )	( )	( )	( )	( )	( )	152,000	2.0584
18	Type 17 quarters, for Central and South America Telegraph Co., Balboa.	A, 1 story.	4,920.11	179.51	495.28	661.94	10.64		147.47	3,425.27	25,600	.1338
19	1 family quarters, for Central and South America Telegraph Co., Balboa.	do.	5,573.34	149.47	550.24	700.66	10.65		215.29	3,947.03	37,400	.1055
20	Type 17 quarters, West India Oil Co., Balboa.	do.	3,589.73	( )	( )	( )	( )	( )	( )	( )	25,600	2.1402
21	Type 17 quarters, Salvation Army.	do.	3,019.94	151.47	441.33	186.81			56.85	2,213.48	25,600	.0865

<sup>1</sup> No detail costs kept on this building.

<sup>2</sup> Cost per cubic foot as based on total cost of project.

<sup>3</sup> This includes \$126,000 for cork insulation.

Column No. 8, "Miscellaneous," includes design and all items of other charges not included under columns Nos. 3, 4, 5, 6, and 7.  
Column No. 9, "Cost of building proper," includes labor and material other than that included under columns Nos. 3, 4, 5, 6, 7, and 8.



## DESCRIPTION OF VARIOUS CLASSES OF BUILDINGS.

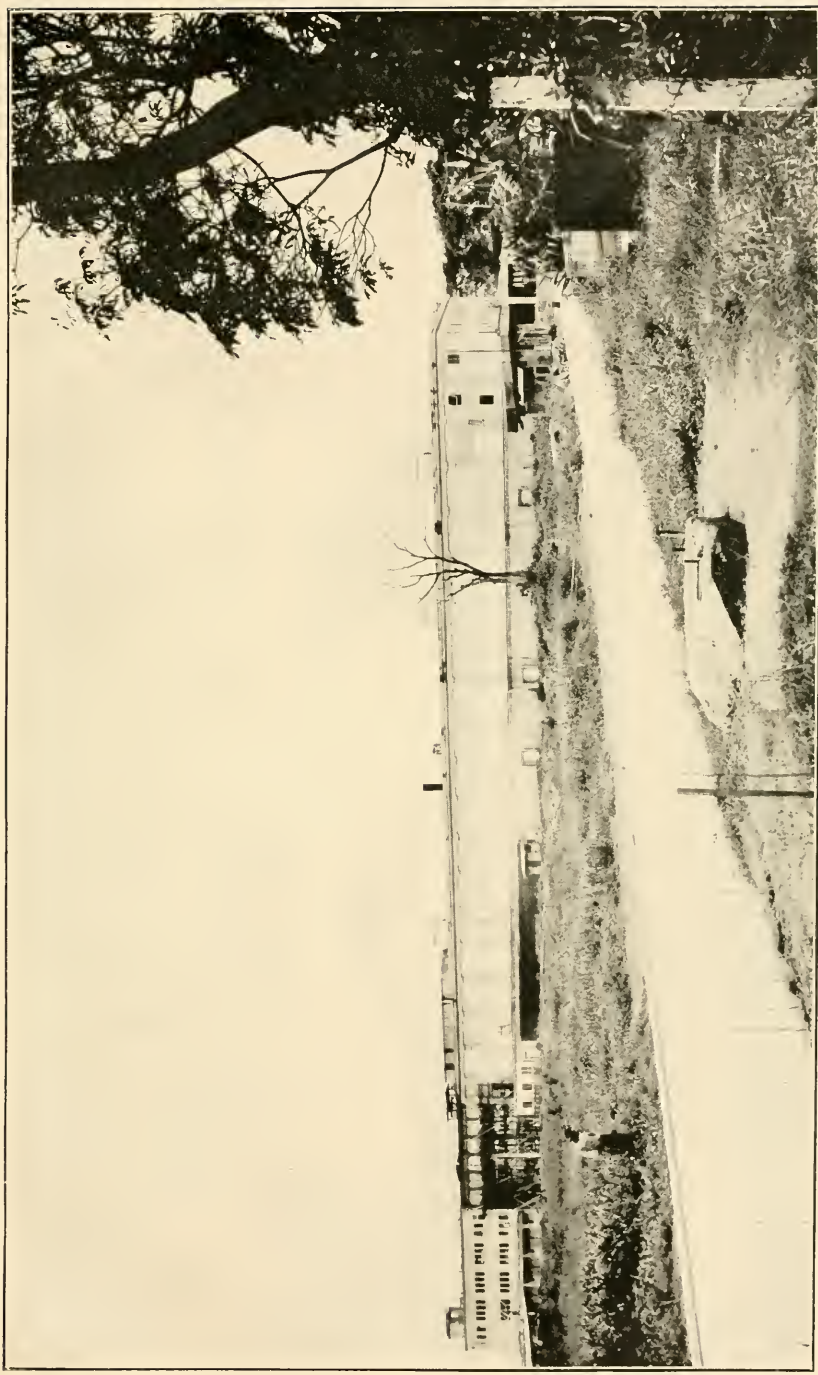
- Class A.—Frame; wood post foundation; asphalt-shingle roof.  
Class B.—First floor paved over earth fill; other floors wood; reinforced concrete frame; block walls and partitions; red tile roof on wood frame.  
Class D.—Reinforced concrete bearing walls and floors; cement block partitions; cement plaster; Spanish red-tile roof on wood frame.  
Class G.—Reinforced concrete floor; block walls; asphalt-shingle roof on wood frame.  
Class I.—Reinforced concrete bearing walls; cement block partitions; cement plaster; oil painted; tile floor and base; Spanish red tile on frame roof.  
Class J.—Reinforced concrete bearing walls and partitions; cement plaster, enamel painted; tile floors and wall; Spanish red tile on steel roof trusses.  
Class L.—Reinforced concrete columns and beams; cement block walls; concrete floors and roof.

In addition to the work outlined in the above tables, construction and repair work was performed for the various departments and divisions.

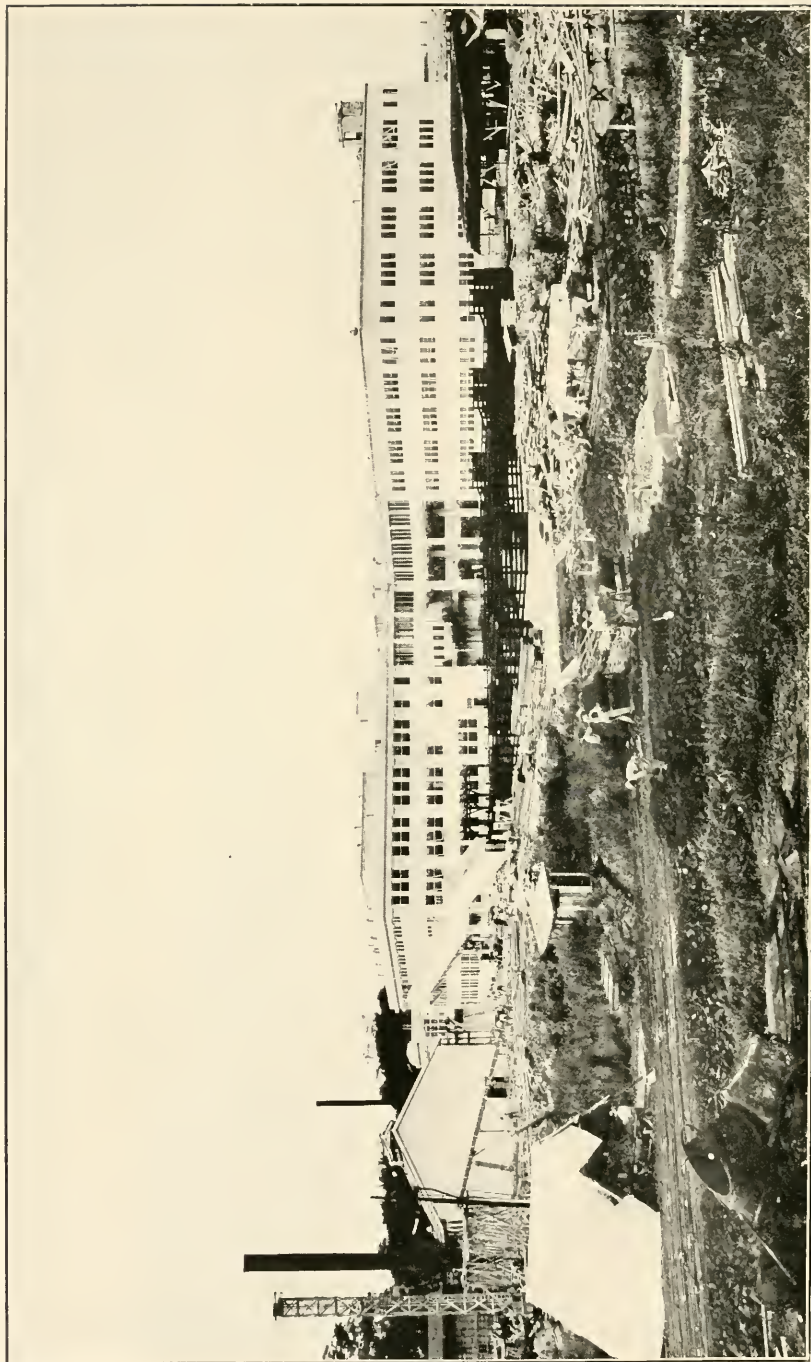
Respectfully submitted.

T. C. MORRIS,  
*Acting Resident Engineer.*

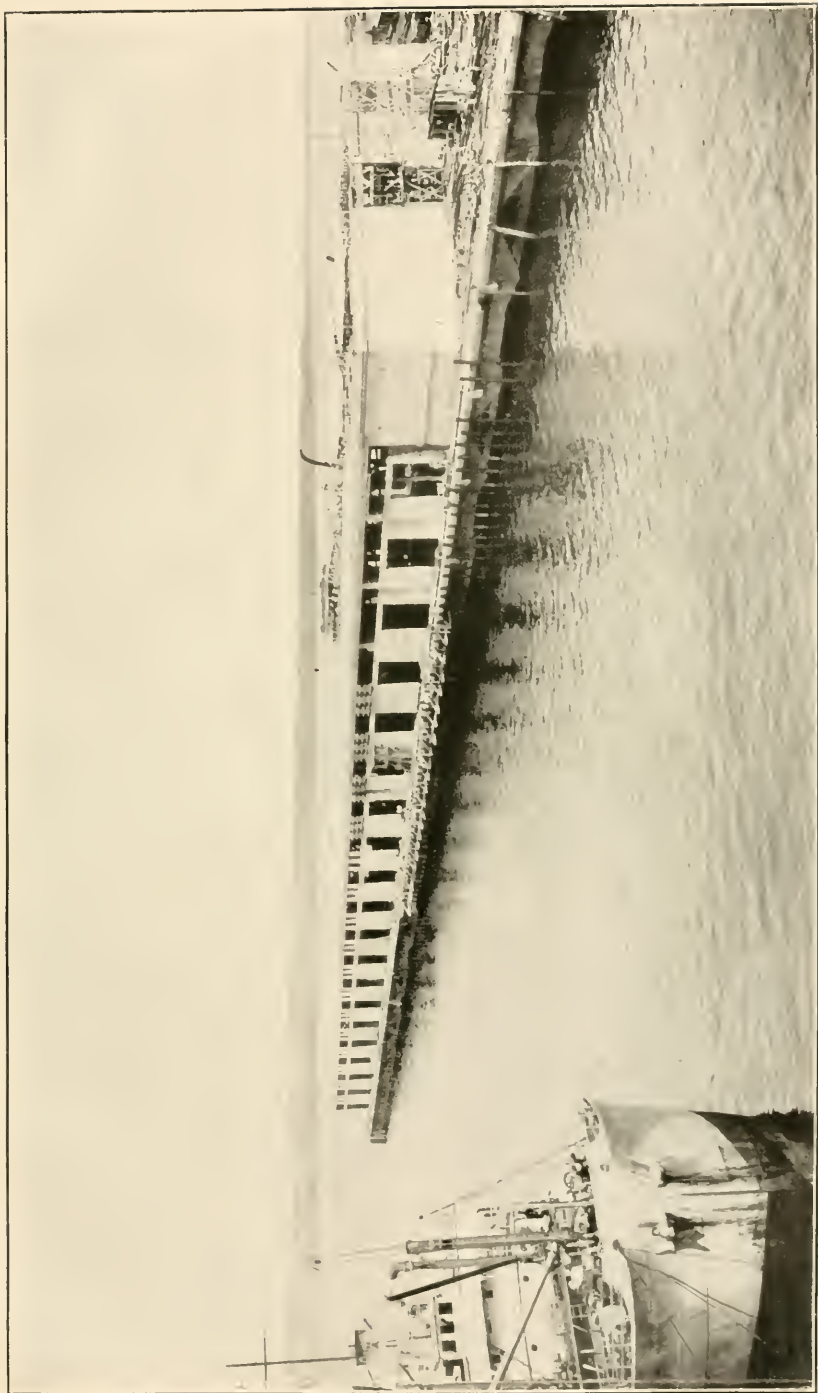
Col. CHESTER HARDING, *United States Army,*  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*



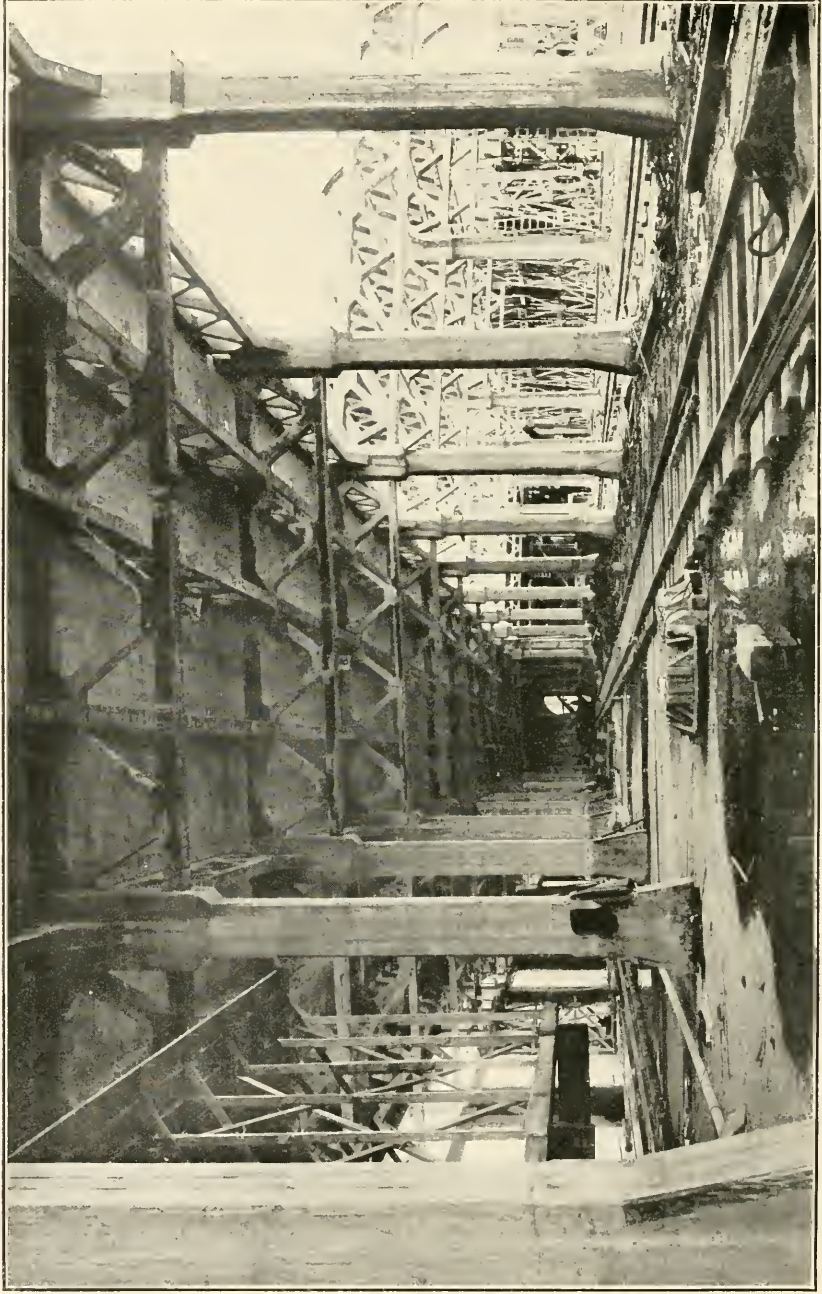
NEW INDUSTRIAL PLANT AT MOUNT HOPE. SOUTHWEST VIEW SHOWING COLD-STORAGE PLANT AT RIGHT, CANNING FACTORY AT LEFT.



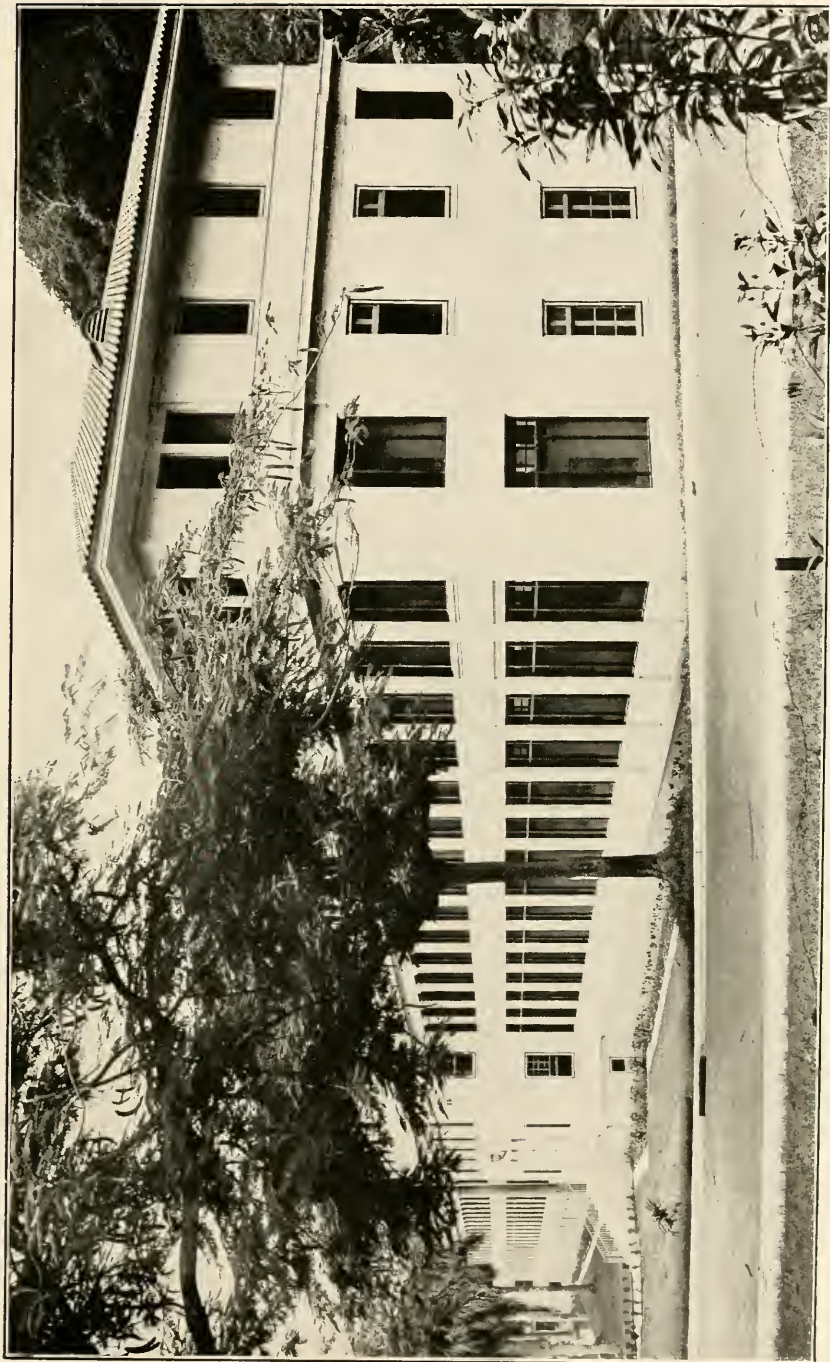
NEW INDUSTRIAL PLANT AT MOUNT HOPE. NORTHEAST VIEW SHOWING ABATTOIR AT LEFT, CANNING FACTORY AT RIGHT.



ATLANTIC TERMINALS, NEW PIER NO. 6, CRISTOBAL



ATLANTIC TERMINALS, NEW PIER NO. 6, CRISTOBAL, LONGITUDINAL VIEW SHOWING REINFORCED CONCRETE ROOF CONSTRUCTION.



NEW ANCON HOSPITAL. SECTION D.





## APPENDIX C.

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### REPORT OF THE MARINE SUPERINTENDENT, MARINE DIVISION, DEPARTMENT OF OPERATION AND MAINTENANCE.

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BALBOA HEIGHTS, CANAL ZONE, *July 18, 1919.*

SIR: The following report is submitted, covering the operations of the marine division for the fiscal year ended June 30, 1919.

Throughout the year the below-named incumbents continued in the positions occupied at date of last report:

Marine superintendent, Capt. L. R. Sargent, United States Navy.

Captain of the port, Cristobal, Lieut. Commander John G. Fels, U. S. N. R. F.

Captain of the port, Balboa, Lieut. Commander Charles Svensson, U. S. N. R. F.

Pilot in charge lighthouse subdivision, Fred Kariger.

Following the suspension of hostilities (Nov. 11, 1918), restrictions governing pilotage and movement of vessels in defensive sea areas off the terminal ports were progressively relaxed by local naval authority, with a corresponding progressive return to normal procedure in the handling, on the part of the marine division, of incoming and outgoing shipping. On February 20, 1919, notification was received of the revocation by the President of Executive orders establishing defensive sea areas.

Similarly, local procedure in matters such as trade control, travel control, and the guarding and inspection of vessels during canal transit and while in Canal Zone waters kept pace—to the benefit of local traffic—with developments in the situation and with authorized relaxations of war-time requirements and precautions.

San Jose Island light was established September 30, 1918, completing the contemplated system of navigation aids for the Pacific approach to the canal.

Construction was started, and on June 30 was nearly completed, of two-story concrete building at Gatun to meet the combined storage, repair, and office requirements of the lighthouse subdivision.

Time ball was established at signal station on Sosa Hill (Balboa) September 12, 1918.

Panama Canal craft loaned to local naval establishment (fifteenth naval district) were returned, together with tugs *Gorgona* and *Tavernilla*, loaned to the Navy Department for distant service. Early return of tugs *La Boca* and *Miraflores*, loaned to War Department, is expected. Two 40-foot motor launches were purchased.

Ex-German vessels *Sierra Cordova* (now *Callao*), *Rhakotis* (now *Eten*), *Luxox* (now *Piseo*), *Uarda* (now *Salaverry*),<sup>1</sup> *Anubis* (now

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<sup>1</sup> *Salaverry*, ex-*Uarda*, cleared for New York, July 16, 1919.

*Paíta*) were towed from Peruvian ports to the canal at the request of the United States Shipping Board. Three of them have been repaired, outfitted, and dispatched to New York; the others are due to leave in the near future.

Salvage operations were undertaken on occasion by reason of abnormal conditions resulting from a state of war, and met with a reasonable measure of success, considering deficiencies in equipment.

Arrangement whereby for war purposes the offices of marine superintendent The Panama Canal and commandant fifteenth naval district were combined in one person was terminated, pursuant to the signing of the armistice. Marine superintendent was relieved as commandant on November 18, 1918, and on April 6, 1919, was released from all duty with local naval establishment.

#### STEAMBOAT-INSPECTION SERVICE.

The operations of the board of local inspectors for the fiscal year ended June 30, 1919, are covered in the report of that board, which follows:

On July 1, 1918, Lieut. Malcolm C. Davis, U. S. N. R. F., was appointed junior member of the board. Lieut. Commanders John G. Fels and Charles Svensson, U. S. N. R. F., continued to act as chairman and member, respectively.

Semiannual inspections of all floating plant of The Panama Canal and Panama Railroad Company were made and reports submitted.

Annual inspections were made and certificates of seaworthiness issued to 5 American steamers, 18 foreign steamers, 60 motor boats of The Panama Canal, 3 motor boats of the Panama Railroad Company, and 58 privately owned motor boats.

Various small craft on survey requests were inspected and disposition recommended. All small boats were located and renumbered.

Inspection and hydrostatic tests were made of 46 boilers on floating equipment of the canal and railroad, and the heads of divisions interested were furnished reports and certificates thereof.

On requests from the several heads of divisions, inspections and appraisals were made from time to time of floating plant for sale and transfer.

Licenses were issued to 8 pilots, 31 masters, 11 mates, 18 engineers, and 59 operators of motor boats.

Licenses were refused 1 mate, 4 engineers, and 33 operators of motor boats.

On December 31, 1919, the issuance of chauffeurs' licenses was transferred from the local board to the chief of police, whose annual report will cover this item for the entire fiscal year.

#### ADMEASUREMENT OF VESSELS AND APPLICATION OF TOLLS.

New form of Panama Canal tonnage certificates recommended by board of admeasurement was established, effective May 4, 1919, by Executive order of March 4, 1919.

The situation and the need of remedial legislation in connection with the alternative application of Panama Canal rules of measurement and United States national rules are described in my "Memorandum regarding Panama Canal tolls," dated May 27, 1919, and published in H. R. Document No. 126 of the Sixty-sixth Congress (first session).

Tolls collected (July 1, 1918, to June 30, 1919) under existing alternative system of measurement amounted to \$6,149,598.54. Had all tolls been based upon Panama Canal rules alone, the amount collected would have been \$7,017,125.02, increasing the revenue from this source by \$867,526.48.

The total number of ships making the transit of the canal during the fiscal year in seagoing traffic was 2,025, of which 860 were in transit from the Atlantic to the Pacific and 1,165 from the Pacific to the Atlantic. This does not include 32 launches, each of which was of less than 10 tons. The aggregate gross registered tonnage of the 2,025 ships was 7,876,703 tons. Their aggregate net tonnage, according to the rules for measurement for The Panama Canal, was 6,131,575 tons.

The cargo carried through the canal amounted to 6,877,649 tons of 2,240 pounds. Of this, 2,705,091 tons were from Atlantic to Pacific and 4,172,558 tons from Pacific to Atlantic.

The total number of ships passing through the canal in ballast was 249. Of these, 138 went from Atlantic to Pacific and 111 from Pacific to Atlantic. Net tonnages were, respectively, 369,529 and 428,870, Panama Canal measurement.

The total number of United States Navy vessels making the transit of the canal was 186, of which 102 went from Atlantic to Pacific and 84 from Pacific to Atlantic.

The total number of ships other than those of the United States Navy which passed through the canal without cargo but not in ballast (vessels of other navies, ships with passengers only, etc.) was 80, of which 77 went from Atlantic to Pacific and 3 from Pacific to Atlantic. Not including the tonnage of naval vessels, the net tonnage of such ships from Atlantic to Pacific was 191,514, and from Pacific to Atlantic, 72 tons.

The total number of all ships without cargo, including those in ballast, naval vessels, and vessels with passengers only, but not considering launches under 10 tons, was 515. Of these, 317 went from Atlantic to Pacific and 198 from Pacific to Atlantic. Net tonnages, excluding naval ships, were 561,043 and 429,942, a total of 990,985 net tons, Panama Canal measurement.

Vessels carrying cargo numbered 1,510. Of these, 543 were in transit from Atlantic to Pacific and 967 from Pacific to Atlantic. Their aggregate net tonnages were 2,117,536 from Atlantic to Pacific and 3,013,604 from Pacific to Atlantic, a total of 5,130,600 net tons, Panama Canal measurement.

The average net tonnage of ships, excluding from calculation the 186 vessels of the United States Navy and two of other navies for which no net tonnage figures are given, was 3,337 tons, Panama Canal measurement. The average net tonnage of ships carrying cargo was 3,404. The ratio of cargo to net tons of ships carrying cargo was 1.337 tons of cargo to each net ton. As distributed over all traffic, the ratio was 1.122 tons of cargo to each net ton. The average loading of the 1,510 ships carrying cargo was 4,554.7 tons. Over the total of 2,025 ships passing through the canal, the average of cargo was 3,396.4 tons per vessel.

During the preceding fiscal year 2,130 ships of 6,658,858 net tons had carried 7,562,133 tons of cargo through the canal. The traffic for the fiscal year showed a decrease in ships, tonnage, and cargo, amounting, respectively, to 4.93 per cent, 7.92 per cent, and 9.05 per cent, with respect to the traffic of the preceding year. Comparison with traffic in other years is given in the appended Table No. 1. Traffic in the fiscal year ended June 30, 1917, showed a greater quan-

tity of cargo handled than in the fiscal year 1919, but with this exception the traffic during the past year exceeded all previous years but 1918.

By nationalities, in the order of preponderance, ships made the transit during the fiscal year as follows: United States, 786; British, 602; Norwegian, 128; French, 104; Chilean, 93; Japanese, 87; Danish, 79; Peruvian, 65; Swedish, 29; Dutch, 19; Costa Rican, 12; Spanish, 5; Chinese, 4; Greek, 3; Russian 3; Canadian, 2; Belgian, Colombian, Ecuadorian, and Mexican, 1 each. Comparison with the numbers of ships of various nations making the transit during preceding years is given in appended Table No. 2.

Respectfully,

L. R. SARGENT,  
*Marine Superintendent.*

Col. CHESTER HARDING, United States Army,  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

TABLE NO. 1.—Summary of commercial traffic through The Panama Canal during fiscal year 1919 and since its opening to commercial traffic.

	Atlantic to Pacific.						Pacific to Atlantic.						Total.	
	Vessels.	Canal tonnage.		Tons of cargo.	Vessels.	Canal tonnage.		Tons of cargo.	Vessels.	Canal tonnage.		Tons of cargo.	Canal tonnage.	
		Gross.	Net.			Gross.	Net.			Gross.	Net.		Gross.	Net.
1918														
July.....	64	207,312	137,165	105	427,184	332,727	439,857	169	634,496	497,489	577,022	3,547,094	3,066,542	577,022
August.....	62	218,054	123,746	96	360,999	253,242	401,257	158	579,053	452,006	531,003	3,547,094	3,066,542	531,003
September.....	88	338,407	184,456	90	314,713	262,897	352,017	178	653,120	523,341	536,473	3,547,094	3,066,542	536,473
October.....	75	264,997	171,206	114	441,272	349,190	485,382	189	706,269	552,725	656,588	3,547,094	3,066,542	656,588
November.....	69	244,784	190,171	114	413,364	324,986	404,391	183	658,148	515,157	623,548	3,547,094	3,066,542	623,548
December.....	64	256,515	198,838	105	410,827	326,986	408,218	169	667,342	525,824	622,460	3,547,094	3,066,542	622,460
Total for first half fiscal year.....	422	1,532,069	1,055,972	624	2,368,359	1,880,028	2,491,122	1,046	3,895,428	3,066,542	3,547,094	3,547,094	3,066,542	3,547,094
1919														
January.....	77	314,464	240,636	94	341,757	263,558	317,539	171	656,221	503,994	536,815	3,547,094	3,066,542	536,815
February.....	80	367,070	286,462	70	288,258	215,503	241,705	156	655,928	504,965	559,254	3,547,094	3,066,542	559,254
March.....	78	333,514	253,175	75	282,092	222,134	243,282	153	625,006	475,309	489,960	3,547,094	3,066,542	489,960
April.....	65	299,307	236,740	96	327,677	244,127	234,261	161	626,984	480,867	506,929	3,547,094	3,066,542	506,929
May.....	75	338,850	269,249	101	388,410	297,643	287,769	176	727,260	566,832	642,071	3,547,094	3,066,542	642,071
June.....	63	274,543	202,793	99	411,633	317,213	354,800	162	686,176	520,006	583,396	3,547,094	3,066,542	583,396
Total for second half fiscal year.....	438	1,928,348	1,492,065	541	2,049,827	1,562,978	1,681,436	979	3,978,275	3,065,033	3,330,555	3,547,094	3,066,542	3,330,555
Total for fiscal year 1919.....	860	3,460,417	2,705,091	1,165	4,418,186	3,443,006	4,172,558	2,025	7,876,703	6,131,575	6,877,649	3,547,094	3,066,542	6,877,649
Fiscal year ending June 30, 1915.....	530	2,657,865	1,854,728	558	2,758,922	1,958,307	2,844,057	1,088	5,416,787	4,069,792	4,969,792	3,547,094	3,066,542	4,969,792
Fiscal year ending June 30, 1916.....	411	1,912,846	1,308,231	411	1,683,683	1,171,531	1,705,810	787	3,596,529	2,479,762	3,140,046	3,547,094	3,066,542	3,140,046
Fiscal year ending June 30, 1917.....	905	4,170,733	2,920,414	971	4,300,688	3,083,940	4,152,412	1,876	8,530,821	6,009,358	7,229,255	3,547,094	3,066,542	7,229,255
Fiscal year ending June 30, 1918.....	921	3,938,042	2,750,378	1,200	5,453,297	3,908,880	4,922,607	2,130	9,371,339	6,658,858	7,562,133	3,547,094	3,066,542	7,562,133
Fiscal year ending June 30, 1919.....	860	3,460,417	2,705,091	1,165	4,418,186	3,443,006	4,172,558	2,025	7,876,703	6,131,575	6,877,649	3,547,094	3,066,542	6,877,649
Total.....	3,627	16,139,903	11,551,330	4,279	18,654,176	13,565,268	17,797,504	7,906	34,794,079	25,116,598	29,778,875	3,547,094	3,066,542	29,778,875

TABLE No. 2.—Number of commercial vessels of various nationalities passing through The Panama Canal.

ATLANTIC TO PACIFIC.													Total.													
1918.																										
July.....	19	4	1	1	1	9	5	2	2	2	2	2	2	14	3	14										
August.....	16	5	1	1	2	7	2	4	4	6	6	4	4	26	1	26										
September.....	24	5	1	1	4	7	2	4	4	6	4	4	8	3	1	26										
October.....	17	3	3	1	4	8	1	4	4	4	4	4	9	2	2	75										
November.....	17	3	3	1	4	8	1	4	4	4	4	4	9	2	27	69										
December.....	19	4	4	1	3	3	2	3	3	3	3	3	5	3	19	64										
1919.																										
January.....	33	4	4	1	1	1	3	3	3	4	4	4	5	4	23	77										
February.....	33	2	3	1	2	2	2	2	2	3	3	3	3	3	2	27	80									
March.....	36	5	3	1	3	3	1	1	1	5	5	4	4	3	1	20	78									
April.....	26	5	5	2	1	1	1	1	1	7	7	7	2	2	1	20	65									
May.....	37	3	3	3	3	3	3	3	3	7	7	7	3	2	23	75										
June.....	29	4	4	4	4	4	4	4	4	3	3	3	4	5	16	63										
Total fiscal year 1919.....	306	2	48	2	1	6	37	6	29	47	47	56	56	34	3	2	268	860								
Total fiscal year 1918.....	303	50	10	44	31	44	31	19	19	2	33	145	145	1	41	5	12	224	921							
Total fiscal year 1917.....	371	50	11	3	26	36	4	4	4	1	54	6	1	74	5	43	1	10	7	198	905					
Total fiscal year 1916.....	193	16	50	10	11	10	11	11	2	1	19	1	1	19	5	16	1	5	1	5	114	411				
Total fiscal year 1915.....	226	1	16	2	1	10	5	2	2	2	1	4	1	16	2	5	8	2	5	8	231	530				
Total.....	1,399	3	180	2	1	27	3	127	89	54	4	4	2	3	5	157	6	2	310	11	136	10	17	44	1,035	3,627
PACIFIC TO ATLANTIC.																										
1918.																										
July.....	35	4	4	1	1	2	1	8	8	12	12	12	12	2	2	1	27	105								
August.....	20	3	1	1	4	3	4	7	4	9	9	5	5	3	3	2	3	35	96							
September.....	11	5	2	7	1	3	1	4	4	3	3	8	8	3	3	3	1	35	921							
October.....	26	3	1	8	1	8	1	9	7	6	6	10	10	2	2	1	4	48	90							
November.....	21	3	1	1	1	8	1	9	9	6	6	8	8	2	2	1	4	52	114							
December.....	26	4	4	1	1	4	1	5	5	4	4	7	7	3	3	1	2	49	105							







## APPENDIX D.

### REPORT OF THE SUPERINTENDENT, MECHANICAL DIVISION.

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BALBOA, CANAL ZONE, *July 17, 1919.*

SIR: I have the honor to submit herewith the annual report relative to the operations of the mechanical division for the fiscal year ended June 30, 1919.

#### ORGANIZATION.

The general organization of the division has remained essentially the same as at the beginning of the year.

Commander E. G. Kintner, C. C., United States Navy, reported February 13, 1919, as the relief of the superintendent of the mechanical division. He was appointed temporarily assistant superintendent pending the detachment of Commander R. D. Gatewood, which occurred on February 21, 1919, at which time Commander E. G. Kintner succeeded to the position of superintendent, mechanical division.

Mr. H. H. Evans was appointed assistant superintendent effective April 4, 1919, and arrived at Balboa to take up his duties on April 14, 1919. He had just been released from active duty as a lieutenant commander, U. S. N. R. F., in the industrial department, navy yard, Norfolk, Va., where he served during the war with Germany.

Mr. William M. Kennedy, chief planner, resigned, effective September 5, 1918, and Mr. Charles R. Chisholm was appointed chief planner September 6, 1918.

The position of assistant general foreman was authorized at the Cristobal shops late in the year, but has not yet been filled.

#### PRINCIPAL WORK PERFORMED.

There is given below an outline of the principal items of work performed during the year, listing only those on which considerable sums of money were expended.

(a) *At Balboa shops.*—(1) Five ex-German merchant steamers, which have been chartered by the United States Shipping Board from the Peruvian Government, were given extensive overhaul and repairs in accordance with surveys made by a representative of the United States Shipping Board, placing the vessels in good operating condition. The vessels referred to are the *Sierra Cordoba* (renamed *Callao*), *Rhakotis* (renamed *Eten*), *Luxor* (renamed *Pisco*), *Uarda* (renamed *Salaverry*), and *Anubis* (renamed *Paita*). These vessels had been lying in Peruvian ports since the beginning of the war with very little care, in addition to which the German crews had deliberately wrecked the machinery to a very considerable extent, the boilers having been seriously damaged by dry firing, the main engines and auxiliaries being damaged by breaking the cylinders, valve gears, and other essential parts. In some cases new boilers were furnished from the United States, while in others it was found possible to save the shell and certain parts of the boiler, renewing the remaining parts. Several new

cylinders were made for the main engines, while several others were repaired by resecuring in place the broken-out portions. Practically all the auxiliary machinery had to be rebuilt.

(2) Completing the construction of the Coast Guard cutter *Manhattan*. This vessel was given complete tests and trials of machinery and turned over to the Coast Guard for operation. This vessel had the following characteristics:

Length overall	120 feet 3 inches.
Length on L. W. L.	110 feet.
Breadth (molded)	24 feet.
Depth (molded top of keel to M. D. at side)	14 feet.
Draft, L. W. L.	10 feet 6 inches.
Displacement at L. W. L. sea water	383 tons.

One Babcock & Wilcox marine boiler, at a working pressure of 200 pounds per square inch, burning fuel oil, furnished steam for the main engine, which is a vertical, inverted, three-cylinder, direct-acting, triple-expansion steam engine designed to develop 600 I. H. P. at 150 revolutions per minute.

(3) The *Koningin der Nederlanden*, a former Dutch steamer, on which work was begun in the previous year, was completed in its conversion into a troop-ship.

(4) The steamship *Cristobal*, of the Panama Railroad Steamship Line, is being thoroughly overhauled, including the renewal of all boilers, complete overhaul of the main engines in the shops, and renewal of such parts of the hull construction as have been weakened by corrosion.

(5) The steamship *Circassian Prince* was given a general overhauling, including renewal of several shell plates of the hull, parts of the inner bottom plating and bulkheads, with extensive repairs to the boilers.

(6) The steamship *Middlebury* was partly converted into a cattle carrier at the request of the chief quartermaster, The Panama Canal. The alterations consist principally of installing a 'tween deck, using wood throughout, clearing the main deck of machinery, and installing cattle pens on both decks in such way as to carry the maximum number of cattle. On account of the quantity of work on hand at Balboa this vessel was transferred to Cristobal for completion.

(7) The steamship *Santa Isabel* received extensive repairs in dry dock to the keel and bottom, the vessel having been on a reef. At the same time repairs of considerable importance were made to the propelling machinery, including making two new sections of the propeller shaft.

(8) Steamship *Heina*: Repairs were made in dry dock, including renewal of several bottom plates, straightening several plates and frames which had been damaged by grounding. A thorough cleaning out of the condenser, main engines, and auxiliaries was done to remove the sand which had gotten into the machinery using circulating water while the vessel was ashore.

(9) Steamship *Quoque*: The old boilers were removed and new boilers installed.

(10) The U. S. S. *Yorktown* had three new furnaces installed in the boilers.

(11) Motor schooner *Elizabeth Ruth* had extensive work to the gas engines.

(12) Motor schooner *Evelyn* received repairs to the propelling machinery and auxiliaries, with considerable work on the hull, particularly the deck houses.

(13) The Panama Canal tug *Cocoli* and the steamship *Balboa* received extensive repairs.

(14) Fifty 1,800-pound standard Navy cast-steel anchors were made on order for the Navy Department and shipped to the Mare Island Navy Yard.

(15) For Alaskan Engineering Commission: Repaired 167 Lidgerwood cars and prepared them for shipment.

(16) For United States Army: Repaired 140 Rodger ballast cars, 92 western dump cars, and 30 301-class locomotives and prepared them for shipment.

(17) Manufactured two tank cars for the Panama Railroad.

(18) The manufacture of lumber from timber cut on the Canal Zone has continued. This source of supply was very important during the war. Several new species are being tried, while certain others have been discontinued as unsuitable.

(b) *At Cristobal Shops*.—(1) Extensive repairs to the following vessels: *Alliance*, *Balboa*, *Clairmont*, *Advance*, *Colon*, and dredges 83 and 86.

(2) Installing roof on new concrete oil tank at Mount Hope.

The following canal equipment and other vessels were in dry dock for repairs during the year:

(1) *Balboa Dry Dock*.—(a) Canal equipment: Tugs *Bolivar*, *Cocoli*, *Empire*, *Mariner*, *Bohio*; barges Nos. 15, 67, 71, 103, 104, 107, 108, 133, 136; Clapet 7; crane boat *La Valley*; cranes *Hercules*, *Ajax*; dredges No. 84, *Cascades*, *Marmot*, *Paraiso*, *Gamboa*; scows Nos. 101, 102, 105, 106, 109, 116, 117, 118, 119, 121, 122, 123, 132, 134, 135, 137, 138; Coast Guard cutter *Manhattan*; supply boat No. 2; house boat No. 176; wrecking barge No. 91; air-compressor barge No. 27; pile driver No. 2.

(b) Vessels other than canal equipment: Steamships *Koningin der Nederlanden*, *Martopoa*, *La Habra*, *War Nymph*, *San Joaquin*, *Acajutla*, *Luise Neilson*, *Lady Sybil*, *Columbia*, *General Geo. W. Getty*, *Sierra Cordoba*, *Rhakotis*, *Cristobal*, *Aneon*, *Ormkec*, *Luzor*, *Uarda*, *Azor*, *Montrolite*, *Anubis*, *Heina*, *Benjamin Brewster*, *Lake Copely*, *Zuiderdijk*, *Achilles*, *Circassian Prince*, *Nanshan*, *Guatemala*, *Magunkook*, *Santa Isabel*, *Lake Blanchester*, *Middlebury*; schooners *Caoba*, *Tacoma*, *Chiriqui*, *Elizabeth Ruth*; schooner yacht *Invader*; United States steamship *Yorktown*; barge "A. L."; submarines C-4, C-15, O-16, R-15, R-16, R-17, R-18; destroyer *Ringgold*; mine planter *Graham*; mine sweeper *Risor*; cable ship *Guardian*.

(2) *Cristobal Dry Dock*.—(a) Canal equipment: Tugs *Chame*, *Farragut*, *Mariner*, *Poc*, *Engineer*, *San Juan*, *Porto Bello*, *Balboa*, *Coco Solo*, *Tavernilla*; barges Nos. 1, 13, 18, 20, 21, 36, 50, 56, 87, 96, 97, 98, 142, 143, 145, 150; scows Nos. 48, 144; clapets Nos. 4, 7; crane boat *La Valley*; steamships *Caribbean*, *Culebra*; dredge No. 86; lighter No. 151; house boat No. 179; derrick barge No. 156; pile driver No. 198; graders Nos. 1, 3; supply boat No. 1.

(b) Vessels other than canal equipment: Steamships *Jamaica*, *Balboa*, *Claremont*, *Henry T. Scott*, *Albert G. Force*, *Isabel*, *Salvador*, *Manavi*, *Advance*, *Acajutla*, *Elizabeth Ruth*; schooners *Constance*, *Kentucky*, *Acapulco*, *Laura C. Hall*, *Herbert May*; submarines C-2, C-3, C-5; submarine chasers Nos. 275, 276, 277, 278, 279, 281, 282, 284, 285, 286, 287, 302, 255; submarine patrol boats Nos. 1841, 2232, 2235; mine planter *C. W. Field*.

The total number of vessels other than tugs, barges, and dredges worked on at Balboa and Cristobal shops during the year was: Balboa, 558; Cristobal, 771; total, 1,329.

#### IMPROVEMENTS.

1. Cement sidewalks and gutters have been completed alongside several of the shop buildings, which will facilitate transportation, using electric trucks, and the removal of the heavy rainfall during the wet season.

2. A special telephone system has been installed about the dry dock for use in docking large vessels. It is so arranged that the dockmaster standing at one side of the entrance can communicate with his assistants stationed at several points about the dock, especially the head of the dock, the opposite side of the entrance, and three points on each side along the dock.

3. Skylights have been installed over the northwest corner of the car shop to improve the light conditions for carrying on coach work.

4. A reclaiming roll is under contract for delivery in the near future for use in recovering certain scrap material; rerolling material of about 2½ inches, round or square, down to rods and bars. For housing this reclaiming machinery, a wooden shed is being erected east of building 10.

5. A hydrogen compressor is being installed in the oxyacetylene plant to permit the furnishing of hydrogen gas to the naval air station at Coco Solo. The compressor and motor are the property of the Navy Department, bureau of steam engineering.

6. The following tools are under contract and expected to be delivered in the near future: A large horizontal boring, drilling, and milling machine and six engine lathes, 18 inches by 10 feet; a pipe machine (Jarecki). Several small pieces of equipment have been purchased and added to the shops during the year.

7. Work is under way in connection with the installation of an exhaust system for the removal of dust and fine shavings from the woodworking machinery in the car and pattern shops.

8. The roof of the main machine-shop building, Cristobal shops, is being extended about 30 feet to provide sufficient space for the pipe work, coppersmith work, and sheet-metal work.

Numerous minor improvements have been made.

#### NEEDS FOR THE COMING FISCAL YEAR.

The principal needs of the division for the coming year, exclusive of those for which estimates have already been submitted, covering purchase of additional machine-tool equipment, are as follows:

1. The construction of new shops and dry-dock facilities at Cristobal. This has been recommended for several years and is a matter of much importance, as the present plant is inadequate and much out of date.

2. The construction and equipment of a light-repair shop adjacent to the piers at Cristobal to facilitate repairs to ships at the piers and avoid the transportation to the dry-dock shops  $1\frac{1}{2}$  miles away.

3. Provision of additional quarters at Balboa and Cristobal for both gold and silver employees.

#### STATISTICAL DATA.

The following statistical statements and charts accompany the report:

Plate No. 21, showing the classes of work and source of revenue.

Plate No. 22, showing the gross overhead expense percentage compared with the total direct labor charges, Balboa shops.

Plate No. 23, showing comparatively the productive labor and the indirect expense of mechanical division shops, and the factors of indirect expense.

Plate No. 24, showing the relative cost of power elements, the evolution of charges transferred, and the quantities consumed.

Table No. 1, abstract of expenditures.

Table No. 2, statement of overtime performed, showing the per cent of the total pay roll.

Table No. 3, force report.

Table No. 4, statement of foundry outputs.

Table No. 5, expenditures and output of the oxyacetylene plant.

Table No. 6, operation of Panama Canal dry docks.

Table No. 7, number of repairs to rolling stock.

Table No. 8, status as of June 30, 1919.

Respectfully submitted.

E. G. KINTNER.

*Superintendent, Mechanical Division.*

Col. CHESTER HARDING, United States Army,

*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

TABLE NO. 1.—Abstract of expenditures.

Month.	Labor.	Material.	Other expense.	Total.
BALBOA SHOPS.				
1918.				
July.....	\$217,045.46	\$116,872.05	\$46,889.38	\$380,806.89
August.....	174,911.76	122,898.63	27,333.02	325,143.41
September.....	168,407.53	151,533.00	33,694.01	353,634.54
October.....	201,900.47	164,581.75	31,142.61	397,624.83
November.....	172,271.53	140,045.18	17,591.78	329,908.49
December.....	218,491.02	162,478.86	28,410.35	409,380.23
1919.				
January.....	221,879.94	147,468.72	29,329.62	398,678.28
February.....	217,753.15	146,379.10	26,082.01	390,214.26
March.....	225,747.63	143,490.36	39,217.15	408,455.14

TABLE No. 1.—Abstract of expenditures—Continued.

Month.	Labor.	Material.	Other expense.	Total.
Balboa shops—continued.				
1919.				
April.....	\$199,654.79	\$155,554.08	\$52,426.40	\$407,635.27
May.....	220,088.73	133,799.19	31,988.25	385,876.17
June.....	225,992.47	154,253.03	22,497.08	402,742.58
Total.....	2,464,144.48	1,739,353.95	386,601.66	4,590,100.09
Average per month this year.....	205,345.37	144,946.16	32,216.81	382,508.34
Average per month last year.....	163,505.63	145,210.11	21,043.19	329,758.93
CRISTOBAL SHOPS.				
1918.				
July.....	47,512.93	18,993.69	11,398.77	77,905.39
August.....	46,110.26	22,184.72	3,602.33	71,897.31
September.....	43,198.08	21,655.69	5,331.36	70,185.13
October.....	47,937.40	17,042.21	5,490.22	70,469.83
November.....	45,466.92	15,827.44	3,723.30	65,017.66
December.....	48,504.99	21,154.22	12,760.65	82,419.86
1919.				
January.....	45,685.57	16,402.75	4,668.03	66,756.35
February.....	42,982.12	24,045.90	4,605.70	71,633.72
March.....	48,267.41	20,259.22	5,300.98	73,827.61
April.....	48,582.27	17,100.27	5,517.43	71,199.97
May.....	56,354.12	18,518.28	3,693.84	78,566.24
June.....	59,214.53	33,235.31	4,398.49	96,848.33
Total.....	579,816.60	246,419.70	70,491.10	896,727.40
Average per month this year.....	48,318.05	20,534.98	5,874.26	74,727.29
Average per month last year.....	44,126.85	21,046.66	4,590.17	69,763.68
TOTAL.				
1918.				
July.....	264,558.39	135,865.74	58,288.15	458,712.28
August.....	221,322.02	145,083.35	30,935.35	397,040.72
September.....	211,605.61	173,188.69	39,025.37	423,819.67
October.....	249,837.87	181,623.96	36,632.83	468,094.66
November.....	217,738.45	155,872.62	21,315.08	394,926.15
December.....	266,996.01	183,633.08	41,171.00	491,800.09
1919.				
January.....	267,565.51	163,871.47	33,997.65	465,434.63
February.....	260,735.27	170,425.00	30,687.71	461,847.98
March.....	274,015.04	163,749.58	44,518.13	482,282.75
April.....	248,237.06	172,654.35	57,943.83	478,835.24
May.....	276,442.85	152,317.47	35,682.09	464,442.41
June.....	285,207.00	187,488.34	26,895.57	499,590.91
Total.....	3,043,961.08	1,985,773.65	457,092.76	5,486,827.49
Average per month this year.....	253,663.42	165,481.14	38,091.06	457,235.62
Average per month last year.....	207,632.49	166,256.77	25,633.36	399,522.62

TABLE No. 2.—Overtime work performed, showing the per cent of the total pay roll.

Month.	Balboa shops.		Cristobal shops.		Total.	
	Overtime.	Per cent of pay roll.	Overtime.	Per cent of pay roll.	Overtime.	Per cent of pay roll.
1918.						
July.....	\$20,940.90	9.65	\$7,379.80	15.53	\$28,320.70	10.70
August.....	11,697.63	6.65	7,609.21	16.70	19,306.84	8.74
September.....	21,001.05	12.49	6,848.80	17.20	27,849.85	13.11
October.....	39,547.45	18.83	8,813.94	19.68	48,361.39	19.35
November.....	23,351.95	13.55	10,402.57	24.83	33,754.52	15.50
December.....	30,057.55	13.76	7,134.19	15.88	37,191.74	13.93
1919.						
January.....	26,567.94	11.97	6,606.55	14.63	33,174.49	12.39
February.....	31,837.09	16.17	7,570.76	19.36	39,407.85	15.11

TABLE No. 2.—*Overtime work performed, etc.*—Continued.

Month.	Balboa shops.		Cristobal shops.		Total.	
	Overtime.	Per cent of pay roll.	Overtime.	Per cent of pay roll.	Overtime.	Per cent of pay roll.
1918.						
March.....	\$27,402.16	13.43	\$6,612.86	14.94	\$34,015.02	12.41
April.....	9,989.33	5.64	8,039.81	17.89	18,029.14	7.26
May.....	16,359.51	8.26	7,734.03	14.81	24,093.54	8.72
June.....	24,286.79	10.74	6,732.11	11.37	31,018.90	10.88
Total.....	283,039.35	.....	91,484.63	.....	374,523.98	.....
Average per month this year.....	23,586.61	11.49	7,623.72	15.78	31,210.33	12.30
Average per month last year.....	12,142.15	7.43	5,956.47	13.50	18,098.62	8.72

TABLE No. 3.—*Force report.*

(Average number of men actually working.)

Month.	Balboa shops.			Cristobal shops.			Total.		
	Gold.	Silver.	Total.	Gold.	Silver.	Total.	Gold.	Silver.	Total.
1918.									
July.....	540	1,244	1,784	94	308	402	634	1,552	2,186
August.....	530	1,201	1,731	101	317	418	631	1,518	2,149
September.....	525	1,194	1,719	103	333	436	628	1,527	2,155
October.....	558	1,293	1,851	105	348	453	663	1,641	2,304
November.....	523	1,308	1,841	115	339	454	648	1,647	2,295
December.....	555	1,376	1,931	117	326	443	672	1,702	2,374
1919.									
January.....	563	1,369	1,932	116	322	438	679	1,691	2,370
February.....	645	1,311	1,956	109	315	424	754	1,626	2,380
March.....	668	1,296	1,964	118	358	476	786	1,654	2,440
April.....	623	1,288	1,911	117	363	480	740	1,651	2,391
May.....	609	1,299	1,908	123	447	570	732	1,746	2,478
June.....	643	1,372	2,015	136	572	708	779	1,944	2,723
Total.....	6,992	15,551	22,543	1,354	4,348	5,702	8,346	19,899	28,245
Average per month this year.....	583	1,296	1,879	113	362	475	696	1,658	2,354
Average per month last year.....	620	1,278	1,898	133	372	505	752	1,649	2,401

TABLE No. 4.—*Foundry outputs.*

Month.	Nonferrous.			Iron.		
	Patterns.	Castings.	Weight.	Patterns.	Castings.	Weight.
1918.						
July.....	70	1,722	10,702½	55	3,949	116,987½
August.....	48	864	13,891	49	4,647	107,795
September.....	34	951	18,250	42	4,023	102,005
October.....	60	1,613	13,661	37	3,040	132,404
November.....	44	2,561	14,150	47	2,642	124,915
December.....	15	2,908	15,178	51	2,315	151,085
1919.						
January.....	31	4,117	13,238	56	2,566	161,145
February.....	52	4,366	12,624	68	2,499	139,459
March.....	34	3,210	19,915	41	3,219	167,200
April.....	60	1,067	22,853½	72	3,250	206,592
May.....	99	2,515	18,551½	113	3,389	149,563
June.....	66	1,421	17,389½	68	4,260	176,027
Total.....	613	27,315	190,404	699	39,799	1,735,177½
Average this year.....	51	2,276	15,867	58	3,317	144,598
Average last year.....	34	1,135	13,669	50	2,994	159,981

TABLE No. 4.—*Foundry outputs*—Continued.

Month.	Steel.			Total.		
	Patterns.	Castings.	Weight.	Patterns.	Castings.	Weight.
1918.						
July.....	8	1,204	63,761	133	6,875	191,451½
August.....	11	945	76,882	108	6,456	198,568
September.....	8	803	69,055	84	5,777	189,310
October.....	21	918	41,254	118	5,571	187,319
November.....	20	497	20,098	111	5,700	159,163
December.....	4	529	24,108	70	5,752	190,371
1919.						
January.....	3	597	25,042	90	7,280	199,425
February.....	10	432	23,927	130	7,297	176,010
March.....	6	748	8,830	81	7,177	195,945
April.....	5	279	12,191	137	4,596	241,636½
May.....	9	343	10,726	221	6,247	178,840½
June.....	31	290	18,459½	165	5,971	211,876
Total.....	136	7,585	394,333½	1,448	74,699	2,319,915
Average this year.....	11	632	32,861	121	6,225	193,326
Average last year.....	13	1,002	123,670	97	5,041	297,321

TABLE No. 5.—*Expenditures and output of the oxyacetylene plant, Balboa shops.*

Month.	Total expenditures.	Oxygen output (cubic feet).	Acetylene output (cubic feet).	Hydrogen output (cubic feet).
1918.				
July.....	\$2,330.27	106,600	61,794	10,175
August.....	2,454.13	104,800	57,310	11,200
September.....	2,106.29	103,100	52,275	8,400
October.....	2,961.89	125,800	67,550	9,900
November.....	5,640.14	131,800	88,815	4,800
December.....	10,133.43	167,700	115,650	4,100
1919.				
January.....	3,758.39	123,200	68,000	16,600
February.....	6,725.55	129,800	61,400	12,700
March.....	3,687.87	116,300	90,900	6,500
April.....	2,696.05	110,700	63,546	7,200
May.....	2,833.82	116,200	69,613	5,900
June.....	2,953.73	140,500	88,221	5,400
Total.....	48,281.56	1,476,500	885,074	102,875
Average this year.....	4,023.46	123,042	73,756	8,573
Average last year.....	2,596.00	113,267	56,220	8,558

TABLE No. 6.—*Operation of Panama Canal dry docks.*

Month.	Balboa.					
	Operating expense.	Vessels docked.				
		Panama Canal.	War and Navy.		Commercial.	
			Number.	Number.	Tonnage.	Number.
1918.						
July.....	\$8,339.78	6			6	37,871
August.....	8,659.47	4			3	7,842
September.....	7,413.90	5	3	1,353	2	2,888
October.....	8,075.76	9	1	4,367	5	36,449
November.....	9,061.83	2	2	2,390	3	17,791
December.....	11,079.44	4	5	3,321	5	25,300

TABLE No. 6.—Operation of Panama Canal dry docks—Continued.

Month.	Balboa.					
	Operating expense.	Vessels docked.				
		Panama Canal.	War and Navy.		Commercial.	
		Number.	Number.	Tonnage.	Number.	Tonnage.
1919.						
January.....	\$7,638.44	5	2	2,030	2	8,259
February.....	9,693.62	2	1	3,824	5	23,251
March.....	10,334.53	5	-----	-----	7	35,276
April.....	8,092.83	5	-----	-----	5	22,101
May.....	10,122.16	5	1	153	7	19,639
June.....	8,854.98	3	1	153	3	16,263
Total.....	107,366.74	55	16	17,591	53	252,930
Average this year.....	8,947.23	-5	+1	1,466	+4	21,077
Average last year.....	7,172.47	+2	-1	4,033	+2	8,966

Month.	Cristobal.					
	Operating expense.	Vessels docked.				
		Panama Canal.	War and Navy.		Commercial.	
		Number.	Number.	Tonnage.	Number.	Tonnage.
1918.						
July.....	\$2,675.65	6	11	609	1	2,245
August.....	2,820.53	2	10	1,099	2	3,524
September.....	3,300.30	2	9	2,067	3	332
October.....	2,691.42	1	1	169	3	968
November.....	2,741.88	2	2	365	4	4,296
December.....	3,100.15	4	3	374	4	2,845
1919.						
January.....	2,222.23	9	2	466	6	7,779
February.....	1,889.12	5	5	601	1	1,041
March.....	1,235.48	4	2	100	3	5,637
April.....	879.01	3	1	50	3	3,354
May.....	932.04	3	3	340	4	2,733
June.....	741.81	3	3	649	2	3,098
Total.....	25,229.67	44	52	6,889	36	37,902
Average this year.....	2,102.47	-4	+4	574	3	3,158
Average last year.....	2,380.17	+3	-3	971	-3	1,599

TABLE No. 7.—Number of repairs to rolling stock.

Month.	Locomotives.		Cars.		Cranes.	Others.	Total.
	Heavy.	Running.	Shop.	Field.			
1918.							
July.....	8	828	252	1,427	24	11	2,550
August.....	6	885	222	1,598	24	2	2,737
September.....	7	901	210	1,614	17	9	2,758
October.....	3	880	163	1,176	20	7	2,249
November.....	6	897	121	1,534	24	6	2,588
December.....	5	940	222	1,750	15	14	2,946
1919.							
January.....	4	905	181	1,804	9	9	2,912
February.....	5	744	210	1,423	26	1	2,409
March.....	7	877	282	2,152	12	7	3,337
April.....	6	692	189	1,607	8	0	2,502
May.....	5	796	170	1,556	13	4	2,544
June.....	5	866	237	1,518	34	5	2,665
Total.....	67	10,211	2,459	19,159	226	75	32,197
Average this year.....	5½	851	205	1,597	19	6	2,683
Average last year.....	7	970	299	1,920	38	2	3,236



TABLE No. 8—*Mechanical Division, fiscal year 1918-19.*

Status as of June 30, 1919:

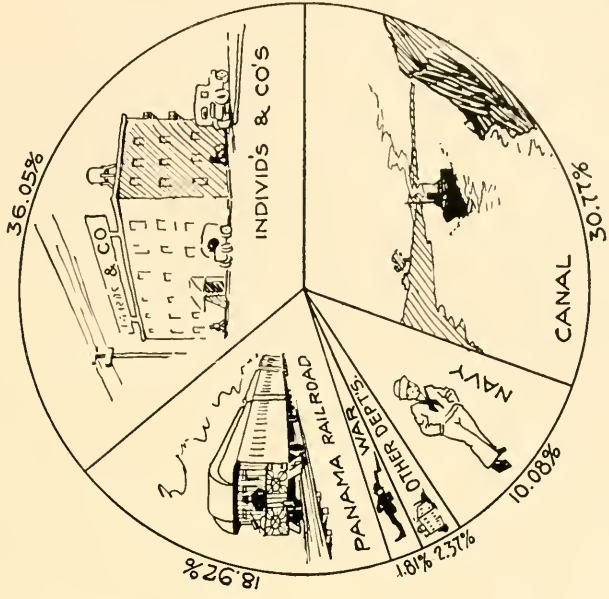
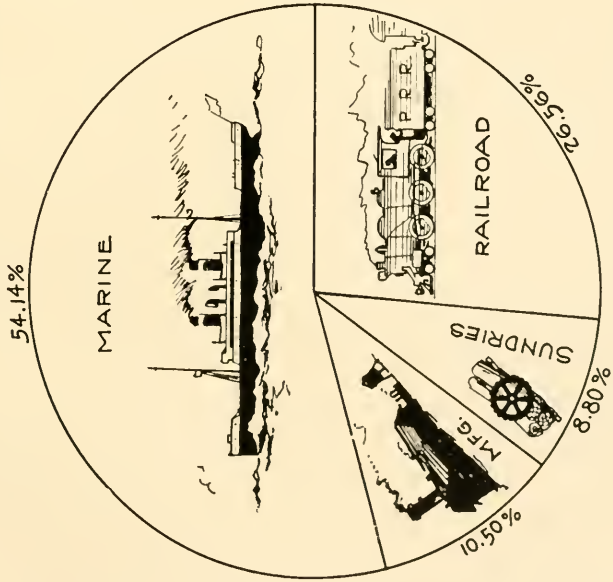
	<i>Credit.</i>
Overhead expense-----	\$140,210.54
Reserves:	
Equipment repairs-----	\$23,997.77
Structure repairs-----	22,897.10
Accrued leave, holiday time-----	138,446.36
	<hr/>
Stock on hand-----	185,341.23
Work in progress-----	22,600.18
	<hr/>
Total-----	408,684.80
	<hr/>
140921°—19—10	756,836.75



THE PANAMA CANAL  
MECHANICAL DIVISION  
BALBOA SHOPS

Plate 21.

CHARTS SHOWING CLASSES OF WORK AND SOURCE OF REVENUE



THE PANAMA CANAL, MECHANICAL DIVISION, BALBOA SHOPS.

Plate 22.

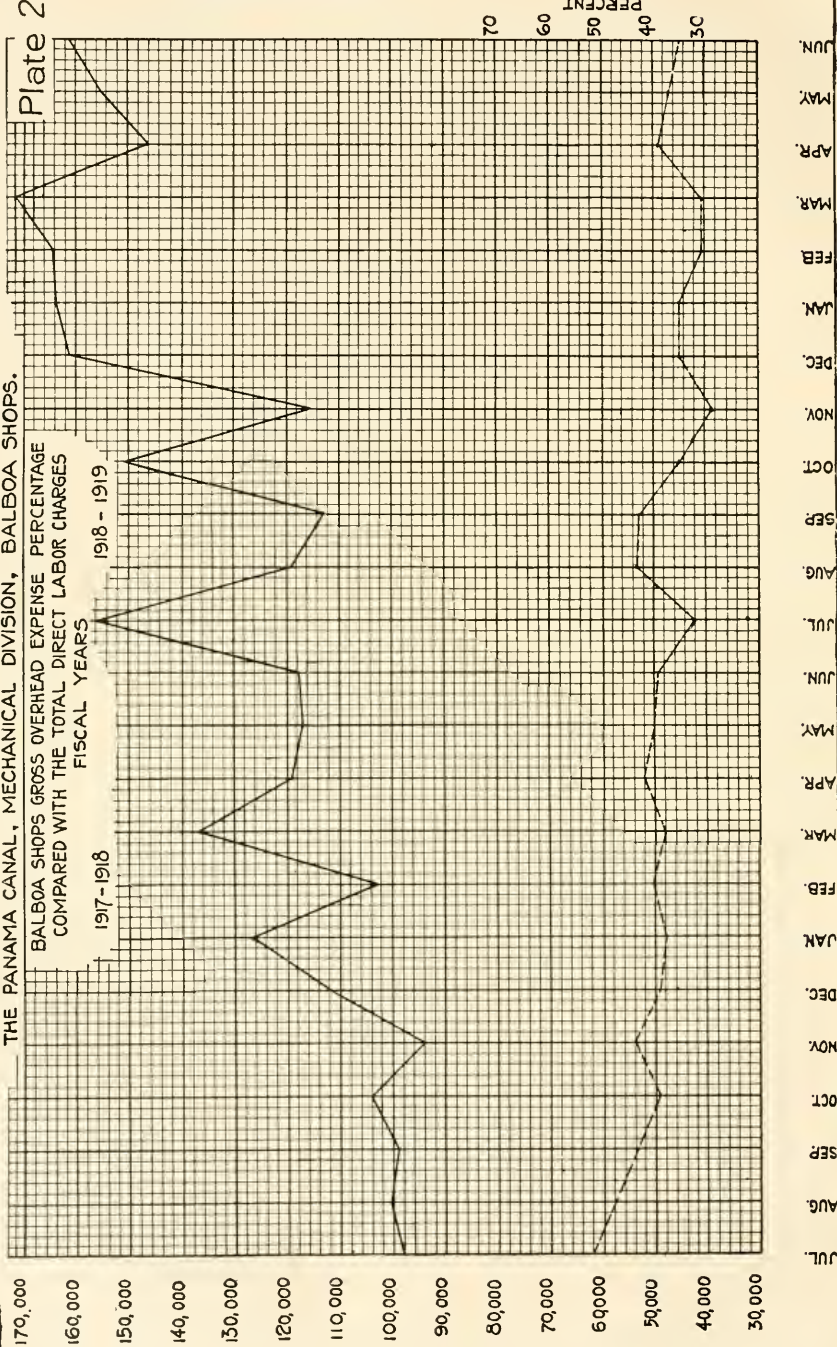
BALBOA SHOPS GROSS OVERHEAD EXPENSE PERCENTAGE  
 COMPARED WITH THE TOTAL DIRECT LABOR CHARGES  
 FISCAL YEARS

1917-1918

1918-1919

— PRODUCTIVE LABOR

--- OVERHEAD EXPENSE PERCENTAGE



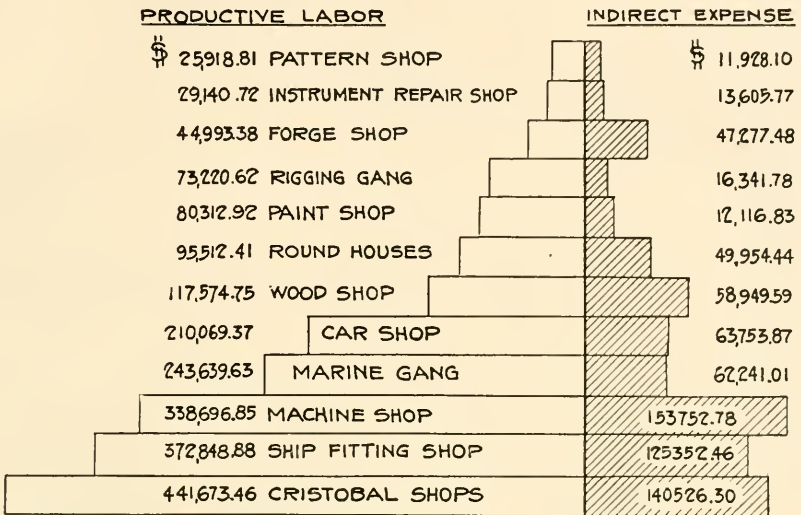
JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY. JUN.

PERCENT  
 70  
 60  
 50  
 40  
 30

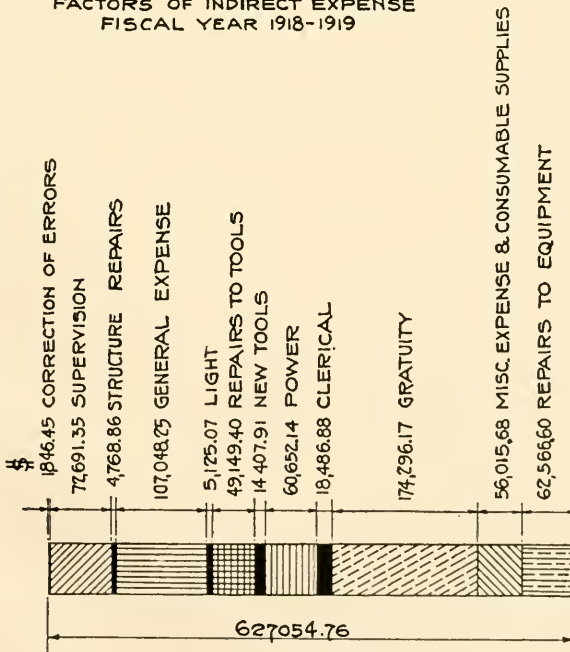
THE PANAMA CANAL  
MECHANICAL DIVISION  
FISCAL YEAR 1918-1919

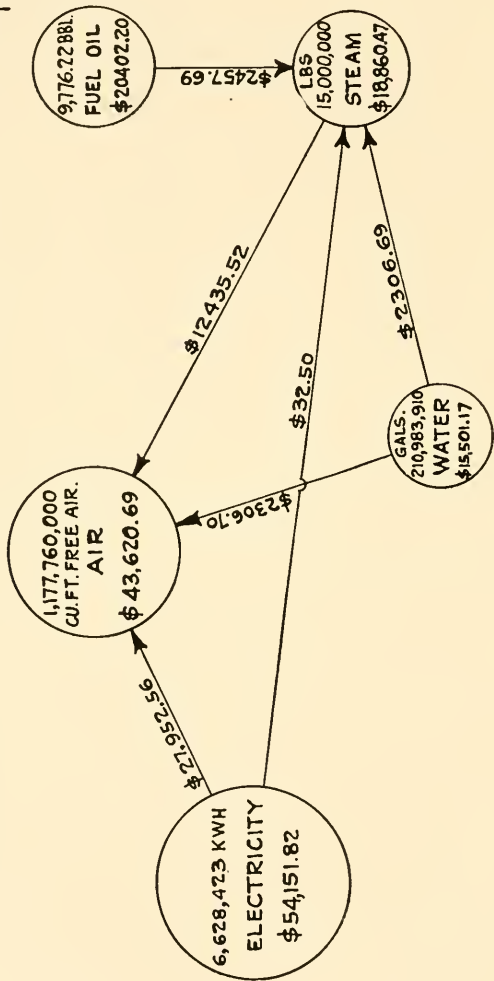
Plate 23.

CHART SHOWING COMPARATIVELY THE PRODUCTIVE LABOR AND THE INDIRECT EXPENSE OF MECHANICAL DIVISION SHOPS



FACTORS OF INDIRECT EXPENSE  
FISCAL YEAR 1918-1919





## THE PANAMA CANAL

MECHANICAL DIVISION, BALBOA SHOPS.

FISCAL YEAR 1918-1919.

RELATIVE COST OF POWER ELEMENTS SHOWING THE EVOLUTION  
OF CHARGES TRANSFERRED AND QUANTITIES CONSUMED.

## APPENDIX E.

### REPORT OF THE CHIEF QUARTERMASTER, SUPPLY DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 28, 1919.*

SIR: I have the honor to submit the following report covering the operations of the supply department for the fiscal year ended June 30, 1919:

#### ORGANIZATION.

The organization of the department continued substantially the same as set forth in the annual report of June 30, 1918.

#### PERSONNEL.

There has been no substantial change in the personnel. Mr. R. K. Morris continued as chief quartermaster; Mr. Roy R. Watson as superintendent; Mr. J. J. Jackson as general manager, commissary division; Mr. W. B. Brown as superintendent, cattle industry; and Mr. M. D. Smith as general storekeeper.

#### LABOR.

In June, 1918, the force consisted of 16,157 silver employees and 3,108 gold employees, or a total of 19,265 actually working. In June, 1919, the silver force was 17,071 and the gold force 3,290, or a total of 20,361. The increase of 914 on the silver roll was due to increased work on the docks at Cristobal and the starting of grading work on the new Army posts at Miraflores and Gatun. The increase of 182 on the gold roll was due to the same causes, as well as additional mechanics in the mechanical division on account of ship work.

There has been a surplus of labor throughout the year. There has also been a wide fluctuation in the number of silver employees on the rolls. The number of silver employees on the rolls each month throughout the year was as follows:

1918 July	15,526	1919 January	17,718
August	16,056	February	18,238
September	14,870	March	16,374
October	16,110	April	17,285
November	17,200	May	16,363
December	17,371	June	17,071

This shows a fluctuation between the maximum and minimum number of men on the rolls of 3,768, or 20 per cent, based on the average number of men employed throughout the year.

There has been considerable unrest among the labor which culminated in a strike on the docks and at the coaling plant from May 3 to 10. A number of petitions were submitted requesting an increase

in pay by both the strikers and by other silver employees who remained at work. The work was at no time seriously inconvenienced on account of the strike and the dock laborers returned to work without receiving the increase demanded.

The question of an increase in the silver roll was taken up in May and June and a general increase was made effective July 1.

The labor unrest which has been apparent has emphasized the necessity of providing some means of employment, or at least a means of making a livelihood for the laborers during slack times on the canal. The labor conditions will never be satisfactorily adjusted until some reservoir of labor is provided, as it will never be practicable to operate without a fluctuation of several thousand men throughout the year. Under present conditions there is practically no employment open to a laborer when he is laid off by the canal, and in time he becomes a vagrant or is a charge upon his friends or relatives. The necessary reservoir of silver labor might be provided either by utilizing surplus labor in road construction which is contemplated by the Army, or by the opening up of lands in the Republic of Panama adjacent to the Zone.

#### QUARTERS.

Applications on file for married quarters for gold employees on June 30, 1918, were 226, as compared with 306 on June 30, 1919. The increase is due to more married men being employed during the year, taking the places of single men who entered the military service.

No new quarters were built during the year for gold employees, except on the cattle plantations, detail of which is shown under the cattle industry report. One two-family, two-story building was removed from Paraiso and reerected at New Cristobal during the year.

The number of applications on file for silver married quarters June 30, 1919, are as follows:

D. Q. M. Balboa Heights-----	450
D. Q. M. Cristobal-----	938
D. Q. M. Pedro Miguel-----	89
D. Q. M. Gatun-----	58
Total -----	1,535

One laborers' barracks was removed from the Paraiso bachelor section to La Boca and converted into six apartments for married silver employees.

The various former gold quarters at Paraiso that were undergoing conversion at the close of the year 1918, were completed and assigned to silver employees during the year, including a six-stall garage which was converted into a three-apartment house and one school-house which was converted into eight apartments. The entire town of Paraiso is now a silver settlement and contains no quarters for gold employees.

Ten 12-apartment houses at Cristobal, for which funds were appropriated, were started during the year and on June 30, 1919, were 95 per cent complete. It is expected to make assignment to these quarters during the month of July.

One laborers' barracks was converted into a lodge room at Gatun and will be rented to silver secret organizations at the rate of \$24 per month.



The bachelor quarters situation for the past four months of the fiscal year developed into a somewhat congested condition, due to increase in force of the mechanical and building divisions.

During the year one new 12-stall boathouse was constructed at Gatun, also one 6-stall automobile garage, to be rented to canal employees for privately owned boats and automobiles. One 12-stall garage was constructed at Pedro Miguel.

#### ZONE SANITATION.

The same methods of collecting and disposing of garbage were carried on during the past year as during the previous year, except that motor transportation was substituted for collection of garbage in Panama, Ancon, Balboa and Pedro Miguel. The cost for 1919 was \$20,935.13, as compared with \$22,797.36 in 1918.

The supply department transferred the sanitary grass-cutting gangs to the health department on June 1, 1919, and from that time on the health department will do all scythe work for sanitation.

#### MOTOR TRANSPORTATION.

Motor transportation has been increased to facilitate the handling of material and supplies, while animal transportation has been reduced, because of greater expense to operate.

#### *Vehicles on hand and operated by all departments.*

	1918	1919
Ford cars, $\frac{1}{2}$ -ton delivery .....	77	78
1-ton trucks .....	2	47
1 $\frac{1}{2}$ -ton trucks .....	7	7
3 $\frac{1}{2}$ -ton trucks .....	15	15
2 $\frac{1}{2}$ -ton trucks .....	3	3
Ford passenger cars .....	15	11
Combination (passenger and delivery) .....	1	4
Hearse .....	1	1
Ambulances .....	7	7
Motoreycles .....	47	56

The above includes commissary, electrical, quartermaster, hospital, mechanical division, and mail cars, but not police and fire cars or Panama Railroad motor busses.

#### ANIMAL TRANSPORTATION.

The animal transportation is being gradually reduced and replaced by motor transportation, and corrals converted into garages:

#### *Animals.*

	Horses.	Mules.
Number on hand July 1, 1918 .....	44	219
Number received, other departments and cattle industry .....	4	8
Number sold, died, condemned and destroyed .....	1	18
Number transferred to other divisions and cattle industry .....	7	15
Number on hand June 30, 1919 .....	39	194

*Pastures and plantations.*

	Horses.	Mules.
On hand July 1, 1918.....	136	157
Number received by transfer.....	2	6
Purchased.....	77	1
Born on Isthmus.....	3	.....
Died, sold, condemned.....	27	19
Transferred.....	1	8
On hand June 30, 1919.....	190	137

## MATERIAL AND SUPPLIES.

A total of 898 requisitions was prepared and forwarded to the general purchasing officer, as compared with 880 during the preceding fiscal year. The total value of material received during the fiscal year was \$7,832,845.61, as compared with \$8,700,356.62 for the preceding fiscal year. The local purchases amounted to \$1,452,153.35, as compared with \$1,349,783.84 for the last year.

The total tonnage of material received was 67,701 short tons, exclusive of lumber, piling, spud timbers, etc., as compared with 119,894 for the fiscal year 1918. Material consigned to The Panama Canal came forward in 205 steamers.

On June 30, 1919, the value of material in stock was \$6,001,451.24, as against \$6,511,392.86 on June 30, 1918, not including the stock of obsolete material and scrap. The following statement shows material on hand at beginning and end of year and total of all issues from the different storehouses for 1918 and 1919, exclusive of obsolete material and scrap:

	General storehouse.	Cristobal storehouse.	Paraiso storehouse.	Total.
On hand 1918.....	\$4, 932, 204.69	\$675, 412. 40	\$903, 775. 77	\$6, 511, 392. 86
On hand 1919.....	4, 332, 763. 70	743, 228. 87	919, 458. 67	6, 001, 451. 24
Issued 1917-18.....	9, 439, 032. 03	1, 740, 223. 65	858, 601. 44	12, 037, 857. 12
Issued 1918-19.....	9, 479, 634. 02	2, 078, 800. 88	598, 655. 34	12, 157, 090. 24

## SALES.

Table No. 3 attached covers total of all classes of sales for the year, showing 86,606 sales, amounting to \$2,733,360.64, exclusive of issues on foreman's orders or an increase of \$1,102,533.04 over the previous year. Sales to steamships show an increase of \$248,413.91 and 2,156 vessels were handled as compared with 1,917 for the fiscal year ending June 30, 1918.

Sales to the United States Army amounted to \$287,256.82 and sales to the United States Navy totaled \$141,329.68. The principal items sold were lumber, building material, general hardware, rope, cable, gasoline, kerosene, and lubricating oils.

During the year a total of 223,027 requisitions and foreman's orders was handled, distributed as follows:

General storehouse .....	150, 802
Cristobal storehouse .....	59, 184
Paraiso storehouse .....	13, 041

The consumption of cement for the year was 170,466 barrels.

SURPLUS AND OBSOLETE MATERIAL—EQUIPMENT AND SCRAP.

The Mount Hope obsolete storehouse, under the supervision of the storekeeper, Cristobal store, was operated, as during the previous years, as a concentration point for obsolete and surplus material, equipment, and scrap.

Table No. 10 herewith shows the status of obsolete and surplus material at the beginning and end of the fiscal year, the receipts and issues during this period, and the balance on hand June 30, 1919.

*Scrap.*—Table No. 11, attached, covers American scrap operations during the fiscal year.

The French scrap situation is as follows:

On hand July 1, 1918.....	Gross tons. 13,427.02
Receipts, 1919.....	
Total.....	13,427.02
Shipped on Rovetta contract.....	3,997.17
Balance, June 30, 1919.....	9,429.85

Table No. 5, attached, gives detail of sales from the obsolete and general storehouse of material, equipment, and supplies, the original cost of which was over \$500, to be reported to the Secretary of War.

FUEL-OIL PLANTS.

The operation of the Balboa and Mount Hope fuel-oil plants continued under the supervision of the general storekeeper during the fiscal year.

Contracts to furnish fuel oil were entered into with the Anglo Mexican Petroleum Co. (Ltd.) of New York, for 500,000 barrels for delivery f. o. b. steamer either Puerto Mexico, Tuxpan, or Tampico, Mexico, at \$0.7875 per barrel, and with the Huasteca Petroleum Co., of New York, for 600,000 barrels for delivery f. o. b. steamer Tampico, Mexico, at \$0.7875 per barrel. Both contracts expire August 31, 1919, and there remains to be delivered a balance of 345,251 barrels and 370,051 barrels under each, respectively.

The construction of the 55,000-barrel capacity concrete fuel-oil tank for The Panama Canal at Mount Hope was completed March 22, 1919.

Table No. 12, attached, indicates total fuel oil handled by the Balboa and Mount Hope fuel-oil plants in amount 2,649,868 barrels for 396 vessels.

Erection of two 55,000-barrel capacity fuel-oil tanks by the West India Oil Co. at the Mount Hope tank farm was practically completed June 30, 1919.

GASOLINE STORAGE.

Storage of bulk gasoline in tanks No. 31 and 27 at Balboa and Mount Hope was continued during the year, the principal issues from same having been made to Navy vessels and to the Army on the Isthmus.

## PANAMA CANAL PRESS.

The value of stock on hand at the close of the fiscal year was \$98,103.52, as against \$86,542.96 for the preceding fiscal year, which increase was due almost entirely to the increased cost of material.

The following table shows the principal items of manufacture:

Forms -----	28, 041, 968	Pads, desk -----	302
Pamphlets -----	926, 950	Pads, scratch -----	64, 356
Sheets, carbon -----	69, 700	Sheets, ruled -----	71, 550
Cards, guide, etc. -----	548, 222	Tags, assorted -----	1, 448, 150
Stamps and daters -----	3, 289	Canal Records -----	432, 850
Cardboards -----	63, 106	Binders -----	2, 133
Paper, sheets, flat -----	4, 038, 287	Programs -----	48, 383
Paper, rolls, pounds -----	71, 562	Folders -----	33, 750
Badges -----	4, 657	File boxes -----	276
Envelopes -----	483, 365	Books, coupon -----	1, 410, 000

The total value of material issued was \$147,627.39, as compared with \$107,302.55 for the preceding fiscal year. Practically all of this increase was due to the printing of commissary books. It is estimated that a saving of \$33,000 was effected by the printing of commissary books on the Isthmus.

The total value of material used in manufacture was \$63,634.43, as compared with \$51,096.31 for the fiscal year ending June 30, 1918.

## SUBSISTENCE.

The general administration of the subsistence branch was as heretofore, Mr. Roy R. Watson, superintendent of the supply department, having direct charge, assisted by an inspector.

On June 30, 1919, the department was operating the hotels Tivoli and Washington, and the Hotel Aspinwall, Taboga Island; 11 line restaurants and 4 labor messes. The Hotels Tivoli and Washington were operated on the European plan, the Tivoli having been changed from the American plan on May 1, 1919. The Hotel Aspinwall is operated on the American plan. Five of the line restaurants are a combination of a la carte and regular meal menu, the remainder are cafeteria and a la carte. The labor messes are using both cafeteria and ration-meal system. The Hotel Washington is owned and financially supported by the Panama Railroad Company, under the management of the supply department.

The revenue for the year from restaurants and messes was \$745,192.75, an increase of \$147,039.24 over the previous year, while the total cost of operation was \$749,147.60, an increase of \$154,751.61, making a loss of \$3,954.85, as compared with a profit of \$3,757.52 for last year. Had the charges for buildings, building repairs, fuel, and light been made a net loss of \$35,026.48 would have been shown. No charge for equipment has been made, the charge being absorbed by allotments of The Panama Canal.

The net expense for salaries and wages was \$122,854.74, an increase of \$31,923.10, making the proportion of net pay roll to revenue 16.49 per cent, or 1.29 per cent more than last year.

As a result of the year's operation, the line restaurants showed a loss of \$5,996.43, and the labor messes showed a profit of \$2,041.58.

During the year the following buildings under construction were completed and occupied:

The new Tivoli kitchen was occupied in December, 1918. The new restaurant at Pedro Miguel was occupied in January, 1919.

A silver mess was opened at Summit for the convenience of the employees of the cattle industry and Summit poultry farm, the building for this purpose being furnished by the cattle industry.

On June 16 the old Washington restaurant was reopened. This was found necessary for the convenience of bachelors occupying quarters on Colon Beach.

The Hotel Aspinwall, Taboga Island, showed a loss of \$4,281.61 for the year. This, however, is due to the extensive improvements made during the year, such as the installation of a lighting plant, the construction of a floating dock, which was necessary on account of the poor facilities for passengers embarking and disembarking, also the installation of a cold-storage plant.

The Hotel Tivoli showed a net profit of \$2,130.98, compared with a net loss of \$6,936.06 for the last fiscal year.

The Hotel Washington showed a net gain of \$11,132.26, against a loss of \$15,465.92 for last year.

There is a considerable increase in revenue for both the hotels Tivoli and Washington for the year. This is attributed to the increased South American travel.

#### COMMISSARY DIVISION.

The commissary division remained in charge of Mr. J. J. Jackson, general manager. An increase was recorded in the business of the commissary division, as a whole, and on practically all individual units. The only units not showing an increase were the coffee-roasting plant and the bakery. The decrease in the bakery was due to conservation rules in regard to saving wheat flour during the war, and also due to the fact that a bakery was established by the Navy at the submarine base, Coco Solo, and also by the Army at Empire, which supplied bread for the troops on the west side of the canal. Heretofore both the Army and Navy were obtaining all of their bread from the commissary division.

The number of cattle killed at the abattoir showed an increase of 43 per cent over last year, and the value of products showed an increase of over a million dollars. Considerable increase in the amount of beef sold to steamships has been recorded. The increase in prices of by-products from the abattoir, particularly in hides, accounts for the increase in revenue from this unit. Hides are now selling at practically 50 per cent more than they were a year ago.

There was a decrease in the purchases of a number of the most important items of foodstuffs during the fiscal year, due to the fact that a large stock was carried over in 1918 from the previous fiscal year. The prices on practically all retail cuts of beef remained the same throughout the year. The facilities for curing and pickling pork obtained from hogs slaughtered locally were extended and such items as ham, bacon, and sausage are being sold in the commissaries at considerably lower prices than obtained in 1918 when products obtained from the United States formed the bulk of supplies of this kind handled by the commissaries.

As far as staple foods are concerned, there is not a considerable difference between the present prices and those existing a year ago.

The output of the sausage plant has practically trebled during the last year. Jellied tongue and spiced lunch tongue have recently been added to the list of products. Sausage was manufactured from native pork and beef, and the prices of products turned out were considerably lower than States prices.

*Costa Rican agency.*—This agency was continued in operation and the purchases amounted to approximately \$6,500 more than the previous year. The commissary division was able to obtain practically all of their potatoes from this source during a large part of the year. The agency was established in 1915 as a source of supply in case of war. It proved its usefulness in furnishing a number of products during a time when they could not be obtained from the United States, or only obtained at a very high cost. Due to the present unsettled political situation in that country and the difficulties experienced in obtaining transportation, this agency will probably be discontinued within the next six months.

*Haitian agency.*—This agency was discontinued in January. After a very thorough trial it indicated the fact that it was not economical to maintain an agency in this country. The failure in this case was due mainly to inadequate transportation and difficulties in purchasing in reasonably large quantities.

*Changes, alterations, and improvements in retail commissaries.*—In November a tailor shop was opened at Cristobal. Prior to that time all of the work had been done at the Ancon shop.

The cashier's cage at the Cristobal commissary was removed from the mezzanine floor where it would be more accessible to commissary patrons.

With the town of Paraiso being turned into a silver settlement, the commissary at this point, which had formerly been operated as a gold and silver commissary, was remodeled so as to handle silver business only.

The Pedro Miguel commissary was equipped with cold-storage rooms, refrigeration being furnished by the small plant in the restaurant. The installation of small refrigerating plants in the commissaries has proved very successful and has demonstrated that considerable saving is made in foodstuffs, as well as keeping supplies in much better condition.

A ventilation system was installed in the Ancon commissary at a total cost of \$1,331.46.

The commissary at Empire was discontinued on May 31, due to the fact that the garrison and permanent quarters at this point were moved. A commissary was opened at Culebra on June 2, to furnish supplies for the troops at this point, and also for such canal employees as were still on the west side of the canal.

*Installation of kerosene oil tanks.*—In July, 1918, requisition was placed for nine kerosene tanks and pump outfits for installation at various stores for the purpose of selling kerosene oil in bulk, rather than in 5-gallon tins as formerly, it being believed that this would permit the sale of oil at a reduced price and with less work to the division. The outfits were received in December and installation was handled by the building division. Up to June 30, 1919, the tanks at the following commissaries were completely installed and

ready for use: Ancon, Red Tank, Balboa, La Boca, Pedro Miguel, Ancon market. Only two, however, had been filled with oil and were in actual service, namely, those at La Boca and Ancon market.

*Bakery.*—The instructions in regard to the use of wheat flour were continued in effect until November 16, on which date the restrictions were removed in response to advice received from the Federal Food Administration. On February 25 the manufacture of soda biscuits was begun and a very satisfactory product was turned out at a price considerably lower than imported crackers.

*Fishing industry.*—It was found that, except at certain seasons, the fishing industry established June 19, 1918, could not be maintained on a profitable basis, and therefore the commissary division discontinued this enterprise on June 30, 1919.

*Industrial laboratory products.*—The line of products manufactured by the industrial laboratory was still further increased during the fiscal year. Among these additions were panela sirup, coconut fudge, maple chocolate fudge, liquid green soap, neat's-foot oil, denatured bay rum, and paraffin wax.

*Food conservation—Sugar.*—It was not until August 31, 1918, that it was found necessary to enforce strictly and stringently the conservation rules governing the sale of white granulated, powdered, and loaf sugar imported from the United States. A limit of 2 pounds per month, which was later increased to 3 pounds, was fixed for each gold employee and member of his family and card records instituted. Sales to Army organizations and post exchanges were discontinued, and sales to clubhouses, tugs, dredges, hotels and restaurants, steamships, etc., were regulated. There being an ample supply of Peruvian yellow sugar and panela purchased locally, no restrictions were placed on the sale of these varieties. Restrictions were removed on the sale of white sugar on December 6, 1919, to the gold trade, and on February 13, 1919, to the silver trade.

*Wheat.*—On September 18 wheatless Mondays, established by the Governor's circular of March 11, were discontinued, this being in line with the Federal Food Administration program. Other wheat conservations were continued in effect, however, till the signing of the armistice.

*Propaganda.*—The commissary division distributed gratis from its retail stores many copies of pamphlets and booklets intended to combat any pro-German sentiment that might exist and correct certain misimpressions in connection with America's entrance into the war. Some of these booklets, printed in English and Spanish, were received from the committee on public information, some were supplied free by patriotic citizens, and others were purchased outright.

*Products shipped to the United States.*—Shipments by the commissary division to the United States, exclusive of beef, during the year were as follows:

Steer hides, pounds-----	1,981,879
Cow hides, pounds-----	599
Calf hides, pounds-----	2,401
Kip hides, pounds-----	98
Mule hides, pounds-----	558
Horse hides, pounds-----	499
Goat skins, pounds-----	354
Inedible grease, pounds-----	845,249
Tallow, pounds-----	21,868
Neat's-foot oil, gallons-----	964

Bone meal, pounds	136, 974
Hoofs, pounds	58, 246
Horns, pounds	77, 836
Bones, round, flat, and thigh, pounds	64, 269
Hair, switch, pounds	1, 246
Pits, pounds	4, 962
Casings, beef, middles, sets	3, 730
Casings, beef, rounds, each	895
Casings, beef, bungs, each	15, 225
Weazands, each	20, 350
Bladders, each	14, 005
Hog stomachs, each	890
Hog bungs, each	1, 070
Cacao, pounds	23, 332

The total value of these shipments was \$643,272.72.

*Beef shipments.*—During the year 41,659 quarters of beef, valued at \$678,364.11, were shipped to the depot quartermaster, United States Army, New York. The largest consignment went forward per the steamship *Panama*, January 23, and consisted of 1,000 hind-quarters, weighing 133,130 pounds, and 1,000 forequarters, weighing 134,187 pounds.

*New Mount Hope plant.*—On February 25 the new cold-storage plant at Mount Hope was used for the first time, 300 sides of beef being put into the chill rooms on that date. Two rendering tanks, each with a daily capacity of 9,000 pounds of offal, were placed in operation on February 26. The first hides were put down three days later, and by the middle of March practically all the beef storage was in use. With the transfer of the butter, cheese, egg, and vegetable sections on May 18, the new plant was in complete operation.

Space is provided for refrigeration of over 5,000 carcasses of beef, consisting of two chill rooms with a capacity of 200 carcasses; four coolers with a hanging capacity of 3,000 carcasses (6,000 sides); three freezers in which quarters of beef are stacked, having a capacity of 8,064 quarters—2,016 carcasses.

On June 30, 1919, the plant was full almost to capacity, there being 2,411 carcasses hanging, 8,159 quarters wrapped ready for export, and 2,009 quarters unwrapped. This was due to the fact that the kill had been for some time maintained at the rate of 200 cattle daily and shipments to the depot quartermaster, United States Army, New York, were suspended on very short notice. As soon as this advice was received from the Army, the kill was reduced to approximately 100 cattle daily.

*New abattoir.*—It is expected that all tanks, vats, and equipment will be moved to the new abattoir (which is situated alongside the new cold-storage plant and have overhead connection at the third floor), not later than July 10. The facilities at the new plant are a great improvement over those at the old slaughterhouse, where the employees worked in such congested quarters that, when the kill reached 200 cattle the day, it was necessary to work two shifts. Located immediately contiguous to the cold storage, it will be much more convenient for all concerned, and time and labor will be saved. After slaughtering, the halved carcasses will be transferred by conveyor track to the chill room, thus obviating the necessity of the car formerly used for conveying from old abattoir to cold-storage plant.



The following machinery and equipment were installed during the past fiscal year:

*Industrial laboratory.*

Bottle-filling machine.  
Corking machine.  
Labeling machine.  
Bottle dryer.  
Meat and vegetable cutter.  
Fruit juice extractor.  
Cocoa grinding machine.

*Coffee roasting plant.*

Automatic weighing machine.

*Bakery.*

Bread wrapping machine.  
Cracker machine.  
Dough brake.  
Automatic dough divider.

2 molding machines.  
(All the above are electric driven.)

*Wholesale groceries.*

Portable bag stacker.  
Vacuum cleaner (motor driven).  
Sack cleaner with dust collector and adjustable bag turner attached.  
Rice separator and cleaner (operated electrically).  
Pea and bean separator (operated electrically).  
Corn and grain cleaner (operated electrically).

*Ice cream plant.*

Butter churn and worker (belt driven).

*Miscellaneous.*—The first shipment of dried sliced beef made and packed by the commissary division was shipped to the retail stores on July 18 and found ready sale. It is put up in 8-ounce cartons, which retail at 40 cents, which is much lower in price than the canned product imported from the United States, besides being thought superior in quality and appearance.

Sales of Christmas goods in the commissaries have always been very large; but the past year, in accordance with recommendation of the Council of National Defense, no special orders for the holiday trade were placed, except for books, Christmas and New Year cards, gift stationery, and for small amount of toys. As a result sales were considerably lower than in previous seasons.

CATTLE INDUSTRY.

The cattle industry division, comprising the cattle operations, pastures, plantations, dairy, hog farm, poultry farm, and the operation of the cattle steamers, continued under the supervision of Mr. W. B. Brown as superintendent. Mr. J. H. K. Humphrey continued as cattle buyer.

*Purchases.*—The delivery of cattle under contract for 1918-19 was not completed by June 30, 36,439 head having been received of the 37,500 head contracted for. Delivery began on April 30, and of the total number delivered 29,353 head were delivered during the fiscal year.

The purchase price of beef continues favorable. The contract for the year 1919-20 has been made for a maximum of 40,000 head of beef cattle and 20,000 head of canners. In addition to the purchase of beef cattle during the fiscal year, 4,780 head of feeders were purchased; 12 bulls, and 501 cows. There were also purchased in the open market locally 202 head of steers and 1,393 hogs.

Fourteen Durham and 15 Hereford bulls were purchased in the United States and on arrival were placed at the Mindi dairy. Later they were distributed among the breeding stock.

Three Duroc boars and two gilts were received from the United States and were placed at the hog farm.

The cattle buyer made a purchase in the United States of 100 head of pure bred Holstein heifers and 3 bulls, which were received on the Isthmus in two shipments; 69 heifers and 2 bulls arriving in December, 1918, and 28 heifers, 3 cows, and 1 bull arriving in February, 1919. The entire herd was placed at the dairy. The assistant cattle buyer made a purchase of 6 Holstein heifers and 1 bull calf, which were placed at the Corozal farm and later transferred to the dairy.

The following table shows the open market purchases made in addition to the above:

Item.	Unit.	Quantity.	Price.
Chickens.....	Each.....	25,437	\$0.50
Ducks.....	do.....	6,865	\$0.60
Turkeys.....	do.....	7,164	\$1.75
Goats.....	do.....	480	\$2.00
Hogs.....	do.....	12,224	12 to 15 cents per pound.
Monkeys <sup>1</sup> .....	do.....	103	\$3.00
Bran.....	Pound.....	16,320	.05 to .07 per pound.
Butter.....	do.....	25,997	.44 to .48 per pound.
Cocoanuts.....	Each.....	61,070	\$.025
Corn.....	Pound.....	405	\$.035
Lumber.....	Feet B. M.....	691	\$0.06 per foot.
Milk, dried.....	Pound.....	300	\$0.09 per pound.
Mochillas, large.....	Dozen.....	75	\$12.50
Mochillas, small.....	do.....	358 $\frac{1}{2}$	\$2.50
Peas.....	Pound.....	1,640	\$0.05
Grass seed.....	do.....	170,537	14 to 20 cents.
Yams.....	do.....	84,816	\$0.016 to \$0.026 per pound.

<sup>1</sup> Purchased for the health department.

*Transportation.*—The steamship *Caribbean* completed 47 trips to Colombian ports during the year, bringing to the Canal Zone 17,906 head of beef cattle, 3,810 three-year olds, 501 cows, and 12 bulls. All other Colombian produce purchased was carried exclusively by the *Caribbean*. In addition to the live stock and produce, this steamer carried passengers, mail, and general cargo. The total number of passengers carried was 429; the total tonnage of general cargo amounted to 8,392.32 tons, including specie valued at \$1,034,577.12.

The steamship *Culebra* completed 29 trips to Colombian ports, bringing to the Canal Zone 11,466 head of beef cattle and 970 head of 3-year-old steers.

From July 30 to November 22, 1918, this steamer was under charter to the United States Shipping Board for the purpose of towing interned German ships from South American ports to Balboa. On May 9 of this year she was laid up for general overhauling, repairs, and alterations. This work was approximately 60 per cent complete on June 30.

During April of this year the steamship *Middlebury* was turned over to the cattle-industry division by the United States Shipping Board. This steamer is now undergoing extensive alterations converting her into a cattle steamer with a carrying capacity of approximately 1,000 head. This work was 50 per cent completed on June 30.

The following table shows the monthly commercial steamship business during the year:

Month.	General cargo.		Specie.		Mail revenue.	Passengers. <sup>1</sup>	
	Tonnage.	Revenue.	Value.	Revenue.		Number	Revenue.
1918.							
July.....	19.65	\$212.24	\$57,240.00	\$783.60	\$6.85	.....	.....
August.....	467.51	6,062.01	81,384.00	1,229.77	9.20	.....	.....
September.....	311.15	4,788.84	247,998.30	3,568.68	9.82	.....	.....
October.....	222.68	3,308.86	195,699.71	2,821.30	8.49	.....	.....
November.....	694.55	9,776.48	99,029.66	1,668.81	4.97	18	\$360.00
December.....	1,105.79	13,833.04	46,031.50	636.66	764.93	39	780.00
1919.							
January.....	687.00	9,298.74	45,483.00	625.40	70.90	33	630.00
February.....	850.21	10,637.86	59,497.65	818.03	84.75	64	1,220.00
March.....	804.83	10,569.41	18,000.00	247.50	48.96	84	1,590.00
April.....	1,049.18	15,235.69	67,823.50	932.56	17.43	82	1,435.00
May.....	1,127.74	16,066.19	94,396.80	1,339.20	17.92	62	1,030.00
June.....	1,054.03	14,383.71	21,977.00	312.18	24.67	47	720.00
Total.....	8,392.32	114,173.07	1,034,559.12	14,983.69	1,068.89	429	7,765.00

<sup>1</sup> Passenger business did not start until November.

The revenue shown on general cargo and specie is the gross amount, the cattle industry's proportion being 50 per cent. The total net revenue to commercial steamship business is shown in recapitulation below:

General cargo, net.....	\$57,086.53
Specie.....	7,492.85
Mail.....	1,068.89
Passenger business.....	7,765.00
Total.....	73,413.27

SALES.

The sales of live stock and poultry during the year were as follows:

	To commissary.	To individuals.
Beef cattle, head.....	31,207	6
Bulls, head.....	.....	4
Calves, head.....	163	.....
Pigs, head.....	14	4
Hogs, head.....	13,537	6
Sows, head.....	17	1
Goats, head.....	63	1
Chicks, head.....	1,496	377
Chickens, head.....	26,105	30
Turkeys, head.....	7,028	51
Ducks, head.....	5,221	14

HEALTH.

The general health of the fat and lean stock was excellent throughout the year; 131 deaths occurred from anthrax, the majority shortly after arrival from Colombia. During the dry season 10,000 doses of antianthrax serum were shipped to Colombia, and the vaccination took place there 20 days prior to shipping. This did not, however, materially reduce the deaths from this disease after arrival.

The breeding herds at Miraflores and Monte Lirio have been in excellent health during the entire year, the only deaths occurring being the results of accidents.

The health of the stock at the hog farm was comparatively good throughout the year. During the months of November, December, January, and February 501 deaths occurred from cholera brought in by stock from Colombia, and in addition 48 deaths occurred en route. One hundred and ninety-one other deaths occurred at the farm from various causes.

The stock at the poultry farm was fairly good, although a high percentage of mortality continued throughout the year, shown below :

Chicks.....	16, 530	Mongrels.....	1, 363
Poultts.....	67	Turkeys.....	1, 445
Ducklings.....	241	Ducks.....	480
Thoroughbreds.....	1, 830		

The deaths among the chickens, turkeys, and ducks which occurred en route from Colombia are included in the above.

#### CONSTRUCTION.

The following work was performed during the year by the construction gang of this division:

*Mount Hope.*—A second story was added to gold quarters and a 40-stall stable erected.

*Summit.*—The old horse corral was reconstructed and the building is now being used for a mess hall. The old engine shed was converted into a 33-stall stable.

*Monte Lirio.*—A dip, corral, and a 4-stall stable were erected at this point.

*Caimito.*—A dip, corral, 24-stall stable, gold cottage, and a combination two-story silver quarters were built.

*Mandingo.*—A loading corral and chute were built.

*Mindi cattle dock.*—Cattle scales were received from the States and erected at the unloading dock.

*Mindi dairy.*—A dip and a corral nearer to the barns were completed during the month of June.

*Hog farm.*—Three concrete feed pens and shelter houses, runway for garbage disposal, and 1,000 feet of 20-inch concrete sewer line were constructed.

*Poultry farm.*—A compost pit, concrete duck pond, concrete drain, and secondary brooder house were built. The interior of the secondary brooder houses were reconstructed.

*Frijoles Plantation.*—A four-stall stable and wagon shed were erected.

*Summit Plantation.*—The old La Pita station house was reconstructed and made into quarters for the Chinese gardeners.

#### PASTURES.

*Mount Hope "A."*—Beef pastures. These contain 4,297 acres, including 150 acres of the old Manawa Plantation. A monthly average of 1,949 head of beef cattle were pastured during the year.

*Summit "B."*—Fattening pastures, containing 4,997 acres, of which 130 acres were cleared and added this year. An average of 1,362 head of lean cattle were pastured.

*Miraflores "C."*—Breeding pastures, containing 4,423 acres. No additions were made during the year. An average of 960 head of cattle were pastured, in which are a great many half-breed white-

headed calves, showing conspicuous marking of the imported stock which has been crossed with the native cow.

*Mandingo "D."*—Fattening pastures, containing 9,227 acres, of which 2,922 acres were added this year. A monthly average of 1,839 head of lean cattle were pastured.

*Monte Lirio "E."*—Breeding pastures, containing 1,625 acres. No additions were made this year. An average of 859 head were pastured. There is also a large number of half-breed calves here showing a conspicuous marking toward the imported bulls.

*Pedro Miguel "G."*—Fattening pastures, containing 3,005 acres, including 220 acres of newly cleared land added this year. An average of 1,146 head of lean cattle was pastured.

*Caimito "H."*—Fattening pastures, containing 5,362 acres, of which 846 acres were cleared this year. A monthly average of 2,342 head of lean cattle was pastured.

*Farfan "I."*—This is virgin clearing, containing 5,992 acres, and is situated on the west side of the canal entrance at Balboa, adjoining Venado, which is now combined with Farfan.

*Bohio "J."*—Situated on a peninsula in Gatun Lake, south of Frijoles, and contains 1,790 acres of virgin clearing. No pasturing of cattle has yet been done in this area since cleared.

*Clearing.*—The total virgin clearing for the year amounted to 11,830 acres, divided as follows:

	Acres.		Acres.
Summit "B"-----	130	Caimito "H"-----	846
Mandingo "D"-----	2,922	Farfan "I"-----	5,922
Pedro Miguel "G"-----	220	Bohio "J"-----	1,790

The total area reclaimed amounted to 23,240 acres, being divided as follows:

	Acres.		Acres.
Mount Hope "A"-----	4,553	Mandingo "D"-----	5,439
Dairy pastures-----		Monte Lirio "E"-----	2,961
Manawa-----		Pedro Miguel "G"-----	2,697
Summit "B"-----	3,815	Caimito "H"-----	1,806
Miraflores "C"-----	1,989		

*Seeding.*—Approximately 150,000 pounds of grass seed were planted. All new area was seeded, and considerable reseeding was done throughout the old pastures.

*Fencing.*—There were 64½ miles of new fence lines run, including corrals. The division of the work is shown below:

	Miles.		Miles.
Mount Hope "A"-----	6	Pedro Miguel "G"-----	3
Summit "B"-----	7	Caimito "H"-----	22
Miraflores "C"-----	6	Farfan "I"-----	12
Mandingo "D"-----	7	Bohio "J"-----	14

All clearing gangs were abolished on May 20, and only sufficient men retained to complete the work on new fence lines. The total area cleared and devoted to pastures amounts to 42,347 acres. Two hundred and seventy acres of clearing in La Pita pastures were omitted from the 1918 report.

PLANTATIONS.

During the fiscal year seven plantations were discontinued or have ceased to be known as plantations, viz:

Pena Guapa and Sweetwater were taken over by the Army. Manawa was combined with Mount Hope pasture, and will be included in this area.

Gatun corn farm was abolished.

Las Gaucas is combined with Limon, the joint plantations to be known as the Limon hog ranch.

Flat Rock and Chilibre were combined with Juan Mina, and will be known as one unit under the name of Juan Mina.

Venado was combined with Farfan pastures, and will be included in that area.

*Bracho Mindi.*—This is a papaya plantation situated on the old French canal between Gatun and the Mindi diversion. A total of 183,100 pounds of papaya were shipped to the commissary during the year, the maximum yield being produced in May in which month 29,594 pounds were harvested. This production greatly exceeded our estimate.

*Frijoles.*—This place continued to be operated as an avocado orchard and contains approximately 2,500 trees. A small grove of Cuban mango trees are under cultivation. The Chinese gardens operated at this point continue to prove satisfactory.

*Juan Mina.*—The citrus groves at this point have made wonderful progress and a fine initial crop will be harvested in the near future.

*Limon.*—The cultivation at Limon is confined to crops for feeding hogs, which will be put on range at this place. Beginning July 1, 1919, this unit will be known as the Limon hog ranch. Hogs will be put to graze and in addition will be fed the crops raised.

*Las Cascadas.*—This plantation has always been operated at a loss. Beginning July 1, it will be let on contract, all produce being sold to the commissary division on a basis of two-thirds of the revenue to the contractor and one-third to this division.

*Summit.*—Summit plantation and pastures are being operated as one unit under pastures, the plantation phase being retained only in so far as the Chinese gardens are concerned. The old Chinese gardens at Summit have proved very satisfactory, and as a result another Chinese garden contract has been made which will be known as No. 2.

The following table shows the items of produce furnished by the Chinese gardens during the year:

Items.	Quantity.	Items.	Quantity.
Beans, string, pounds	47, 076	Onions, green, bunches	190, 978
Celery, bunches	43, 334	Peppers, green, pounds	21, 611
Chayotes, pounds	11, 007	Peppers, hot, pounds	5, 515
Cucumbers, pounds	40, 222	Papaya, pounds	28, 061
Cabbage, pounds	752	Parsley, bunches	79, 030
Eggplant, pounds	34, 716	Radishes, white, bunches	30, 816
Endive, green, bunches	46, 746	Spinach, bunches	45, 039
Lettuce, pounds	38, 144	Radishes, red, bunches	31, 850
Mint, bunches	37, 450	Squash, pounds	657
Mustard, bunches	12, 773	Tomatoes, pounds	1, 056
Okra, pounds	27, 370		

The following is a list of the items shipped to the commissary division from the plantations:

Items.	Quantity.	Items.	Quantity.
Ackee, each	2, 035	Corn, on cob, pounds	17, 544
Bananas, bunches	23, 621	Citrus, each	190
Bananas, fig, pounds	229	Cucumbers, pounds	221
Beans, green pea, pounds	5, 850	Eggplant, pounds	42
Beans, string, pounds	48	Fiber, banana, pounds	200
Bread fruit, each	5, 995	Ginger, pounds	52
Cane, sugar, sticks	8, 953	Guava, dozen	12, 476
Charcoal, pounds	5, 419	Grapefruit, each	802
Chocolate, balls	16, 734	Limes, each	90, 131
Coconuts, dry, each	18, 072	Lemons, each	5, 925
Coconuts, water, each	6	Mangoes, each	2, 395
Cocoa beans, pounds	22, 088	Oranges, each	118, 594
Corn, green, ears	180, 115	Oranges, select, each	23, 105
Corn, shelled, pounds	60, 832	Oranges, Chinese, each	2, 100

Items.	Quantity.	Items.	Quantity.
Oranges, bitter sweet, each-----	2, 400	Roselle, pounds-----	22
Okra, pounds-----	338	Soursaps, pounds-----	1, 262
Plantain, each-----	61, 569	Squash, pounds-----	7, 675
Papaya, pounds-----	186, 188	Tania, pounds-----	17, 421
Pears, alligator, each-----	2, 371	Tangerines, each-----	755
Pepper, green, pounds-----	8	Tomatoes, first class, pounds-----	45, 422
Potatoes, sweet, pounds-----	182, 861	Tomatoes, second class, pounds-----	1, 764
Peas, cow, pounds-----	2, 532	Watermelons, pounds-----	1, 171
Pineapples, each-----	6, 751		

CHAGRES RIVER LAUNCH SERVICE.

On September 1, 1918, a tariff covering the carrying of passengers and freight on the Chagres River launches was put into effect. This work is being carried on in connection with the regular launch service now being operated for the benefit of the Chagres River plantations. The cost of operations minus the revenue derived will be prorated over the units making use of the launches. The following is a summary of the revenue derived to date:

September-----	\$60. 86	March-----	\$187. 75
October-----	101. 20	April-----	130. 85
November-----	102. 70	May-----	121. 95
December-----	92. 50	June-----	121. 90
January-----	94. 08		
February-----	138. 05	Total-----	1, 151. 84

POULTRY FARM.

The conditions existing in the Tropics are a great detriment to poultry raising. The fact that 95 per cent of all feed has to be imported also adds to the difficulty experienced. Our operations for the past year have not been very encouraging. To place the poultry farm on a paying basis a number of things are necessary. The quantity of imported feed will have to be reduced, as well as the labor; the mongrel stock dispensed with and only thoroughbreds handled. Close supervision will have to be given to all details.

During September a "Blue Hen" incubator was received and installed, increasing the incubator capacity to 10,800 eggs. This incubator has given excellent results.

Twenty Harrisburgh colony brooder stoves were received and installed as required. They have proven very satisfactory.

Our egg production for the year amounted to 35,662 $\frac{1}{3}$  dozen hen and 998 duck eggs, of which 33,179 $\frac{2}{3}$  dozen hen and 830 $\frac{1}{2}$  dozen duck eggs were shipped to the commissary, 2,451 $\frac{5}{12}$  dozen hen and 166 $\frac{2}{3}$  dozen duck eggs were placed in incubator, and 31 $\frac{3}{12}$  dozen hen and 1 dozen duck eggs were sold to individuals.

For other items produced and disposed of, see "Sales."

HOG FARM.

Marked improvement in breeding stock is seen at the hog farm. From native sows bred to thoroughbred boars 200 gilts were selected. These were bred to thoroughbred boars with excellent results. The first cross produced a pig much superior to the native, both in color and conformation. The second cross showed a still greater improve-

ment. From these our future breeding stock will be selected. Of the two thoroughbred gilts received one died. These gilts were bred in the States and the one remaining has farrowed with very satisfactory results. For stock produced and disposed of refer to items under "Sales."

## DAIRY FARM.

Of the Holstein stock 24 cows are now being milked. Seventeen calves are now on hand out of 21 born, 4 having died. Seven cows have aborted and 70 heifers are still to calve.

Our monthly production of milk reached its maximum in May, when 8,645½ gallons were produced. The total production for the year amounted to 59,178 gallons, of which 49,443½ gallons of milk and 1,298 gallons of cream were shipped to the commissary, 46¾ gallons sold to individuals, and 9,688 gallons were fed to calves.

Approximately 40 acres near the dairy were planted in cane for dry-season feed. We hope to raise most, if not all, of our dairy feed on the Zone in the near future. This will eliminate the purchase of high-priced feed in the United States and will greatly reduce the cost of production.

The refrigerating plant was put into operation in September and the use of ice for cooling milk was discontinued in that month.

In March a cream separator was installed and placed in operation and daily shipments of cream made to the commissary.

Respectfully submitted.

R. K. MORRIS,  
Chief Quartermaster.

Col. CHESTER HARDING, *United States Army,*  
*Governor, The Panama Canal, Balboa Heights, C. Z.*

TABLE NO. 1.—Occupants of Panama Canal and Panama Railroad quarters June 30, 1919.

Place.	Gold.			Europeans.			West Indians.		
	Men.	Women.	Children.	Men.	Women.	Children.	Men.	Women.	Children.
Balboa <sup>1</sup> .....	1,100	738	1,071	68	18	32	862	423	960
Ancon.....	742	683	513	.....	.....	.....	150	11	3
Corozal.....	17	15	9	.....	.....	.....	50	18	3
Pedro Miguel <sup>2</sup> .....	262	174	192	2	2	8	710	357	625
Paraiso.....	5	4	13	48	16	19	497	301	518
Culebra <sup>4</sup> .....	8	6	5	.....	.....	( <sup>5</sup> )	103	72	139
Gamboa <sup>6</sup> .....	21	10	3	10	.....	( <sup>7</sup> )	207	60	95
Gatun.....	190	162	205	4	2	11	772	415	602
Cristobal <sup>8</sup> .....	899	482	531	81	.....	( <sup>9</sup> )	2,064	358	787
Total.....	3,244	2,274	2,542	213	38	70	5,415	2,015	3,732

<sup>1</sup> Includes Palo Seco and quarantine station.

<sup>2</sup> Includes Miraflores and Red Tank.

<sup>3</sup> Includes 43 Panamanians.

<sup>4</sup> Includes Empire and Las Cascadas.

<sup>5</sup> Includes 40 Panamanians.

<sup>6</sup> Includes Summit and Gold Hill.

<sup>7</sup> Includes 46 Panamanians.

<sup>8</sup> Includes Colon Beach and Colon Hospital.

<sup>9</sup> Includes 660 Panamanians, 14 colored Americans, 81 Europeans, and 3 East Indians.



TABLE No. 2.—Applications for married quarters on file June 30, 1919.

Stations.	Number.
D. Q. M. Balboa Heights.....	238 (34)
D. Q. M. Pedro Miguel.....	31 (6)
D. Q. M. Gatun.....	8 (0)
D. Q. M. Cristobal.....	116 (47)
Total.....	393 (87)

NOTE.—The figures in parentheses show the number of applicants already occupying regular or non-housekeeping quarters at stations other than at which applications are filed.

TABLE No. 3.—Sales.

	General storehouse.	Cristobal storehouse.	Paraiso storehouse.	Total.
Number of local sales.....	9,108	5,744	1,859	16,711
Number of sales to steamships.....	1,072	1,084	.....	2,156
Number of credit sales.....	50,322	17,313	104	67,739
Total.....	60,502	24,141	1,963	86,606
Value of local sales <sup>1</sup> .....	\$123,883.17	\$114,825.34	\$3,430.21	\$242,138.72
Value of sales to steamships <sup>2</sup> .....	873,708.50	303,807.83	.....	1,177,516.33
Value of credit sales <sup>3</sup> .....	968,293.61	976,560.69	6,944.03	1,951,798.33
	1,965,885.28	1,395,193.86	10,374.24	3,371,453.38

<sup>1</sup> Includes fuel oil sold locally.

<sup>2</sup> Includes fuel oil sold to steamships.

<sup>3</sup> Includes material issued on foreman's orders to Army, Navy, etc., and for work on individuals' and companies' jobs: General storehouse, \$513,878.55; Cristobal storehouse, \$124,214.19; total, \$638,092.74.

TABLE No. 4.—Value of material received during the fiscal year 1918-19 on requisition.

	1918							1919					Total.	
	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	February.	March.	April.	May.	June.		
Construction, operation, and maintenance:														
Supply department														
Printing plant (stock).....	\$314,085.48	\$536,173.02	\$176,656.65	\$347,687.06	\$418,182.55	\$361,618.87	\$306,918.22	\$767,855.54	\$563,866.20	\$649,341.69	\$518,775.24	\$432,073.67	\$5,398,234.19	
Lock operation.....	11,346.66	8,015.50	9,026.41	6,669.26	9,402.38	9,713.56	14,202.54	24,179.68	4,955.58	10,107.59	6,526.55	6,463.40	120,009.11	
Dredging division.....	215.00	330.30	31.55	19.00	3,748.47	270.36	346.75	6,275.04	978.96	1,131.62	5,313.69	2,384.00	15,544.74	
Electrical division.....	4,523.50	12,336.06	109.36	2,509.60	9,558.08	3,237.76	26.80	6,227.56	656.83	931.04	9,082.40	2,199.00	51,398.99	
Municipal engineering division.....	80,356.87	66,927.89	33,513.33	49,030.77	102,242.64	37,777.13	46,671.67	54,544.98	29,176.14	48,207.24	44,033.81	165,435.56	757,918.03	
Mechanical division.....	4,819.55	5,526.29	776.36	6,280.80	1,785.81	86.50	20,453.73	1,255.52	2,420.32	4,363.37	2,530.54	14,965.54	65,264.33	
Accounting department.....	3,999.88	11,908.30	10,846.27	20,370.52	3,532.98	1,289.90	9,864.94	16,511.30	7,023.10	7,462.30	2,828.65	3,647.76	99,285.47	
Supply department—chief quartermaster and substitute.....	2,926.14	3,674.55	4,842.48	1,861.21	948.14	394.48	8.50	431.00	743.00	1,062.40	74.90	2,896.63	19,882.03	
Building division.....	5,848.45	2,289.75	172.20	1,527.50	1,684.95	1,989.00	670.72	21,518.67	11,086.39	9,998.69	3,066.42	4,188.24	64,020.98	
Engineer of docks.....	56,628.20	32,652.48	60,181.48	24,708.96	263,015.61	18,616.28	65,448.06	89,703.64	44,667.43	33,615.16	7,234.70	20,525.63	716,997.63	
Fortifications.....	6,354.00	85.00	168.00	.....	.....	33,030.00	.....	3,476.94	56.00	43.80	943.50	40,080.00	84,837.24	
Marine division.....	1,168.83	3,488.41	410.05	2,429.00	1,728.10	787.54	403.84	4,126.24	16.25	.....	.....	44.10	14,617.11	
Operation and maintenance, general.....	.....	112.61	1,132.19	13.50	1,305.56	186.00	341.66	5,181.91	21.00	1,695.75	12,141.58	12,689.11	34,820.87	
Total.....	4,062.88	1,016.77	678.10	2,433.64	2,161.70	424.27	1,363.07	3,468.96	515.15	13,513.60	3,323.90	5,330.42	38,292.46	
Health department.....	496,335.42	684,516.93	298,544.43	465,540.82	1,666,428.78	469,421.74	466,720.50	999,256.98	686,182.35	781,444.25	615,919.98	713,492.71	7,476,673.18	
Civil affairs.....	29,951.51	12,163.54	6,878.98	5,061.84	10,025.06	32,193.54	19,809.28	13,423.19	4,511.48	9,756.16	7,094.61	12,632.69	162,901.88	
Posts and schools.....	80.05	1,333.29	158.82	557.05	268.45	2,208.10	626.00	31.90	119.05	225.50	238.14	3.19	5,849.63	
Panama Railroad Company.....	79.44	4,583.07	4,374.92	1,946.69	1,980.45	5,572.99	626.68	636.55	495.02	373.73	110.34	248.29	20,628.15	
Panama Railroad (commissary).....	2,153.42	6,698.25	2,892.02	21,931.49	689.55	20,534.12	9,237.84	12,611.63	2,691.71	2,291.41	1,614.44	28,192.99	111,538.87	
Grand total.....	85.75	1,862.92	5,608.21	4,285.50	1,117.55	5,525.50	1,730.01	9,103.01	2,147.45	4,149.00	3,846.50	15,782.50	55,253.90	
Local purchases on the Isthmus:	528,685.59	711,158.00	318,457.38	499,333.39	832,978.11	535,455.99	498,759.31	1,035,063.35	676,147.06	798,238.05	628,824.01	769,754.37	7,832,845.61	
Coal purchased from Panama Railroad Com-pany.....	27,856.31	29,514.75	22,110.11	33,179.24	23,112.10	31,027.06	33,784.14	28,010.39	29,227.03	22,641.36	24,145.74	19,213.51	323,821.74	

Miscellaneous purchases from Panama Railroad Company.....	9,708.82	10,412.11	8,584.52	13,970.34	10,111.14	10,121.35	10,958.52	4,819.18	7,265.57	9,506.96	12,608.97	9,494.79	117,562.29
Subsistence supplies purchased from Panama Railroad commissaries—	41,595.33	43,648.23	43,080.29	48,976.91	45,958.81	48,542.53	50,289.43	43,965.54	46,797.47	48,830.78	52,397.35	47,813.74	564,905.41
Hotels.....	6,452.83	5,445.05	5,355.72	5,351.55	6,949.15	5,769.85	6,835.31	6,677.42	8,664.68	7,759.22	5,668.52	5,621.75	76,561.05
Tivoli.....	5,976.82	6,194.60	5,102.91	6,845.44	6,079.16	6,181.97	7,500.36	7,457.15	7,224.45	8,098.26	7,688.90	6,387.76	80,737.78
Dredging division.....	16,299.49	14,344.27	12,386.01	13,713.47	14,125.69	15,130.33	16,398.19	14,328.02	14,787.99	15,212.95	15,141.89	14,437.70	176,306.00
Health Department.....													
Miscellaneous purchases from local merchants.....	2,816.04	3,764.01	4,717.74	8,661.19	3,685.44	3,644.59	9,539.37	7,614.35	6,004.00	1,929.71	10,677.74	1,752.45	64,806.63
Ice.....	3,811.23	3,757.76	3,536.50	3,841.30	3,714.57	3,843.57	4,002.50	3,718.47	5,054.38	3,901.35	4,194.93	4,075.91	47,452.47
<b>Total local purchases on Isthmus.</b>	<b>117,546.87</b>	<b>117,080.78</b>	<b>104,862.80</b>	<b>134,539.44</b>	<b>113,736.06</b>	<b>124,261.25</b>	<b>139,307.82</b>	<b>116,590.52</b>	<b>125,025.57</b>	<b>117,880.59</b>	<b>132,524.04</b>	<b>108,797.61</b>	<b>1,452,153.35</b>

TABLE NO. 5.—Sales of material, supplies, and equipment heretofore purchased or acquired for the construction of The Panama Canal made by authority of the Governor without advertisement, and on which time did not permit securing approval of the Secretary of War required by Executive order of May 12, 1915, fiscal year 1919.

Sale number.	Name of purchaser.	Article sold.	Sale value.
<b>Bills:</b>			
C. S. 529	A. Levingston	4,199 pounds tubing, copper	\$839. 80
C. S. 565	do.	1,088 tubes, condenser, $\frac{1}{4}$ -inch	837. 76
C. S. 591	do.	Engine, Eagle, G-24	200. 00
C. S. 701	do.	1 condenser	} 250. 00
		1 winch	
C. S. 702	do.	1 tank, heater	} 273. 75
C. S. 713	do.	21,900 pounds scrap steam shovel parts	
C. S. 718	do.	41,220 pounds scrap steam shovel parts	515. 25
C. S. 778	do.	Engine, upright, 40 horsepower, DD-95	100. 00
Do	do.	Engine, upright, 40 horsepower, DD-96	100. 00
C. S. 805	do.	Engine, Amos, horizontal, 125 horsepower	300. 00
C. S. 820	do.	3,013.099 gross tons French scrap	17,024. 01
C. S. 852	do.	52,124 pounds scrap steam shovel parts	651. 55
C. S. 858	Thompson & Daley	Boiler, horizontal, 100 horsepower, ICC-150	300. 00
C. S. 889	do.	Pump, Canton-Hughes, compressor, 18 by 28 by 13 $\frac{1}{2}$ by 18 inches, No. 10821	1,500. 00
C. S. 913	do.	Crane, Bay City, No. 1	2,500. 00
C. S. 938	A. Levingston	Boiler, horizontal, 250 horsepower, No. 12, Robb-Mumford	250. 00
C. S. 941	do.	Boiler, horizontal, 250 horsepower, No. 15, Robb-Mumford	250. 00
C. S. 1015	do.	959.357 gross tons French scrap	5,420. 37
C. S. 1093	Thompson & Daley	42,000 pounds scrap iron rods	525. 00
C. S. 1180	do.	41,900 pounds scrap iron	523. 75
C. S. 1327	R. E. Hopkins	26,000 pounds scrap reinforcing iron	549. 00
C. S. 1642	S. S. Mantaro, Peruvian S. S. Co.	46,000 pounds scrap rail	462. 00
C. S. 1852	C. A. Nelson	Mixer, concrete, w/engine, Chicago Cube	250. 00
C. S. 1893	do.	23,150 pounds miscellaneous scrap iron	231. 50
C. S. 1927	F. Y. Thompson	37,800 pounds miscellaneous scrap iron	378. 00
C. S. 1950	do.	56,000 pounds scrap iron	560. 00
C. S. 2000	C. A. Nelson	25,000 pounds bits, mooring, old	625. 00
B. S. 4354	W. J. Spalding	1 pump, centrifugal, 10-inch, steam driven	30. 00
Do	do.	1 engine, upright, steam	35. 00
Do	do.	1 engine, steam, horizontal, Simplex	35. 00
Do	do.	1 engine, hoisting, single cylinder	25. 00
Do	do.	1 engine, hoisting, double cylinder	65. 00
Do	do.	1 boiler, upright, water tube	25. 00
Do	do.	1 pump, centrifugal, 6-inch, steam driven	15. 00
Do	do.	1 pump, steam, Blake Simplex	40. 00
Do	do.	1 engine, Duplex, 5 $\frac{1}{2}$ by 4 $\frac{1}{2}$ by 5 inches	45. 00
Do	do.	9 cars, Decauville, comp.	450. 00
B. S. 4393	do.	6 cars, Decauville, trucks	150. 00
B. S. 4582	Panama Electric Co.	1 switchboard, telephone	300. 00
B. S. 4715	H. J. Stone	7,000 pounds tubes, boiler scrap	70. 00
B. S. 5478	H. R. Tucker	500 feet hose, fire, 2 $\frac{1}{2}$ -inch	100. 00

TABLE NO. 6.—Houses, apartments, and occupants, by districts, of gold and silver quarters, as of June 30, 1919.

Districts.	Gold.		Silver.		Total.	
	Family.	Bachelor.	Family.	Bachelor.	Family.	Bachelor.
<b>Ancon-Balboa:</b>						
Houses occupied	462	53	57	34	519	87
Rooms or apartments	1,051	806	426	133	1,477	939
Number of occupants	3,690	975	1,841	572	5,531	1,547
<b>Corozal:</b>						
Houses occupied	9	3	1	3	10	6
Rooms or apartments	11	3	2	17	13	20
Number of occupants	12	8	6	58	18	66
<b>Paraiso-Pedro Miguel:</b>						
Houses occupied	83	9	110	14	193	23
Rooms or apartments	178	89	653	121	831	204
Number of occupants	546	104	2,515	588	3,061	692
<b>Gamboa:</b>						
Houses occupied	4	1	8	2	12	3
Rooms or apartments	7	6	55	26	62	32
Number of occupants	21	6	130	56	151	62

TABLE NO. 6.—Houses, apartments, and occupants, by districts, of gold and silver quarters, as of June 30, 1919—Continued.

Districts.	Gold.		Silver.		Total.	
	Family.	Bachelor.	Family.	Bachelor.	Family.	Bachelor.
<b>Cristobal:</b>						
Houses occupied.....	160	26	61	30	221	56
Rooms or apartments.....	434	412	409	69	843	481
Number of occupants.....	1,385	527	1,493	1,797	2,878	2,324
<b>Gatun:</b>						
Houses occupied.....	57	6	54	11	111	12
Rooms or apartments.....	172	34	470	139	642	173
Number of occupants.....	516	41	1,432	192	1,948	533
<b>Total:</b>						
Houses occupied.....	775	98	291	94	1,066	187
Rooms or apartments.....	1,853	1,350	2,015	505	3,868	1,849
Number of occupants.....	6,170	1,661	7,217	3,263	13,587	5,224

NOTE.—The above does not include 15 and 79 apartments at Culebra, Empire and Summit, accommodating 10 gold families and 75 silver families, respectively.

TABLE NO. 7.—Operation of Hotel Tivoli, July 1, 1918, to June 30, 1919.

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Total cost of operation.	Revenue.	Surplus.	Deficit.
<b>1918.</b>							
July.....	\$6,023.72	\$2,900.83	\$3,402.59	\$12,327.14	\$12,391.90	\$64.76	.....
August.....	5,235.04	2,900.08	4,270.15	12,405.87	9,087.75	.....	\$3,318.12
September.....	5,388.09	3,495.49	2,334.00	11,217.58	11,405.30	187.72	.....
October.....	4,905.06	3,008.88	2,987.66	10,901.60	8,895.05	.....	2,006.55
November.....	5,969.66	3,061.40	3,682.07	12,713.13	14,779.60	2,066.47	.....
December.....	6,006.76	3,067.40	4,231.28	13,305.44	13,355.55	50.11	.....
<b>1919.</b>							
January.....	5,988.10	3,043.15	4,696.84	13,728.09	12,363.50	.....	1,364.59
February.....	6,351.52	3,309.16	3,780.31	13,440.99	15,196.77	1,755.78	.....
March.....	8,565.15	3,426.17	5,315.01	17,306.33	20,748.15	3,441.82	.....
April.....	6,502.47	3,571.73	3,738.70	13,812.90	14,960.10	1,147.20	.....
May.....	6,190.38	3,163.26	3,878.22	13,231.86	15,430.25	2,198.39	.....
June.....	5,852.68	3,097.49	5,835.54	14,785.71	12,693.70	.....	2,092.01
<b>Total.....</b>	<b>72,979.23</b>	<b>38,045.04</b>	<b>48,152.37</b>	<b>159,176.64</b>	<b>161,307.62</b>	<b>10,912.25</b>	<b>8,781.27</b>

Net surplus, \$2,130.98.

TABLE NO. 7A.—Summary of operations. Hotel Aspincall, July 1, 1918, to June 30, 1919.

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Direct cost of operation.	Revenue.	Surplus.	Deficit.
<b>1918.</b>							
July.....	\$2,412.18	\$925.32	\$1,424.08	\$4,761.58	\$5,356.79	\$595.21	.....
August.....	3,102.32	1,038.30	2,533.47	6,694.09	5,567.61	.....	\$1,126.48
September.....	2,075.28	1,002.54	586.40	3,664.22	5,103.28	1,439.06	.....
October.....	1,212.60	972.65	1,327.13	3,512.38	2,267.76	.....	1,244.62
November.....	1,233.65	948.04	1,063.63	3,245.32	2,555.25	.....	690.07
December.....	1,203.41	1,020.95	1,390.46	3,614.82	2,547.34	.....	1,067.48
<b>1919.</b>							
January.....	1,934.15	1,097.17	540.70	3,572.02	3,325.88	.....	246.14
February.....	1,723.06	1,218.13	1,402.91	4,344.10	4,059.62	.....	284.48
March.....	1,657.42	1,179.96	1,335.28	4,172.66	3,885.64	.....	287.02
April.....	1,858.58	1,217.96	1,079.23	4,155.77	4,513.03	357.26	.....
May.....	1,222.94	1,051.27	1,480.72	3,754.93	2,836.49	.....	918.44
June.....	1,352.44	1,071.60	996.76	3,420.89	2,612.39	.....	808.41
<b>Total.....</b>	<b>20,988.03</b>	<b>12,743.89</b>	<b>15,180.77</b>	<b>48,912.69</b>	<b>44,631.08</b>	<b>2,391.53</b>	<b>6,673.14</b>

Net deficit, \$4,281.61.

TABLE NO. 8.—*Summary of operations of restaurants, July 1, 1918, to June 30, 1919.*

Month	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Total cost of operation.	Revenue.	Surplus.	Deficit
1918.							
July.....	\$32,904.70	\$7,552.05	\$3,285.84	\$43,742.59	\$44,705.01	\$962.42	.....
August.....	32,766.65	7,394.72	3,999.09	44,160.46	43,426.10	.....	\$734.36
September.....	34,717.90	7,585.97	3,490.29	45,794.16	47,703.72	1,909.56	.....
October.....	39,093.90	8,825.11	3,398.42	51,317.43	50,616.81	.....	700.62
November.....	39,408.69	9,193.58	3,554.31	52,156.58	51,276.59	.....	879.99
December.....	39,691.44	9,201.52	5,251.50	54,144.46	52,901.33	.....	1,243.13
1919.							
January.....	42,942.78	9,374.57	4,623.66	56,941.01	56,187.21	.....	753.80
February.....	37,822.94	9,736.75	4,449.29	52,008.98	50,105.79	.....	1,903.19
March.....	40,130.17	9,749.49	4,592.92	54,472.58	55,023.81	551.23	.....
April.....	38,543.71	9,674.46	4,414.52	52,632.69	50,840.42	.....	1,792.27
May.....	39,304.06	9,548.41	4,026.67	52,929.14	53,287.24	358.10	.....
June.....	37,764.17	9,571.30	4,477.18	51,812.65	50,042.27	.....	1,770.38
Total.....	455,141.11	107,407.93	49,563.69	612,112.73	606,116.30	3,781.31	9,777.74

Deficit.....	\$3,996.43
Indirect expense (not charged).....	31,071.63
Total.....	37,068.06
Net surplus on messes—see table No. 9.....	2,041.58

Net deficit on restaurants and laborers' messes if indirect charges for building, repairs, fuel, and light, etc., had been made..... 35,026.48

Above statement includes services for departments and divisions of The Panama Canal.

TABLE NO. 9.—*Summary of operations, laborers' messes, July 1, 1918, to June 30, 1919.*

Month.	Supplies consumed.	Salaries and wages.	Miscellaneous expenses.	Direct cost of operation.	Revenue.	Surplus.	Deficit.
1918.							
July.....	\$6,951.62	\$1,137.52	\$1,195.21	\$9,284.35	\$9,491.12	\$206.77	.....
August.....	7,329.65	1,157.05	1,252.50	9,739.20	9,500.92	.....	\$238.28
September.....	8,042.91	1,088.49	1,077.40	10,208.80	10,042.24	.....	166.56
October.....	9,933.56	1,323.74	1,304.01	12,561.31	12,696.87	135.56	.....
November.....	8,164.84	1,351.23	908.73	10,424.80	10,441.82	17.02	.....
December.....	8,394.79	1,338.28	1,506.73	11,239.80	11,001.20	.....	238.60
1919.							
January.....	8,522.26	1,313.33	2,091.35	11,926.94	10,936.39	.....	990.55
February.....	6,963.39	1,169.32	1,733.61	9,866.32	9,289.12	.....	577.20
March.....	8,264.00	1,275.43	1,230.48	10,769.91	10,933.74	163.83	.....
April.....	7,709.89	1,351.72	1,168.62	10,230.23	10,492.71	262.48	.....
May.....	14,130.71	1,529.86	1,664.38	17,324.95	20,057.01	2,732.06	.....
June.....	10,738.44	1,410.84	1,308.98	13,458.26	14,193.31	735.05	.....
Total.....	105,146.06	15,446.81	16,442.00	137,034.87	139,076.45	4,252.77	2,211.19

Net surplus, \$2,041.58.

TABLE NO. 10.—*Obsolete and surplus material (appraised value).*

On hand July 1, 1918.....	\$359,903.58
Received during fiscal year 1919.....	567,856.92
	927,760.50
Account sales over appraised values, sales and issues	
R. F. S., cars, etc.....	276,558.40
	\$1,204,318.90
Shipped to the United States.....	127,609.75
Sales.....	678,349.72
Transfers and issues.....	184,059.49
Surveyed and scrapped.....	52,827.25
	1,042,846.21
Balance to account for June 30, 1919.....	161,472.69

TABLE No. 11.—American scrap operations.

American and shop scrap.	\$5 net ton.		\$7 net ton.		\$8 net ton.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
On hand July 1, 1918.....					16,710.132	\$133,681.06
Received.....	1,129.185	\$5,645.93	20.9	146.30	8,056.000	64,448.00
Total to account for.....	1,129.185	5,645.93	20.9	146.30	24,766.132	198,129.06
Issued.....					8,280.1	66,240.80
Balance.....	1,129.185	5,645.93	20.9	146.30	16,486.032	131,888.26
Account price changes \$8 to \$5 and \$10 to \$7.....	16,486.032	82,430.16	2,514.1	17,598.70	16,486.032	131,888.26
Issued.....	17,615.217	88,076.09	2,535.0	17,745.00		
	197.249	986.25	554.6	3,882.20		
Balance on hand June 30, 1919.....	17,417.968	87,089.84	1,980.4	13,862.80		

American and shop scrap.	\$10 net ton.		Total tons.	Total value.
	Tons.	Value.		
On hand July 1, 1918.....				
Received.....	514.1	\$5,141.00	17,224.232	\$138,822.06
	2,000.0	20,000.00	11,206.085	90,240.23
Total to account for.....	2,514.1	25,141.00	28,430.317	229,062.29
Issued.....			8,280.1	66,240.80
Balance.....	2,514.1	25,141.00	20,150.217	162,821.49
Account price changes \$8 to \$5 and \$10 to \$7.....	2,514.1	25,141.00		
Issued.....			20,150.217	105,821.09
			751.849	4,868.45
Balance on hand June 30, 1919.....			19,398.368	100,952.64

TABLE No. 12.—Fuel oil handled.

	Balboa.	Mount Hope.	Total.
Number of barrels received by The Panama Canal.....	591,001	112,849	703,850
Number of barrels used by The Panama Canal.....	243,053	64,618	307,671
Number of barrels pumped for individuals and companies.....	678,558	407,453	1,086,011
Number of barrels sold by The Panama Canal.....	344,330	80,957	425,287
Number of barrels representing miscellaneous transfers on tank farm.....	26,916	100,133	127,049
Total.....	1,883,858	766,010	2,649,868
Number of ships handled.....	248	148	396

TABLE No. 13.—Comparative statement of output of manufacturing plants, commissary division, supply department, fiscal years 1915 to 1919.

	1915	1916	1917	1918	1919
Laundry (Cristobal):					
Total number pieces handled.....	4,327,859	3,970,674	3,649,814	3,341,613	3,360,443
Value of output.....	\$101,949.75	\$94,719.68	\$91,722.87	\$87,271.73	\$101,746.03
Laundry (Ancon):					
Total number pieces handled.....	3,889,855	4,509,308	4,094,273	5,642,383	4,988,676
Value of output.....	\$78,148.92	\$98,242.83	\$93,262.51	\$132,047.11	\$132,033.90
Bakery:					
Total output—Bread, loaves.....	5,784,546	6,385,981	7,211,417	7,504,920	5,438,121
Total output—Rolls, each.....	1,026,816	1,093,792	1,129,400	637,653	234,624
Total output—Cakes, pounds.....	133,082	140,477	132,493	81,386	131,708
Total output—Doughnuts, packages.....		50,982	54,840	38,075	14,654
Total output—Pies, each.....		19,019	28,559	48,357	
Total output—Soda crackers, pounds.....					
Value of output.....	\$255,878.44	\$297,439.63	\$365,962.92	\$539,239.48	\$454,020.16

TABLE No. 13.—Comparative statement of output of manufacturing plants, commissary division, supply department, fiscal years 1915 to 1919—Continued.

	1915	1916	1917	1918	1919
Coffee roasting:					
Roasted coffee produced, pounds.	300,391	381,630	427,921	382,233	336,354
Value of output.....	\$66,100.94	\$83,535.69	\$94,023.30	\$106,584.48	\$96,242.64
Ice manufacturing:					
Ice manufactured, tons.....	37,479	39,461	45,044	48,672	52,513
Value of output.....	\$191,041.22	\$230,834.69	\$263,507.40	\$282,297.60	\$287,537.47
Ice cream plant:					
Ice cream manufactured, gallons.	160,505	167,528	163,326	216,262	252,344
Milk bottled, quarts <sup>1</sup> .....			386,164	452,697	399,997
Cream bottled, quarts.....			11,697	7,809	7,710
Value of output.....	\$159,376.36	\$251,880.93	\$226,024.22	\$339,926.34	\$423,623.67
Sausage factory and pickling dept.:					
Corned beef produced, pounds...	173,112	196,169	188,271	238,142	192,998
Hamburger steak produced, pounds.....	46,498	125,712	135,677	208,859	186,005
Homemade sausage produced, pounds.....	1,154	8,553	37,718	47,451	67,241
Corned pork produced, pounds.....		2,932	12,027	56,687	80,134
Tongue produced, pounds.....		5,450	12,913	9,730	34,320
Bacon smoked, pounds.....				60,144	60,669
Ham smoked, pounds.....				65,208	61,137
Miscellaneous sausage produced, pounds.....			10,856	240,521	288,846
Shoulders smoked, pounds.....					12,409
Beef smoked, pounds.....					7,979
Ham boiled, pounds.....					1,822
Shoulders boiled, pounds.....					2,136
Value of output.....	\$38,307.68	\$54,969.67	\$55,525.14	\$101,516.07	\$275,121.87
Industrial laboratory:					
Value of output.....	\$72,016.63	\$116,176.40	\$179,363.56	\$275,682.50	\$323,268.63
Abattoir:					
Cattle killed, head.....		7,762	13,180	21,731	31,209
Hogs killed, each.....			681	11,483	13,553
Chickens, turkeys, ducks, etc., killed, each.....				41,435	40,031
Weight of dressed beef produced, pounds.....		3,843,377	7,118,803	10,788,446	15,974,950
Weight of dressed hogs produced, pounds.....			66,999	991,903	1,327,268
Value of output.....		\$446,882.69	\$927,551.06	\$2,025,280.75	\$3,071,878.15
All manufacturing plants:					
Total value of output.....	\$962,519.94	\$1,674,682.11	\$2,296,942.98	\$3,889,846.06	\$5,165,472.52

<sup>1</sup> Of the quantity shown, 197,170 quarts were Minda dairy farm milk.

TABLE No. 14.—Quantities of certain staple articles purchased during the fiscal year ended June 30, 1919, as compared with the previous year.

	Quantity.	1918	1919
Groceries and meats:			
Beef, native.....	Pounds.....	20,171,423	29,361,885
Butter.....	do.....	458,976	481,126
Coffee.....	do.....	536,703	177,217
Corn.....	do.....	1,881,506	440,770
Cured and pickled meats.....	do.....	200,508	145,410
Eggs.....	Dozen.....	725,522	971,243
Fish, canned.....	Pounds.....	71,666	114,638
Flour.....	do.....	7,673,504	7,614,491
Fresh meats.....	do.....	457,385	159,678
Hogs.....	do.....	2,091,231	1,853,493
Milk, evaporated and condensed.....	do.....	3,675,566	2,008,280
Milk, fresh.....	Gallons.....	138,745	138,675
Rice.....	Pounds.....	3,740,219	1,666,753
Sugar.....	do.....	2,741,921	4,147,754
Tomatoes in tins.....	do.....	691,290	469,000
Fresh vegetables:			
Cabbage.....	do.....	1,149,456	977,570
Onions.....	do.....	959,684	884,858
Potatoes.....	do.....	6,528,482	6,713,534
Yams.....	do.....	888,724	685,145
Fresh fruits:			
Apples.....	do.....	813,183	706,989
Grapefruit.....	Each.....	241,853	200,814
Oranges.....	Dozen.....	225,931	215,014



TABLE No. 15.—Comparative selling prices for June 30, 1919, as against June 30, 1918.

	Unit.	Prices.	
		1918	1919
<b>Fresh meats:</b>			
Beef, stew (native).....	Pound.....	\$0.08	\$0.08
Beef, chuck roast, 3 pounds and over (native).....	do.....	.12	.12
Beef, rib roast, not under 3 pounds (native).....	do.....	.17	.17
Beef, rump roast (special).....	do.....	.53	.....
Beef, rump roast (native).....	do.....	.18	.18
Beefsteak, sirloin (special).....	do.....	.53	.....
Beefsteak, sirloin (native).....	do.....	.18	.18
Mutton, loin chops.....	do.....	.57	.47
Pork, hams, fresh.....	do.....	.32	.32
Pork, loin chops.....	do.....	.46	.45
Veal, loin chops.....	do.....	.47	.49
<b>Cured and pickled meats:</b>			
Bacon, breakfast, States, whole piece.....	do.....	.46	.55
Ham, sugar cured, States, whole piece.....	do.....	.45	.50
Bacon, breakfast, native, whole piece.....	do.....	.....	.38
Ham, sugar cured, native, whole piece.....	do.....	.....	.35
<b>Poultry and game:</b>			
Chickens, corn-fed.....	do.....	.50	.53
<b>Dairy products:</b>			
Butter, creamery, (special).....	do.....	.52	.64
Eggs, fresh.....	Dozen.....	.53	.56
<b>Fish:</b>			
Codfish, dried.....	Pound.....	.18	.20
Fish, fresh (native).....	do.....	.12	.13
<b>Vegetables:</b>			
Onions.....	do.....	.04	.10
Potatoes, white.....	do.....	.03	.03½
<b>Fruits, fresh:</b>			
Apples.....	do.....	.10	.12
<b>Groceries:</b>			
Beans, navy, dried.....	do.....	.10	.08
Coffee, ground, No. 1.....	do.....	.20	.24
Corn, sugar.....	Tins, 2's.....	.16	.16
Flour.....	Pound.....	.075	.07
Lard, compound.....	do.....	.24	.33
Milk, evaporated.....	Tins, 1's.....	.14	.14
Peas, extra sifted.....	Tins, 2's.....	.18	.19
Rice.....	Pound.....	.08	.09
Soap, laundry.....	Cake.....	.08	.09
Sugar, granulated.....	Sacks, 5's.....	.42	.50
Tomatoes.....	Tins, 3's.....	.19	.18

TABLE No. 16.—Articles purchased by the products buyer in Costa Rica during period from July 1, 1918, to June 30, 1919.

Article.	Unit.	Quantity.	Amount.
Bananas.....	Bunch.....	1,756	\$439.00
Beans, string.....	Pound.....	1,805	30.65
Beets.....	do.....	28,143	446.65
Cabbage.....	do.....	297,832	3,753.39
Carrots.....	do.....	241,290	3,001.15
Grapefruit, small.....	Each.....	74,283	368.89
Grapefruit, select.....	do.....	93,239	2,768.50
Honey.....	Pound.....	13,958	330.73
Limes.....	Each.....	8,596	31.70
Oranges, select.....	do.....	449,924	8,229.09
Oranges, tropical.....	do.....	991,305	3,956.81
Peas, green.....	Pound.....	10,074	330.85
Pineapples.....	Each.....	7,794	254.72
Potatoes, sweet.....	Pound.....	140,062	1,725.83
Potatoes, white.....	do.....	4,160,087	56,042.71
Preserves, strawberry.....	Jar.....	411	359.30
Squash.....	Pound.....	13,525	116.70
Sugar.....	do.....	177,754	9,702.21
Tomatoes.....	do.....	79,637	2,817.12
Turnips.....	do.....	160,571	2,052.50
Total value.....			96,758.50

TABLE No. 17.—*List of the more important articles purchased in Haiti during period from July 1, 1918, to June 30, 1919.*

Potatoes, sweet, pounds-----	31,647
Meal, cottonseed, pounds-----	186,796

In addition to the articles enumerated, small quantities of grapefruit, alligator pears, and honey were purchased.

Total value of all purchases made in Haiti was \$3,369.51.

*List of the important articles (1) purchased locally, (2) from plantations of the cattle industry, (3) from Corozal Farm and Army truck gardens, from local producers and importing agencies, and by the local commissary buyer, Panama.*

Bananas, bunches-----	28,044	Onions, green, bunches-----	203,197
Bananas, dozens-----	16,868	Oranges, each-----	1,617,850
Beans, pounds-----	70,570	Papaya, pounds-----	235,935
Butter, pounds-----	34,519	Parsley, bunches-----	103,691
Celery, bunches-----	41,703	Pears, alligator, each-----	72,316
Coconuts, dry-----	184,630	Pineapples, each-----	58,198
Corn, green, ears-----	180,115	Plantains, each-----	320,779
Cream, gallons-----	487,276	Potatoes, sweet, pounds-----	215,397
Cucumbers, pounds-----	117,275	Radishes, bunches-----	93,895
Eggs, fresh, dozens-----	30,161	Rice, pounds-----	906,415
Fish, pounds-----	448,299	Spinach, bunches-----	76,908
Flour, pounds-----	532,591	Spinach, pounds-----	42,858
Hogs, pounds-----	853,493	Soap, bars-----	51,890
Lettuce, pounds-----	62,666	Squash, pounds-----	112,578
Limes, each-----	562,364	Sugar, pounds-----	1,740,022
Macaroni, pounds-----	35,850	Tomatoes, pounds-----	54,494
Mangoes-----	267,211	Yams, pounds-----	898,329
Milk, gallons-----	50,906		

(1) In addition to the products listed, various purchases were made of fruits and vegetables in season and of different commodities, including chayotes, guavas, dasheen, eggplant, endive, mint, okra, peppers, and cowpeas.

(2) Total value of all local purchases was \$841,786.74.

(3) Detail of all supplies received from Panama Canal pastures, plantations, hog and poultry farms, etc., will be included in the report of the cattle industry.

## APPENDIX F.

### REPORT OF THE AUDITOR IN CHARGE OF THE ACCOUNTING DEPARTMENT.

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BALBOA HEIGHTS, CANAL ZONE, *September 5, 1919.*

SIR: I have the honor to submit the following report of transactions of the accounting department for the fiscal year ended June 30, 1919:

#### ORGANIZATION.

The organization of the accounting department has undergone no changes of importance except changes in personnel. Mr. T. L. Clear, collector, resigned in September, 1918, to enter the service of the Army overseas in the Inspector General's Department. He was succeeded by Mr. Elwood P. Sine. A number of other employees of the department resigned to enter the Army or Navy, or to engage in other services connected with war activities. These changes have made it quite difficult at times to maintain an adequate personnel of competent employees familiar with the work assigned to them. Mr. Elwyn Greene has continued as assistant auditor on the Isthmus, Mr. J. H. McLean as paymaster, and Judge B. F. Harrah as assistant auditor in charge of the accounting department office in Washington, D. C., with Mr. H. P. Merrill, as disbursing clerk.

#### PAYMASTER.

Disbursements to the amount of \$32,488,481.97 were made during the year by the paymaster. Of this amount the sum of \$13,383,128.18 was on account of the Panama Railroad Company. Employees on the gold roll of The Panama Canal were paid \$6,911,566.56, and those on the silver roll \$5,557,963.88, while the sum of \$6,635,823.35 was paid on miscellaneous vouchers. (See Table No. 33.) Collections on the pay rolls amounted to \$4,708,625.02. Of this amount the sum of \$3,391,685.29 was collected for coupon books, the remainder being for miscellaneous items. Of the total collections on pay rolls the sum of \$4,474,814.79 was disbursed directly by the paymaster, the balance, \$233,810.23, being transferred to the collector's accounts. The American Foreign Banking Corporation was continued as a Government depository. Small deposits of both Government and Panama Railroad funds are carried in this bank. During the year the sum of \$8,424,150.77, Panama Railroad funds, was transferred to the Treasurer, New York. The cash situation on the Isthmus continued tight. The use of gold and Panaman silver

for making payments being discontinued, American paper money was used in large quantities and required frequent replacement on account of deterioration through climatic conditions. The sum of \$754,500 was brought from the States during the year.

#### COLLECTOR.

The collections during the year repaid to appropriations amounted to \$10,364,875.07. The sum of \$6,442,981.67 was collected for deposit as miscellaneous receipts. Of these amounts there was received by the disbursing clerk at Washington the sum of \$464,903.24 as a credit to appropriations, while \$37,797.57 was collected as miscellaneous receipts. Deposits for the payment of tolls and bills for supplies and services were made with assistant treasurers of the United States to the credit of the collector, in the sum of \$4,362,252. Similar deposits were made with the collector on the Isthmus in the sum of \$12,081,122.03. Of the total, \$16,443,374.03, which is \$2,583,906.98 in excess of last year's total, the sum of \$609,415.87 was refunded upon settlement of accounts. Money-order funds to the amount of \$1,671,000 were transferred to the Postmaster General of the United States in payment of money orders drawn on the United States. Other disbursements of miscellaneous funds to the amount of \$28,076.57 were made by the collector. Collections were also made on account of the Panama Railroad Company in the sum of \$19,540,944.96, an increase from last year of \$2,369,277.26. (See tables Nos. 34, 35, 39.)

#### ACCOUNTING TO THE TREASURY FOR COLLECTIONS.

During the past fiscal year no examination of the collection accounts was made by employees from the offices of the Auditor for the War Department and the Comptroller of the Treasury as contemplated by section 3 of the sundry civil act approved March 3, 1915, probably due to the stress of Government business in Washington.

#### TOLLS.

Tolls actually collected on vessels transiting the canal during the year amounted to \$6,149,306.04. In addition, the sum of \$292.50 was collected for a vessel that passed through the canal during the prior fiscal year, making the total amount collected \$6,149,598.54. Tolls earned amounted to \$6,181,637.43. Of this the sum of \$32,331.39 was unpaid, being mainly charges on certain Government-operated vessels that may not be finally held liable for tolls. In addition, there remains unpaid from previous years the sum of \$14,821.86. The total differs from the amount shown on the operation and maintenance statement by the amount of refunds, account of overcharges during prior years (\$25,518.48). Under the ruling of the Attorney General, tolls on vessels with cargo or passengers are collected in accordance with the Panama Canal rules of measurement only in cases where the amount derived by multiplying the Panama Canal net tonnage by \$1.20 per ton is less than the amount ascertained by using the rate of \$1.25 and the net registered tonnage as defined by United States statutes. Had Panama Canal rules been applied in all cases the sum of \$7,017,125.02 would have been collected. The limitation, therefore, resulted in a

loss to The Panama Canal during the past year of \$867,526.48, as compared with a loss of \$1,083,111.69 for the fiscal year 1918, \$1,034,001.88 for the fiscal year ending June 30, 1917, and \$390,714.05 for the fiscal year ending June 30, 1916, or a loss to the canal since the decision of the Attorney General was applied of \$3,375,354.10. This amount, plus the sum of \$25,518.48, which was the amount refunded during the year, under the authority of the act of Congress of June 12, 1917, and \$189,432.64 refunded during the previous year, on account of the erroneous collections made prior to the ruling of the Attorney General, and approximately \$74,481.52 still to be refunded, gives the total loss to the canal and the United States Government as \$3,664,786.74. Vessels of American and foreign register have benefitted since the opening of the canal, under the rules of measurement now in force as follows:

American vessels plying between American ports.....	\$103,980.35
Foreign vessels plying between American ports.....	36,155.05
American vessels plying between American ports and canal ports...	80,329.05
Foreign vessels plying between American ports and canal ports....	114.55
American vessels plying between American possessions and American ports.....	6,546.85
Foreign vessels plying between American possessions and American ports.....	20,226.00

The total saving in payment of tolls on all vessels engaged in American trade, as above defined, was \$247,351.85. Of this total \$52,089.20 consisted of deck loads, \$51,317.60 of which was carried by American vessels and \$771.60 by foreign vessels. Vessels engaged in foreign trade, and especially vessels under foreign registry, have been the beneficiaries at a time when the United States has been searching out new sources of revenue.

#### CLAIMS FOR DAMAGES TO VESSELS PASSING THROUGH THE LOCKS.

Three claims for damages to vessels passing through the locks have been settled in accordance with the provisions of section 5 of the Panama Canal act; also a few claims for damages arising in the canal and harbors. The amount paid, including the value of work done in the shops, was \$16,739.19. Claims amounting to \$7,243.51, pending at the end of the year, have since been settled. All claims so far have been adjusted without recourse to the courts.

#### EXAMINATION OF PAY ROLLS.

The work of checking pay rolls under the provisions contained in the act approved August 23, 1912, that "Disbursing officers shall make only such examination of vouchers as may be necessary to ascertain whether they represent legal claims against the United States" has continued satisfactorily. A total of 363,467 pay-roll items (47,338 gold and 316,129 silver) was audited prior to payment. On his final examination, the Auditor for the War Department found a total of 74 errors involving \$406.22, out of payments on Panama Canal rolls of over \$13,700,000. Much the larger number of errors were either typographical errors or were adjusted prior to the receipt of the statement from the auditor. Only two, amounting to \$19.10, were of such a nature that the clerks responsible for the

errors were required to make good the amounts. This result is especially gratifying in view of the number of inexperienced clerks who had to be used on the pay-roll force, the fact that there was a general salary and wage revision July 1, 1918, affecting 90 per cent of the gold force, and revisions affecting certain divisions as of May 1, August 1, September 1, November 1, and December 1, as well as a general increase for silver employees effective November 1, 1918. These many changes in rates of pay necessitated almost continuous changes in the addressograph plates used in writing pay rolls, time books, pay receipts, etc. Additional work also resulted from the allowance of a limited amount of sick leave to alien silver employees effective November 1, 1918. To June 30, 1919, \$5,165.91 were paid to approximately 1,100 silver employees. Exceptional pay-roll deductions were also handled for the objects, in the amounts, and for the periods specified below:

Object.	Amount.	Period.
American Red Cross war relief fund.....	\$53,276.12	12 months.
British Red Cross.....	278.55	8 months.
United war work fund.....	8,900.25	8 months.
War savings stamps.....	7,743.35	5 months.
Third Liberty loan bonds.....	356,288.77	3 months.
Fourth Liberty loan bonds.....	758,988.94	5 months.
Victory loan notes.....	164,991.68	1 month.

This makes a total of \$1,350,467.66, as against a total of \$898,868.84 collected during the prior year. The duty of seeing that these deductions were properly made has devolved upon the pay-roll section.

#### CANAL APPROPRIATIONS.

The Congress to June 30, 1919, appropriated for the canal and fortification thereof a total of \$459,443,105.99. Of this amount \$36,931,896.85 were for fortifications, \$2,000,000 to cover eight annual payments of \$250,000 each to the Republic of Panama for Canal Zone rights, and \$170,000 for regulating commerce and for the censorship of foreign mail during the fiscal year. The sum of \$34,716,006.22 has been specifically appropriated for the operation and maintenance, sanitation and civil government of The Panama Canal and Canal Zone. Of the amounts appropriated other than specifically for operation and maintenance, the sum of \$4,289,159 was charged against operation and maintenance to the end of the fiscal year 1915, while \$2,225,000 of the general appropriations for construction have been used under proper authority to pay for a part of the stock of material and supplies for the operation and maintenance of the canal. Deducting from the total appropriations the amount appropriated for fortifications \$36,931,896.85; for Panama, \$2,000,000; for regulating commerce and censorship of mails, \$170,000; for operation and maintenance (including the amount of the stock of material and supplies), \$41,230,165.22; leaves \$379,111,043.92 appropriated for the construction of the canal and its immediate adjuncts. I have included this year the appropriation for presenting the launch *Louise* to the French Government as a general expense in connection with the construction of the canal, following the rule adopted in connection with acts for relief and the judgments of the courts. Of

the total appropriated for construction, \$3,600,000 for colliers and coal barges, \$2,093,190 for Dock No. 6, Cristobal, \$300,000 for work on the colliers *Ulysses* and *Achilles*, and \$720,000 for reboiling and repairing the steamships *Ancon* and *Cristobal* were specifically exempted by law as a charge against the amount of the authorized bond issue. The sum of \$372,397,853.92 is left chargeable against the bond issue. The balance available for appropriation within the limit of the cost of the canal and the authorized bond issue is \$2,825,302.08, the actual difference between the amount appropriated and the items which are exempted as a charge against the bond issue being increased by the appraised value of the American Legation building, Panama, \$22,256, which was transferred to the Department of State. The amounts appropriated for the support of the canal during the fiscal year 1920, \$8,099,939, and \$729,898 appropriated for the increased cost of two coal barges under construction in the United States, are not included in the above figures, as the appropriation was not made until after the 1st of July.

Miscellaneous receipts to June 30, 1919, amounted to \$32,945,084.14. Deducting tolls, \$24,810,499.11, Canal Zone revenues collected since July 1, 1915, \$538,644.38, profits on business operations, \$118,512.92, interest on the cost of public works in the cities of Panama and Colon and on bank balances, \$494,654.38, and miscellaneous collections, \$904.61, gives the amount repaid on the cost of construction as \$6,981,868.74. I have taken credit for the amount paid by the Panama Railroad for subsidies, dividends, and interest, as the canal would have obtained the benefit of these amounts in reduced rates if they had not been added to the expenses of the railroad. Deducting the amount repaid on the cost of construction and including available balances, there is left the sum of \$365,415,985.18 as the actual present cost of the canal projects estimated for in 1908. This amount is reduced from year to year by receipts from the sale of construction material and equipment and by additional collections covering expenditures for water works, sewers, and pavements in the cities of Panama and Colon. The cost of the canal as a commercial venture is also entitled to credit to the value of the buildings, public works, and equipment transferred to the Army, the Alaskan Engineering Commission, and to the State Department without any actual payment therefor. The appraised value of items so transferred is \$2,034,537.94, of which \$146,500 were the value of items constructed by the Canal Zone Government. (See Tables Nos. 3, 4, and 12.) The status of the authorized bond issue is shown in Table No. 1. General balance sheet is published as Table No. 2.

#### CURRENT APPROPRIATIONS.

The cash balance in the current appropriations for operation, maintenance, and construction on June 30, 1919, amounted to \$8,476,270.70, which was considerably more than the amount on hand June 30, 1918. This increase was due to a reduction in the value of the stock of material and supplies on hand in storehouses, in the possession of divisions and not charged to work in progress, to a reduction in the stock of sand and gravel, and also to the fact that work appropriated for was not completed during the year. The total cash and cash items, i. e., accounts receivable and transfers of appropria-

tions to be made in payment for work done, amounted to \$13,969,239.66. Liabilities immediately payable amounted to \$3,031,118.91. The balance, \$10,938,120.75, is all obligated; to cover outstanding order, \$2,067,867.94; uncompleted work chargeable to operation and maintenance appropriations, \$1,449,264.89; for construction work, including the payment of land claims, and for material and supplies in storehouses, absorbing the total balance in the construction appropriations, \$4,404,562.31; to cover repairs of certain equipment as such repairs become necessary, \$954,412.47; to pay leaves of employees which have been earned, \$804,086.18; and to cover a portion of the reserves for depreciation on equipment, set up for the purpose of replacing same when worn out in service, \$1,257,926.96.

Too much stress can not be given to the necessity of keeping the appropriations for canal operations and maintenance on a continuing rather than on an annual basis, and to the maintenance of an adequate cash balance to carry on the business operations. When the \$6,000,000 available for original construction work and for additions to the canal is expended, the small working balance is liable at any time to cause a serious situation in financing canal operations. Work for the Army and Navy has been done on a very large scale in the past and will continue to be done. Delays in payments seemingly can not be avoided. This throws a burden on canal funds that must be recognized and provided for. The cash balance with which to operate can be provided by a special appropriation, or what is believed to be better and more in keeping with the law relative to the business operations of the canal, by considering the reserves for depreciation as a direct charge, a direct obligation against the appropriations, for operation and maintenance. If it had been possible to have fully accomplished this by the end of the year, there would have been on hand an additional \$1,300,000 to the credit of the appropriation for maintenance and operation. Until an amount equal to the reserves is retained as a part of the cash assets of the canal, the entire amount appropriated each year must not be expended; the balance must be retained and must not be used as a reason for reducing the amount to be appropriated during the following year. Fluctuations in the value of stock on hand also directly affect the cash balance and if the value of the stock falls below the amount authorized for investment in stock then the difference must be considered as a direct obligation chargeable to the appropriation at any given time.

#### EXCHANGE OF PROPERTY WITH PANAMA RAILROAD COMPANY.

Being firmly convinced that proper accounting and a reasonably satisfactory handling of matters in connection therewith require a readjustment of the ownership of the property operated by The Panama Canal and the Panama Railroad Company on the Isthmus, I can only repeat the recommendations made in previous reports—that an exchange of property be consummated so that the interest operating certain property shall have the title to that property and that, so far as practicable, the title to each class of property shall be in one interest only. A provision authorizing this exchange was included in the estimates for the fiscal years 1917, 1918, 1919, and 1920,



but no action so far has been taken by the Congress, due probably to their failure to recognize its importance from the point of view of the canal and railroad. There is now charged to the Panama Railroad Company the sum of \$3,247,332.11, being the balance of an amount advanced to enable that company to renew its line and take up its bonds. Being relieved by section 2 of the act of Congress of March 4, 1911, of the obligation to repay the principal or to pay interest on the notes given the United States to cover this amount, the company has constructed docks at Cristobal at an expenditure about equal to the amount of the loans. It is desired to offset the one against the other. Also considerable equipment was purchased and paid for by The Panama Canal which is required in connection with the operation of the railroad and its steamship line—viz, the steamships *Panama* and *Colon*—and a large amount of rolling stock. Certain docks have been constructed by The Panama Canal and others by the Panama Railroad Company at Balboa. Satisfactory results require the effecting of an exchange.

#### PUBLIC WORKS, PANAMA AND COLON.

Under the agreement with the Republic of Panama, which requires the reimbursement within 50 years from July 1, 1907, for the expenditures incurred by the United States for the construction, operation, and maintenance of waterworks, sewers, and pavements in the cities of Panama and Colon, the expenditures for construction to June 30, 1919, in Panama have amounted to \$1,325,276.27, and in Colon to \$1,217,993.44, a total of \$2,543,269.71. The total expenditures for operation and maintenance were \$784,660.37 for Panama, and \$721,761.43 for Colon. Besides being authorized to currently reimburse itself from water-rental collections for the expenses of operation and maintenance, the United States gradually liquidates the expenditures for construction by a quarterly charge equal at least to one-quarter of that part of the capital cost ascertained by dividing the amount thereof by the number of years the contract has to run. In addition, the Republic of Panama pays interest at the rate of 2 per cent per annum on the capital cost balances and on the proportionate cost of waterworks in the Canal Zone used for supplying water to the two cities, based upon the quantity of water consumed. For the work in Panama, this interest has amounted to \$272,404.52; for the work in Colon, \$229,309.41; and for the proportionate cost of waterworks in the Canal Zone \$110,198.08, a total of \$611,912.01. There has been paid to the United States, or is immediately due, the sum of \$2,627,522.41, leaving a balance unpaid of \$1,030,070.31 for the work in Panama and \$1,004,010.80 for the work in Colon, a total of \$2,034,081.11, payable in installments during the contract period. The amount which is payable immediately under the agreement is \$74,603.90, and is covered by bills for the difference between the current charges for the work plus the quarterly payments required and the amount collected as water rentals. The Panama Canal continues to maintain the pavements in the two cities under the temporary agreement reached at the beginning of the fiscal year 1918, whereby reimbursement is still obtained through the water-rental collections.

## OPERATION AND MAINTENANCE.

[Table No. 6.]

The ordinary expenses for operation and maintenance of the canal, including those of civil government and sanitation, amounted to \$6,112,194.77, as against \$5,903,719.69 expended in 1918 and \$6,788,047.67 during 1917. This does not include expenditures for additions and improvements amounting to \$634,472.72. The expense of maintenance dredging was reduced from \$1,726,803.54 to \$1,152,188.99. Other maintenance expenditures show increases which must be expected as the structures become older, but the main increase was in overhead expenses. There was an increase of \$350,000 in the cost of operation of quarters. This, however, was largely due to heavy charges made in June for furniture, mattresses, etc., the amount having previously been held in suspense accounts. The charge on account of furniture was \$187,422.88, and for mattresses, small tools, etc., \$55,000. The civil government expenses show an increase of over \$29,000, but this is not the total increase for the year, as there is due about \$23,000 for the transportation of mails for which bills were not rendered, over \$6,000 to the Panaman Government for postage stamps issued during the last quarter of the fiscal year and some other items which were not included in the accounts. The expenses of the Washington office increased from \$280,953.02 to \$327,714, due to some extent to increased compensation following similar increases in other departments in the States. Expenses of the executive office increased from \$365,519.69 to \$416,052.38. Of this amount the sum of \$32,000 is due to an increase in expenses charged against the bureau of clubs and playgrounds, the major portion of which was occasioned by a transfer of the janitors and other silver employees of the club-houses from the rolls of the supply department to the rolls of the bureau of clubs and playgrounds.

The overhead expenses charged to maintenance and operation amounted to \$3,382,167.30, as against \$2,826,651.32 charged for the prior year. In the overhead expense accounts are included charges for civil government amounting to \$707,595.31, expenses for hospitals, quarantine, and sanitation amounting to \$646,335.46, and \$2,028,236.52 of a total of \$3,109,859.39 expended for administration, including expenses of the executive department, accounting department, Washington office, operation and repairs of storehouses and quarters, lighting of streets, operation and maintenance of sewer system and roads. Offsetting the total expenses for operation and maintenance are the amounts earned as tolls for vessels transiting the canal during the year—\$6,181,637.43 less refunds \$25,518.48, or \$6,156,118.95 (this amount differs from the amount actually collected from vessels transiting the canal because of certain unpaid bills on Government-operated vessels); the amounts collected as licenses and taxes, court fees, and fines, \$136,870.77, and as profits on business operations \$61,027.26, a total of \$6,354,016.98. The revenues earned in excess of current expenses amounted to \$241,822.21. The charges to operation and maintenance with minor exceptions do not include depreciation of plant and equipment. Interest on the capital investment is also excluded.

The expenditures charged to operation and maintenance to date amount to \$30,109,494.49, to offset which are the total revenues from tolls, civil government collections, and profits on business operations, amounting to \$25,490,803.71, which will be reduced by about \$75,000 when refunds of tolls erroneously collected are made. This deficit would have been reduced to less than \$1,000,000 had Panama Canal tonnage rules been applied.

## BUSINESS OPERATIONS.

[Table No. 7.]

The total revenues derived from business operations, carried on with Panama Canal funds amounted to \$13,684,881.18, as against a total of \$10,324,071.91 received during the prior fiscal year, an increase of 32½ per cent over 1918, and 45 per cent over 1917. The cost of carrying on these operations during the last fiscal year amounted to \$13,623,853.92, leaving a net profit of \$61,027.26 to be covered into the Treasury as miscellaneous receipts under the Panama Canal act and the regular Panama Canal appropriations. The net profits for the fiscal year 1916 amounted to \$11,898.44, for 1917 to \$39,427.66, and for 1918, to \$6,159.56. The result is due to the approved policy of making the charges in most cases so as to barely cover the cost. Shop work, work for the Panama Railroad and other departments of the Government and all services rendered for employees (and these are the major items) are performed at cost except that both subsistence and hospital services rendered employees are consistently rendered at a loss. There was an increase in the work performed by the shops, including electrical work, from \$2,901,643.55 to \$4,277,823.90. The value of tug service increased from \$199,292.53 to \$288,675.36. Sales of water increased by \$20,000, and the use of dry dock at Balboa is reflected in the increase in the revenues by about \$20,000. The sales of fuel oil increased from \$838,374.76 to \$1,161,573.74. The increase in business operations at the canal is shown by the increased numbers and amounts of formal bills as follows:

	Number of bills.	Amount.
1915.....	8,686	\$12,197,170.74
1916.....	12,754	11,786,187.91
1917.....	16,386	17,007,342.16
1918.....	22,070	20,887,460.60
1919.....	24,210	25,272,815.50

In addition, Panama Railroad commissary bills increased from 10,733, amounting to \$3,459,038.28, in 1917, to 13,100, amounting to \$4,438,725.57, in 1918, and to 13,949, amounting to \$5,249,707.46, in 1919. The regular Panama Railroad bills increased from 9,285, amounting to \$8,993,007.41, in 1917, to 9,652, amounting to \$10,282,388.24, in 1918, and to 10,036, amounting to \$12,643,489.63, in 1919, or a total increase from 1917 to 1918 and to 1919, in numbers, from 36,404 to 44,822 and to 48,195 in bills, and amounts from \$29,459,-

387.85 to \$36,008,574.41 and to \$43,166,012.59. The charges to the various accounts into which the business operations are classified include: (1) The direct costs, i. e. (a) labor directly engaged on the work, (b) material that is used therein, and (c) miscellaneous expenses that can be directly located thereto. (2) The proper proportion of the indirect expenditures of the division performing the work, including leave pay earned and in some cases charges for depreciation of plant and equipment used, distributed ordinarily on the basis of a percentage of the direct labor. (3) Ten per cent additional on the total division cost to cover the general overhead expenses of the canal. The overhead expenses absorbed in part by charges to business operations include the expenses incurred in operating and maintaining quarters and storehouses, purchasing, inspecting, distributing, and accounting for material and supplies, transporting employees to and from the Isthmus, together with the expenses of paying them and furnishing them such privileges as transportation on the Isthmus and those afforded by the clubhouses. The 10 per cent added to the cost of business operations to cover overhead expense is not the average overhead expense incurred by the canal. The percentage was fixed to include, as nearly as practicable, only the additional expenses incurred by the Panama Canal organization on account of handling other operations than the primary function of maintaining and operating the canal as a waterway between the oceans.

#### MATERIAL AND SUPPLIES.

As a basis for making estimates for appropriations, for furnishing to stores and divisions classified statements of the value of the material issued to and expended by them, and to aid in controlling the purchases to the amount appropriated, a material classification of 145 different classes has been adopted, and tabulating machines are used in compiling the necessary data. The value of material and supplies in storehouses on June 30, 1919, amounted to \$6,312,836.28, as compared with \$6,747,688.26 on July 1, 1918. In addition, the divisions had on hand for immediate use material to the value of \$879,022.45. Material issued during the year amounted to \$7,967,563.30. Sales amounted to \$1,887,609.25. For the previous year issues and sales amounted to \$8,773,192.96 and \$1,484,849.90, respectively. (For further information, see tables Nos. 55 and 56.) A reduction of over \$600,000 in the value of the stock in the storehouses and in the hands of divisions has been reflected in increasing the cash balance so that the securing of a special appropriation to permit carrying the present amount of stock is not so imperative as it seemed when last year's report was prepared. As I have indicated elsewhere, in this report, if a saving can be made for a few years from the total appropriations for the canal operation and maintenance, a sufficient capital can be obtained to permit of carrying on the business operations of the canal without the liability of serious difficulties arising at the end of the year when the funds have been very much depleted. If this plan is adopted as a settled policy for the next four or five years, a special additional appropriation for stock will probably not be necessary.

## CONSTRUCTION OF CANAL AND CAPITAL ADDITIONS.

[Tables Nos. 16 et seq.]

The expenditures charged to the canal construction accounts were small as compared with those charged for prior years, the total charges during the year amounting to only \$2,406,832.29. The charges to capital additions covering expenditures for permanent improvements, the cost of which is payable from maintenance and operation appropriations, amounted to \$634,472.72. The principal items chargeable to construction, with unit costs where available, were: Dredging from Gatun to Pedro Miguel, \$33,892.19; Pacific entrance, \$149,297.54, the latter involving the excavation of 230,000 cubic yards of material, at an average cost of \$0.5901 per cubic yard. Of this material 67.35 per cent was earth and 32.65 per cent was rock. (See Table No. 24.) Dredging inner harbor, Balboa, \$331,951.65, involving the removal of 918,200 cubic yards of material, at an average division cost of \$0.3266 per cubic yard. Of this material 84.53 per cent was earth and 15.47 per cent rock. (See Table No. 25.) Sanitary fills and ditches, \$83,996.66; roadways, \$43,027.93; settlement of claims for private property within the Canal Zone, \$127,004.77; buildings, \$370,480.68, the two main items being quarters for gold employees, \$177,180.14, and continuing the construction of Ancon Hospital, \$144,668.80; Dock No. 6, Cristobal, \$827,330.19. In order to more effectively show in the accounts the cost of the electric power, water and sewer, street and road systems, the charges for these classes of expenditures were transferred from the heading Permanent Town Sites to the headings which indicate the nature of the work performed, leaving under Permanent Town Sites only the general work performed therein. This transfer was made in the capital addition accounts, as well as in the canal construction accounts, but all expenditures for permanent town sites other than buildings is shown classified by main items in Table No. 21.

The main items under Capital Additions were dredging in Cristobal Harbor, to increase the width of the channel, \$108,450.94; extension to the power and lighting systems, \$171,776.56; additions to fuel oil plant, Cristobal, \$23,153.41; quarters for silver employees, \$118,212.25; for gold employees, \$41,415.88; and roads, streets, and walks, \$265,732.02. There were transferred from the Capital Addition accounts items totaling \$339,268.04, so as to more properly take them up under the heading of equipment and tools.

## MANUFACTURING PLANT.

No sand and gravel was reclaimed during the year. The quantity on hand of usable sand and gravel was reduced from 124,441 to 65,544 cubic yards. The new Gatun hydroelectric plant and the Miraflores steam electric power plant generated 47,467,280 k. w. hours during the past year at an average cost of \$0.0081 per k. w. (See Table No. 27.)

The Ancon-Balboa-Panama waterworks system produced 2,655,479,000 gallons of water at an average cost of \$0.0766 per thousand gallons. Of this amount 915,047,000 gallons were used in the city of Panama.

The Gatun system produced 424,798,000 gallons of water at an average cost of \$0.1118 per thousand gallons. The Colon-Cristobal system produced 1,647,850,000 gallons at an average cost of \$0.0764 per thousand gallons. Of this amount 560,586,000 gallons were used in the city of Colon. (See Tables Nos. 28, 29, and 30.)

#### CANAL ZONE ACCOUNTS.

Since July 1, 1915, the revenues derived from licenses and taxes, court fees and fines, postal receipts, etc., which had heretofore been appropriated separately for the support of the Canal Zone Government, have been deposited in the Treasury of the United States and credited to miscellaneous receipts. The collections for licenses and taxes during the year amounted to \$11,033.23; court fees and fines, \$19,849.62; postal receipts \$104,932.34, with miscellaneous items amounting to \$1,061.10, a total of \$136,876.29. During the prior year the sum of \$140,690.91 was collected. The cash balances of Canal Zone and miscellaneous funds in the hands of the collector have decreased from \$945,061.95 on June 30, 1918, to \$683,085.95 on June 30, 1919. All of the expenses of the Canal Zone were paid out of the regular appropriations for civil government, as contemplated by the appropriation acts. During the year 140,618 money orders to the value of \$3,108,678.27 were issued, as against 168,022 to the value of \$3,382,663.69 during the previous year, or a decrease of \$273,985.42. This decrease was due to the fact that employees have diverted their savings from money orders to Liberty loan bonds and War savings stamps. Since the establishment of the money order business on the Isthmus, 2,328,880 orders have been issued to the value of \$54,325,074.83. There have been paid \$38,274,645.48 on money orders drawn on the United States. (See Tables Nos. 40-44.)

#### CLUBHOUSE ACCOUNTS.

The revenues derived from the operation of the various clubhouses amounted to \$463,409.39, as compared with \$365,701.50 received during the prior fiscal year. The expenditures amounted to \$414,895.93. Soda fountain receipts amounted to \$189,838.41; cigars and candies, \$151,609.01; moving pictures, \$30,437.14. These items show large increases over prior years' receipts, while the receipts on account of membership fees were reduced from \$3,835.27 to \$808. The cash balance on hand June 30, 1919, amounted to \$76,962.34. In addition there were commissary coupons \$6,126.88, and deduction certificates \$16, making a grand total of cash and cash items of \$83,105.22. The profits derived from business operations amounted to about \$75,000 as compared with \$18,000 received during the prior fiscal year. The balance sheet shows a net profit of \$54,790.62. This amount is less than the actual surplus over current expenses on account of purchases of soda fountain equipment and furniture and alterations of buildings costing about \$20,000. Additional equipment ordered to the value of about \$8,000 was not charged into the account last year. (See Tables Nos. 45, 46, 47, and 48.)

## CLAIMS FOR INJURIES AND DEATHS.

During the past fiscal year there were reported 3,308 accidental injuries and 23 accidental deaths of employees, as against 3,413 accidental injuries and 35 accidental deaths during the prior year. Compensation was allowed in 1,521 cases of injury and 10 cases of death. In 113 injury cases no compensation was allowed, the reasons being in one case disability commenced over one year after the injury; in 16, the injury was found not to have been received in the performance of duty; in 55, the evidence was considered insufficient to justify allowance; in 37, the disability was not caused by the injury described, and in 4, the notice of injury was not given as required by the compensation act. Nine death claims were disapproved—1, because the person on account of whom claim was made was not an employee of The Panama Canal or Panama Railroad Company; in 1 case death did not result from injury received while in the performance of duty; in 2 cases death was not the result of the injury claimed, while in 5 cases there were no dependents. Four claims were still pending at the close of the fiscal year.

Under the act of September 7, 1916, the sum of \$93,412.48 was allowed on account of injuries to employees of The Panama Canal and Panama Railroad Company, and the sum of \$10,798.06 was allowed on account of deaths, or a total of \$104,210.54. In addition there were paid \$1,547.34 under the Executive order of March 20, 1914, and \$163.54 under the act of Congress approved May 30, 1908. Lump-sum payments to the amount of \$25,270.60 have been made under the act of September 7, 1916, to 14 widows, 11 children, 15 parents, 2 sisters, and 1 brother. Monthly payments are being made to 2 widows, 15 children, 4 parents, and 1 sister. Sixty-four persons had injury payments for decreased earning capacity on account of injuries received, commuted to lump-sum payments amounting to \$92,764.34. The total amount paid by The Panama Canal on account of injuries and deaths of employees from August 1, 1908, the effective date of the act of May 30, 1908, to June 30, 1919, was \$1,577,037.33.

Fifteen cripples injured during the construction of the canal who had become a charge on the canal, were granted an allowance under the law applicable to their cases, and with their families were furnished transportation to their homes, thereby relieving the canal of further expense for their maintenance. The large number of claims against the Panama Railroad Company for damages to persons or property, most of which grew out of the Gamboa wreck of May 20, 1918, and on account of which there were pending at one time suits to the amount of \$275,350, were almost entirely disposed of through the efforts of the claims bureau working in conjunction with the legal department. (Further details, including amounts paid, the causes of accidents, and the nature of the injuries, will be found in Tables Nos. 49 to 54.)

## COUPON BOOKS.

The strip coupon has been continued in use throughout the year. The supply has been provided by the Panama Canal press, as the contractor who had received the contract for furnishing books failed to supply a single one, and other concerns asked what appeared to be an excessive price. Books to the value of \$4,527,330 were issued

to employees for pay-roll deduction, while books to the value of \$1,978,455 were sold for cash. This amounts to an increase over the previous year of 10 per cent in issues to employees and 15 per cent in sales for cash. Coupons are used in lieu of cash in the commissaries, the restaurants, and to a large extent at the clubhouses. The amount taken in and counted on measuring machines designed for the purpose, just about equals the value of the issues. There were also used during the year by silver employees, meals tickets to the value of \$67,916.40. This was a material reduction from the \$132,766 issued during the previous year. (For further details see table No. 38.)

#### INSPECTION OF ACCOUNTS.

The accounts of all officers and employees charged with the collection, disbursement, and custody of Panama Canal, Canal Zone, and Panama Railroad funds, or with other funds which are semi-public, have been examined at frequent and irregular periods, as contemplated by the regulations. There were 553 examinations made during the year, 374 covering Panama Canal activities and 179 for the Panama Railroad. There were 123 Panama Canal and 52 Panama Railroad accounts subject to examination at the close of the fiscal year. The inspection force must necessarily have a thorough knowledge of bookkeeping and be men with a high degree of honesty to properly perform their functions. In one case of embezzlement the guilty party was sentenced to a term in Gamboa penitentiary. In another case, the allegation has been made that a former employe charged more than the regular rates and pocketed the difference.

#### TIME INSPECTION.

Inspection of time books and the methods of timekeeping have continued without modification. During the year 10,132 gangs were inspected, involving the checking of 541,310 employees, and 654 special reports were made by inspectors, calling attention to errors of various kinds. The saving that can actually be located on account of errors discovered by the time inspection bureau amounts to over \$3,500. The indirect savings, due to the impossibility of showing tangible results, can not be estimated.

#### FREIGHT CLAIMS.

The freight claims section received 2,168 new claims, involving approximately \$215,000. There was paid in adjustment of claims the sum of \$32,901.58. In addition, there was charged against the Panama Railroad Steamship Line the sum of \$30,470.87 as compared with \$42,154.61 during the nine months of the preceding fiscal year.

#### BONDS OF EMPLOYEES.

The schedule bond of employees of The Panama Canal and Panama Railroad Company, executed to insure the faithful performance of their duties, was continued with the Maryland Casualty Co. The total liability for Panama Canal employees was \$467,000, and for Panama Railroad Company employees, \$349,000.



## OPERATIONS WITH PANAMA RAILROAD COMPANY FUNDS.

The operations of the railroad proper, harbor terminals, coaling plants, stables, baggage transfer, motor busses, and motor car machine shop have continued under the direction of the superintendent of the railroad; the telephone system under the electrical engineer of The Panama Canal; the rental of lands and buildings under the land agent and special attorney; the commissaries, plantations, cattle industry, dairy, poultry farm, hog farm, and Hotel Washington, under the supervision of the chief quartermaster of The Panama Canal.

To eliminate a heavy loss, the operation of the Panama stables was discontinued by leasing same to Mr. Thomas R. Lombard of Panama City who will continue to use them to stable animals, vehicles, automobiles, etc., and in connection with the buss line, the operation of which was also taken over by him. No change was made in the system of railroad accounts except the operations of the cattle steamers which were removed from the cattle industry accounts and set up separately, under the heading of Cattle Steamer Operations.

## RAILROAD, HARBOR TERMINALS, ETC.

The operations of the railroad proper show a profit of \$185,879.42, as compared with \$298,985.54 last year. The net profits were shown in last year's report as \$315,976.46, but this figure had to be reduced by the amount of back pay to railroad men and taxes, \$16,990.92, which figures were received too late to include in the operating statement last year.

The net revenues for harbor terminal operations amounted to \$342,699.47 as compared with \$235,144.13 last fiscal year. The gross expenses increased \$282,997.37, and the gross revenues increased \$390,552.71, making a net increase in the revenues of \$107,565.34. Over \$60,000.00 of this increase are due to increased storage revenue and the balance, on account of increased tonnage handled.

The gross receipts from the sale of coal amounted to \$6,139,628.36. The value of coal sold was \$4,030,199.88, and the cost of operating the coaling plants \$1,299,048.65, a total of \$5,329,248.53, resulting in a net profit of \$810,379.83. The stables, motor busses, and motor-car machine shop operated at a loss, the total loss amounting to \$27,633.35. The baggage transfer service made \$1,152.20 and the Hotel Washington \$11,389.24. The net revenue from the rental of lands is \$96,238.10, and from the rental of buildings \$7,842.95. The cost of operating the telephone system was \$8,781.17 in excess of the revenues.

## COMMISSARY.

The gross receipts from the sale of commissary supplies amounted to \$11,237,646.33, as compared with \$10,239,703.37 last year. Supplies to the amount of \$9,777,867.73 were purchased; this includes \$2,780,309.81 for cattle, hogs, and poultry purchased on the Isthmus. The net profits for the year amount to \$267,282.07, as compared with \$242,677.27 last year. The value of supplies on hand on June 30, 1919, was \$2,769,506.81.

## FARM INDUSTRIES.

*Cattle.*—The cattle industry continued to import cattle from Colombia. The total number imported is 34,334, costing \$1,892,066.60 laid down on the Isthmus. Thirty-one thousand two hundred and thirteen were sold and slaughtered. The total pasture operating expenses amounted to \$230,349.59. The steamships *Caribbean* and *Culebra* continued to bring cattle during the entire year, although the *Culebra* assisted in United States Shipping Board operations during a part of the year. The cost of operating these steamers was \$494,452.45, and they earned a revenue of \$564,262.74, resulting in a profit of \$30,189.71. The profits from the sale of cattle amounted to \$336,865.58. There remained on hand June 30, 11,779 cattle of all kinds.

*Plantations.*—The cost of operating the plantations during the past year amounted to \$123,142.76, and the value of produce turned in \$76,107.37, resulting in a loss of \$47,035.39.

*Dairy.*—The total cost of operating the Mindi dairy was \$99,205.15. The value of dairy products sold during the year amounted to \$45,968.01. The net loss on dairy operations amounts to \$42,381.90.

*Hog farm.*—The expenses in connection with the operation of the hog farm amounted to \$54,347.93, and the receipts from the hogs sold and slaughtered amounted to \$306,948.73. The hog farm made a profit of \$26,472.35.

*Poultry.*—The cost of operating the poultry farm was \$92,048.42. The value of poultry and eggs sold during the year was \$72,905.19. The loss in poultry operations amounted to \$33,747.09.

## GENERAL.

All the operations of the railroad on the Isthmus show a net revenue of \$1,504,871.19, as compared with \$1,762,122.98 last fiscal year. During the year, approximately \$750,000, representing the value of completed improvements, were added to the capital account of the company. In addition to this, there are authorized and under way improvements estimated at over \$3,200,000, of which about \$2,700,000 have already been expended. In this figure are included the new cold-storage plant at Mount Hope, on which there has been expended \$1,235,367.97; new slaughterhouse, \$230,500; new canning plant, \$115,595.30; 10 new passenger coaches, \$166,000; purchase of Royal Mail property, \$250,284.50; and a large number of smaller improvements which will be itemized in the annual report of the Panama Railroad. The detailed statements of revenues, expenses, and statistics will also appear in the Panama Railroad annual report. Only the essential figures are shown here so as to cover in one place, in a general way, all of the operations on the Isthmus.

Respectfully submitted.

H. A. A. SMITH,  
*Auditor, The Panama Canal.*

Col. CHESTER HARDING, United States Army,  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

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## THE PANAMA CANAL.

TABLE No. 1.—*Status of authorized bond issue.*

Authorized bond issue.....			\$375, 200, 900. 00
Appropriations by Congress to June 30, 1919.....	\$459, 443, 105. 99		
Less appropriations for—			
Fortifications.....	\$36, 931, 896. 85		
Annual payment to Republic of Panama.....	2, 000, 000. 00		
Maintenance, operation, sanitation and civil government of canal and increase compensation.....	34, 716, 006. 22		
Regulation of commerce.....	50, 000. 00		
Censorship of foreign mails.....	120, 000. 00	73, 817, 903. 07	
Appropriated for canal construction.....		385, 625, 202. 92	
Less amounts exempted by law—			
Two colliers.....	2, 000, 000. 00		
Two barges.....	1, 600, 000. 00		
Dock No. 6, Cristobal.....	2, 093, 190. 00		
Equipping colliers <i>Ulysses</i> and <i>Achilles</i> .....	250, 000. 00		
Covering unprotected surfaces of colliers.....	50, 000. 00		
Repairs to steamship <i>Ancon</i> and <i>Cristobal</i> , to June 30, 1915.....	720, 000. 00		
Expended for operation and maintenance of canal.....	4, 289, 159. 00		
Stock of material and supplies for operation and maintenance of canal.....	2, 225, 000. 00	13, 227, 349. 00	372, 397, 853. 92
Balance available for appropriation after June 30, 1919, within limit of cost of canal and authorized bond issue.....			2, 803, 046. 08
Appraised value of American Legation Building, in the city of Panama, exempted from charge to bond issue, act of July 1, 1916.....			22, 256. 00
Balance available for appropriation within the limit of cost of canal and authorized bond issue.....			2, 825, 302. 08
Amount appropriated, charged to bond issue.....			372, 397, 853. 92
Amount repaid to construction appropriation account of waterworks, sewers, and pavements, Panama and Colon.....			396, 956. 06
Expended or available for expenditure.....			372, 794, 809. 98

## CLASSIFIED STATEMENT.

Construction of canal.	Expended to June 30, 1919.	Unexpended allotments.	Total.
Prism excavation.....	\$137, 858, 114. 52	\$138, 010. 00	\$137, 996, 124. 52
Locks.....	74, 741, 262. 40		74, 741, 262. 40
Dams and spillways.....	17, 859, 356. 48		17, 859, 356. 48
Breakwaters.....	9, 098, 018. 41		9, 098, 018. 41
Aids to navigation.....	818, 697. 37	11, 000. 00	829, 697. 37
<i>Auxiliary works.</i>			
Electric power and transmission system.....	5, 907, 277. 28	27, 707. 24	5, 934, 984. 52
Coaling stations.....	5, 969, 192. 03	1, 160. 50	5, 970, 352. 53
Fuel oil plants.....	642, 582. 40		642, 582. 40
Dry docks.....	3, 605, 712. 34		3, 605, 712. 34
Wharves, piers, and docks (exclusive of Dock 6).....	3, 302, 687. 77	25, 563. 37	3, 328, 251. 14
Playgrounds.....	54, 474. 41		54, 474. 41
Landscape improvements.....	18, 184. 36		18, 184. 36
Water and sewer systems and roads.....	4, 436, 340. 61	31, 229. 02	4, 467, 569. 63
Sanitary fills and ditches.....	784, 759. 94	923. 54	785, 683. 48
Townsites.....	923, 338. 07	12, 736. 50	936, 074. 57
Improvements, Cristobal Harbor.....	32, 103. 18	37, 896. 82	70, 000. 00
Dredging inner harbor and entrance basin.....	3, 515, 225. 71	68, 205. 00	3, 583, 430. 71
Preparatory work, Balboa terminals.....	1, 808, 921. 65		1, 808, 921. 65
Floating caisson.....	347, 868. 15		347, 868. 15
<i>Miscellaneous items.</i>			
Real estate.....	2, 903, 126. 12	1, 133, 736. 96	4, 036, 863. 08
Purchase with Panama Canal Co.....	38, 721, 690. 16		38, 721, 690. 16
Investment, Panama Railroad stock.....	155, 818. 24		155, 818. 24
Concessions from Republic of Panama.....	10, 000, 000. 00		10, 000, 000. 00
Relocation, Panama Railroad.....	9, 800, 626. 46		9, 800, 626. 46
Buildings.....	15, 997, 650. 83	182, 153. 84	16, 179, 804. 67
Total.....	349, 303, 028. 89	1, 670, 322. 79	350, 973, 351. 68

## Classified statement—Continued.

Construction of canal.	Expended to June 30, 1919.	Unexpended allotments.	Total.
<i>Miscellaneous items—Continued.</i>			
Public works in the cities of Panama and Colon.....	\$2, 543, 269. 71		\$2, 543, 269. 71
Assets transferred to other departments of the Govern- ment.....	2, 034, 537. 94		2, 034, 537. 94
Equipment and property operated by the Panama Railroad.....	2, 163, 249. 56		2, 163, 249. 56
Requisition loan to Panama Railroad.....	1, 399, 114. 61		1, 399, 114. 61
First mortgage bond loan to Panama Railroad.....	1, 848, 217. 50		1, 848, 217. 50
Joint land commission expenses.....	282, 272. 08		282, 272. 08
Chagres River tract.....	32, 459. 77		32, 459. 77
Launch <i>Louise</i> .....	13, 340. 99	\$159. 01	13, 500. 00
Equipment.....	6, 665, 471. 03		6, 665, 471. 03
Material and supplies.....	564, 201. 74		564, 201. 74
Miscellaneous receipts credited to assets.....	5, 040, 070. 42		5, 040, 070. 42
Total.....	371, 889, 234. 24	1, 670, 481. 80	373, 559, 716. 04
Less undistributed credits still due construction accounts.....	764, 906. 06		764, 906. 06
	373, 124, 328. 18	1, 670, 481. 80	372, 794, 809. 98

TABLE NO. 2.—General balance sheet, June 30, 1919.

ASSETS.		LIABILITIES.	
Construction of canal (Table No. 16)	\$351, 277, 614. 69	Appropriations by Congress (Table No. 3).....	\$459, 443, 105. 99
Capital additions (Table No. 17).....	1, 898, 234. 39	Trust funds and security deposits..	30, 494. 44
Assets received from Canal Zone Government.....	510, 712. 50	Reserves (Table No. 15).....	3, 993, 749. 40
Equipment (Table No. 8).....	9, 462, 675. 06	Assets received from the Canal Zone government (Table No. 11).....	544, 792. 37
Material and supplies, etc. (Table No. 10).....	7, 000, 136. 58	Panama Railroad property oper- ated by Panama Canal (Table No. 14).....	884, 327. 97
Fortifications.....	30, 127, 069. 93	Reimbursement account public works in Panama and Colon rep- aid to appropriations.....	396, 956. 06
Public works in Panama and Colon.....	2, 543, 269. 71	Miscellaneous receipts not depos- ited in United States Treasury (Table No. 4).....	330, 236. 11
Presentation of launch <i>Louise</i> to French Government.....	13, 340. 99	Accounts payable.....	3, 054, 035. 76
Requisition loans to Panama Railroad Co.....	1, 399, 114. 61	Unclassified credits.....	1, 646, 575. 59
First - mortgage bond loan to Panama Railroad Co.....	1, 848, 217. 50		
Operation and maintenance of canal (Table No. 6).....	30, 109, 494. 46		
Annual payment to Republic of Panama for Canal Zone rights.....	1, 750, 000. 00		
Property transferred to other de- partments, United States Gov- ernment (Table No. 12).....	2, 034, 537. 94		
Panama Canal property operated by Panama Railroad (Table No. 13).....	2, 163, 249. 56		
Miscellaneous receipts credited to assets.....	5, 040, 070. 42		
Work in progress (Table No. 9).....	493, 981. 68		
Accounts receivable.....	5, 132, 039. 26		
Unclassified expenses.....	784, 477. 11		
Appropriation balances subject to requisition.....	12, 483, 890. 83		
Cash in hands of fiscal officers.....	4, 252, 146. 47		
Total.....	470, 324, 273. 69	Total.....	470, 324, 273. 69

TABLE NO. 3.—Statement of appropriations by Congress.

Canal rights from French company (act of June 28, 1902).....	\$40, 000, 000. 00
Canal Zone rights from Republic of Panama (act of Apr. 28, 1904).....	10, 000, 000. 00
Canal connecting Atlantic and Pacific Oceans:	
Act of June 28, 1902.....	\$10, 000, 000. 00
Act of Dec. 21, 1905.....	11, 000, 000. 00
	21, 000, 000. 00

Deficiency for fiscal year 1906 (act of Feb. 27, 1906) :

Miscellaneous material purchases in United States-----	\$1, 000, 000. 00	
Miscellaneous material purchases on Isthmus-----	400, 000. 00	
Payments to Panama Railroad Company--	200, 000. 00	
Isthmus pay rolls-----	2, 100, 000. 00	
Salaries and services in the United States--	75, 000. 00	
New equipment purchases-----	1, 565, 786. 00	
Reequipment of Panama Railroad-----	650, 000. 00	
		\$5, 990, 786. 00

Classified appropriations 1907-1919:

Expenses in the United States—		
Salaries-----	1, 476, 056. 33	
Incidental expenses-----	583, 179. 36	
		2, 059, 235. 69
Construction and engineering—		
Pay of officers and employees-----	29, 443, 212. 00	
Pay of skilled and unskilled labor-----	101, 809, 961. 00	
Miscellaneous material purchases, etc--	109, 881, 514. 24	
Incidental expenses on Isthmus-----	6, 640, 250. 00	
		247, 774, 937. 24
Civil administration—		
Pay of officers and employees-----	4, 507, 000. 00	
Pay of skilled and unskilled laborers--	191, 000. 00	
Material and expenses-----	1, 178, 200. 00	
		5, 876, 200. 00
Sanitary department—		
Pay of officers and employees-----	5, 391, 000. 00	
Pay of skilled and unskilled laborers--	3, 036, 968. 00	
Material and expenses-----	5, 662, 367. 15	
		14, 090, 335. 15
Reequipment of Panama Railroad-----		4, 185, 000. 00
Relocation of Panama Railroad-----		7, 815, 000. 00
Redemption of first-mortgage bonds of Panama Railroad Company-----		2, 298, 367. 50
Sanitation in cities of Panama and Colon-----		800, 000. 00
Survey of lands, Canal Zone-----		75, 000. 00
Relief of Pembroke B. Benton for injuries-----		10, 000. 00
Construction and equipment-----		23, 598, 190. 00
Private acts for relief—		
Elizabeth G. Martin, June 17, 1910----	\$1, 200. 00	
Marcellus Troxell, Jan. 13, 1911-----	1, 500. 00	
W. L. Miles, Feb. 13, 1911-----	1, 704. 18	
Chas. A. Caswell, Mar. 2, 1911-----	1, 056. 00	
Heirs of Robert S. Gill, July 3, 1912---	2, 520. 00	
Douglas B. Thompson, July 3, 1912---	1, 500. 00	
Allesandra Comba, July 10, 1912-----	500. 00	
Peter Wigginton, Feb. 7, 1913-----	500. 00	
Raymond R. Ridenour, Feb. 7, 1913---	500. 00	
Heirs of Charles B. Stump, Feb. 7, 1913-	1, 500. 00	
Parents of Edward Maher, Feb. 18, 1913	1, 980. 00	
Oscar F. Lackey, Feb. 18, 1913-----	1, 500. 00	
Pedro Sanchez, Feb. 18, 1913-----	2, 000. 00	
John H. Cole, Feb. 18, 1913-----	1, 951. 38	
Robert Coggen, Feb. 18, 1913-----	1, 500. 00	
Wife of William Goodley, July 17, 1914-	1, 000. 00	
John Burrows, Feb. 27, 1915-----	1, 433. 33	
F. W. Theodore Schroeter, Mar. 3, 1915-	1, 397. 66	
L. V. Thomas, Mar. 3, 1915-----	1, 680. 00	
Joseph A. Buckholdt, Aug. 4, 1916---	3, 000. 00	
Olaf Nelson, Aug. 8, 1916-----	1, 200. 00	
		31, 122. 55

## Classified appropriations 1907-1919—Continued.

Judgments of the Court of Claims, War:		
Act of Aug. 26, 1912	-----	\$196.45
Act of Mar. 4, 1913	-----	900.00
Act of July 29, 1914	-----	905.38
Act of Feb. 28, 1916	-----	1,000.00
Act of Sept. 8, 1916	-----	2,537.20
	-----	
Judgment, United States Court (act of Apr. 6, 1914)	-----	\$5,539.03
Presenting steam launch <i>Louise</i> to French Government (act of Aug. 25, 1914)	-----	9,489.76
	-----	6,000.00
	-----	
Total for canal construction, rights, etc., to June 30, 1919		385,625,202.92
Fortifications:		
Aeronautic stations	-----	\$250,000.00
Aviation seacoast defenses	-----	500,000.00
Armament of fortifications	-----	14,023,000.00
Army quarters, storehouses, etc.	-----	8,223,069.70
Buildings and materials	-----	57,375.00
Cantonment construction	-----	500,000.00
Causeway	-----	150,000.00
Construction of sea walls and embankments	-----	63,000.00
Electric light and power plants	-----	301,631.00
Field fortifications and camps	-----	394,350.00
Fire control	-----	976,190.15
Land for military purposes	-----	50,000.00
Land defenses	-----	45,100.00
Maintenance of clearings and trails	-----	176,900.00
Maintenance, etc., of fire-control installations	-----	45,000.00
Maintenance of searchlights and electric power equipment	-----	57,500.00
Ordnance depot	-----	392,400.00
Preservation and repair of fortifications	-----	99,400.00
Protecting Panama Canal and structures	-----	450,000.00
Reserve equipment for fortifications	-----	57,500.00
Sanitary clearing, filling, etc.	-----	210,000.00
Seacoast batteries	-----	6,447,500.00
Searchlights for seacoast fortifications	-----	601,840.00
Sites for seacoast fortifications	-----	155,000.00
Submarine mines	-----	668,316.00
Submarine mine structures	-----	322,200.00
Submarine base	-----	1,652,625.00
Surveys	-----	62,000.00
	-----	
		36,931,896.85
Annual payment to Republic of Panama:		
Act of Mar. 4, 1913	-----	250,000.00
Act of Apr. 6, 1914	-----	250,000.00
Act of Jan. 25, 1915	-----	250,000.00
Act of Feb. 28, 1916	-----	250,000.00
Act of July 1, 1916	-----	250,000.00
Act of Mar. 3, 1917	-----	250,000.00
Act of Apr. 15, 1918	-----	250,000.00
Act of Apr. 15, 1919	-----	250,000.00
	-----	
		2,000,000.00
Regulating commerce (act of May 20, 1918)	-----	50,000.00
Censorship of foreign mails (act of May 20, 1918)	-----	120,000.00
	-----	
		170,000.00
Maintenance and operation of the canal:		
Maintenance and operation, Panama Canal	-----	28,950,000.00
Sanitation, Canal Zone, Panama Canal	-----	3,150,000.00
Civil government, Panama Canal and Canal Zone	-----	2,590,000.00
Increases of compensation, Panama Canal	-----	26,006.22
	-----	
		34,716,006.22
Total appropriations by Congress to June 30, 1919		459,443,105.99

## DETAIL OF ACTS FOR MAINTENANCE AND OPERATION, SANITATION, CIVIL GOVERNMENT, AND CONSTRUCTION AND EQUIPMENT.

	Maintenance and operation.	Sanitation, Canal Zone.	Civil government, Panama Canal, Canal Zone.	Total.	Construction and equipment.
Act of Mar. 3, 1915.....	\$5,200,000.00	\$700,000	\$540,000	\$6,440,000.00	\$10,500,000
Act of July 1, 1916.....	5,750,000.00	700,000	600,000	7,050,000.00	9,750,000
Act of June 12, 1917.....	9,000,000.00	700,000	700,000	10,400,000.00	2,755,000
Act of Mar. 28, 1918.....					593,190
Act of June 4, 1918.....		150,000		150,000.00	
Act of July 1, 1918.....	9,000,000.00	900,000	750,000	10,650,000.00	
Increases of compensation, Panama Canal, 1918, act of July 12, 1917.....	10,006.22			10,006.22	
Increases of compensation, Panama Canal, 1919, act of July 3, 1918.....	16,000.00			16,000.00	
Total.....	28,976,006.22	3,150,000	2,590,000	34,716,006.22	23,598,190
Amount appropriated for construction but used for maintenance and operation and not chargeable against authorized bond issue (act of Aug. 1, 1914, sec. 12):					
Maintenance and operation prior to July 1, 1915.....				4,289,159.00	
Stock of material for maintenance and operation.....				2,225,000.00	
Total for maintenance and operation.....				41,230,165.22	
Act of July 19, 1919.....	7,547,939.00	850,000	702,000	9,099,939.00	729,898

TABLE No. 4.—Detail of miscellaneous receipts, United States funds.

	Fiscal year 1919.	Total to date.
Receipts involving no appropriation expenditures:		
Subsidies from Panama Railroad Company.....		\$631,875.00
Dividends on Panama Railroad stock.....		344,945.00
Interest on reequipment loan.....		320,799.11
Interest on first mortgage bond loan.....		152,395.16
Interest on public works, Panama and Colon.....	\$39,987.65	361,309.00
Interest on Zone water-supply systems, proportion.....	13,440.88	110,198.08
Interest on bank balances.....		23,147.30
Miscellaneous rentals.....		238,650.08
Overages.....	5.04	510.70
Forfeitures.....		28.00
Salvaging steamship Moselle.....		210.50
Miscellaneous.....	135.31	155.41
Total.....	53,568.88	2,184,223.34
Receipts involving expenditures from appropriations:		
Not credited to assets—		
Capital cost, Panama waterworks and sewers.....	13,819.04	67,934.48
Capital cost, Panama pavements.....	11,837.22	58,818.77
Capital cost, Colon waterworks and sewers.....	13,101.24	65,182.82
Capital cost, Colon pavements.....	13,036.07	60,897.90
Tolls.....	6,156,118.95	24,810,499.11
Licenses and taxes.....	11,033.23	53,022.65
Court fees and fines.....	19,849.62	74,444.27
Post receipts.....	104,861.82	406,827.79
Miscellaneous, Canal Zone.....	1,126.10	4,349.67
Total.....	6,344,783.29	25,601,977.46
Credited to assets:		
Sale of property.....		850,500.11
Sale of French material and equipment.....	5,933.47	123,663.50
Sale of Panama Canal Building in city of Panama.....		80,000.00
Sale of water.....		255.43
Messaccounts.....		46,879.48



TABLE NO. 4.—Detail of miscellaneous receipts, United States funds—Continued.

	Fiscal year 1919.	Total to date.
Credited to assets—Continued.		
Hospital receipts.....		\$79,992.68
Quarantine receipts.....		24,900.53
Laundry receipts.....		7,382.01
Rental of lands and buildings.....		41,427.24
Rentals, miscellaneous.....		137,822.99
Telegraph and telephone receipts.....		3,547.35
Hotels and messes.....		758,470.34
Hotel coupon books.....		32,238.28
Corral receipts.....		8,628.56
Labor furnished Panama Railroad Company.....		189,336.97
Other labor furnished.....		27,449.55
Repayments, reequipment loan.....		1,387,714.92
Repayments, first mortgage bond loan.....		300,000.00
Sale of Panama Railroad stock.....		1,300.00
Miscellaneous.....		93,805.47
Sale of construction material and equipment.....	\$44,863.67	\$41,761.49
Profit on business operations.....	61,027.26	118,512.92
Forfeitures by contractors.....		12,293.52
Total.....	111,824.40	5,158,883.34
Grand total.....	6,510,176.57	32,945,084.14
Miscellaneous receipts deposited in United States Treasury.....		32,614,848.03
Cash on hand June 30, 1919.....		177,556.27
Amount of water rentals, Panama and Colon, credited to miscellaneous receipts.....	724,341.05	
Amount of water rentals, Panama and Colon, deposited as miscellaneous receipts.....	679,981.72	
Profit on business operations, 1919, not transferred to miscellaneous receipts.....		44,359.33
Unpaid bills.....		61,027.26
		47,293.25
Total.....		32,945,084.14

TABLE NO. 5.—Statement of overhead expenses, fiscal year 1919.

	Fiscal year—	
	1919	1918
Civil Government:		
Civil affairs—		
Administration.....	\$13,086.07	\$10,104.59
Posts.....	163,192.64	163,915.39
Customs.....	57,453.21	28,503.61
Estates.....	82.03	69.93
Total civil affairs.....	235,813.95	202,593.52
Schools.....	150,380.02	141,091.67
Fire protection.....	81,147.93	85,924.22
Police and prisons.....	293,498.08	265,000.57
District courts.....	17,585.52	17,852.02
Magistrate courts.....	12,551.49	13,025.65
District attorney.....	6,877.77	8,443.06
Canal Zone marshal.....	8,069.16	7,711.91
Municipal expenses.....	43.62	45.27
Total civil government.....	805,967.54	741,687.89
Charged to other interests.....	98,372.23	63,455.01
Amount apportioned.....	707,595.31	678,232.88
Health department:		
Administration.....	20,510.68	11,564.64
Medical storehouse.....	16,242.98	16,696.23
Ancon Hospital.....	477,691.53	455,553.30
Colon Hospital.....	82,128.85	70,208.71
Santo Tomas Hospital.....	14,792.00	12,608.64
Palo Seco Leper Asylum.....	33,091.52	29,687.78
Corozal Farm and Insane Asylum.....	110,046.58	92,159.80
Other hospitals and dispensaries.....	35,491.14	47,530.07
Quarantine service.....	64,850.55	85,988.04

TABLE NO. 5.—Statement of overhead expenses, fiscal year 1919—Continued.

	Fiscal year—	
	1919	1918
<b>Health department—Continued.</b>		
Sanitation:		
Panama.....	\$67,308.05	\$52,531.08
Colon.....	57,734.72	42,701.49
Canal Zone.....	161,505.57	114,736.91
Street cleaning and disposal of garbage:		
Panama.....	73,004.73	61,785.26
Colon.....	37,182.98	31,155.62
Total health department.....	1,251,584.88	1,124,907.57
Charged to other interests.....	605,249.42	489,053.54
Amount apportioned.....	646,335.46	635,854.03
<b>Supply department:</b>		
Maintenance and care of administration building.....	33,186.97	29,946.21
Operation of storehouses.....	526,592.10	548,072.20
Repairs to storehouses.....	4,608.30	1,671.35
Handling freight on docks.....	825,009.58	16,611.69
Operation of quarters.....	57,619.39	479,708.59
Material stock losses.....	314,708.62	55,695.64
Repairs to quarters.....	185,157.71	202,851.04
Inventory adjustments.....	6,283.16	149,659.28
Repairs to other buildings.....	133,086.35	27,948.25
United States bills, adjustments.....	5,208.03	13,587.13
Aneon nursery.....		9,212.34
Total.....	1,665,933.03	1,318,470.90
Charged to other interests.....	202,902.59	219,194.98
Amount apportioned.....	1,463,030.44	1,099,275.92
<b>Accounting department:</b>		
Accounting office.....	378,040.76	370,478.48
Paymaster's office.....	50,290.35	50,778.13
Collector's office.....	43,945.32	38,461.64
Total.....	472,276.43	459,718.25
Charged to other interests.....	167,266.73	164,815.95
Amount apportioned.....	305,009.70	294,902.30
<b>Washington office:</b>		
Assistant auditor's office.....	42,261.78	37,532.26
Disbursing clerk's office.....	12,164.76	10,265.71
General bureau.....	67,098.89	52,215.88
Purchasing expenses.....	213,107.31	184,566.69
Total.....	334,632.74	284,580.54
Charged to other interests.....	6,834.60	3,627.52
Amount apportioned.....	327,798.14	280,953.02
<b>Miscellaneous:</b>		
Transportation of employees on Isthmus.....	141,300.00	141,667.20
Recruiting and repatriating.....	48,857.31	43,064.35
Compensation to injured employees.....	1,710.88	5,523.39
Land office.....	10,175.68	11,902.64
Special attorney.....	8,584.21	11,241.78
Payments to deported alien cripples.....	3,350.00	2,925.00
Total.....	213,978.08	216,324.36
Charged to other interests.....	19,084.21	24,085.55
Amount apportioned.....	194,893.87	192,238.81
<b>Administration:</b>		
Executive office—		
Executive.....	47,404.74	33,753.66
Miscellaneous bureaus—		
Correspondence.....	45,941.17	45,614.14
Record bureau.....	51,255.53	48,195.94
Personnel bureau.....	27,667.22	25,367.10
Property and requisition bureau.....	29,022.85	31,126.07
General bureau.....	62,093.81	51,287.82
Timekeeping bureau.....	89,738.34	95,720.27
Clubs and playgrounds.....	122,956.62	90,434.79
Canal Record.....	10,154.46	8,669.36
Official motor cars.....	16,596.80	17,600.70
Cablegrams and radiograms.....	9,721.03	9,017.64

1 Indicates credit.

TABLE NO. 5.—Statement of overhead expenses, fiscal year 1919—Continued.

	Fiscal year—	
	1919	1918
<b>Administration—Continued.</b>		
Executive office—Continued.		
Miscellaneous.....	\$1,352.52	\$5,369.01
Bureau of statistics.....	13,193.21	13,235.38
Total executive office.....	527,098.30	475,391.88
Charged to other interests.....	111,045.92	109,872.19
Amount apportioned.....	416,052.38	365,519.69
<b>Engineer of maintenance:</b>		
Office engineer.....	48,346.07	66,364.45
Surveys.....	38,828.34	28,660.26
Meteorology and hydrography.....	33,920.22	29,174.28
Total.....	121,094.63	124,198.99
Charged to other interests.....	45,932.35	66,420.88
Amount apportioned.....	75,162.28	57,778.11
<b>Electrical division:</b>		
Lights, street, lodge halls and churches.....	6,797.29	7,802.40
Amount apportioned.....	6,797.29	7,802.40
<b>Municipal engineering:</b>		
Operation and maintenance of waterworks.....	418,556.79	403,329.40
Repairs to sewer system.....	22,027.25	18,851.91
Repairs to roads.....	439,374.24	346,923.51
Total.....	879,958.28	769,104.82
Charged to other interests.....	468,842.99	245,418.84
Amount apportioned.....	411,115.29	523,685.98
<b>Grand total—administration.....</b>	<b>4,221,768.78</b>	<b>3,655,592.14</b>
Charged to other interests.....	1,021,909.39	833,435.91
Amount apportioned.....	3,199,859.39	2,822,156.23
Total overhead expenses.....	6,279,321.20	5,522,187.60
Charged to other interests.....	1,725,531.04	1,385,944.46
Total amount apportioned.....	4,553,790.16	4,136,243.14
<b>Distribution:</b>		
Operation and maintenance of canal.....	3,382,167.30	2,826,651.32
Construction of canal.....	149,510.97	416,529.24
Fortifications.....	119,385.48	213,686.63
Business operations.....	724,472.09	627,211.16
Expenses of sales—construction, material and equipment.....	61,529.17	28,788.92
Public works in cities of Panama and Colon.....	5,795.25	436.35
Repairs to steamships <i>Ancon</i> and <i>Cristobal</i> .....	121.86	21,958.07
Village—New Chagres.....		981.45
Censorship of mails.....	9,316.70	
Regulation of commerce.....	3,015.15	
Capital additions.....	98,476.19	
Total.....	4,553,790.16	4,136,243.14

TABLE NO. 6.—Panama Canal operation and maintenance to June 30 1919.

	Fiscal year 1918.	Fiscal year 1919.	Total to date.
<b>Marine division:</b>			
Admeasurement of vessels.....	\$16,167.58	\$21,650.91	\$70,150.15
Local inspection.....	3,940.34	4,104.76	21,315.00
Aids to navigation.....	82,855.73	98,857.28	387,256.99
Pilotage.....	95,237.08	128,416.96	430,090.08
Operation of harbor tugs—balance.....	58,285.37	74,343.04	238,407.67
Operation of port captain's office—balance.....	36,975.53	53,800.48	116,896.92
Assisting vessels through cut.....	84.65		6,118.03
<b>Total marine division.....</b>	<b>293,546.28</b>	<b>381,173.43</b>	<b>1,271,134.84</b>

TABLE No. 6.—Panama Canal operation and maintenance to June 30, 1919—Continued.

	Fiscal year 1918.	Fiscal year 1919.	Total to date.
Locks, operation and maintenance:			
Gatun locks—			
Superintendence.....	\$24,316.13	\$28,748.49	\$102,608.70
Operation.....	132,137.54	155,566.39	580,078.10
Maintenance.....	127,979.14	142,643.16	734,860.68
Total Gatun locks.....	284,432.81	326,958.04	1,417,547.48
Gatun spillway.....	11,602.24	6,226.22	69,596.51
Pedro Miguel locks:			
Superintendence.....	17,846.54	22,429.48	92,536.15
Operation.....	94,867.83	156,080.69	442,853.29
Maintenance.....	93,176.86	53,027.12	449,415.97
Total Pedro Miguel locks.....	205,891.23	231,537.29	984,805.41
Pedro Miguel dams.....			168.96
Miraflores locks:			
Superintendence.....	18,682.42	17,613.67	96,023.48
Operation.....	145,067.82	170,423.13	591,667.66
Maintenance.....	77,927.05	123,593.92	549,066.29
Total Miraflores locks.....	241,677.29	311,630.72	1,236,787.43
Miraflores spillway and east dam.....	1,357.43	753.68	17,396.37
Miraflores west dam—maintenance.....			832.37
Total lock operation and maintenance.....	744,961.00	877,105.95	3,727,134.53
Dredging:			
Atlantic entrance.....	7,577.76	6,868.56	189,352.14
Gatun Lake.....		12,530.77	12,973.65
Gaillard Cut.....	1,456,297.08	684,563.67	9,899,721.04
Miraflores Lake.....			85,277.96
Pacific entrance.....	262,928.70	448,225.99	875,790.62
Total dredging.....	1,726,803.54	1,152,188.99	11,063,115.41
Gatun dam, maintenance.....	8,202.78	17,707.93	110,803.79
Removal of floating obstructions.....	36,014.71	22,578.72	133,227.66
Gatun-Mindi levee, maintenance.....	32.31		31,326.04
Colon west breakwater, maintenance.....	1,419.29		81,523.46
Naos Island breakwater, maintenance.....			14,193.55
Damages to vessels in locks.....	5,950.09	5,789.70	12,668.93
Damages to vessels in canal.....	20,574.73	10,949.49	38,708.56
Operation of floating derricks.....	148,889.03	77,591.81	530,373.25
Maintenance of transportation tracks.....	55,906.20	55,022.49	219,976.92
Dry excavation, Rio Grande.....	37,606.99		37,606.99
Shop expense, Balboa, balance.....			19,158.55
Capital losses.....		108,108.69	124,731.94
Capital replacements.....		21,810.27	21,810.27
Loss on business operations.....			61,823.17
Total, operation and maintenance.....	3,077,068.37	2,730,027.47	17,499,317.86
Proportion of overhead expenses.....	2,826,651.32	3,382,167.30	12,610,176.60
Total.....	5,903,719.69	6,112,194.77	30,109,494.46
Revenues:			
Tolls.....	6,454,198.35	6,156,118.95	24,810,499.11
Licenses and taxes, fees, fines, etc.....	140,918.01	136,870.77	561,791.68
Profit on business operations.....	6,159.56	61,027.26	118,512.92
Total revenues.....	6,601,275.92	6,354,016.98	25,490,803.71
Revenues in excess of expenses.....	697,556.23	241,822.21	
Expenses in excess of revenues earned.....			4,618,690.75

<sup>1</sup> Indicates credit.

TABLE No. 7.—Statement of profit and loss on business operations for fiscal year ending June 30, 1919.

	Cost.	Revenues.	Profit or loss.
<b>DEPARTMENT OF OPERATION AND MAINTENANCE.</b>			
Construction and repairs.....	\$2,680,190.78	\$2,690,745.11	\$10,554.33
Shopwork.....	3,959,221.08	3,948,116.31	<sup>1</sup> 11,104.77
Electric work.....	318,602.82	321,791.43	3,188.61
Electric currents.....	124,030.52	129,182.86	5,152.34
Train service and use of rolling equipment.....	1,337.17	1,293.88	<sup>1</sup> 43.29
Tug service.....	288,675.36	240,106.23	<sup>1</sup> 48,569.13
Service of other floating equipment.....	39,637.70	37,324.74	<sup>1</sup> 2,312.96
Pilotage.....	39,680.91	37,829.15	<sup>1</sup> 1,851.76
Wharriage.....	10,049.75	18,843.38	8,793.63
Sales of water.....	194,138.81	219,875.93	25,737.12
Panama water works.....	87,994.92	87,994.92	.....
Panama pavements.....	22,754.54	22,754.54	.....
Colon waterworks.....	62,458.06	62,458.06	.....
Colon pavements.....	9,429.19	9,429.19	.....
Handling lines on docks.....	27,132.10	.....	<sup>1</sup> 27,132.10
Handling lines on locks.....	38,150.05	29,466.00	<sup>1</sup> 8,684.05
Steamship inspection.....	1,237.54	3,013.02	1,775.48
Dredging.....	31,102.97	31,102.97	.....
Minor services, supplies and property.....	89,827.29	87,506.79	<sup>1</sup> 2,320.50
Dry dockage—Balboa.....	99,042.91	150,441.61	51,398.70
Dry dockage—Cristobal.....	21,229.64	19,891.25	<sup>1</sup> 1,338.39
<b>Total, Department of Operation and Maintenance.</b>	<b>8,145,924.11</b>	<b>8,149,167.37</b>	<b>3,243.26</b>
<b>SUPPLY DEPARTMENT.</b>			
Subsistence:			
Hotel Tivoli.....	170,045.52	161,072.47	<sup>1</sup> 8,973.05
Hotel Aspinwall.....	52,183.71	44,833.91	<sup>1</sup> 7,349.80
Line hotels.....	670,275.66	597,106.96	<sup>1</sup> 73,168.70
Messes.....	138,403.93	133,943.21	<sup>1</sup> 4,460.69
Minor services, supplies and property.....	.....	377.50	377.50
<b>Total, subsistence.....</b>	<b>1,030,908.82</b>	<b>937,334.08</b>	<b><sup>1</sup> 93,574.74</b>
<b>QUARTERMASTER.</b>			
Material from stock.....	1,852,344.18	1,883,765.53	31,421.35
Fuel oil.....	963,791.13	1,161,573.74	197,782.61
Rock, sand, gravel and screenings.....	24,277.65	24,277.65	.....
Printing and binding.....	65,497.38	65,995.12	497.74
Corral.....	96,178.74	98,216.23	2,037.49
Rental of gold quarters.....	2,386.74	2,386.74	.....
Rental of silver quarters.....	113,822.86	115,280.67	1,457.81
Garage rental.....	2,407.69	7,211.87	4,804.18
Ancon nursery.....	5,187.28	5,187.28	.....
Handling fuel oil.....	46,174.47	44,667.90	<sup>1</sup> 1,506.57
Operation of stores.....	54,000.00	54,000.00	.....
Operation of quarters.....	87,000.00	87,000.00	.....
Minor services, supplies and property.....	113,636.46	112,298.66	<sup>1</sup> 1,337.80
<b>Total, quartermaster.....</b>	<b>3,426,704.58</b>	<b>3,661,861.39</b>	<b>235,156.81</b>
<b>ACCOUNTING DEPARTMENT.</b>			
Lost metal checks.....	34.30	783.00	748.70
Cablegrams.....	2,486.20	3,690.02	1,203.82
Service to Panama Railroad Company.....	159,610.67	159,615.68	5.01
Safety deposit boxes.....	357.00	357.00	.....
<b>Total, accounting department.....</b>	<b>162,488.17</b>	<b>164,445.70</b>	<b>1,957.53</b>
<b>HEALTH DEPARTMENT.</b>			
Ancon Hospital:			
Fees.....	327,766.71	190,996.32	<sup>1</sup> 136,770.39
Mess.....	15,723.17	15,723.17	.....
Burials.....	6,821.67	6,821.67	.....
Miscellaneous.....	421.45	421.45	.....
Colon Hospital:			
Fees.....	41,652.84	32,746.42	<sup>1</sup> 8,906.42
Mess.....	5,196.68	5,196.68	.....
Miscellaneous.....	170.50	170.50	.....
Palo Seco Asylum.....	21,327.38	13,765.25	<sup>1</sup> 7,562.13
Line dispensaries.....	2,778.75	2,778.75	.....
Quarantine:			
Subsistence.....	22,273.32	37,151.98	14,878.66
Other charges.....	7,057.43	12,592.41	5,534.98
Sanitation:			
Panama.....	10,453.66	10,453.66	.....
Colon.....	15,860.93	15,860.93	.....
Zone.....	17,999.35	17,909.35	.....

<sup>1</sup> Indicates credit.

TABLE No. 7.—Statement of profit and loss on business operations, etc.—Con.

	Cost.	Revenues.	Profit or loss.
HEALTH DEPARTMENT—continued.			
Street cleaning:			
Panama.....	\$64,945.65	\$64,945.65	.....
Colon.....	19,212.66	19,212.66	.....
Corozal Hospital:			
Produce.....	16,484.43	16,484.43	.....
Pasturage.....	129.00	129.00	.....
Burials.....	650.00	650.00	.....
Insane Asylum.....	52,371.66	83,803.18	\$31,431.52
Sales from medical store.....	33,031.74	37,595.19	4,563.45
Dental service.....	5,244.98	4,979.00	1,265.98
Miscellaneous.....	718.94	718.94	.....
Total, health department.....	688,202.90	591,106.59	1 97,096.31
CIVIL GOVERNMENT.			
School tuition.....	4,049.19	4,049.19	.....
Sale of school books.....	714.67	694.74	1 19.93
Police service.....	31,800.00	31,800.00	.....
Postal service.....	4,794.24	4,794.24	.....
Minor services, supplies and property.....	4,643.84	4,604.19	1 39.65
Total, civil government.....	46,001.94	45,942.36	1 59.58
EXECUTIVE DEPARTMENT.			
Service to Panama Railroad Company.....	81,756.57	81,773.83	17.26
Photographs and prints.....	1,833.83	1,833.83	.....
Motor car service.....	7,285.28	7,255.28	1 30.00
Minor services, supplies and property.....	248.56	247.83	1.73
Canal Record.....	111.80	221.60	109.80
Lost photograph identification checks.....	124.85	226.98	102.13
Total, executive department.....	91,360.89	91,559.35	198.46
MISCELLANEOUS.			
Land rental.....	12,591.24	15,097.52	2,506.28
Building rental.....	1,135.59	7,486.34	6,350.75
Land office expense.....	10,500.00	10,500.00	.....
Rental, Pier No. 18.....	7,697.04	9,999.98	2,302.94
Boathouse rental.....	338.64	380.50	41.86
Total, miscellaneous.....	32,262.51	43,464.34	11,201.83
Total.....	13,623,853.92	13,684,881.18	61,027.26

1 Indicates credit.

TABLE No. 8.—Detail of equipment.

FLOATING EQUIPMENT:		
Steamships <i>Ancon</i> and <i>Cristobal</i> .....	\$1,444,357.31	
Colliers <i>Ulysses</i> and <i>Achilles</i> .....	2,024,440.87	
Tugs and supply boats.....	947,680.69	
Launches.....	187,927.87	
Clapnets.....	10,000.00	
Dredges.....	1,649,098.60	
Barges.....	1,221,204.74	
Floating cranes <i>Ajax</i> and <i>Hercules</i> .....	906,212.71	
Miscellaneous floating equipment.....	201,573.66	
Total floating equipment.....		\$8,592,496.45
OTHER EQUIPMENT:		
Automobiles and trucks.....	131,487.35	
Cranes.....	226,077.02	
Motor cars.....	11,250.00	
Road rollers.....	27,781.00	
Miscellaneous (Gamboa crusher and gravel plants).....	59,686.09	
Total other equipment.....		456,281.46
MACHINERY AND TOOLS:		
Electrical division.....	9,327.49	
Municipal engineering division.....	30,595.62	
Mechanical division.....	265,645.74	
Building division.....	18,971.42	
Subsistence.....	86,384.69	
Panama Canal press.....	2,972.19	
Total machinery and tools.....		413,897.15
Total.....		493,981.68
Total.....		9,462,675.06

TABLE No. 9.—*Detail of work in progress.*

Uncompleted work, mechanical division-----	\$408,684.80
Uncompleted work, other divisions-----	76,235.08
McClintic-Marshall lock gate claim-----	9,061.80

TABLE No. 10.—*Detail of material and supplies.*

Balboa store-----	\$4,047,019.38
Cristobal store-----	749,228.42
Paraiso store-----	919,458.67
Medical store-----	153,234.82
Stationery store, administration buildings-----	21,301.09
Printing plant store-----	97,700.58
Fuel oil-----	285,744.32
District quartermaster's store:	
Cristobal-----	\$5,409.45
Gatun-----	25,383.46
Paraiso-Pedro Miguel-----	2,248.06
Balboa-Ancon-----	6,108.03
	39,149.00
Total, quartermaster stores-----	\$6,312,836.28
Containers in transit-----	13,263.01
Obsolete store-----	150,212.70
Material drawn by divisions not yet charged to work-----	879,022.45
Total-----	7,355,334.44
Less price adjustments, unpaid invoices, etc-----	355,197.86
Net book value, material and supplies-----	7,000,136.58

TABLE No. 11.—*Detail of assets received from the Canal Zone Government.*

School buildings-----	\$72,115.00
Roads-----	451,887.50
Waterworks and sewer system-----	18,500.00
Stationery stock-----	2,167.04
Miscellaneous-----	122.83
Total-----	544,792.37

TABLE No. 12.—*Detail of assets transferred to other departments of the United States Government.*

To Army on Canal Zone:	
Buildings—	
Corozal-----	\$206,552.25
Cristobal-----	22,261.51
Culebra-----	244,586.41
Empire-----	368,606.67
Gatun-----	51,925.15
Las Cascadas-----	126,416.00
Margarita Island-----	375.50
Toro Point-----	24,076.24
	\$1,044,799.73
Roads-----	249,200.00
Water works and sewer systems-----	361,550.00
Railroad tracks, Fort Amador-----	8,773.00
Chagres village-----	34,846.27
To State Department, legation building, city of Panama-----	22,256.00
To Alaskan Engineering Commission-----	311,463.33
To Army and Navy on Canal Zone, boat house, Colon-----	1,649.61
Total-----	2,034,537.94

TABLE No. 13.—*Detail of Panama Canal equipment and property operated by the Panama Railroad.*

Locomotives-----	\$335,917.73
Steel flat cars-----	258,754.62
Oliver dump cars-----	226,292.90
Lidgerwood flat cars-----	85,307.22
Floating equipment (barges)-----	73,164.66
Other miscellaneous equipment-----	55,182.83
Wooden docks, Cristobal-----	62,000.00
Steamships:	
Panama-----	\$400,000.00
Colon-----	400,000.00
Caribbean-----	157,304.60
Culebra-----	109,325.00
	1,066,629.60
Total-----	2,163,249.56

TABLE No. 14.—Detail of Panama Railroad equipment and property operated by The Panama Canal.

Floating equipment.....	\$39,480.00
Other equipment.....	19,820.32
Buildings and structures.....	414,554.78
Concrete dock, Balboa.....	373,742.10
Scrap turned over for sale.....	36,730.77
Total.....	\$84,327.97

TABLE No. 15.—Detail of reserves for gratuity, depreciation, and repairs.

Gratuity:		
Building division.....	\$100,678.79	
Electrical division.....	84,230.60	
Mechanical division.....	250,715.04	
Municipal engineering division.....	48,771.56	
Fortifications.....	26,325.53	
Censorship of mails.....	3,223.99	
Miscellaneous.....	288,940.06	
		\$802,885.57
Depreciation:		
Equipment—		
Tugs and supply boats.....	258,907.27	
Launches.....	43,063.08	
Clapnets.....	3,768.40	
Dredges.....	468,024.38	
Barges.....	410,217.18	
Floating cranes.....	121,050.00	
Miscellaneous—		
Crane boat <i>La Valley</i> .....	\$8,795.34	
Graders 1, 2, and 3.....	27,058.28	
Pile driver No. 2.....	1,203.19	
Coal hoist No. 1.....	1,062.76	
Air compressor.....	6,674.00	
	44,793.57	
Total, floating equipment.....		1,349,823.88
Automobiles and trucks.....	48,003.92	
Cranes.....	73,733.88	
Railroad motor cars.....	2,140.00	
Road rollers.....	13,890.50	
Total other equipment.....		137,768.30
Buildings—		
Balboa store.....	54,341.70	
Cristobal store.....	1,586.54	
Cristobal oil house.....	1,290.00	
Total buildings.....		57,218.24
Structures and plants—		
Atlantic tank farm.....	3,483.55	
Pacific tank farm.....	8,656.46	
Mount Hope fuel-oil plant.....	45,810.00	
Balboa fuel-oil plant.....	63,095.00	
Balboa dry dock.....	99,000.00	
Pier No. 18, Balboa.....	29,567.23	
Transmission system.....	451,028.70	
Total structures and plants.....		691,640.94
Repairs:		
Equipment—		
Tugs and supply boats.....	222,411.06	
Launches.....	7,671.17	
Clapnets.....	1,481.65	
Dredges.....	244,372.42	
Barges.....	98,142.93	
Floating cranes.....	188,769.85	
Miscellaneous:		
Graders 1, 2, and 3.....	5,178.13	
Total floating equipment.....		768,027.21
Railroad motor cars.....	1,465.15	
Road rollers.....	508.72	
Miscellaneous:		
Balboa shops.....	22,562.88	
Total other equipment.....		24,536.75
Buildings:		
Balboa shops.....	20,575.09	
Balboa stores.....	23,781.80	
Cristobal oil house.....	1,237.66	
Total buildings.....		45,594.55



Repairs—Continued.

Structures and plants:

Balboa fuel oil plant.....	\$57, 542. 24
Mount Hope fuel oil plant.....	41, 863. 64
Balboa and Mount Hope baseball parks.....	1, 100. 94
Transmission system.....	15, 747. 14

Total structures and plants..... \$116, 253. 96

Grand total..... 3, 993, 749. 40

Recapitulation:

Gratuity..... 802, 885. 57

Depreciation:

Equipment.....	\$1, 487, 592. 18
Structures.....	748, 859. 18

2, 236, 451. 36

Repairs:

Equipment.....	792, 563. 96
Structures.....	161, 848. 51

954, 412. 47

TABLE NO. 16.—Construction of canal, fiscal year 1919, and to June 30, 1919.

[Amounts include canal overhead.]

	Fiscal year 1919.	To June 30, 1919.
CANAL CONSTRUCTION.		
Prism excavation:		
Gatun to sea.....		\$11, 932, 801. 89
Gatun to Pedro Miguel (Table No. 24).....	\$33, 892. 19	107, 534, 849. 33
Pedro Miguel to sea (Table No. 24).....	149, 297. 54	18, 390, 463. 30
Total prism excavation.....	183, 189. 73	137, 858, 114. 52
Gatun locks.....	1, 372. 97	35, 851, 186. 28
Pedro Miguel locks.....	1 110. 71	15, 768, 904. 62
Miraflores locks.....	1 677. 54	23, 121, 171. 50
Gatun spillway.....		4, 101, 671. 11
Miraflores spillway and east dam.....		1, 326, 906. 40
Gatun dam.....		9, 871, 635. 81
Gatun-Mindi levee.....		141, 329. 45
Trinidad River dam.....		66, 713. 27
Pedro Miguel dams.....		433, 835. 38
Miraflores west dam.....		1, 165, 516. 74
La Boca locks and dams (abandoned).....		751, 748. 32
Colon east breakwater.....		3, 785, 604. 79
Colon west breakwater.....		4, 291, 747. 21
Naos Island breakwater.....		1, 020, 666. 41
Aids to navigation.....		818, 697. 37
Improvements, Cristobal Harbor.....	32, 103. 18	32, 103. 18
Total canal.....	32, 687. 90	102, 549, 437. 84
AUXILIARY WORKS.		
Power producing and transmitting system (Table No. 23):		
Gatun hydroelectric plant.....	79, 741. 98	1, 644, 333. 95
Miraflores steam electric plant.....		307, 485. 78
Substations, transmission, and distribution lines.....	28, 501. 59	3, 573, 733. 56
Street lighting, town sites.....	2 65, 989. 54	65, 989. 54
Underground duct system—town sites.....	2 315, 734. 45	315, 734. 45
Total power producing and transmitting system.....	489, 967. 56	5, 907, 277. 28
Pacific terminals (Table No. 20):		
Coaling station.....		2, 289, 394. 44
Fuel oil plant.....		404, 093. 48
Dry dock.....	1 4, 059. 62	3, 532, 236. 83
Docks.....	11, 521. 34	3, 183, 797. 38
Dredging inner harbor.....	331, 951. 65	3, 025, 745. 32
Entrance basin.....		489, 180. 39
Preparatory work.....		1, 808, 921. 65
Total Pacific terminals.....	339, 413. 37	14, 733, 669. 49
Atlantic terminals (Table No. 19):		
Coaling station.....	6, 907. 50	3, 679, 797. 59
Fuel oil plant.....	2, 650. 05	238, 488. 92
Dry dock.....		73, 475. 51
Docks.....	827, 330. 19	2, 084, 524. 86
Total Atlantic terminals.....	836, 887. 74	6, 076, 286. 88
Gatun dock.....		8, 951. 33

TABLE NO. 16.—Construction of canal, fiscal year 1919, and to June 30, 1919—Con.

	Fiscal year 1919.	To June 30, 1919.
AUXILIARY WORKS—continued.		
Permanent town sites (Table No. 21):		
Cristobal.....	<sup>1</sup> \$228,602.63	\$122,040.71
Gatun.....	<sup>1</sup> 21,053.73	1,704.70
Pedro Miguel.....	<sup>1</sup> 89,489.96	91,709.06
Red Tank.....	<sup>1</sup> 22,564.21	2,614.43
Balboa-Ancon.....	<sup>1</sup> 1,059,681.68	582,063.04
La Boca.....	<sup>1</sup> 69,356.81	123,206.13
Total permanent town sites.....	<sup>1</sup> 1,490,749.02	923,338.07
Buildings (Table No. 22):		
Designing and preliminary expenses.....	<sup>1</sup> 73,992.05	<sup>1</sup> 759.15
Offices—		
Administration, Balboa.....	21,246.50	1,224,847.51
Administration, Santa Rosa.....		130,892.39
Balboa shops.....		238,553.94
Balboa terminals.....		80,634.42
Shops—		
Balboa.....	2,480.49	3,801,692.24
Cristobal.....		145,460.61
Storehouses.....		1,087,532.43
Hotels and mess halls.....	17,273.73	535,726.99
Gold quarters.....	177,180.14	4,801,173.40
Silver quarters.....	144.22	607,820.78
Ancon Hospital.....	144,668.80	1,499,582.42
Colon Hospital.....	37.63	248,975.54
Dispensaries.....	685.01	161,213.97
Asylums.....		184,073.47
Quarantine stations.....		72,469.36
Medical storehouses.....		25,471.15
Miscellaneous buildings, health department.....	8,341.70	55,060.93
Post offices.....		35,982.62
Schoolhouses.....	3,726.10	478,172.71
Courthouses, police stations, jails, etc.....	<sup>1</sup> 335.00	90,119.10
Fluviographs.....		13,709.02
Miscellaneous buildings.....	6,023.41	479,244.98
Total buildings.....	307,480.68	15,997,650.83
Playgrounds, including Balboa grandstand.....	4,200.92	54,474.41
Sanitary fills.....	35,268.44	636,732.11
Sanitary ditches.....	48,728.22	148,027.83
Landscape improvements.....		18,184.36
Waterworks systems:		
Colon-Cristobal.....		585,642.89
Panama-Gamboia.....		1,765,222.58
Other Zone systems—general.....		550,376.89
Other Zone systems—town sites.....	<sup>2</sup> 131,946.43	131,946.43
Total waterworks systems.....	131,946.43	3,033,188.79
Roadways, streets, and walks:		
Roadways.....	43,027.93	359,160.27
Streets.....	<sup>2</sup> 527,283.83	527,283.83
Walks.....	<sup>2</sup> 90,161.03	90,161.03
Total roadways, streets, and walks.....	660,472.79	976,605.13
Zone sewage system:		
General.....		68,457.15
Town sites.....	<sup>2</sup> 358,089.54	358,089.54
Total Zone sewage system.....	358,089.54	426,546.69
Real estate:		
For canal construction and flooded areas.....	12,139.00	891,722.06
For auxiliary works and buildings.....		146,258.94
For depopulation of the Canal Zone.....	114,865.77	1,865,145.12
Total real estate.....	127,004.77	2,903,126.12

<sup>1</sup> Indicates credit.<sup>2</sup> Fiscal year 1919. Expenditures include the transfer of \$1,489,204.82 from Permanent Town Sites for construction of street lighting system, underground duct system, water system, sewage system, streets, and walks.

TABLE No. 16.—Construction of canal, fiscal year 1919, and to June 30, 1919—Continued.

	Fiscal year 1919.	To June 30, 1919.
Miscellaneous:		
Floating caisson.....	\$347,868.15	\$347,868.15
Gravel reclaiming plant, Gamboa.....	1,168.96	
Relocation, Panama Railroad.....		9,800,626.46
Investment, Panama Railroad stock.....		155,818.24
Concessions from Republic of Panama.....		10,000,000.00
Purchase from New Panama Canal Co.....	16,793.89	38,721,690.16
Total miscellaneous.....	342,243.22	59,026,003.01
Total construction of canal.....	2,406,832.29	351,277,614.69

<sup>1</sup> Indicates credit.

TABLE No. 17.—Capital additions fiscal year 1919 and to June 30, 1919.

[Amounts include canal overhead.]

	Fiscal year 1919.	To June 30, 1919.
Gatun locks.....	\$14,978.13	\$50,132.86
Pedro Miguel locks.....		12,180.00
Miraflores locks.....	4,907.94	66,086.80
Aids to navigation.....	3,879.95	38,765.95
Improvements, Cristobal Harbor.....	108,450.94	124,478.55
Total canal.....	132,216.96	291,644.16
Auxiliary works:		
Power system (Table No. 23)—		
Gatun hydroelectric plant.....	4,407.78	4,407.78
Substation, transmission and distribution lines.....	65,769.58	126,857.96
Street lighting—town sites.....	24,043.72	24,043.72
Underground duct system—town sites.....	77,555.48	77,555.48
Total power system.....	171,776.56	232,864.94
Pacific terminals (Table No. 20), fuel-oil plant.....	3,055.84	3,055.84
Atlantic terminals (Table No. 19), fuel-oil plant.....	23,153.41	63,838.47
Permanent town sites (Table No. 21)—		
Cristobal.....	<sup>1</sup> 48,762.83	279.23
Gatun.....	<sup>2</sup> 3,268.62	71.86
Pedro Miguel.....	<sup>2</sup> 3,239.40	5,088.02
Balboa-Ancon.....	<sup>1</sup> 29,503.19	14,216.59
Total permanent town sites.....	<sup>1</sup> 78,295.24	19,655.70
Buildings (Table No. 22):		
Shops—		
Balboa.....	<sup>1</sup> 251,056.51	168,798.31
Cristobal.....	<sup>1</sup> 35,347.94	17,742.53
Storehouses.....	57,499.98	74,490.06
Hotels and mess halls.....	25,054.02	36,177.93
Gold quarters.....	41,415.88	76,057.98
Silver quarters.....	118,212.25	204,356.86
Miscellaneous buildings.....	69,851.21	141,549.31
Courthouses, police and fire stations, jails, etc.....	1,043.27	12,154.78
Ancon Hospital.....		3,923.48
Asylums.....	22,434.33	24,902.62
Quarantine stations.....		6,971.92
Gold quarters, Corozal, health.....	3,670.40	3,670.40
Miscellaneous buildings, health.....		83.99
Schoolhouses, civil government.....	2,586.81	7,618.52
Total buildings.....	55,363.70	778,498.72
Landscapc improvements.....	15,168.08	15,485.18
Waterworks systems:		
Zone system, general.....	9,428.67	9,661.46
Zone system, town sites.....	1,969.92	1,969.92
Total waterworks systems.....	11,398.59	11,631.38

<sup>1</sup> Indicates credit.<sup>2</sup> Fiscal year 1919 includes the transfer of \$97,950.94 from Permanent Town Sites for construction of street lighting system, underground duct system, water system, sewage system, streets, and walks.<sup>3</sup> Includes transfer of new tools and equipment, amounting to \$339,268.04 to Account 5—Equipment.

TABLE No. 17.—*Capital additions fiscal year 1919, and to June 30, 1919.*—Con.

	Fiscal year 1919.	To June 30, 1919.
<b>Zone sewage system:</b>		
General.....	\$51.46	\$28,864.50
Town sites.....	34,851.34	34,851.34
<b>Total Zone sewage system.....</b>	<b>34,902.80</b>	<b>63,715.84</b>
<b>Zone roadways, streets, and walks:</b>		
Roadways.....	169,842.36	321,954.50
Streets.....	45,393.75	45,393.75
Walks.....	22,095.16	22,095.16
Roads, Ancon Hospital grounds.....	28,400.75	28,400.75
<b>Total roadways, streets, and walks.....</b>	<b>265,732.02</b>	<b>417,844.16</b>
<b>Total capital additions.....</b>	<b>634,472.72</b>	<b>1,898,234.39</b>
<b>Charged to:</b>		
Maintenance and operation.....	577,380.43	1,822,662.71
Sanitation.....	54,505.48	67,953.16
Civil government.....	2,586.81	7,618.52
	634,472.72	1,898,234.39

<sup>1</sup> Fiscal year 1919 includes the transfer of \$97,950.94 from Permanent Town Sites for construction of street lighting system, underground duct system, water system, sewage system, streets, and walks.

TABLE No. 18.—*Detailed cost, Pier No. 6, Cristobal, to June 30, 1919.*

	Quantity.	Amount.	Unit cost
Surveys.....		\$17,104.05	
Designing.....		32,706.23	
Testing.....		1,447.23	
Preliminary borings..... linear feet..	2,924.6	1,514.78	\$0.5179
Final borings..... do.....	6,603	2,496.69	.3781
Preparing site.....		5,999.38	
Preliminary work.....		54,168.51	
Dredging.....		4,627.99	
Maintenance range lights.....		198.12	
Caisson, 6 feet diameter..... linear feet..	22,610	345,619.95	15.2313
Excavation inside caissons..... cubic yards..	14,117.01	86,639.51	6.1372
Concrete in caissons..... do.....	22,005.80	122,013.84	5.5446
Pedestals..... each.....	190	1,338.93	7.0470
Bumping posts.....		309.50	
Column anchor bolts.....		2,946.14	
Mooring bitts.....		4,172.36	
Silver toilets.....		540.71	
Winch motor anchors.....		821.89	
Fender system.....		36,964.93	
<b>Arches and large girders, concrete floor system:</b>			
Placing forms..... square feet..	206,058	96,289.93	.4680
Placing reinforcing..... pounds..	3,417,640	147,567.56	.0428
Placing concrete..... cubic yards..	1,429,880	95,876.68	6.7056
Struts..... pounds.....	1,565,795	123,957.52	.0793
<b>Floor beams:</b>			
Placing forms..... square feet..	232,820	49,583.03	.2127
Placing reinforcing..... pounds..	1,910,440	94,186.08	.0499
Placing concrete..... cubic yards..	6,609.4	62,902.51	9.5171
<b>Slab—concrete floor system:</b>			
Placing forms..... square feet..	134,413	25,327.69	.1884
Placing reinforcing..... pounds..	600,640	30,021.85	.0499
Placing concrete..... cubic yards..	6,953.8	67,681.53	9.6517
Apron tracks.....		15,946.40	
Temporary water lines.....		545.79	
Temporary power lines.....		481.77	
Drains.....		1,297.81	
Electrical work in floor.....		19,597.80	
Handling miscellaneous material account floor system.....		10.00	
<b>Reinforced concrete shed (columns except in end wall):</b>			
Placing forms..... square feet..	42,580	8,754.71	.2025
Placing reinforcing..... pounds..	107,600	7,344.34	.0682
Placing concrete..... cubic yards..	764	9,854.63	12.8988

TABLE NO. 18.—Detailed cost, Pier No. 6, Cristobal, to June 30, 1919—Continued.

	Quantity.	Amount.	Unit cost.
Trusses:			
Placing forms.....square feet..	103,640	\$13,917.96	\$0.1343
Placing reinforcing.....pounds..	971,795	45,831.02	.0472
Placing concrete.....cubic yards..	1,852	19,453.89	10.5043
Erection of trusses.....		7,018.38	
Concrete—side walls (girders and pilasters):			
Placing forms.....square feet..	80,078	27,302.01	.3410
Placing reinforcing.....pounds..	240,175	13,617.64	.0567
Placing concrete.....cubic yards..	1,502	23,177.87	15.4314
Concrete—end walls:			
Placing forms.....square feet..	23,276	7,987.77	.3435
Placing reinforcing.....pounds..	43,420	3,596.90	.0831
Placing concrete.....cubic yards..	298	4,103.08	13.7691
Scaffolding.....		646.57	
Roofs:			
Placing forms.....square feet..	123,372	18,791.56	.1524
Placing reinforcing.....pounds..	164,000	9,888.21	.0603
Placing concrete.....cubic yards..	1,623	24,116.85	14.8596
Steel doors:			
End doors.....		2,061.09	
Side doors.....		1,082.74	
Miscellaneous:			
Windows and louvers.....		4,295.80	
Skylights.....		998.54	
Telephone and transformer booths.....		638.98	
Gold toilets.....		1,459.29	
Wheel guards.....		9,916.39	
Overhead cranes.....		971.87	
Crane tracks.....		2,655.92	
Total division cost, Pier No. 6.....		1,822,388.70	

TABLE NO. 19.—Detailed cost, Atlantic terminals, fiscal year 1919, and to June 30, 1919.

	Fiscal year 1919.	To June 30, 1919.
COALING PLANT.		
Preliminary and general work.....		\$177,963.68
Foundations:		
Retaining-wall construction.....		110,376.98
Caisson construction.....		647,178.27
Total foundations.....		757,555.25
Back filling.....		32,518.20
Floors.....	<sup>1</sup> \$120.74	472,683.32
Superstructure:		
Stocking and reclaiming bridges.....		495,636.85
Unloading towers.....	238.41	374,078.24
Reloading towers.....		237,733.92
Conveyor system.....	388.97	608,985.74
Total superstructure.....	627.38	1,716,434.75
Accessories.....		7,452.29
Miscellaneous.....		140,830.75
Boat landings.....		10,073.22
Plant.....		<sup>1</sup> 11,431.76
Total division cost, coaling plant.....		3,304,079.70
Dredging.....		719,565.48
Total division cost, coaling plant, including dredging.....		4,023,645.18
Less Panama Railroad Co.'s proportion.....		<sup>1</sup> 775,000.00
Net division cost, coaling plant.....	506.64	3,248,645.18
FUEL-OIL HANDLING PLANT.		
Storage:		
United States tanks Nos. 1 and 2.....		51,928.55
United States tank No. 9.....		23,054.16
United States tank No. 43.....	17,079.18	54,065.60
Total storage.....	17,079.18	129,048.31

<sup>1</sup> Indicates credit.

TABLE No. 19.—Detailed cost, Atlantic terminals, fiscal year 1919, and to June 30, 1919—Continued.

	Fiscal year 1919.	To June 30, 1919.
FUEL-OIL HANDLING PLANT—continued.		
Oil-pump plant.....		\$73,239.31
Oil docks.....		243.15
Pipe lines.....	\$3,969.39	47,264.52
Tank farm.....		3,166.86
Total division cost, oil-fuel storage.....	21,048.57	252,962.15
Gasoline storage: United States tank No. 27.....	2,650.05	15,354.12
Total division cost, fuel-oil handling plant.....	23,698.62	268,316.27
Dry dock.....		72,705.01
Pier No. 6.....	779,429.06	1,822,388.70
Boathouse between Piers Nos. 7 and 8.....		99,944.61
Cristobal shops.....	<sup>1</sup> 236,678.38	108,522.75
Cristobal roundhouse.....		45,441.89
Total division cost, Atlantic terminals.....	766,955.94	5,665,964.41
Charged to—		
Canal construction.....	782,131.81	5,595,889.81
Capital additions.....	<sup>1</sup> 15,175.87	70,074.60
	766,955.94	5,665,964.41

<sup>1</sup> Indicates credit.<sup>2</sup> Includes transfer of new tools and equipment amounting to \$44,989.59 to Account 5, Equipment.

TABLE No. 20.—Detailed cost, Pacific terminals, fiscal year 1919, and to June 30, 1919.

	Fiscal year 1919.	To June 30, 1919.
PREPARING SITES, GENERAL.		
Preliminary and general work.....		\$409,628.87
Preparing site.....		734,904.69
Corundu River drainage culvert.....		41,137.01
Cofferdam, construction.....		58,970.29
Cofferdam, dredging.....		133,636.99
Plant.....		71,981.59
Total division cost, preparing sites.....		1,450,259.44
Dredging inner harbor.....	\$299,259.72	2,257,197.18
Reclaiming land.....	2,514.52	364,738.37
Entrance basin dry excavation.....		380,988.19
MAIN DRY DOCK.		
Preliminary and general work.....		142,902.05
Dry excavation.....		585,665.96
Preparing foundations.....		89,861.29
Concrete masonry, mass.....		584,853.62
Concrete masonry, reinforced.....		292,083.05
Granite.....		36,069.35
Pumping plant.....	<sup>1</sup> 924.95	178,898.40
Miter gates, original cost of gates and operating machinery.....		132,147.15
Erection of gates.....		111,142.25
Installation miter-gate machinery.....		5,437.06
Miter-gate anchorage.....		337.24
Back filling.....		62,006.16
Miscellaneous.....	<sup>1</sup> 2,765.60	569,732.50
Total division cost, main dry dock.....	<sup>1</sup> 3,690.55	2,791,136.08
ENTRANCE PIER.		
Preliminary and general work.....		15,588.54
Dry excavation.....		72,544.90
Preparing foundation.....		22,764.84
Concrete masonry, mass.....		80,065.00
Concrete masonry, reinforced.....		23,972.10
Back filling.....		127.65
Miscellaneous.....		79,327.12
Total division cost, entrance pier.....		294,390.15
Total division cost, main dry dock and entrance pier.....	<sup>1</sup> 3,690.55	3,085,526.23

<sup>1</sup> Indicates credit.

TABLE No. 20.—Detailed cost, Pacific terminals, fiscal year 1919, and to June 30, 1919—Continued.

	Fiscal year 1919.	To June 30, 1919.
COALING PLANT.		
Preliminary and general work.....		\$46,667.64
Coal-storage area:		
Dry excavation.....		144,909.98
Preparing foundations.....		7,674.40
Concrete masonry.....		61,362.86
Back filling.....		24,856.39
Grading floor.....		11,017.13
Miscellaneous.....		3,636.52
Total division cost, coal-storage area.....		253,457.28
Coal-handling plant:		
Foundations for stocking and reclaiming cranes.....		69,477.24
Erection of stocking and reclaiming cranes.....		168,798.65
Unloader towers.....		187,943.93
Reloader towers.....		118,438.69
Conveyor system.....		365,828.35
Miscellaneous.....		8,568.51
Total division cost, coal-handling plant.....		919,055.37
SEA WALL AND UNLOADER WHARF.		
Preliminary and general work.....		13,723.03
Dry excavation.....		121,465.23
Preparing foundation.....		15,943.43
Substructure.....		4,865.55
Concrete masonry, mass.....		95,871.57
Concrete masonry, reinforced.....		26,351.23
Miscellaneous.....		110,104.17
Total division cost, sea wall and unloader wharf.....		388,324.21
RELOADER WHARF.		
Preliminary and general work.....		65,266.08
Substructure.....		157,907.82
Superstructure.....		131,650.47
Filling.....		16,422.17
Miscellaneous.....		105,728.89
Total division cost, reloader wharf.....		476,975.43
Total division cost, coaling plant.....		2,084,479.93
PERMANENT SHOPS.		
Miscellaneous.....	\$2,146.23	639,761.22
Steel erection.....		34,508.77
Machine and erection shop.....		687,582.13
Forge shop.....		224,722.28
Steel-storage shop.....		116,342.69
Boiler and ship fitters' shop.....		235,314.09
Paint shop.....		57,216.79
Car shop.....		101,198.70
Planing mill.....		194,748.13
Galvanizing building.....		77,349.11
Lumber and equipment shed.....		116,925.79
Pattern-storage room.....		57,983.65
Foundry.....		263,091.05
Coko shed.....		10,208.63
Boiler house.....		26,206.65
Roundhouse.....		173,593.06
Gas house.....		39,360.37
Toilets.....		86,148.21
Paint house.....		10,753.73
Main office.....		200,413.92
Sand house.....		12,395.81
Lyo house.....		2,592.65
Compressor plant and pump house.....		170,273.77
Ice-storage house.....		656.80
New pattern-storage.....		4,747.17
Shop tunnel.....	108.76	163,973.83
Mechanical division charges.....	1 2 254,985.79	1 74,220.38
Total division cost, permanent shops.....	1 252,730.80	3,633,848.62

<sup>1</sup> Indicates credit.

<sup>2</sup> Includes transfer of new tools and equipment amounting to \$294,278.45 to Account 5—Equipment.

TABLE No. 20.—Detailed cost, Pacific terminals, fiscal year 1919, and to June 30, 1919—Continued.

	Fiscal year 1919.	To June 30, 1919.
DOCKS.		
Quay wall, north of concrete dock .....	\$13. 37	\$444,998. 28
Quay wall, south of concrete dock .....		533,147. 78
Bulkhead quay wall, between wharf and Pier No. 18.....		228,328. 18
Pier No. 18 (Old No. 1) .....	250. 00	1,110,056. 64
Concrete lumber wharf .....		255,667. 79
Electrical installation .....		13,002. 29
Water mains .....		7,162. 62
Air mains .....		3,389. 93
Lot improvement .....	10,212. 09	15,167. 84
Ratproofing .....	<sup>1</sup> 1. 51	66,567. 17
Total division cost, all docks .....	10,473. 95	2,677,488. 52
FUEL-OIL HANDLING PLANT.		
Storage:		
United States tanks Nos. 3 and 4 .....		46,983. 00
United States tank No. 5 .....		25,991. 63
United States tank No. 62 .....		2,083. 57
Tank farm .....		15,256. 87
Total division cost, storage .....		90,315. 07
Oil-pump plant .....		75,337. 49
Oil docks .....		59,079. 28
Pipe lines .....	1,647. 24	81,075. 66
Dredging berth for ships .....		37,104. 89
Total division cost, oil-fuel storage .....	1,647. 24	252,597. 32
Gasoline storage, United States tank No. 31 .....	1,130. 80	16,576. 45
Total division cost, fuel-oil handling plant.....	2,778. 04	359,488. 84
Total division cost, Pacific terminals .....	58,604. 88	<sup>2</sup> 16,294,015. 32
Charged to:		
Canal construction .....	310,812. 63	16,164,536. 86
Capital additions .....	<sup>2</sup> 252,207. 75	129,478. 46
	58,604. 88	16,294,015. 32

<sup>1</sup> Indicates credit.<sup>2</sup> General storehouse, Balboa and Balboa terminal office building not included in these totals.



TABLE No. 21—Detailed cost, permanent town sites, fiscal year 1919 and to June 30, 1919.

Items.	La Boca.		Balboa-Ancon.		Pedro Miguel.		Red Tank.		Gatum.		Cristobal and Colon Beach.		Total.	
	Fiscal year 1919.	To June 30, 1919.	Fiscal year 1919.	To June 30, 1919.	Fiscal year 1919.	To June 30, 1919.	Fiscal year 1919.	To June 30, 1919.	Fiscal year 1919.	To June 30, 1919.	Fiscal year 1919.	To June 30, 1919.	Fiscal year 1919.	To June 30, 1919.
Miscellaneous improvements:														
Preliminary and general work.....	\$37,557.50	\$176,171.18			\$45,884.40				\$1,330.09		\$93,093.00			\$354,036.26
Preliminary maintenance.....	31,869.40	10,519.78			22,488.65									42,380.18
Drainage.....	14,842.53	7,903.21												45,234.39
Nursery, Balboa-Ancon.....		1,576.79												1,576.79
Lot improvements.....	10,221.73	282,561.35	\$87.42	\$2,194.43	\$871.11	\$2,194.43			3.75	\$1,818.00	14,983.17			300,530.12
General improvements—Block A.....	2,841.06	103.30	19,850.98	182.32	109.10	182.32					2,818.49			10,221.73
Division expense.....					100.35									27,964.56
Total division cost.....	97,332.22	2,961.84	498,583.29	414.17	887.77	2,376.75			1,442.94	1,818.00	110,894.75			781,953.03
Panama Canal overhead.....	25,873.91	296.18	86,737.77	41.42	88.78	237.68			261.76	1,181.79	1,145.96			145,619.61
Total cost—Miscellaneous im- provements.....	123,206.13	3,258.02	585,321.06	455.59	976.55	2,614.43			1,704.70	1,999.79	122,040.71			927,572.64
Municipal expenses and electrical work (included in Tables 16 and 17):														
Streets.....			11,840.86		27,554.56	48,958.98					171.58	39,648.09		497,937.57
Walks.....	6,267.28	19,179.92	79,979.76	58.17	348.28	3,536.67					7,455.28	19,238.09		97,610.27
Water system.....	21,404.50	55,847.84	20,188.38		2,280.52	2,280.52					1,700.84	11,618.66		111,330.55
Sewer system.....	27,119.75	194,681.51	11,921.78		11,921.78	2,216.76					588.10	102,683.32		338,003.12
Street lighting.....		666.55	36,624.07		3,978.21	17,367.40					5,064.72	6,283.60		17,719.39
Underground duct system.....		20,404.86	288,965.52		6,464.81	9,732.26					1,555.51	16,783.37		57,721.99
Total division cost.....	54,791.53	52,101.19	997,557.29	2,791.23	38,055.75	108,716.73			5,314.47	27,318.07	13,900.60	204,486.87		1,476,588.80
Panama Canal overhead.....	14,565.28	5,210.13	163,155.49	279.12	3,805.58	24,483.18			2,922.05	1,390.05	26,448.68			233,946.52
Total cost—municipal and electrical work.....	69,356.81	57,311.32	1,160,712.78	3,070.35	41,861.33	133,199.91			5,845.91	30,240.12	15,290.65	290,935.55		1,710,535.32
Total division cost—Grand total.....	152,123.75	55,063.03	1,496,140.58	3,205.40	38,943.52	180,039.81			5,314.47	28,761.01	12,082.60	375,381.62		114,600.02
Panama Canal overhead— Grand total.....	40,439.19	5,506.31	249,808.26	3,204.54	8,804.36	45,845.71			531.44	3,183.81	1,208.26	37,594.64		379,566.13
Grand total—Town sites.....	192,562.94	60,569.34	1,746,038.84	6,409.94	47,747.88	225,885.52			5,845.91	31,944.82	13,290.86	412,976.26		2,638,107.96
Charged to canal construction.....	192,562.94		1,641,744.72		181,199.02	25,634.23								1,544.20
Charged to capital additions.....		60,569.34	104,293.12	3,775.71	44,686.50	3,070.35			22,758.43	1,999.79	348,643.55			2,412,542.89
					42,837.88	44,686.50			9,186.39	15,290.65	64,332.71			225,565.07

1 Indicates credit.

TABLE No. 22.—Detail of buildings, fiscal year 1919, and to June 30, 1919.

	Fiscal year 1919.	Total to June 30, 1919.
Designing and preliminary expenses, new buildings (includes building division plant).....	1 \$70,601.46	1 \$2,318.97
Administration building, Balboa Heights.....	19,315.00	951,859.28
Administration building, Santa Rosa.....		128,083.99
Storehouses:		
General storehouse, Balboa.....	13,327.77	307,943.09
Reclamation shed, Balboa.....	1,587.70	1,587.70
Lumber storehouse, Balboa.....	17,386.98	144,513.01
Paint storehouse, Balboa.....		27,882.85
Oil storehouse, Balboa.....	12,840.05	43,907.27
Forage storehouse, Balboa.....		6,140.66
Explosives storehouse, Balboa.....		461.14
Electrical storehouse, Balboa.....	152.07	82,518.70
Oil storehouse, Cristobal.....		5,800.00
Storage shed, Cristobal store.....	4,153.15	4,153.15
General storehouse, Cristobal.....		44,712.96
Additional storehouse, printing plant, Mount Hope.....	2,824.98	2,824.98
Dynamite storehouse, Gamboa.....		3,938.69
Fuse storehouse, Gamboa.....		1,673.97
Dredge parts storehouse.....		5,053.36
Appraisal of old buildings.....		86,357.07
Total, storehouses.....	52,272.70	769,468.60
Hotels and mess halls:		
Hotel Aspinwall landing stage.....		1,897.34
Hotel Aspinwall landing stage, extension.....	2,470.79	2,470.79
Cristobal restaurant.....	2,665.28	78,930.07
Balboa restaurant.....		73,428.87
Ancon restaurant.....		72,346.83
Pedro Miguel restaurant.....	16,893.08	32,604.21
Tivoli kitchen.....	18,332.44	51,041.83
Linen room—Tivoli Hotel.....	1,209.08	1,209.08
Gatun mess hall.....		5,876.19
La Boca mess hall.....		7,386.39
La Boca kitchen.....		2,606.67
Camp Biedr mess hall and kitchen.....		6,440.04
Appraisal of old buildings.....	1 3,400.00	203,730.50
Total, hotels and mess halls.....	38,170.67	539,968.81
Gold quarters:		
Four-family concrete quarters.....		1,172,785.09
Two-family concrete quarters.....		177,536.86
Bachelor concrete quarters.....		68,926.42
New wooden quarters.....	4,854.55	1,209,917.06
Reereeted wooden quarters.....	21,034.78	277,113.58
Bath and hot water boilers in wooden quarters.....	19,387.03	19,387.03
Appraisal of old buildings.....	1 1,920.00	1,346,117.34
Total, gold quarters.....	43,356.36	4,271,783.38
Silver quarters—New wooden quarters.....	99,489.22	359,459.56
Reereeted wooden quarters.....	6,889.94	205,543.76
Appraisal of old buildings.....		181,797.97
Alterations and repairs of old buildings.....	1,217.65	17,302.90
Total, silver quarters.....	107,596.81	764,104.19
Hospitals:		
Colon Hospital.....	34.21	226,100.66
Ancon Hospital.....	290,055.66	1,525,362.12
Total, hospitals.....	290,089.87	1,751,462.78
Dispensaries:		
Balboa.....		16,677.79
Ancon.....		57,142.25
Pedro Miguel.....	1 24.00	37,271.61
Gatun.....	646.75	35,136.92
Total, dispensaries.....	622.75	146,228.57
Quarantine stations:		
Colon quarantine barracks.....		6,338.11
Balboa quarantine station.....		38,756.88
Balboa quarantine landing.....		26,078.40
Total, quarantine stations.....		71,173.39
Asylums:		
Corozal asylum building.....		72,782.28
Tuberculosis ward, Corozal.....	20,394.85	20,394.85
Dairy shed.....		23,562.45
Dairy building.....		12,546.53
Hog shed.....		13,333.49
Guinea pig house.....		311.79
Chicken house.....		1,589.19

1 Indicates credit.

TABLE No. 22.—Detail of buildings, fiscal year 1919, and to June 30, 1919—Con.

	Fiscal year 1919.	Total to June 30, 1919.
Asylums—Continued.		
Compost pit.....		\$552.22
Palo Seco building.....		45,396.19
Total, asylums.....	\$20,394.85	190,468.99
Medical storehouse, Ancon.....		22,393.93
Health department, miscellaneous:		
Garage, Colon Hospital.....		6,237.60
Kitchen, Colon quarantine station.....		742.90
Storage building, Cristobal.....	1,989.74	1,989.74
Dentists' and sanitary inspectors' offices and quarters.....	1,131.40	25,680.51
Larvacide plant, Ancon.....	5,725.02	13,367.23
Corozal cemetery.....		2,113.77
Total, health department, miscellaneous.....	7,583.36	50,131.75
Post Offices:		
Corozal.....		1,592.62
Appraisal of old buildings.....		34,390.00
Total post offices.....		35,982.62
Schoolhouses:		
Concrete white school, Balboa.....	1,164.46	163,426.27
Manual training school, Balboa.....		4,611.85
Lower floor, Balboa lodge hall.....	2,136.72	2,136.72
Concrete white school, Ancon.....		77,224.67
Concrete white school, Pedro Miguel.....		46,902.68
Concrete white school, Gatun.....	14.52	47,858.07
Concrete white school, Cristobal.....		99,632.52
Addition to colored school, Paraiso.....		1,438.73
Industrial school, Balboa.....		1,085.55
Colored school, Pedro Miguel.....		2,050.00
Colored school, Empire.....	2,115.86	2,115.86
Appraisal of old buildings.....	1,800.00	32,625.00
Total, schoolhouses.....	5,902.64	481,107.92
Courthouses, fire and police stations, etc.:		
La Boca fire station.....		280.22
Balboa fire station.....		18,335.31
Balboa police station.....		11,190.59
Chinese detention camp, Balboa.....		10,101.38
Pedro Miguel fire station.....	948.43	948.43
Appraisal of old buildings.....		60,635.44
Total, courthouses, fire and police stations, etc.....	948.43	101,491.37
Fluviographs.....		11,534.38
Terminal office building, Balboa.....		73,304.01
Miscellaneous buildings:		
Clubhouses—		
Balboa.....		17,481.20
Balboa (addition).....		1,966.64
Balboa (moving-picture shed).....	1,516.40	1,516.40
La Boca, silver employees.....		3,989.62
La Boca annex.....		3,500.00
Pedro Miguel.....		19,695.77
Red Tank, silver employees.....	10,489.28	10,489.28
Paraiso.....		16,839.08
Gatun, silver employees.....		1,500.00
Gatun, new clubhouse for silver employees.....	6,937.57	6,937.57
Cristobal.....		16,000.00
Total, clubhouses.....	18,943.25	99,915.56
Balboa motor-car houses.....		11,448.16
Motor-truck garage, Ancon corral.....		19,493.04
Garages—		
Ancon-Balboa district.....	513.44	37,798.22
Pedro Miguel district.....	3,956.43	8,855.00
Gatun.....	3,112.10	5,523.95
Cristobal.....		5,227.61
Colon.....		2,943.58
Total, garages.....	7,581.97	60,348.45
Office and storeroom, Ancon.....		1,035.04
Alterations, old Ancon school.....		2,194.18
Office, store, and shop, district quartermaster, Balboa Heights.....	725.79	18,097.19
Fuel shed, district quartermaster, Balboa Heights.....		2,302.81
Anemometer tower, Balboa Heights.....		1,747.69
Incinerator, Gavilan Island, Balboa.....	2,509.36	118,575.28
Balboa shops, mess hall, and pattern shop.....		58,405.77

TABLE No. 22.—*Detail of buildings, fiscal year 1919, and to June 30, 1919—Con.*

	Fiscal year 1919.	Total to June 30, 1919.
Miscellaneous—Continued.		
Storage building, section of surveys, Balboa Heights.....	\$4,739.36	\$4,739.36
La Boca lodge hall.....		1,689.23
Extensions, corral building, Cristobal.....	1,143.29	2,185.77
Toilet, corral building, Cristobal.....		543.70
Municipal building, Cristobal.....	562.39	562.39
Lodge hall, silver employees, Gatun.....	2,158.80	2,158.80
Electrical work and storehouse, Gatun.....		1,952.50
Three toilets, Gatun locks.....		3,888.88
Lighthouse building, Gatun.....	11,885.60	11,885.60
Boathouse, Gatun.....	7,254.56	7,254.56
Paraiso shop building.....		2,480.31
Dredging division shop, Paraiso.....		4,253.46
Office and storeroom, Pedro Miguel.....		311.56
Lodge hall, Pedro Miguel.....	11,196.51	11,196.51
Store and shop, district quartermaster, Pedro Miguel.....		4,948.20
Addition to wagon shed, Pedro Miguel.....	2,212.40	2,212.40
Boathouses, marine division—		
Colon, piers Nos. 1 and 2.....		237.80
Balboa, pier No. 18.....		1,656.48
Total, boathouses, marine division.....		1,894.28
Five small buildings.....		845.17
Appraisal of old buildings.....	1,800.00	113,467.26
Total, buildings.....	584,765.26	10,930,262.10
Charged to—		
Canal construction.....	274,066.95	10,392,194.89
Maintenance and operation.....	285,071.71	497,217.52
Sanitation.....	22,326.53	32,975.34
Civil government.....	3,300.07	7,874.35
	584,765.26	10,930,262.10

<sup>1</sup> Indicates credit.TABLE No. 23.—*Detailed cost of power produced and transmitting system, fiscal year 1919 and to June 30, 1919.*

	Fiscal year 1919.	To June 30, 1919.
Gatun hydroelectric power plant:		
Excavation.....		\$54,862.07
Building.....	\$9,364.73	574,912.79
Operating machinery.....	67,135.05	768,145.93
Total division cost.....	76,499.78	1,397,920.79
Miraflores steam-electric power plant:		
Building and site.....		233,629.74
Operating machinery.....		27,448.90
Total division cost.....		261,078.64
Power system:		
Transformer substations—		
Cristobal.....	5,853.33	330,703.36
Gatun.....	26,996.97	456,898.02
Gamboia.....		23,775.03
Miraflores.....	2,924.74	359,113.65
Balboa.....	4,834.08	289,398.06
Gold Hill.....	136.98	1,696.77
Transmission line.....	25,282.57	1,108,692.59
Distribution and duct system.....	19,672.39	441,709.76
Underground duct system—town sites.....	1,345,068.21	345,068.21
Street lighting—town sites.....	1,77,585.58	77,585.58
Total division cost.....	508,354.85	3,434,641.03
Total division cost, power producing and transmission system....	584,854.63	5,093,640.46
Charged to—		
Canal construction.....	428,694.13	4,881,945.07
Capital additions.....	156,160.50	211,695.39
	584,854.63	5,093,640.46

<sup>1</sup> Includes \$385,597.76, transferred from Permanent Town Sites for work performed prior to fiscal year 1919.

TABLE NO. 24.—*Dredging excavation—Detailed cost per unit of work, fiscal year 1919.*

## GAILLARD CUT—CONSTRUCTION.

No excavation fiscal year 1919.

## PACIFIC ENTRANCE—CONSTRUCTION.

Item.	Quantities.	Unit cost
	<i>Cubic yards.</i>	
Operation, small ladder dredges.....	78,900	\$0.3851
Repairs, small ladder dredges.....	78,900	.3286
Depreciation, small ladder dredges.....	78,900	.0861
Operation, large dipper dredges.....	30,100	.1652
Repairs, large dipper dredges.....	30,100	.1333
Depreciation, large dipper dredges.....	30,100	.0407
Operation, pipe-line suction dredges.....	121,000	.0811
Repairs, pipe-line suction dredges.....	121,000	.0388
Depreciation, pipe-line suction dredges.....	121,000	.0036
Operation, tugs, clapets, and scows.....	109,000	.1361
Repairs, tugs, clapets, and scows.....	109,000	.1098
Depreciation, tugs, clapets, and scows.....	109,000	.0266
Operation, drill barges.....	109,000	.9927
Repairs, drill barges.....		.0662
Depreciation, drill barges.....		.0173
Operation, miscellaneous floating equipment.....	230,000	.0037
Repairs, miscellaneous floating equipment.....	230,000	.0012
Depreciation, miscellaneous floating equipment.....	230,000	.0002
Pipe lines.....	121,000	.0165
Dykes.....	121,000	.0032
Surveys.....	230,000	.0002
Division expense.....	230,000	.0615
<b>Total division expense.....</b>	<b>230,000</b>	<b>.5910</b>
Earth excavated.....	154,900	.6735
Rock excavated.....	75,100	.3265

TABLE NO. 25.—*Dredging excavation—Detailed cost per unit of work, fiscal year 1919.*

## TERMINAL FACILITIES—BALBOA.

## INNER HARBOR AND RECLAIMING LAND.

	Quantities.	Unit cost.
	<i>Cubic yards.</i>	
Dredging inner harbor:		
Operation, large dipper dredges.....	358,400	\$0.1378
Repairs, large dipper dredges.....	358,400	.1096
Depreciation, large dipper dredges.....	358,400	.0319
Operation, pipe-line suction dredges.....	559,800	.0691
Repairs, pipe-line suction dredges.....	559,800	.0254
Depreciation, pipe-line suction dredges.....	559,800	.0034
Operation, tugs, clapets, and scows.....	358,400	.1276
Repairs, tugs, clapets, and scows.....	358,400	.0851
Depreciation, tugs, clapets, and scows.....	358,400	.0262
Operation, miscellaneous floating equipment.....	918,200	.0037
Repairs, miscellaneous floating equipment.....	918,200	.0010
Depreciation, miscellaneous floating equipment.....	918,200	.0002
Pipe lines.....	559,800	.0257
Dykes.....	559,800	.0014
Relay pumps.....	559,800	.0029
Surveys.....	918,200	.0019
Division expense.....	918,200	.0383
<b>Total division cost.....</b>	<b>918,200</b>	<b>.3266</b>
Earth excavated.....	776,200	.8453
Rock excavated.....	142,000	.1547
Reclaiming land:		
Pipe lines.....	56,900	.0048
Operation, relay pumps.....	56,900	.0248
Maintenance, relay pumps.....	56,900	.0057
Division expense.....	56,900	.0089
<b>Total division cost.....</b>	<b>56,900</b>	<b>.0042</b>

TABLE No. 25.—*Dredging excavation—Detailed cost per unit of work, fiscal year 1919—Continued.*

## GAILLARD CUT—OPERATION AND MAINTENANCE.

Operation, large dipper dredges.....	753,800	\$0.1567
Repairs, large dipper dredges.....	753,800	.1036
Depreciation, large dipper dredges.....	753,800	.0266
Operation, tugs, clapets, and scows.....	753,800	.0977
Repairs, tugs, clapets, and scows.....	753,800	.0843
Depreciation, tugs, clapets, and scows.....	753,800	.0236
Operation, drill barges.....	30,587	1.2137
Repairs, drill barges.....	30,587	.1092
Depreciation, drill barges.....	30,587	.0212
Operation, hydraulic graders.....	753,800	.0633
Repairs, hydraulic graders.....	753,800	.0106
Depreciation, hydraulic graders.....	753,800	.0266
Operation, miscellaneous floating equipment.....	753,800	.0302
Repairs, miscellaneous floating equipment.....	753,800	.0070
Depreciation, miscellaneous floating equipment.....	753,800	.0026
Drilling.....	753,800	.0448
Blasting.....	753,800	.0964
Channel lights.....	753,800	.0020
Ditching.....	753,800	.0019
Sluicing.....	753,800	.0003
Surveys.....	753,800	.0043
Division expense.....	753,800	.1231
Total division cost.....	753,800	.9082
Earth excavated..... per cent..	157,400	.2088
Rock excavated..... do.....	596,400	.7912

## PACIFIC ENTRANCE—OPERATION AND MAINTENANCE.

Operation, small ladder dredges.....	165,700	\$0.2260
Repairs, small ladder dredges.....	165,700	.1743
Depreciation, small ladder dredges.....	165,700	.0459
Operation, large dipper dredges.....	201,100	.1588
Repairs, large dipper dredges.....	201,100	.1334
Depreciation, large dipper dredges.....	201,100	.0305
Operation, pipe-line suction dredges.....	1,058,500	.0688
Repairs, pipe-line suction dredges.....	1,058,500	.0250
Depreciation, pipe-line suction dredges.....	1,058,500	.0029
Operation, drill barges.....	31,190	1.0267
Repairs, drill barges.....	31,190	.0630
Depreciation, drill barges.....	31,190	.0325
Operation, tugs, clapets, and scows.....	366,800	.1344
Repairs, tugs, clapets, and scows.....	366,800	.1139
Depreciation, tugs, clapets, and scows.....	366,800	.0287
Operation, miscellaneous floating equipment.....	1,425,300	.0036
Repairs, miscellaneous floating equipment.....	1,425,300	.0009
Depreciation, miscellaneous floating equipment.....	1,425,300	.0002
Pipe lines.....	1,058,500	.0092
Dykes.....	1,058,500	.0030
Surveys.....	1,425,300	.0013
Division expense.....	1,425,300	.0342
Total division cost.....	1,425,300	.3145
Earth excavated..... per cent..	1,254,900	.8804
Rock excavated..... do.....	150,400	.1196

TABLE NO. 27.—Panama Canal—Detail of cost of production and distribution of electric current for fiscal year 1919.

	July.	August.	September.	October.	November.	December.
<b>Power plants:</b>						
Gatun hydroelectric.....	\$3,292.46	\$3,747.14	\$3,276.76	\$3,340.57	\$3,991.22	\$3,994.25
Miraflores steam.....	9,562.81	8,784.55	8,376.31	12,711.14	9,900.42	8,484.25
Reserve for depreciation...	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00
<b>Total production cost...</b>	<b>20,855.27</b>	<b>20,531.69</b>	<b>19,653.07</b>	<b>24,051.71</b>	<b>21,891.64</b>	<b>20,478.50</b>
<b>Substations:</b>						
Cristobal.....	1,349.69	1,243.68	1,146.49	1,115.79	1,308.01	1,422.69
Gatun.....	1,469.90	1,544.30	2,287.70	1,642.83	2,086.29	1,732.06
Miraflores.....	1,835.75	1,544.74	1,620.16	1,772.79	1,637.96	1,763.37
Balboa.....	1,070.48	1,135.98	1,216.05	1,274.21	1,258.37	1,156.75
<b>Transmission lines:</b>						
Cristobal to Gatun.....	98.51	193.35	145.10	184.15	141.37	354.69
Miraflores to Balboa.....	50.90	96.00	214.17	277.19	307.04	35.24
Gatun to Miraflores.....	1,307.50	1,130.95	1,045.81	916.23	1,064.11	1,311.91
Distribution line expense..	3,121.27	1,247.96	1,261.62	1,408.86	1,358.30	2,030.42
<b>Cost of current distributed</b>	<b>31,090.27</b>	<b>28,668.65</b>	<b>27,066.93</b>	<b>32,643.76</b>	<b>31,053.18</b>	<b>30,285.63</b>
<b>Kilowatt hours distributed....</b>	<b>3,775,019</b>	<b>3,718,217</b>	<b>3,667,491</b>	<b>3,919,071</b>	<b>3,628,769</b>	<b>3,763,505</b>
<b>Cost per kilowatt hour:</b>						
Production.....	\$0.0055	\$0.0055	\$0.0054	\$0.0061	\$0.0060	\$0.0054
Current distributed.....	.0082	.0077	.0074	.0083	.0086	.0080

	January.	February.	March.	April.	May.	June.	Total.
<b>Power plants:</b>							
Gatun hydroelectric.....	\$5,056.18	\$3,843.57	\$4,847.40	\$5,033.72	\$4,530.37	\$5,036.32	\$49,989.96
Miraflores steam.....	9,699.79	8,243.26	9,812.77	9,607.77	9,069.80	8,781.67	113,034.54
Reserve for depreciation...	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00	96,000.00
<b>Total production cost....</b>	<b>22,755.97</b>	<b>20,086.83</b>	<b>22,660.17</b>	<b>22,641.49</b>	<b>21,600.17</b>	<b>21,817.99</b>	<b>259,024.50</b>
<b>Substations:</b>							
Cristobal.....	1,510.10	1,405.27	1,591.77	1,677.96	2,101.47	1,386.50	17,259.42
Gatun.....	1,945.86	2,265.53	1,903.31	1,770.66	1,950.76	1,808.88	22,348.08
Miraflores.....	2,132.89	2,010.26	1,654.67	1,796.08	1,756.79	1,866.09	21,391.55
Balboa.....	1,207.67	1,258.48	1,221.65	1,422.36	1,401.39	1,321.96	14,945.35
<b>Transmission lines:</b>							
Cristobal to Gatun.....	265.19	485.32	953.56	123.34	206.23	194.03	3,344.84
Miraflores to Balboa.....	40.41	34.33	169.40	373.26	20.78	37.42	1,656.14
Gatun to Miraflores.....	1,354.48	1,435.76	3,388.43	3,634.78	2,185.21	1,333.22	20,108.39
Distribution line expense..	608.41	2,497.34	3,423.62	3,712.96	2,412.00	2,255.48	23,815.09
<b>Cost of current distributed</b>	<b>31,820.98</b>	<b>31,479.12</b>	<b>36,966.58</b>	<b>37,152.89</b>	<b>33,634.80</b>	<b>32,021.57</b>	<b>383,893.36</b>
<b>Kilowatt hours distributed....</b>	<b>4,047,860</b>	<b>3,727,260</b>	<b>4,216,948</b>	<b>4,306,965</b>	<b>4,405,092</b>	<b>4,291,083</b>	<b>47,467,280</b>
<b>Cost per kilowatt hour:</b>							
Production.....	\$0.0056	\$0.0054	\$0.0054	\$0.0053	\$0.0049	\$0.0051	\$0.0055
Current distributed.....	.0079	.0084	.0088	.0086	.0076	.0075	.0081

<sup>1</sup> Indicates credit.

TABLE NO. 28.—Panama Canal—Cost of water per 1,000 gallons, fiscal year 1919, Ancon-Balboa-Panama system.

[Quantities exclude water used in city of Panama and north of Pedro Miguel.]

	Quantity, 1,000 gallons.	Operation Gamboa pump station.	Operation Miraflores filtration plant.	Operation Balboa pump station.	Mainte- nance water mains.	Total.
<b>1918.</b>						
July.....	143,327	\$0.0175	\$0.0186	\$0.0238	\$0.0423	\$0.1022
August.....	132,964	.0140	.0227	.0122	.0284	.0773
September.....	137,976	.0143	.0212	.0125	.0332	.0812
October.....	146,635	.0134	.0231	.0121	.0417	.0903
November.....	135,106	.0151	.0283	.0128	.0381	.0943
December.....	144,044	.0161	.0214	.0132	.0316	.0823
<b>1919.</b>						
January.....	157,897	.0141	.0183	.0121	.0277	.0722
February.....	147,386	.0153	.0187	.0120	.0037	.0497
March.....	169,152	.0183	.0159	.0125	.0123	.0590
April.....	145,694	.0158	.0206	.0137	.0128	.0629
May.....	142,422	.0165	.0139	.0148	.0235	.0687
June.....	137,829	.0147	.0170	.0124	.0395	.0836
<b>Total.....</b>	<b>1,740,432</b>	<b>.0155</b>	<b>.0198</b>	<b>.0137</b>	<b>.0276</b>	<b>.0766</b>

TABLE NO. 29.—Panama Canal—Cost of water per 1,000 gallons, fiscal year 1919, Colon-Cristobal system.

[Quantities exclude water used in city of Colon.]

	Quantity, 1,000 gallons.	Mainte- nance Brazos Brook reservoir.	Operation Mount Hope filtration plant.	Operation Mount Hope pump station.	Mainte- nance water mains.	Total.
1918.						
July.....	75,294	\$0.0096	\$0.0107	\$0.0267	\$0.0343	\$0.0813
August.....	78,347	.0143	.0099	.0177	.0337	.0756
September.....	79,823	.0124	.0117	.0190	.0394	.0825
October.....	87,873	.0146	.0134	.0176	.0413	.0869
November.....	86,585	.0140	.0149	.0180	.0351	.0820
December.....	84,093	.0158	.0110	.0202	.0364	.0834
1919.						
January.....	83,346	.0164	.0156	.0192	.0328	.0840
February.....	90,714	.0145	.0152	.0184	.0258	.0739
March.....	138,405	.0115	.0131	.0150	.0363	.0759
April.....	88,223	.0152	.0176	.0192	.0401	.0921
May.....	97,905	.0115	.0133	.0161	<sup>1</sup> .0132	.0277
June.....	96,656	.0111	.0133	.0173	.0357	.0774
Total.....	1,087,264	.0133	.0135	.0184	.0312	.0764

<sup>1</sup> Indicates credit.

TABLE NO. 30.—Panama Canal—Cost of water per 1,000 gallons, fiscal year 1919, Gatun system.

	Quantity, 1,000 gallons.	Mainte- nance Agua Clara reservoir.	Operation Agua Clara filtration plant.	Operation Agua Clara pump station.	Mainte- nance water mains.	Total.
1918.						
July.....	35,312	\$0.0271	\$0.0205	\$0.0295	\$0.0207	\$0.0978
August.....	33,711	.0296	.0222	.0556	.0157	.1231
September.....	34,572	.0281	.0259	.0399	.0291	.1230
October.....	38,456	.0273	.0267	.0356	.0221	.1117
November.....	38,300	.0263	.0190	.0372	.0199	.1024
December.....	38,689	.0286	.0235	.0404	.0156	.1081
1919.						
January.....	37,822	.0339	.0012	.0402	.0153	.0906
February.....	36,612	.0298	.0257	.0392	<sup>1</sup> .0006	.0941
March.....	39,141	.0292	.0272	.0472	.0072	.1108
April.....	33,461	.0321	.0461	.0428	.0150	.1360
May.....	29,485	.0385	.0277	.0530	.0145	.1337
June.....	29,237	.0375	.0262	.0464	.0111	.1212
Total.....	424,798	.0304	.0240	.0419	.0155	.1118

<sup>1</sup> Indicates credit.



TABLE No. 31.—Cost of operating all quarters for employees, fiscal year 1919.

	July, 1918.	Aug., 1918.	Sept., 1918.	Oct., 1918.	Nov., 1918.	Dec., 1918.	Jan., 1919.	Feb., 1919.	Mar., 1919.	Apr., 1919.	May, 1919.	June, 1919.	Total, 1919.
Repairs to buildings.....	\$1,528.65	\$19,611.16	\$23,773.73	\$26,355.06	\$22,644.91	\$25,786.34	\$29,980.77	\$27,769.22	\$32,863.30	\$37,437.91	\$26,534.88	\$30,422.69	\$314,708.62
Repairs to furniture.....	3,443.78	3,106.37	3,583.65	3,013.98	3,253.67	3,453.02	4,246.33	4,139.08	5,493.17	3,415.94	3,925.40	4,235.95	45,309.74
Repairs to stoves.....	1,640.00	1,876.43	1,705.96	1,909.70	1,835.76	2,061.13	1,578.20	1,204.30	1,503.06	1,381.18	1,894.39	1,372.82	20,028.93
Mattress factory.....	3,892.84	7,062.27	1,399.82	3,265.81	1,3,072.39	1,268.57	1,434.02	140.71	1,71.86	143.22	1,294.96	1,302.66	12,697.63
Coal and kindling.....	5,201.19	8,954.15	6,787.40	7,994.73	8,019.41	9,413.32	10,823.87	9,753.71	9,204.13	9,414.61	7,748.96	2,796.90	96,112.38
Electric lighting.....	6,315.84	7,766.41	5,804.86	6,997.54	7,767.11	6,300.10	8,312.76	7,011.69	7,403.53	7,337.32	6,815.90	6,794.18	84,627.24
Corral service.....	3,426.81	4,238.13	3,345.37	2,955.79	3,465.78	3,141.38	4,297.35	4,005.83	4,245.68	4,315.26	4,772.91	4,552.31	46,552.60
Janitor service.....	5,685.58	5,852.92	6,197.90	5,830.35	5,228.68	6,803.14	6,457.91	6,673.81	6,743.28	6,552.21	6,515.24	6,933.60	73,574.97
Utility service.....	2,657.73	2,843.29	2,804.25	2,898.00	4,653.00	3,169.93	3,155.17	2,767.61	3,184.96	2,470.58	2,748.41	2,282.88	33,566.11
Disposal garbage.....	1,217.91	1,877.87	2,046.16	1,820.85	2,041.88	3,107.65	2,339.39	2,650.27	2,400.86	2,612.01	2,272.35	2,073.74	26,792.97
Care of grounds.....	4,162.53	3,527.17	3,901.19	3,918.91	4,285.88	4,921.00	5,314.81	5,527.03	6,085.76	6,528.53	5,377.05	6,065.53	60,175.41
Grass cutting.....	4,017.07	534.02	2,003.04	2,696.27	1,922.45	2,068.07	1,661.77	1,313.62	1,545.73	930.81	2,374.59	2,909.04	23,916.51
Division expense.....	4,606.33	4,251.26	4,135.50	3,619.95	3,365.24	3,028.57	3,045.18	4,054.22	4,008.80	4,257.75	3,887.82	4,178.31	46,438.93
Total division cost.....	57,796.26	71,461.46	65,658.08	73,336.94	65,411.63	74,453.22	81,179.49	77,311.10	84,676.40	86,897.21	76,522.86	74,026.79	888,732.04
Install hot water boilers, gold bachelor quarters.....												4,132.67	9,321.43
Furniture, machinery and tools.....												55,000.00	55,000.00
Total division cost.....	57,796.26	71,461.46	65,658.08	73,336.94	65,411.63	74,453.22	81,179.49	77,311.10	84,676.40	86,897.21	81,711.62	33,159.46	953,053.47

1 Indicates credit.

TABLE No. 32.—Statement of appropriation receipts and disbursements for fiscal year ended June 30, 1919.

	Receipts.			Total available.	Expenditures.			Total.	Cash balance, June 30, 1919.
	Cash balance, July 1, 1918.	Appropriations.	Transfers between departments.		Disbursements.	Transfers between departments.			
Canal connecting Atlantic and Pacific Oceans.....	\$488,262.80		\$4,423.21	\$492,686.01	\$15,750.00	\$72,971.79	\$88,721.79	\$403,964.22	
Panama Canal fund.....	402,661.85		72,971.79	402,661.85	1,581.87	223,985.35	225,567.22	177,094.63	
Construction and equipment.....	4,313,023.51		116,615.55	4,429,639.06	369,181.01	1,515,785.03	1,884,966.04	2,517,644.81	
Maintenance and operation.....	2,899,999.46	\$9,000,000.00	12,183,224.47	27,017,346.35	1,939,443.56	21,939,443.56	21,939,443.56	5,077,902.79	
Sanitation.....	89,265.76	900,000.00	571,035.35	1,560,301.11	1,156,328.94	155,643.32	1,311,972.26	248,328.85	
Civil government.....	42,682.72	750,000.00	47,109.24	850,566.98	784,161.78	15,069.80	1,799,231.58	51,335.40	
Increase of compensation, 1918.....	1,445.49			1,445.49			663.29	782.20	
Increase of compensation, 1919.....		16,000.00		16,000.00	15,806.60		15,806.60	493.40	
<b>Total.....</b>	<b>8,147,341.59</b>	<b>10,666,000.00</b>	<b>12,817,984.61</b>	<b>34,743,618.64</b>	<b>24,282,617.05</b>	<b>1,983,455.29</b>	<b>26,266,072.34</b>	<b>8,477,546.30</b>	
Presenting launch <i>Louise</i> to French Government.....	159.01			159.01				159.01	
Private act, Feb. 18, 1913, Oscar F. Lackey.....	1,500.00			1,500.00				1,500.00	
Annual payment to Republic of Panama <sup>2</sup> .....	250,000.00			500,000.00	250,000.00		250,000.00	250,000.00	
<b>Total.....</b>	<b>251,659.01</b>	<b>250,000.00</b>		<b>501,659.01</b>	<b>250,000.00</b>		<b>250,000.00</b>	<b>251,659.01</b>	
Aeronautic station.....	139,469.79			139,469.79			136,328.71	3,141.08	
Armament of fortifications.....	1,171,973.88	\$20,000.00	68,989.12	2,069,963.00	946,184.46	50,000.00	996,184.46	1,064,778.54	
Armament of fortifications, June 15, 1917.....	2,498,532.87		293,806.70	2,792,339.63	499,735.00	2,050,000.00	2,549,735.00	242,604.63	
Armament of fortifications, 1919-20.....		100,000.00		100,000.00				100,000.00	
Army quarters, storehouses, etc., 1919-20.....	3,672.94	71,220.70	1,594.32	81,992.66			14,125.41	66,867.25	
Aviation, seacoast defenses.....	131,550.62	4,161,849.00		4,161,849.00				4,161,849.00	
Cantonment construction.....		590,000.00	4,974.33	136,524.95			111,351.32	25,173.63	
Censorship of foreign mails, 1919.....		120,000.00		500,000.00			148,542.98	351,457.02	
Electric light and power plants.....		17,000.00		120,000.00			42,673.15	77,326.85	
Electric light and power plants, 1919-1920.....		20,000.00		17,000.00			11,275.06	2,724.94	
Fire control at fortifications.....	48,444.13			20,000.00				20,000.00	
Fire control, Panama Canal.....		342,888.55		48,444.13			154.79	48,289.34	
Land defenses.....	1,600.00			342,888.55			87,299.22	255,589.63	
Land defenses, 1919-1920.....		14,000.00		1,600.00			10,000.00	1,600.00	
Maintenance of clearings and trails.....	113.03	30,000.00	1.00	30,114.03			30,000.00	4,000.00	
Maintenance of clearings and trails, 1919-1920.....		30,000.00		30,000.00			30,000.00	114.03	
<b>Total.....</b>	<b>8,147,341.59</b>	<b>10,666,000.00</b>	<b>12,817,984.61</b>	<b>34,743,618.64</b>	<b>24,282,617.05</b>	<b>1,983,455.29</b>	<b>26,266,072.34</b>	<b>8,477,546.30</b>	

Maintenance, etc., fire-control installations, seacoast defenses.....	125.00	886.43	1,011.43	31.18	31.18	980.25
Maintenance, etc., fire-control installations, signal service.....	15,000.00	745.10	15,745.19	2,378.22	2,378.22	13,366.97
Maintenance, etc., fire-control installations, signal service, 1919-20.....	10,000.00		10,000.00			10,000.00
Maintenance of searchlights and electric light and power equipment.....	15,000.00		15,000.00	15,000.00	15,000.00	.....
Maintenance of searchlights and electric light and power equipment, 1919-20.....	20,000.00		20,000.00			20,000.00
Ordnance depot, June 15, 1917.....	72,537.23		97,027.23	37,648.74	37,648.74	59,448.49
Panama fortifications.....	200.00		200.00			200.00
Preservation and repair of fortifications, 1919-20.....	99,831.17	2,737.97	114,695.86	51,814.91	51,814.91	62,886.95
Preservation and repair of fortifications, 1919-20.....	9,400.00	12,126.72	34,400.00	34,400.00	34,400.00	.....
Protecting Panama Canal and structures. Regulating commerce, etc., 1919.....	170,363.68		25,000.00			25,000.00
Reserve equipment for fortifications.....	50,000.00		170,363.68	105,245.08	105,245.08	65,118.60
Seacoast batteries, 1919-20.....	5,000.00		50,000.00	11,619.82	11,619.82	38,380.18
Seacoast batteries, 1919-20.....	7,500.00		7,500.00	5,000.00	5,000.00	.....
Searchlights for seacoast fortifications, June 15, 1917.....	10,773.63		220,773.63	220,000.00	220,000.00	7,500.00
Searchlights for seacoast fortifications, June 15, 1917.....	135,500.00		135,500.00	135,500.00	135,500.00	.....
Searchlights for seacoast fortifications, June 15, 1917.....	158,400.00		158,400.00	76,100.00	76,100.00	773.63
Site for seacoast fortifications.....	53,764.00		53,764.00	38,693.59	38,693.59	20,070.41
Submarine base.....	448,708.77	2,500.00	451,208.77	3,720.00	3,720.00	153,780.00
Submarine mines, June 15, 1917.....	227,826.06		448,708.77	411,417.68	411,417.68	37,291.09
Submarine mines, 1918-19.....	161,689.61		227,826.06			227,826.06
Submarine mine structures.....	8,866.00		161,689.61	57,946.34	57,946.34	103,743.27
.....	47,000.00		8,866.00	6,865.40	6,865.40	2,000.00
.....	47,000.00		47,000.00			2,000.00
.....	47,000.00		47,000.00			47,000.00
Total.....	5,301,036.41	7,088,324.55	12,782,327.50	2,297,746.91	3,081,304.15	7,433,276.44
Grand total.....	13,700,037.01	18,004,324.55	48,027,605.15	26,800,363.96	5,064,759.44	16,162,481.75

<sup>1</sup> Includes \$45,587.22—net profits transferred to miscellaneous receipts.

<sup>2</sup> The Treasury Department does not include in statement of Panama Canal balances.

TABLE No. 33.—*Payments by fiscal officers.*

BY PAYMASTER.

Month.	Panama Canal payments.				Panama Railroad payments.				Grand total.
	Gold rolls.	Silver rolls.	Vouchers.	Total.	Pay rolls.	Vouchers.	Total.		
1918.									
July.....	\$516, 891.57	\$498, 335.94	\$621, 801.66	\$1, 567, 029.17	\$297, 895.19	\$729, 004.97	\$1, 026, 900.16	\$2, 593, 929.33	
August.....	579, 371.04	430, 670.50	557, 782.51	1, 567, 831.04	321, 735.47	812, 476.29	1, 134, 211.76	2, 732, 042.80	
September.....	538, 454.23	429, 832.00	533, 625.63	1, 501, 911.92	313, 280.15	585, 813.46	899, 093.61	2, 421, 005.53	
October.....	533, 731.04	416, 398.35	243, 350.13	1, 193, 679.72	314, 455.05	578, 471.27	892, 926.92	2, 086, 606.04	
November.....	580, 506.99	461, 764.15	538, 341.72	1, 600, 612.86	319, 676.17	539, 239.05	858, 915.22	2, 439, 548.08	
December.....	566, 373.82	478, 407.67	642, 889.48	1, 687, 670.97	348, 502.27	1, 092, 488.66	1, 440, 990.93	3, 128, 661.90	
1919.									
January.....	575, 389.75	494, 043.09	741, 671.35	1, 811, 104.19	333, 948.93	794, 029.19	1, 127, 978.12	2, 939, 082.31	
February.....	608, 827.34	501, 406.14	717, 159.93	1, 827, 393.41	369, 655.33	649, 690.89	1, 019, 346.22	2, 846, 739.63	
March.....	612, 141.91	474, 831.38	644, 817.30	1, 731, 790.59	389, 338.68	976, 072.68	1, 365, 411.36	3, 097, 201.95	
April.....	595, 464.60	487, 672.93	659, 637.34	1, 742, 774.87	374, 604.15	675, 501.83	1, 050, 105.98	2, 792, 880.85	
May.....	578, 818.66	465, 628.64	332, 657.13	1, 397, 104.43	379, 089.42	721, 069.92	1, 100, 159.34	2, 497, 263.77	
June.....	629, 594.71	488, 766.74	312, 089.17	1, 426, 456.62	411, 340.13	1, 055, 729.03	1, 467, 069.16	2, 893, 519.78	
Total.....	6, 911, 566.56	5, 537, 963.88	6, 635, 823.35	19, 105, 353.79	4, 173, 520.94	9, 200, 607.24	13, 383, 128.18	32, 488, 481.97	

TABLE No. 33.—*Payments by fiscal officers*—Continued.

BY COLLECTOR.

Month.	By disbursing clerk.	Total.	Clubhouse funds.	Trust funds.	Postal savings funds.	Money-order funds.	Interest.
1918.							
July.....	\$914,546.77	\$156,308.23	\$26,296.30	\$436.36	.....	\$128,800.00	\$775.57
August.....	505,213.71	183,190.82	31,149.24	913.83	.....	150,430.75	677.00
September.....	620,377.14	156,282.09	28,692.83	2.00	.....	127,100.00	487.26
October.....	338,125.34	212,937.08	46,686.02	279.60	.....	164,894.00	1,077.46
November.....	868,643.87	167,153.84	23,450.85	90.39	.....	143,300.00	314.60
December.....	657,165.42	203,531.41	40,240.91	.....	.....	162,900.00	390.50
1919.							
January.....	682,324.21	201,968.85	26,142.97	1,595.56	.....	173,900.00	360.32
February.....	626,238.85	193,535.36	36,367.43	91.92	.....	156,824.00	252.01
March.....	626,658.43	211,763.99	34,135.78	9,606.12	.....	167,500.00	522.69
April.....	599,023.80	242,447.78	27,037.82	9,636.16	.....	204,525.00	1,248.80
May.....	878,385.49	234,706.63	25,715.82	1,798.00	.....	295,400.57	1,792.24
June.....	1,438,981.35	189,164.30	27,479.70	861.01	.....	160,100.00	1,723.59
Total.....	8,756,004.38	2,353,022.38	373,395.67	25,310.95	.....	1,945,694.32	8,621.44

Table No. 34.—Statement of collections repaid to appropriations and to individuals and companies and collections deposited to miscellaneous receipts during the fiscal year ended June 30, 1919.

Department and classification.	Total fiscal year 1919.	Department and classification.	Total fiscal year 1919.
<b>DEPARTMENT OF MAINTENANCE AND OPERATION.</b>		<b>ACCOUNTING DEPARTMENT.</b>	
Electrical.....	\$800.00	Accounting department.....	\$12,961.13
Municipal engineering.....	7.00	Overpayments.....	412.38
Marine.....	6,711.41	Lost property.....	640.91
Balboa shops.....	3,438.74	Collector.....	757.30
Building.....	503.16	Lost metal checks.....	786.00
Fortifications.....	24,779.04	Cablegrams.....	3,984.58
Joint land commission expenses.....	.60	Proportion of salaries.....	172,718.63
Reserve for losses on obsolete stock.....	25,288.39	Rental of safe deposit boxes.....	357.00
Repairs to steamships Ancon and Cristobal.....	4,250.00	Total accounting department.....	192,617.98
Cable and radiograms.....	1.87	<b>CIVIL GOVERNMENT.</b>	
Construction and repairs.....	1,746,957.45	School tuition.....	4,069.19
Shop work.....	2,341,952.97	Sale of school books.....	694.74
Electric work.....	816,197.55	Police service.....	33,590.40
Electric current.....	79,118.63	Minor services, supplies and property.....	4,197.03
Train service and use of rolling equipment.....	1,165.55	Postal services.....	400.60
Tug service.....	236,649.87	Total civil government.....	42,951.96
Service of other floating equipment.....	37,400.13	<b>EXECUTIVE DEPARTMENT.</b>	
Pilotage.....	36,604.15	Record bureau.....	535.62
Wharfage.....	18,958.04	Correspondence bureau.....	260.62
Sales of water.....	92,739.49	General bureau.....	37.00
Operation and maintenance of Panama waterworks.....	115,000.00	Timekeeping.....	1,385.76
Handling lines at locks.....	28,919.00	Operation of official motor cars.....	25.00
Steamship inspection.....	2,410.72	Executive—miscellaneous.....	71.50
Dredging.....	18,235.50	Proportion of salaries.....	83,928.83
Boiler inspection.....	5.00	Photographs and prints.....	6,419.08
Minor services, supplies, and property.....	33,289.18	Motor car services.....	6,278.97
Dry dock, Balboa.....	82,959.26	Minor services, supplies and property.....	292.39
Dry dock, Cristobal.....	10,820.20	Canal Record.....	62.85
U. S. invoices.....	2,425.96	Lost photo-metal checks.....	229.98
Meals furnished at mess.....	41.85	Total executive department.....	99,527.60
Total department of maintenance and operation.....	5,267,630.71	<b>MISCELLANEOUS.</b>	
<b>SUPPLY DEPARTMENT.</b>		Undistributed expenditures.....	198.00
Subsistence:		Injury.....	3.52
Commissary coupons honored by Panama Canal.....	459,656.01	Land rentals.....	15,172.52
Subsistence.....	61.50	Building rentals.....	2,729.63
Meals furnished.....	28,899.36	Land office expenses.....	10,750.00
Hotel Tivoli.....	151,976.83	Equipment rental.....	1,000.00
Hotel Aspinwall.....	37,240.66	Boathouse rental.....	395.50
Line hotels.....	138,049.48	Total miscellaneous.....	30,249.17
Messes.....	488.43	<b>HEALTH DEPARTMENT</b>	
Minor services, supplies, and property.....	220.00	Overpayments.....	\$1.10
Laborers' meal tickets.....	56,684.39	Health.....	300.98
Total subsistence.....	873,276.66	Santo Tomas Hospital.....	15,397.08
Quartermaster:		Ancon Hospital—fees.....	158,203.00
Audited bills.....	4.25	Ancon Hospital—mess.....	15,746.95
Quartermaster.....	2,729.75	Ancon Hospital—burials.....	4,183.76
Material from stock.....	1,142,429.39	Ancon Hospital—miscellaneous.....	410.31
Rock, sand, gravel, and screenings.....	14,047.80	Colon Hospital—fees.....	26,856.53
Printing and binding.....	44,014.37	Colon Hospital—mess.....	4,768.73
Corral.....	90,395.75	Colon Hospital—miscellaneous.....	306.40
Rental of gold quarters.....	2,110.99	Palo Seco Leper Asylum.....	4,421.00
Rental of silver quarters.....	119,543.10	Dispensaries.....	2,696.00
Garage rentals.....	7,236.39	Quarantine—subsistence.....	92,205.94
Ancon nursery.....	5,078.14	Quarantine—other charges.....	34,880.79
Handling of fuel oil.....	31,320.69	Sanitation—Panama.....	11,261.76
Operation of stores.....	54,000.00	Sanitation—Colon.....	15,963.10
Operation of quarters.....	88,250.00	Sanitation—Canal Zone.....	16,636.22
Minor services, supplies, and property.....	104,420.99	Street cleaning—Panama.....	36,534.40
Fuel oil.....	1,091,502.00	Street cleaning—Colon.....	8,918.28
Cost of making sales.....	54,906.83	Corozal Hospital—produce.....	15,931.59
U. S. Invoices.....	8.36	Corozal Hospital—pasturage.....	129.00
Total quartermaster.....	2,851,998.81	Corozal Hospital—burials.....	257.76
Total supply department.....		Corozal Hospital—Insane Asylum.....	57,675.63
	3,725,275.47	Sales from medical store.....	13,783.63
		District dentist—Ancon Hospital.....	4,669.00
		Total health department.....	541,718.94

TABLE No. 34.—Statement of collections, etc.—Continued.

## RECAPITULATION.

Department and classification.	Total fiscal year 1919.	Department and classification.	Total fiscal year 1919.
Department of maintenance and operation.....	\$5,267,630.71	Miscellaneous receipts, United States funds:	
Supply department.....	3,725,275.47	Water.....	\$111,935.95
Subsistence.....	\$873,276.66	Reserve from obsolete stock.....	12,999.57
Quartermaster.....	2,851,998.81	Tolls.....	6,143,372.29
Accounting department.....	192,617.98	Licenses and taxes.....	11,033.23
Executive department.....	99,527.60	Court fines and fees.....	19,849.62
		Postal receipts.....	104,932.34
		Miscellaneous—Canal Zone.....	1,061.10
Total maintenance and operation.....	9,285,051.76	Total miscellaneous receipts.....	6,405,184.40
Total civil government.....	42,951.96		
Total sanitation.....	541,718.94	Grand total for year.....	16,309,892.31
Total miscellaneous.....	30,249.17		
Total repay to appropriations.....	9,899,971.83	Special deposits on Isthmus.....	12,081,122.03
		Special deposits in United States.....	4,362,252.00
Collections for individuals and companies:			16,443,374.03
Paymaster—various, Ind. & Cos.	4,664.98		
Paymaster—Panama Railroad commissary books.....	71.40		
Total collections for individuals and companies.....	4,736.38		

TABLE No. 35.—Statement of transactions in the collector's special deposit account during the fiscal year ended June 30, 1919.

## IN THE UNITED STATES.

Month.	Deposits.	Panama Canal bills applied.	Payments to individuals and companies. <sup>1</sup>	Refunds.
1918.				
July.....	\$317,996.20	\$202,359.11	\$107,618.17	\$42,877.46
August.....	281,355.15	143,196.31	71,204.76	51,112.79
September.....	434,280.77	194,000.70	145,785.36	14,463.26
October.....	408,022.51	162,041.19	99,462.14	73,112.92
November.....	345,863.90	196,930.30	210,996.46	59,180.19
December.....	479,003.74	198,849.99	156,575.98	46,708.57
1919				
January.....	406,868.20	229,759.44	191,755.61	89,057.32
February.....	528,395.10	257,463.18	226,111.39	22,811.89
March.....	391,869.65	233,243.39	156,860.76	53,503.90
April.....	332,859.28	138,778.21	120,774.85	66,026.16
May.....	233,378.00	134,481.81	93,606.12	22,327.14
June.....	202,359.50	106,501.29	62,762.98	26,667.55
Total.....	4,362,252.00	2,197,601.92	1,643,514.58	567,849.15

## ON THE ISTHMUS.

1918.				
July.....	\$890,840.83	\$540,180.03	\$377,485.41	\$7,547.20
August.....	869,337.97	529,136.59	296,324.07	3,144.31
September.....	894,781.70	591,015.52	378,283.43	2,274.10
October.....	1,081,871.13	728,170.81	308,733.76	2,649.05
November.....	973,420.05	579,157.20	349,053.64	970.41
December.....	958,563.50	594,964.49	439,492.70	1,561.66
1919.				
January.....	1,156,164.05	609,848.34	526,768.06	2,662.82
February.....	931,776.18	476,901.60	384,178.30	744.61
March.....	976,287.61	515,841.74	502,790.95	8,166.78
April.....	970,996.99	520,938.40	450,132.52	2,467.15
May.....	1,231,152.42	706,896.91	434,525.64	2,438.72
June.....	1,145,929.60	626,505.26	539,828.22	6,939.61
Total.....	12,081,122.03	7,019,556.89	4,987,596.70	41,566.72

<sup>1</sup>Includes the Panama Railroad Company, Central & South American Telegraph Co., and other individuals and companies.

TABLE NO. 35.—Statement of transactions in the collector's special deposit account during the fiscal year ended June 30, 1919—Continued.

## RECAPITULATION.

	In the United States.		On the Isthmus.	
	Debit.	Credit.	Debit.	Credit.
On hand July 1, 1918.....	\$237,206.99	.....	\$212,502.14	.....
Deposits during year.....	4,362,252.00	.....	12,081,122.03	.....
Panama Canal bills applied.....	.....	\$2,197,604.92	.....	\$7,019,556.89
Payments to individuals and companies.....	.....	1,643,514.58	.....	4,987,596.70
Refunds.....	.....	567,849.15	.....	41,566.72
On hand June 30, 1919.....	.....	190,490.34	.....	244,903.86
<b>Total.....</b>	<b>4,599,458.99</b>	<b>4,599,458.99</b>	<b>12,293,624.17</b>	<b>12,293,624.17</b>

TABLE NO. 36.—Statement of audited pay rolls on Isthmus during fiscal year 1919.

	Total.	Salaries.	Wages.
<b>Operation and maintenance:</b>			
Executive office—			
Executive.....	\$25,087.21	\$25,087.21	.....
Record.....	58,417.90	57,821.46	\$596.44
Personnel.....	27,115.28	27,115.28	.....
Correspondence.....	45,005.44	45,005.44	.....
Property.....	27,166.98	27,166.98	.....
Statistics.....	12,792.94	12,792.94	.....
General.....	33,917.24	32,904.98	1,012.26
Timekeeping.....	85,020.55	85,020.55	.....
Motor cars.....	11,385.19	3,365.59	8,019.60
Clubs and playgrounds.....	69,173.92	68,473.92	700.00
<b>Total, executive office.....</b>	<b>395,082.65</b>	<b>384,754.35</b>	<b>10,328.30</b>
<b>Engineer of maintenance—</b>			
Lock operation—			
Atlantic.....	272,491.24	70,361.85	202,129.39
Pacific.....	452,164.19	109,933.60	342,230.59
Electrical.....	712,838.45	142,130.19	570,708.26
Dredging.....	893,034.07	205,760.88	687,273.19
Municipal engineering.....	966,317.19	284,135.89	682,181.30
Balboa incinerator.....	8,118.12	315.91	7,802.21
Office engineer.....	44,732.69	43,467.89	1,264.80
Meteorology and hydrography.....	26,684.95	21,297.84	5,387.11
Surveys.....	35,657.71	24,152.05	11,505.66
Maintenance, Gatun dam.....	38,936.15	9,110.50	29,825.65
<b>Total, engineer of maintenance.....</b>	<b>3,450,974.76</b>	<b>910,666.60</b>	<b>2,540,308.16</b>
<b>Marine division—</b>			
Office.....	7,543.57	7,318.57	225.00
Port captain—			
Balboa.....	236,662.27	119,444.75	117,217.52
Cristobal.....	223,892.85	120,529.07	103,363.78
Lighthouse division.....	41,535.63	22,224.70	19,310.93
<b>Total, marine division.....</b>	<b>509,634.32</b>	<b>269,517.09</b>	<b>240,117.23</b>
<b>Mechanical division—</b>			
Balboa.....	2,461,566.45	259,830.50	2,201,735.95
Cristobal.....	582,350.68	45,566.12	536,784.56
<b>Total, mechanical division.....</b>	<b>3,043,917.13</b>	<b>305,396.62</b>	<b>2,738,520.51</b>
<b>Supply department—</b>			
Quartermaster—			
Office.....	34,810.93	34,810.93	.....
Storehouses.....	299,874.87	163,531.95	136,342.92
District quartermaster.....	702,117.95	196,446.37	505,671.58
Printing plant.....	77,863.89	16,694.58	61,169.31
Fuel-oil plants.....	28,358.77	9,904.21	18,454.56
<b>Total, quartermaster.....</b>	<b>1,143,026.41</b>	<b>421,388.04</b>	<b>721,638.37</b>
Subsistence.....	178,248.07	63,591.32	114,656.75
<b>Total, quartermaster and subsistence.....</b>	<b>1,321,274.48</b>	<b>484,979.36</b>	<b>836,295.12</b>



TABLE NO. 36.—Statement of audited pay rolls on Isthmus during fiscal year 1919—Continued.

	Total.	Salaries.	Wages.
Operation and maintenance—Continued.			
Accounting—			
Auditor.....	\$344,870.32	\$344,233.66	\$636.66
Paymaster.....	42,008.41	42,008.41	.....
Collector.....	36,828.65	36,828.65	.....
Total, accounting.....	423,707.38	423,070.72	636.66
Building.....	1,633,896.13	308,490.67	1,325,405.46
Fortifications.....	289,501.99	109,032.28	180,469.71
Injury and death—			
Old act.....	3,700.68	222.63	3,478.05
New act.....	102,057.20	19,246.37	82,810.83
Act May 30, 1908.....	163.54	.....	163.54
Total, operation and maintenance.....	11,173,910.26	3,215,376.69	7,958,533.57
Construction and equipment:			
Joint commission.....	48,040.97	48,040.97	.....
Special attorney and land office.....	14,996.89	14,996.89	.....
Total, construction and equipment.....	63,037.86	63,037.86	.....
Civil government:			
Civil affairs.....	32,341.92	32,341.92	.....
Posts.....	94,425.88	94,425.88	.....
Police and prisons.....	248,595.65	248,595.65	.....
Fire protection.....	66,000.78	66,000.78	.....
Schools.....	114,882.30	114,882.30	.....
District court.....	14,944.42	14,944.42	.....
District attorney.....	6,483.34	6,483.34	.....
Marshal.....	7,511.00	7,511.00	.....
Magistrate courts.....	11,344.56	11,344.56	.....
Censorship of mails.....	55,146.52	55,146.52	.....
Regulation of commerce.....	25,627.64	25,627.64	.....
Total, civil government.....	677,304.01	677,304.01	.....
Sanitation:			
Office.....	11,068.89	11,068.89	.....
Medical store.....	11,624.42	11,045.87	578.55
Ancon Hospital.....	276,391.34	232,377.05	44,014.29
Colon Hospital.....	38,411.07	33,724.70	4,686.37
Santo Tomas Hospital.....	13,822.70	13,822.70	.....
Palo Seco Leper Asylum.....	13,068.67	6,189.22	6,879.45
Dispensaries.....	23,397.40	22,675.82	721.58
Quarantine—			
Office.....	443.01	443.01	.....
Balboa.....	15,409.32	9,932.01	5,477.31
Cristobal.....	12,938.58	9,764.81	3,173.77
Bocas del Toro.....	2,210.26	2,210.26	.....
Total, quarantine.....	31,001.17	22,350.09	8,651.08
Corozal Farm.....	16,772.52	3,566.90	13,205.62
Corozal Asylum.....	38,023.28	30,759.18	7,264.10
Health office—			
Panama.....	100,465.21	34,618.35	65,846.86
Colon.....	78,152.41	34,384.71	43,767.70
Zone sanitation.....	117,396.97	21,992.07	95,404.90
Total, sanitation.....	769,596.05	478,575.55	291,020.50
Grand total.....	12,683,848.18	4,434,294.11	8,249,554.07

TABLE No. 37.—Statement of accounts receivable registered during the fiscal year ended June 30, 1919.

Month.	Num-ber of bills regis-tered.	Total.	Against the Panama Railroad.	Against the Republic of Panama.	Against other de-partments of United States Gov-ernment.	Against steamship companies.	Against other in-dividuals and companies.	Trust funds.		For va-rious col-lections: hospitals and messes.	Tolls.	Repay to appropria-tions.
								For Panama Railroad deductions.	Other col-lections.			
1918.												
July.....	2, 054	\$2, 006, 948.16	\$263, 077.87	\$12, 608.88	\$453, 360.67	\$238, 991.84	\$176, 852.37	\$358, 543.01	\$26.60	\$5, 541.20	\$497, 945.72	\$1, 020, 472.34
August.....	1, 901	2, 074, 896.06	287, 910.24	11, 241.54	234, 946.48	172, 177.54	202, 273.15	714, 529.66	50.15	5, 232.10	446, 535.20	1, 911, 065.88
September.....	1, 955	1, 719, 994.40	338, 373.28	14, 895.92	288, 938.45	300, 290.91	267, 455.19	.....	.....	5, 985.49	504, 045.16	1, 186, 948.94
October.....	2, 013	2, 149, 622.95	357, 505.80	15, 670.10	375, 071.73	232, 640.55	259, 659.41	349, 635.77	2, 823.00	4, 719.80	551, 896.79	1, 239, 722.09
November.....	2, 035	2, 265, 053.35	294, 692.70	31, 576.90	245, 535.11	285, 520.39	602, 014.68	291, 710.02	.....	4, 865.97	509, 137.49	1, 437, 053.35
December.....	2, 147	2, 434, 410.35	373, 029.22	17, 770.76	365, 688.64	329, 445.43	381, 035.90	413, 423.86	20.00	5, 522.59	542, 473.95	1, 473, 429.13
1919.												
January.....	2, 262	2, 456, 577.19	605, 671.09	20, 514.09	295, 006.84	192, 099.42	162, 416.69	473, 740.13	79.13	5, 182.28	516, 267.52	1, 453, 246.90
February.....	1, 908	1, 973, 169.12	359, 973.12	15, 124.52	228, 230.23	244, 692.70	181, 098.40	423, 839.93	30.50	4, 464.15	515, 715.57	1, 033, 448.12
March.....	1, 940	2, 272, 531.74	389, 666.65	17, 735.34	208, 146.95	313, 041.78	439, 651.13	407, 350.48	6.75	5, 667.70	490, 664.96	1, 373, 806.55
April.....	2, 032	1, 811, 663.89	311, 702.22	15, 677.33	170, 917.23	189, 766.35	211, 552.96	421, 468.83	109.20	5, 449.16	485, 020.61	1, 900, 682.29
May.....	2, 089	1, 955, 012.68	365, 565.89	15, 503.13	236, 168.75	181, 751.32	249, 764.04	311, 786.00	6.00	6, 665.89	587, 801.66	1, 043, 408.62
June.....	1, 874	2, 152, 935.61	352, 427.19	16, 363.70	250, 880.44	558, 579.32	123, 198.32	308, 187.10	3, 773.83	5, 392.91	534, 132.80	1, 300, 827.51
Total.....	24, 210	25, 272, 815.50	4, 305, 595.36	204, 682.21	3, 352, 891.52	3, 239, 597.55	3, 256, 972.24	4, 474, 814.79	6, 925.16	64, 699.24	6, 181, 637.43	14, 338, 511.72
Total for year ended June 30, 1918.....	22, 070	20, 887, 460.60	3, 741, 498.55	140, 159.78	3, 473, 608.67	1, 906, 387.82	1, 380, 858.75	3, 659, 820.51	59, 919.10	66, 307.82	6, 458, 899.60	9, 792, 522.94

TABLE No. 38.—Commissary books and coupons and meal tickets, fiscal year ended June 30, 1919.

## COUPON BOOKS ISSUED FOR PAY-ROLL DEDUCTION.

Month.	\$2.50 book.		\$5 book.		\$15 book.		Total value.
	Number.	Value.	Number.	Value.	Number.	Value.	
July.....	20,041	\$50,102.50	36,431	\$182,155.00	6,505	\$97,575.00	\$329,832.50
August.....	20,242	50,605.00	38,115	190,575.00	6,647	99,705.00	340,885.00
September.....	19,925	49,812.50	36,253	181,265.00	6,796	101,940.00	333,017.50
October.....	20,850	52,125.00	42,764	213,820.00	7,251	108,765.00	374,710.00
November.....	20,554	51,385.00	39,759	198,795.00	6,924	103,860.00	354,040.00
December.....	21,347	53,367.50	54,722	273,610.00	7,730	115,950.00	442,927.50
January.....	21,213	53,032.50	42,907	214,535.00	7,880	118,200.00	385,767.50
February.....	19,803	49,507.50	41,415	207,075.00	7,848	117,720.00	374,302.50
March.....	20,809	52,022.50	43,067	215,335.00	8,329	124,935.00	392,292.50
April.....	18,804	47,010.00	44,936	224,680.00	8,955	134,325.00	406,015.00
May.....	19,434	48,585.00	44,299	221,495.00	8,525	127,875.00	397,955.00
June.....	19,876	49,690.00	45,455	227,275.00	7,908	118,620.00	395,585.00
Total.....	242,898	607,245.00	510,123	2,550,615.00	91,298	1,369,470.00	4,527,330.00

## COUPON BOOKS SOLD FOR CASH.

Month.	\$2.50 book.		\$5 book.		\$15 book.		Total value.	Sur-charge to steamship companies. <sup>1</sup>
	Number.	Value.	Number.	Value.	Number.	Value.		
July.....	6,621	\$16,552.50	14,425	\$72,125.00	5,705	\$85,575.00	\$174,252.50	\$318.75
August.....	7,040	17,600.00	14,395	71,975.00	5,659	84,885.00	174,460.00	233.75
September.....	5,986	14,965.00	12,356	61,780.00	5,162	77,430.00	154,175.00	271.25
October.....	6,073	15,182.50	13,209	66,045.00	5,497	82,455.00	163,682.50	202.50
November.....	6,139	15,347.50	14,179	70,895.00	6,229	93,435.00	179,677.50	222.50
December.....	6,323	15,807.50	21,014	105,070.00	4,589	68,835.00	189,712.50	262.50
January.....	5,494	13,735.00	13,155	65,775.00	5,329	79,935.00	159,445.00	276.25
February.....	4,219	10,547.50	11,895	59,475.00	5,303	79,545.00	149,567.50	297.50
March.....	3,822	9,555.00	12,315	61,575.00	5,536	83,040.00	154,170.00	261.25
April.....	3,529	8,822.50	12,795	63,975.00	5,964	89,460.00	162,257.50	190.00
May.....	2,758	6,895.00	12,329	61,645.00	6,027	90,405.00	158,945.00	236.25
June.....	3,316	8,290.00	12,084	60,420.00	5,960	89,400.00	158,110.00	242.60
Total....	61,320	153,300.00	164,151	\$20,755.00	66,960	1,004,400.00	1,978,455.00	3,015.00

<sup>1</sup>25 per cent surcharge on sale of coupon books to steamship companies for use in purchasing supplies for vessels, in effect Apr. 1, 1917.

## COUPON BOOKS ISSUED TO OFFICERS, U. S. ARMY CONTRACTORS, ETC.

Month.	\$2.50 book.		\$5 book.		\$15 book.		Total value.
	Number.	Value.	Number.	Value.	Number.	Value.	
July.....	218	\$545.00	42	\$210.00			\$755.00
August.....	119	297.50	14	70.00	1	\$15.00	382.50
September.....							
October.....							
November.....	74	185.00	3	15.00	2	30.00	230.00
December.....	30	75.00	10	50.00			125.00
January.....	54	135.00	40	200.00			335.00
February.....	208	520.00	181	905.00			1,425.00
March.....	118	295.00	141	705.00			1,000.00
April.....	128	320.00	128	640.00			960.00
May.....							
June.....							
Total.....	949	2,372.50	559	2,795.00	3	45.00	5,212.50

TABLE No. 38.—*Commissary books and coupons and meal tickets, fiscal year ended June 30, 1919.*—Continued.

## COUPONS HONORED AT COMMISSARIES, RESTAURANTS, NURSERY, DREDGES, AND CLUBHOUSES.

Month.	Clubhouses.	Ancon nursery.	Restaurants.	Commissaries.	Dredges.	Total value.
July.....	\$6,072.72	\$254.68	\$38,290.04	\$462,592.26	\$50.90	\$507,260.60
August.....	6,440.07	211.15	37,496.49	470,077.24	52.64	514,277.59
September.....	6,993.03	185.94	37,859.28	434,070.06	57.82	479,166.13
October.....	7,087.27	198.87	42,348.68	484,615.20	59.98	534,310.00
November.....	6,805.94	230.36	40,714.58	481,293.76	50.38	529,095.02
December.....	7,555.07	190.68	41,269.80	552,106.65	59.98	604,182.18
January.....	7,757.86	189.61	46,032.37	518,936.44	71.26	572,987.54
February.....	6,845.01	94.78	43,152.07	464,226.34	58.47	514,376.67
March.....	7,382.68	147.86	47,028.28	494,728.41	66.35	549,353.58
April.....	9,359.71	157.27	44,624.15	519,616.83	22.90	573,780.86
May.....	8,938.96	167.16	46,401.24	507,169.91	26.00	562,703.27
June.....	8,670.60	158.46	45,449.37	496,752.62	7.50	551,038.55
Total.....	89,908.92	2,186.82	513,666.35	5,886,185.72	584.18	6,492,531.99

## STATEMENT OF MEAL TICKETS ISSUED TO SILVER EMPLOYEES FOR WHICH COLLECTIONS WERE MADE ON PAY ROLLS.

Month	10-cent.		30-cent.		40-cent.		Total value.
	Number.	Value.	Number.	Value.	Number.	Value.	
July.....	1,734	\$173.40	2,030	\$609.00	11,752	\$4,700.80	\$5,483.20
August.....	1,689	168.90	1,851	555.30	12,363	4,945.20	5,669.40
September.....	1,115	111.50	1,327	398.10	15,214	6,085.00	6,595.20
October.....	1,661	166.10	1,677	503.10	18,158	7,263.20	7,932.40
November.....	1,169	116.90	668	200.40	14,662	5,864.80	6,182.10
December.....	1,087	108.70	628	188.40	13,742	5,496.80	5,793.90
January.....	1,163	116.30	1,129	338.70	13,412	5,364.80	5,819.80
February.....	647	64.70	718	215.40	9,825	3,930.00	4,210.10
March.....	720	72.00	1,478	443.40	9,692	3,876.80	4,392.20
April.....	458	45.80	1,772	531.60	9,112	3,644.80	4,222.20
May.....	518	51.80	623	186.90	11,522	4,608.80	4,847.50
June.....	452	45.20	396	118.80	16,511	6,604.40	6,768.40
Total.....	12,413	1,241.30	14,297	4,280.10	155,965	62,386.00	67,916.40

TABLE No. 39.—*Statement of balance of Canal Zone funds with collector, by appropriations, June 30, 1919.*

Miscellaneous and contingent.....	\$1,045.48
Public improvements and schools.....	2,428.73
Postal receipts, 1915.....	2,745.90
Postal savings funds.....	509.00
Money-order funds.....	541,165.80
Trust funds.....	10,204.26
Clubhouse funds.....	72,394.24
Interest.....	52,592.54
Total.....	\$683,085.95

TABLE No. 40.—Postal service—Statement of money orders issued and paid by the Canal Zone and Canal Zone orders paid by other administrations, fiscal years 1907 to 1919, inclusive.

Year.	Domestic money orders issued.		Money orders paid by Canal Zone post office.				Canal Zone money orders paid by—				Cash remitted to United Post Office Department.
	Number.	Value.	Martinique.	Costa Rica.	United States.	Canal Zone.	Martinique.	Costa Rica.	United States.	Canal Zone.	
1907	84,441	\$2,369,031.49	.....	.....	\$18,237.90	\$208,165.48	.....	.....	\$1,581,251.91	\$208,165.48	\$1,884,000.00
1908	153,357	4,686,684.98	.....	.....	33,378.45	1,017,750.97	.....	.....	2,875,719.61	1,017,750.97	3,055,000.00
1909	189,589	5,166,749.46	.....	.....	52,686.22	1,432,132.76	.....	.....	3,583,419.57	1,432,132.76	3,332,000.00
1910	207,220	5,228,533.69	.....	.....	60,470.77	1,331,568.20	.....	.....	4,068,960.16	1,331,568.20	3,535,000.00
1911	214,780	5,304,906.60	.....	.....	66,696.58	1,280,397.88	.....	.....	3,725,966.12	1,280,397.88	4,422,249.17
1912	227,680	4,915,077.26	.....	.....	83,455.62	1,280,397.88	.....	.....	3,521,511.95	1,280,397.88	3,580,000.00
1913	238,316	4,883,624.13	.....	.....	85,700.00	1,176.95	.....	.....	3,046.10	1,176.95	3,408,000.00
1914	198,828	4,029,364.97	.....	.....	191.95	881,728.73	.....	.....	4,286,948.31	881,728.73	3,401,000.00
1915	150,906	2,873,182.84	.....	.....	375.38	776,265.68	.....	.....	2,099,583.06	776,265.68	3,033,007.08
1916	147,042	2,417,033.83	.....	.....	226.93	431,004.25	.....	.....	2,102,740.27	431,004.25	2,125,043.80
1917	146,421	2,300,918.71	.....	.....	1,318.12	289,011.70	.....	.....	1,960,097.67	289,011.70	1,675,500.00
1918	143,250	2,138,328.69	.....	.....	1,821.08	231,467.61	.....	.....	1,907.15	2,023,706.75	1,655,000.00
1919	118,500	1,963,218.27	.....	.....	1,436.01	209,704.77	.....	.....	1,776,373.55	1,434,729.77	1,671,000.00
Total	2,211,230	\$8,270,674.83	9,952.56	3,816.19	1,395,848.04	9,711,171.06	58,903.13	15,884.37	38,274,645.48	15,339,658.06	36,918,200.14
Deposit orders issued in lieu of postal savings:											
1915	19,632	1,075,570.00	.....	.....	.....	722,680.00	.....	.....	.....	.....	.....
1916	24,054	1,101,190.00	.....	.....	.....	1,103,430.00	.....	.....	.....	.....	.....
1917	27,054	1,481,845.00	.....	.....	.....	1,136,115.00	.....	.....	.....	.....	.....
1918	24,772	1,244,335.00	.....	.....	.....	1,441,225.00	.....	.....	.....	.....	.....
1919	22,118	1,145,400.00	.....	.....	.....	1,225,025.00	.....	.....	.....	.....	.....
Total	117,650	6,048,400.00	.....	.....	.....	5,628,475.00	.....	.....	.....	.....	.....
Grand total	2,328,880	\$4,325,074.83	9,952.56	3,816.19	1,395,848.04	15,339,646.06	58,903.13	15,884.37	38,274,645.48	15,339,658.06	36,918,200.14

1 Deposit money orders paid by Canal Zone included.

SUMMARY.

Total Canal Zone orders issued	\$54,225,074.83
Total Canal Zone orders paid	53,689,091.04
Total Canal Zone orders outstanding unpaid	635,983.79
Due Martinique by the Canal Zone	1,425.59
Averages	17.77
	\$637,427.15

Money order funds:  
 Cash on deposit with collector, Panama Canal.....  
 Cash due from United States.....  
 Cash due from Costa Rica.....  
 Cash due from postmasters.....  
 Less amount of fees included.....

\$541,165.80  
 75,104.47  
 .40

\$21,207.59  
 51.11

21,156.48

637,427.15

NOTE.—Costa Rica list of Canal Zone orders paid during quarter ended June 30, 1919, not included.

TABLE No. 41.—Postal service—Statement showing the monthly money order business of the Canal Zone postal service, during the fiscal year ended June 30, 1919.

	Money orders issued, including deposit money orders.		Interest paid on department orders.	Money orders paid by the Canal Zone post-offices.				Canal Zone orders paid by—		
	Number.	Amount.		United States.	Mar-tinique.	Costa Rica.	Canal Zone. <sup>1</sup>	Mar-tinique.	Costa Rica.	United States.
1918.										
July.....	11,450	\$236,037.92	\$30,122.94	.....	.....	\$123,945.49	.....	.....	.....	\$131,848.73
August.....	11,289	237,863.73	25,004.29	.....	.....	116,153.77	.....	.....	.....	130,795.38
September.....	10,999	249,335.12	487.26	.....	.....	29,171.49	.....	.....	.....	172,762.29
October.....	11,666	258,170.71	1,077.46	.....	.....	34,605.90	.....	.....	.....	62,924.97
November.....	12,643	276,202.67	306.40	.....	.....	25,094.37	.....	.....	.....	114,572.55
December.....	13,761	256,996.96	390.50	.....	.....	33,420.74	.....	.....	.....	248,798.32
1919.										
January.....	12,035	274,348.53	360.32	.....	.....	27,863.53	.....	.....	.....	143,191.26
February.....	10,885	240,930.26	252.01	.....	.....	23,832.60	.....	.....	.....	137,295.19
March.....	13,287	304,540.12	592.09	.....	.....	24,722.54	.....	.....	.....	139,865.67
April.....	10,973	261,625.78	1,238.80	.....	.....	26,391.51	.....	.....	.....	149.25
May.....	10,717	230,635.33	1,792.24	.....	.....	25,781.87	.....	.....	.....	1,369.00
June.....	10,913	251,971.14	714.59	.....	.....	20,192.69	.....	.....	.....	1,214.00
Total.....	140,618	3,108,678.27	8,604.24	325,954.47	1,456.04	255.40	1,434,729.77	2,995.11	1,531.50	1,776,374.55

<sup>1</sup> Including deposit money orders.

TABLE NO. 42.—*Postal service—Statement of audited revenues, fiscal years 1907 to 1919, inclusive.*

Year.	Receipts.						
	Miscellaneous.	Money-order fees.	Interest on money-order funds.	Stamp sales.	Box rent.	Newspaper postage.	Total revenue.
1907.....		\$9,832.65		\$51,803.79			\$64,636.44
1908.....		19,309.14		72,708.67		\$0.87	92,018.68
1909.....		21,720.93		74,241.87		85.53	96,048.33
1910.....		22,980.96		83,765.60		81.50	106,828.06
1911.....		23,457.98		82,585.21		28.51	106,071.70
1912.....		22,889.93		87,497.21		144.24	110,531.38
1913.....		23,366.31		100,599.15		318.84	124,284.30
1914.....		19,408.44		90,792.63		463.67	110,664.74
1915.....		13,169.55		75,202.29	\$2,973.65	988.50	92,339.99
1916.....		12,878.29		76,337.08	5,029.50	1,410.39	95,655.26
1917.....	\$1,207.59	12,371.28	\$12,884.57	74,474.98	8,100.00	1,703.89	110,742.31
1918.....	1,344.75	11,918.35	32,940.22	83,939.74	8,147.30	1,825.38	140,115.74
1919.....	2,313.25	10,424.16	25,746.20	81,723.76	8,268.20	2,553.88	131,029.45
Total.....	4,865.59	223,727.97	71,570.99	1,038,671.98	32,518.65	9,605.20	1,380,960.38

TABLE NO. 43.—*Postal service—Statement of postal revenues, fiscal year ended June 30, 1919.*

Month.	Receipts.						
	Miscellaneous.	Money-order fees.	Interest on money-order funds.	Stamp sales.	Box rents.	Newspaper postage.	Total revenue.
1918.							
July.....	\$173.45	\$816.27	\$1,250.86	\$6,354.87	\$708.80	\$226.71	\$9,530.96
August.....	270.96	828.20	1,356.13	6,512.12	48.90	234.65	9,250.96
September.....	205.35	839.89	1,400.58	6,216.88	1,169.05	271.60	10,103.35
October.....	99.31	868.27	7,999.19	6,932.45	753.20	216.52	16,868.94
November.....	179.68	942.95	1,260.72	6,898.66	38.25	223.56	9,543.82
December.....	305.19	985.65	1,074.74	8,954.94	1,252.60	223.19	12,796.31
1919.							
January.....	191.76	836.02	996.08	7,811.87	761.90	188.90	10,786.53
February.....	192.07	770.52	1,049.32	5,976.13	40.65	171.35	8,200.04
March.....	232.41	1,033.46	5,942.28	6,972.42	1,380.15	214.51	15,775.23
April.....	166.47	837.45	1,272.29	6,470.32	652.15	179.40	9,578.08
May.....	45.31	838.26	1,083.37	6,204.21	42.20	198.49	8,411.84
June.....	251.29	827.22	1,060.64	6,418.89	1,420.35	205.00	10,183.39
Total.....	2,313.25	10,424.16	25,746.20	81,723.76	8,268.20	2,553.88	131,029.45

TABLE NO. 44.—*Postal service—Statement of postal saving payments and deposit money order transactions (in lieu of postal savings system) for fiscal year ended June 30, 1919.*

Month.	Postal savings certificates.		Deposit money orders.		
	Balance July 1, 1918.	Paid.	Balance July 1, 1918.	Issued.	Paid.
1918.					
July.....		\$509.00	\$499,490.00	\$86,410.00	\$106,175.00
August.....				91,185.00	99,730.00
September.....				87,480.00	81,140.00
October.....				95,070.00	129,870.00
November.....				99,780.00	73,865.00
December.....				83,665.00	74,460.00
1919.					
January.....				118,700.00	99,225.00
February.....				98,875.00	57,780.00
March.....				106,425.00	91,905.00
April.....				98,165.00	141,105.00
May.....				85,765.00	181,875.00
June.....				93,940.00	87,895.00
Balance unpaid June 30, 1919.....		\$509.00			419,925.00
	509.00	509.00	499,490.00	1,145,460.00	1,644,950.00

TABLE No. 45.—Statement of income, bureau of clubs and playgrounds, July 1, 1918, to June 30, 1919.

	Ancon.	La Boca.	Balboa.	Pedro Miguel.	Paraiso.	Gatun.	Gatun silver.	Cristobal.	Cristobal silver.	Bureau clubs and playgrounds stock.	Red Tank.	General secretary.	Total.
Soda fountain.....	\$30,710.77	\$10,627.90	\$57,022.77	\$6,699.05	\$7,507.79	\$23,631.40	\$6,598.32	\$31,933.56	\$15,106.85	.....	.....	.....	\$189,838.41
Cigars and candy.....	27,750.21	12,255.41	32,999.81	5,080.91	4,086.52	11,630.23	4,174.77	22,105.57	31,382.07	.....	\$143.51	.....	151,009.01
Salable merchandise.....	5,003.48	7.60	17,715.26	296.89	.50	621.02	.....	8,617.44	.....	.....	.....	.....	32,262.19
Moving pictures.....	3,653.65	684.30	11,533.83	2,117.45	824.30	5,067.46	1,300.25	3,445.90	1,095.00	.....	113.50	.....	30,437.14
Billiards.....	2,353.60	556.71	3,232.00	3,572.10	901.45	965.24	709.83	3,366.43	1,135.94	.....	30.90	.....	13,824.20
Bowling.....	1,403.95	129.65	2,423.30	417.10	252.30	867.29	.....	1,340.50	68.80	.....	.....	.....	6,902.80
Entertainments.....	406.90	1.85	423.70	184.15	.....	472.00	93.50	132.50	.....	.....	.....	.....	2,010.60
Tournaments.....	253.11	41.00	148.31	23.00	178.60	25.00	.....	25.00	.....	.....	.....	.....	2,010.60
Playgrounds.....	.....	542.40	456.71	.....	.....	.....	.....	41.75	734.20	.....	.....	.....	1,953.66
Swimming pool.....	.....	.....	6,900.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,900.90
Pressing club.....	.....	.....	590.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	590.90
Tennis clubs.....	166.00	28.00	237.00	26.50	.....	.....	.....	128.50	.....	.....	.....	.....	586.00
Restaurant.....	.....	.....	.....	.....	.....	7,135.63	577.30	.....	.....	.....	.....	.....	7,712.93
Library deposits.....	31.70	1.50	29.64	19.50	1.50	9.00	.....	49.80	6.50	.....	.....	.....	149.14
Rentals and interest.....	363.72	188.00	327.80	90.05	124.10	89.00	121.00	164.75	110.00	.....	.....	\$1,531.26	3,104.68
Membership.....	368.00	.....	231.00	80.00	.....	23.00	.....	105.50	.50	.....	.....	.....	808.00
Activities.....	653.98	38.00	302.71	416.50	70.80	85.75	131.55	128.70	.....	.....	.....	.....	1,827.99
Bureau clubs and playgrounds stock.....	.....	.....	.....	.....	.....	500.00	3.00	.....	.....	\$11,133.61	.....	.....	11,133.61
Supplies and equipment.....	.....	.....	500.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,068.00
Maintenance and general expense.....	1.85	.....	42.37	.....	.....	.....	.....	.....	.....	.....	.....	187.50	1,068.00
Total.....	73,212.92	25,102.32	134,723.51	16,025.20	14,547.86	51,722.02	13,709.52	71,585.90	49,639.86	11,133.61	287.91	1,718.76	463,409.39



TABLE No. 46.—Statement of expenses, bureau of clubs and playgrounds, July 1, 1918, to June 30, 1919.

	Ancon.	La Boca.	Barboia.	Pedro Migucl.	Paraiso.	Gatum.	Gatum silver.	Cristobal.	Cristobal silver.	Bureau clubs and playgrounds stock.	Red Tank.	General secretary.	Total.
Soda fountain.....	\$24,441.03	\$7,939.61	\$41,006.78	\$5,420.66	\$5,425.28	\$18,762.18	\$5,187.76	\$23,474.07	\$11,693.45		\$140.14		\$143,950.82
Cigars and candy.....	23,135.60	10,029.71	25,221.75	4,084.25	3,894.11	9,431.43	3,308.57	18,323.50	25,468.77				123,037.83
Salable merchandise.....	3,861.26		12,430.43	163.09	8.63	298.36		7,286.45					24,948.22
Moving pictures.....	3,184.98	894.66	7,893.26	1,556.93	808.72	4,904.61	1,003.94	2,849.63	1,153.61		275.37	10.42	24,835.63
Billiards.....	545.39	369.67	1,226.86	109.75	390.93	4,003.64	127.09	487.27	502.10		35.26		4,298.18
Bowling.....	1,742.76	154.43	2,449.46	280.25	288.06	819.90	4.83	1,574.09	71.21				7,384.69
Entertainments.....	403.63	6.45	611.38	89.33		427.45	1.50	201.93					1,831.67
Tournaments.....	378.51	76.28	382.11	31.11	7.50	39.12	7.50	127.89	1.96			6.00	1,057.98
Playgrounds.....	311.51	366.90	1,070.13		392.75		.50	23.89	302.83				2,468.71
Swimming pool.....			4,824.18										4,824.18
Pressing club.....			566.19		1.24								567.43
Tennis club.....	149.62		72.83		4.09	36.29		20.56	7.76				312.20
Restaurant.....				21.05		7,196.85	535.66						7,732.51
Office help.....	587.60	264.90	1,533.79	713.85	272.73	1,898.73	8.09	989.45	387.98				6,657.12
Maintenance and general expense.....	2,005.37	2,006.87	11,539.42	396.17	436.25	1,537.79	1,267.18	2,019.44	1,720.19		20.51	1,208.34	24,267.53
Books and periodicals.....	192.26	43.72	194.10	158.41	46.62	244.32	9.45	152.85	56.05				1,097.78
Supplies and equipment.....	3,409.58	39.66	5,261.54	914.25	17.08	1,414.20	53.15	1,912.81	319.17				13,341.47
Refunds.....	40.75	1.00	37.50	49.50		16.50		48.10	1.50				164.85
Activities.....	812.80	55.48	991.93	356.34	119.36	718.27	188.14	239.49	253.03		8.24		3,693.08
Bureau clubs and playgrounds stock.....										\$18,418.55			18,418.55
Rentals.....	2.00		3.50										5.50
Total.....	66,204.55	22,249.37	117,916.84	14,614.94	12,133.37	48,149.44	11,653.36	59,821.52	41,939.71	18,418.55	479.52	1,314.76	414,893.36

TABLE No. 47.—Summary of income and expenses, bureau clubs and playgrounds, July 1, 1918, to June 30, 1919.

	Ancon.	La Boca.	Balboa.	Pedro Mignel.	Paraso.	Gatun.	Gatun silver.	Cristobal.	Cristobal silver.	Bureau clubs and playgrounds stock.	Red Tank.	General secretary.	Total.
Soda fountain inventory, July 1, 1918.....	\$564.04	\$231.06	\$1,346.19	\$183.74	\$101.28	\$225.32	\$157.26	\$699.10	\$213.44	.....	.....	.....	\$3,721.43
Cigars and candy inventory, July 1, 1918.....	462.32	185.24	971.96	132.64	51.83	140.49	42.97	519.62	23.80	.....	.....	.....	2,529.87
Salable merchandise inventory, July 1, 1918.....	294.25	6.90	4,416.85	163.87	.....	240.14	.....	234.46	.....	.....	.....	.....	5,266.47
Restaurant inventory, July 1, 1918.....	.....	.....	.....	.....	.....	42.63	11.52	.....	.....	.....	.....	.....	54.15
Total expenditures, fiscal year, 1919.....	66,204.55	22,249.37	117,916.84	14,614.94	12,133.37	48,149.44	11,653.36	59,821.52	41,989.71	\$18,418.55	\$479.52	\$1,314.76	414,895.93
Earnings, fiscal year, 1919.....	8,370.93	2,975.50	13,418.81	1,441.96	2,852.47	3,538.10	2,105.58	11,868.66	7,951.29	9.89	1,146.57	404.00	54,790.02
Total.....	75,806.09	25,648.07	138,070.65	16,537.15	15,138.95	52,336.12	13,970.69	73,143.36	50,127.24	18,428.44	332.95	1,718.76	481,258.47
Soda fountain inventory, June 30, 1919.....	242.73	204.89	589.96	193.98	243.71	264.51	138.65	305.68	134.00	.....	.....	.....	2,317.11
Cigars and candy inventory, June 30, 1919.....	1,543.99	340.86	1,135.87	219.92	345.01	280.97	122.52	823.83	351.38	.....	.....	.....	5,209.39
Salable merchandise inventory, June 30, 1919.....	806.45	.....	1,624.31	98.05	2.37	68.62	.....	427.95	.....	.....	45.04	.....	3,027.75
Bureau clubs and playgrounds stock inventory, June 30, 1919.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total income, fiscal year, 1919.....	73,212.92	25,102.32	134,723.51	16,025.20	14,547.86	51,722.02	13,709.52	71,585.90	49,633.86	7,294.83	287.91	1,718.76	463,409.39
Total.....	75,806.09	25,648.07	138,070.65	16,537.15	15,138.95	52,336.12	13,970.69	73,143.36	50,127.24	18,428.44	332.95	1,718.76	481,258.47

1 Indicates loss.

TABLE No. 48.—Bureau of clubs and playgrounds, balance sheet, June 30, 1919.

ASSETS.		LIABILITIES.	
Cash on hand:		Surplus:	
Secretaries' balances	\$4,568.10	To June 30, 1918	\$23,230.63
Deposited with collector	72,394.24	Profit, current fiscal year	54,790.62
	<u>\$76,962.34</u>	Accounts payable:	\$78,021.25
Inventories:		Audited vouchers	23,902.43
Soda fountain	2,317.11	Panama Railroad Company (swimming pool)	300.00
Cigars and candy	5,209.39	Balboa yacht club	1,005.46
Salable merchandise	3,027.75		
Bureau clubs and playgrounds stock	7,294.83		
	<u>17,849.08</u>		
Accounts receivable:			
Registered bills	6,142.88		
Gun soldiers	16.24		
Balboa gun club	2,158.60		
	<u>8,317.72</u>		
Total	<u>103,129.14</u>	Total	<u>103,129.14</u>

TABLE No. 49.—*Statements of amounts paid under Executive order No. 1902, dated Mar. 20, 1914, as compensation to employees injured and on account of deaths of employees injured while directly engaged in actual work with The Panama Canal and Panama Railroad Company from July 1, 1918, to June 20, 1919, and statement of amounts paid under act of September 7, 1916, as compensation to employees injured, and on account of deaths of employees injured while in the performance of duty with The Panama Canal and the Panama Railroad Company from July 1, 1918, to June 30, 1919.*

	Payments under act of Sept. 7, 1916.		Payments under Executive order of Mar. 20, 1914.	
	Injury.	Death.	Injury.	Death.
Mechanical.....	\$21,736.11	\$2,029.30		
Supply, quartermaster.....	2,496.35			
Supply, subsistence.....	98.96			
Building.....	8,070.82	935.81		
Fortifications.....	411.05	23.52		
Health.....	910.72			
Dredging.....	1,661.64	1,505.44		
Municipal engineering.....	3,398.63	4,450.27		
Police and Fire protection.....	17,673.40			
Electrical.....	3,566.30			
Locks.....	800.71	1,244.28		
Marine.....	207.65			
Superintendent, Panama Railroad.....	424.95			
Transportation, Panama Railroad.....	3,514.96			
Receiving and forwarding agency.....	13,457.65	126.67		
Balboa agency.....	2,282.34			
Coaling plant.....	7,268.40	344.08		
Commissary.....	1,423.05			
Cattle industry.....	3,966.68			
Executive.....	42.11			
Panama Railroad Steamship Line.....		138.69		
Terminals.....			\$1,547.34	
Total.....	93,412.48	10,798.06	1,547.34	

TABLE No. 50.—*Statement of amounts paid under the act of May 30, 1908, to employees as compensation on account of deaths of employees injured in the course of employment; amounts paid under act of Feb. 24, 1909, for injuries lasting 15 days or less; amounts paid under Executive order of Feb. 26, 1913; amounts paid under Executive order No. 1902, dated Mar. 20, 1914; and amounts paid under act of Sept. 7, 1916, covering period from Aug. 1, 1908, to June 30, 1919.*

Total payments, by fiscal years.	Injuries.	Deaths.	Under act of Feb. 24, 1909.	Total.
Aug. 1, 1908, to June 30, 1909.....	\$32,355.71	\$3,682.79	\$8,225.16	\$44,263.66
July 1, 1909, to June 30, 1910.....	96,810.33	21,053.22	16,010.30	133,873.85
July 1, 1910, to June 30, 1911.....	168,416.23	35,248.39	49,957.80	253,622.42
July 1, 1911, to June 30, 1912.....	166,620.21	37,534.68	53,838.25	259,993.14
July 1, 1912, to June 30, 1913.....	150,943.79	23,792.02	49,335.91	224,071.72
July 1, 1913, to June 30, 1914.....	111,240.75	41,015.34	33,704.92	185,961.01
July 1, 1914, to June 30, 1915.....	17,703.40	14,268.97		31,972.37
July 1, 1915, to June 30, 1916.....	168.00	1,206.00		1,374.00
July 1, 1916, to June 30, 1917.....		545.40		545.40
July 1, 1918, to June 30, 1919.....	163.54			163.54
Total.....	744,421.96	178,346.81	213,072.34	1,135,841.11
Payments under Executive order of Feb. 26, 1913.....				13,227.62
Payments under Executive order of Mar. 20, 1914:				
Apr. 1, 1914, to June 30, 1914.....	4,283.82			4,283.82
July 1, 1914, to June 30, 1915.....	41,871.91	43,017.71		84,889.62
July 1, 1915, to June 30, 1916.....	32,341.85	33,321.07		65,662.92
July 1, 1916, to June 30, 1917.....	9,748.10	11,400.95		21,149.05
July 1, 1917, to June 30, 1918.....		740.18		740.18
July 1, 1918, to June 30, 1919.....	1,547.34			1,547.34
Payments under provisions of contracts between Panama Canal and contractors.....	334.18			334.18
Payments under special acts of Congress.....				39,418.37
Total.....				1,367,094.21

TABLE No. 50.—Statement of amounts paid under the act of May 30, 1908, to employees as compensation on account of deaths—Continued.

Total payments, by fiscal years.	Injuries.	Deaths.	Under act of Feb. 24, 1910.	Total.
Amounts paid to Panama Railroad employees:				
Apr. 1, 1914, to June 30, 1914.....	\$770.61			\$770.61
July 1, 1914, to June 30, 1915.....	10,275.45	\$2,300.42		12,575.87
July 1, 1915, to June 30, 1916.....	9,056.66	3,330.24		12,386.90
July 1, 1916, to June 30, 1917.....	3,146.70			3,146.70
July 1, 1917, to June 30, 1918.....	185.98			185.98
Payments made by Panama Railroad Company for injuries incurred prior to Apr. 1, 1914.....				614.60
Payments under act of Congress of Sept. 7, 1916:				
Sept. 7, 1916, to June 30, 1917.....	15,845.04	13,961.57		29,806.61
July 1, 1917, to June 30, 1918.....	42,396.51	3,848.77		46,245.31
July 1, 1918, to June 30, 1919.....	93,412.48	10,798.06		104,210.54
Grand total.....				1,577,037.33

TABLE No. 51.—Number of injuries, by extent of disability, for each division or department.

	Total injuries.	Number of injuries resulting in—							Total temporary disability.	Pending cases.
		Death.	Perma- nent disa- bility.	Temporary disability of—						
				Over 1 to 3 days.	Over 3 to 7 days.	Over 7 to 14 days.	Over 14 to 28 days.	Over 28 days.		
Executive office.....	2	1		1					1	
Clubs and playgrounds.....	1						1		1	
Land office, special attorney.....	1			1					1	
Office engineer.....	2			1				1	2	
Lock operation division.....	144	3		91	8	18	11	10	138	3
Electrical division.....	46			26	9	5	4	2	46	
Municipal engineering.....	206	2	3	84	24	31	25	18	182	19
Building division.....	473	1	5	205	81	74	43	35	438	29
Dredging division.....	115	6		51	16	15	13	10	105	4
Marine division.....	20			4	4	6	3	1	18	2
Mechanical division.....	539	3	5	271	76	83	44	25	499	32
Quartermaster division.....	65			15	18	18	6	4	61	4
Storerooms.....	70			32	13	8	8	9	70	
Printing plant.....	4			1	2	1			4	
Subsistence.....	34			10	7	6	7	3	33	1
Accounting department.....	2			1	1				2	
Health department.....	70		1	33	8	7	7	7	62	7
Civil government.....	9			6	1	2			9	
Fortification.....	83	1		41	11	12	11	4	79	3
Maintenance of way.....	47	1	1	21	5	7	5	7	45	
Panama Railroad stables and baggage transfer.....	4			3		1			4	
Motor cars and busses.....	2			2					2	
Coaling plant.....	149	1	3	69	20	23	17	14	143	2
Hotels.....	3			2	2	1			3	
Commissary.....	255	2	1	145	49	25	18	7	241	8
Plantations.....	23			7	4	2	5	5	23	
Cattle steamers.....	5			1	2		2		5	
Cattle ranches.....	246	1		91	35	38	45	31	240	5
Poultry farm.....	1			1					1	
Hog farm.....	7			4	1	1	1		7	
Dairy farm.....	9			3	2	1	2		8	1
Railroad transportation.....	26			6	3	6	4	6	25	1
Harbor terminal.....	668	1	4	307	79	126	81	46	639	24
Total.....	3,331	23	23	1,533	482	517	363	245	3,140	145

TABLE No. 52.—*Nature of injury in nonfatal cases, by department or division.*

	Bruises, contusions, abrasions.	Burns and scalds.	Concussions.	Cuts, punctures, lacerations.	Amputations.	Dislocations.	Fractures.	Sprains and strains.		Eye injuries.	All other.	Total.
								Hernia.	Other.			
Executive office.....	1											1
Clubs and playgrounds.....							1					1
Land office, special attorney.....						1						1
Office engineer.....	1											2
Lock operation division.....	52	6		57	2	1	2	1	7	8	5	141
Electrical division.....	13	6		15	1	1	2		3	5		46
Municipal engineering.....	80	3	1	78	4		8	4	18	8		204
Building division.....	144	10		237	6		10	6	28	30	1	472
Dredging division.....	35	6	1	48	3	1	6	1	5	3		109
Marine division.....	5			5	2		2	1	5			20
Mechanical division.....	233	44	1	137	5	1	15	5	39	56		536
Quartermaster division.....	20	1		28		2	3	1	9	1		65
Storehouses.....	35			23	1		4	1	5	1		70
Printing plant.....	1			3								4
Subsistence.....	8	5		14	1		1	2	3			34
Accounting department.....				1					1			2
Health department.....	18	2		34			5	3	4	3	1	70
Civil government.....	3			1			2		3			9
Fortification.....	34			39			1		7	1		82
Maintenance of way.....	23			15			3		3	2		46
Panama Railroad stables and baggage transfer.....				4								4
Motor cars and busses.....	1			1								2
Coaling plant.....	67	11		49	2		8	3	4	4		148
Hotels.....		2		1								3
Commissary.....	85	11	1	130	4		1	2	15	4		253
Plantations.....	7			11				1	2	1	1	23
Cattle steamers.....	1			2				2				5
Cattle ranches.....	56	3		157	2	1	6	1	7	12		245
Poultry farm.....									1			1
Hog farm.....	1			4					2			7
Dairy farm.....	2			7								9
Railroad transportation.....	10			8	3	1			3	1		26
Harbor terminal.....	354	17		225	2		22	6	32	7	2	667
<b>Total.....</b>	<b>1,290</b>	<b>127</b>	<b>4</b>	<b>1,335</b>	<b>38</b>	<b>9</b>	<b>102</b>	<b>40</b>	<b>206</b>	<b>147</b>	<b>10</b>	<b>3,308</b>

TABLE No. 53.—*Nature of injury in nonfatal cases, with cases of infection for all divisions and departments combined.*

Nature of injury.	Total injuries.	Injuries with infections.
Bruises, contusions, and abrasions.....	1,290	31
Burns and scalds.....	127	2
Concussions.....	4	
Cuts, punctures, and lacerations.....	1,335	75
Total.....	2,756	108
Sprains and strains:		
Hernia.....	40	
Back.....	93	
Ankle, foot, or leg.....	68	
Wrist or arm.....	35	
Other.....	10	
Total.....	246	
Dislocation.....	9	
Fractures:		
Arm.....	25	
Hand.....	2	
Finger or fingers.....	11	
Leg.....	18	
Foot.....	20	
Toe or toes.....	6	
Ribs.....	2	
Skull.....	3	
Other.....	15	
Total.....	102	
Eyo injuries:		
Loss of both eyes.....		
Loss of one eye.....	2	
Partial loss of vision.....	1	
Other.....	144	
Total.....	147	
Amputations:		
Right arm.....		
Right hand.....		
Right finger.....	10	
Right fingers, 2 or more.....	4	
Left arm.....		
Left finger.....	13	
Left hand.....	1	
Left fingers, 2 or more.....	5	
Leg.....	1	
Foot.....	1	
Toe or toes.....	4	
Total.....	38	
Other permanent injuries.....	10	
Poisoning and occupational diseases.....		
Grand total.....	3,308	108

TABLE No. 54.—Cause of injury.

	Executive office.	Motor cars.	Clubs and playgrounds.	Lock operation.	Electrical.	Dredging.	Municipal engineering.	Office engineer.	Meteorology and hydrography.	Marine.	Mechanical.	Quartermaster.	Storehouses.	Printing plant.	Health department.	Subsistence.	Accounting department.	Building division.	Fortification division.	Civil government.	Joint land, land office.	Maintenance of way.	Baggage transfer and stables.	Motor cars and busses.	Coaling plants.	Hotels.	Commissary.	Plantations.	Cattle steamers.	Cattle ranches.	Poultry farm.	Hog farm.	Dairy farm.	Transportation.	Receiving and forwarding agent.	Total.	
Animals, kicks, bites, falls from, etc.				5							1	1			1			1	3	4	4					1	3	4			3						20
Blow of hammer or other object.		1		2							30	1			1			8	2	1						1	3	2			1						64
Caught between two hard bodies.		16		3		20	24				83	3	15		4	3		52	16	15		1			16	3	1	3				8				504	
Collapse of material.				1		5	9				18	1						24	2							22										76	
Contact with gear.				3							34	3			3	5		12	2							11										112	
Contact with machinery.				5		16	8				21	3	4		3			19	9	1					5											175	
Contact with rough edge or surface.				8							2																										
Contact with sharp instruments, splinters, etc.				23		4	21	2			10	8	3	1	21	7		28	5	5					4	1	70	10	1	129	1	1				374	
Derailment of locomotive or cars.				3		4	2	21			3	1				2		1	4						1	7									85		
Explosions of boilers, pipes, gases, etc.																																				21	
Explosion of powder or dynamite.																																				12	
Electric current.				1		2	1				3				5	3		31	4	2	1				4	1	17	2	2							191	
Fall from elevations.				10		8	6	5			33	11	4		2	3		3	3	3					23	17	1	2	2							12	
Fall into excavations.				1							3														4	1	1	1	1	1	1	1	1				12
Fall on even surface.				1							12	1			2	2		15	3	1	1				5	1	10	1	13	1	1	1	1				102
Fall from cars, etc.				8		5	8				2	8			3	4		2	2							2	2									43	
Hot metals, liquids, inflammable, or corrosive.				6		2	3	1			32				2	3		8							2	1	3	2	2								82
Lifting, pushing, pulling.				7		2	10				3	5	2		5	2		21	3	1					5	14	2	2	3								144
Operating hand car or speeder.				11			3				28	5	2		3			38	2	1					5	3	1	4	3								20
Struck by flying object.				10		5	13				69	3	6		4			3	2	1	4					6	11	1	4							180	
Struck by engine, cars, or collision.	1			9		16	28				81	7	25		6			75	10	7					49	36	2	53								627	
Struck by falling body.				7			3				18				2			12	2	2					5	3	6	6								103	
Struck by swinging or loose object.				2		7	3				1	14	5	2	6			1	15	2	2				5	6	1	13	3							210	
Stepping on nails, thorns, etc.				7		2	9				26	1	2		1			13	2	2					1	2	3	2	2								68
Using simple hand tools.				7			3				26	1	2		1			13	2	2					1	2	3	2	2								20
Vapors, gases, or poisonous substance.				2		1	2				8				1			3	1	1					1	1	1	1	2								12
Resisting or making arrest, fighting.				1			1								1			3							3	3											9
Drowning.				1			6																														
Total.	2	1	144	46	115	208	2	2	20	539	65	70	4	70	34	2	473	83	9	1	47	4	2	149	3	255	23	5	246	1	7	9	26	668	3,331		



TABLE No. 55.—Receipts, issues and transfers of stores and purchases charged to divisions during the fiscal year 1918-19.

Month.	Receipts by—			Issued by—			Purchases direct to divisions.
	Purchase.	Transfer.	Manufacture.	Issues.	Transfers.	Sales.	
July.....	\$478,231.45	\$248,726.54	\$28,096.94	\$527,200.61	\$153,646.84	\$211,267.17	\$149,068.93
August.....	404,039.36	300,781.69	38,650.76	674,067.87	281,530.30	166,257.42	208,631.49
September.....	605,703.31	286,140.42	43,369.86	663,430.00	171,816.13	210,883.92	110,552.18
October.....	434,158.94	453,807.42	70,182.09	766,686.76	327,441.20	156,224.95	241,301.52
November.....	405,116.25	312,038.07	38,226.94	604,266.35	226,879.03	190,655.04	169,385.26
December.....	622,332.63	351,429.06	70,424.43	719,492.16	244,321.86	194,807.04	116,945.57
January.....	383,590.11	363,538.40	55,721.58	711,551.99	256,400.20	176,961.47	323,189.43
February.....	636,928.16	1,023,507.07	75,983.44	832,396.05	279,684.09	124,068.58	169,417.90
March.....	966,622.68	401,209.29	34,723.53	656,549.76	309,305.89	148,047.69	541,498.17
April.....	438,895.81	347,251.14	45,692.70	598,411.81	243,336.09	142,956.17	194,290.95
May.....	794,518.07	358,604.81	27,464.97	599,481.15	280,944.29	100,665.26	254,911.87
June.....	700,563.25	568,061.95	59,781.95	634,048.79	415,604.90	64,814.54	176,301.44
Total.....	6,870,722.22	5,075,095.86	588,259.19	7,987,583.30	3,190,910.82	1,887,609.25	2,655,718.71

Regular stock in storehouses July 1, 1918..... \$6,747,688.26  
 Obsolete material credited to assets July 1, 1918..... 223,002.83  
 Material in hands of divisions July 1, 1918..... 1,077,438.31

Regular stock in storehouses July 1, 1919..... \$6,312,836.28  
 Obsolete material in obsolete storehouses July 1, 1919..... 150,212.70  
 Material in hands of divisions July 1, 1919..... 879,022.45

TABLE No. 56.—Comparative statement of store balance, July 1, 1918, and July 1, 1919.

Quartermaster Store (by comm.).	July 1, 1918	July 1, 1919.
1. Air brake material.....	\$27,613.59	\$32,143.82
2. Alcohol.....	9,320.82	22,429.07
3. Alum and other chemicals for filtering water.....	17.55	237.18
4. Arms and ammunition.....	1 12.97	-----
5. Asbestos and magnesia and compounds.....	1,127.15	1,223.14
6. Asphalt, petroleum, residue, and mineral tar, pitch, and rosin.....	7,184.00	12,187.58
7. Blocks, chain, and tackle.....	9,675.53	9,187.86
8. Boilers, steam.....	1,912.74	1,332.93
9. Bolts, nuts, rivets, and washers.....	123,405.21	102,759.21
10. Books, educational, library, and reference.....	1 11.72	11.00
11. Bricks, building, fire and paving.....	6,170.69	9,830.90
12. Brooms, mops, dusters, and scrub brushes.....	13,124.52	8,888.62
13. Building material (not otherwise specified).....	22,653.63	23,022.01
14. Buoys.....	780.70	950.27
15. Cars, hand, push, and inspectors', and velocipedes.....	1,628.29	1,203.08
16. Castings, rough—brass and copper.....	47,334.48	38,345.42
17. Castings, rough—iron and steel.....	87,274.82	91,067.35
18. Cement, Portland (including bags).....	40,988.02	20,633.22
19. Chain.....	21,964.48	21,519.82
20. Cleanings and toilet supplies.....	29,354.60	12,007.35
21. Construction equipment, accessories, and supplies.....	96,219.61	82,746.72
22. Containers, nonexpendable (except cement bags).....	75,412.08	56,958.18
23. Conveying and lifting equipment, accessories and parts.....	112,099.39	112,293.62
24. Diving outfits and parts.....	1130.59	68.42
25. Drafting supplies.....	289.39	631.76
26. Drugs, chemicals, vaseline, naphtha, and benzine.....	68,103.94	58,692.77
27. Educational supplies.....	1 45.35	78.42
28. Ejectors, injectors, lubricators, pop valves, blow-off cocks, water gauges, and parts.....	48,026.42	43,381.40
29. Electrical equipment, accessories and parts (except lock machinery).....	283,809.81	368,510.76
31. Electricians' supplies (not otherwise specified).....	1,168.92	1,591.60
32. Engines, steam, and parts.....	6,443.15	6,343.02
33. Explosives and blasting batteries and parts.....	24,634.92	61,379.79
34. Farm, plantation, and cattle ranch implements, supplies, and parts.....	8,466.06	8,330.19
35. Fire preventing and fire fighting equipment, supplies and parts (not hose).....	2,966.12	3,781.17
36. Fittings, pipe, and valve.....	149,957.38	118,247.27
37. Flags (railroad excluded).....	1,948.74	4,196.33
38. Floating equipment.....	1 92.99	-----
39. Floating equipment, parts for.....	821,901.45	801,967.42
40. Forage, feed, and bedding.....	1 609.01	16,480.13
41. Fuel, coal, anthracite.....	274.63	6,076.32
42. Fuel, coal, bituminous.....	5,670.45	2,775.07
43. Fuel, crude oil.....	1 1,700.99	205.88
44. Furnace and foundry supplies (except pig iron).....	55,420.42	66,325.10
45. Furniture and equipment (office) and parts.....	4,548.46	4,396.55
46. Furniture, other than office.....	16,261.01	13,555.20
47. Gasoline.....	101,077.15	95,023.12
48. Gauges, steam and vacuum.....	1,042.55	517.81
49. Glass, window, sash, and plate.....	15,760.37	33,752.42
50. Glue, gelatine, rubber, and asbestos cement.....	8,502.39	3,732.56
51. Hair, feathers, and moss.....	2,152.85	1 1,926.78
52. Hardware (except nails and spikes).....	245,016.30	176,312.10
53. Harness, saddlers' and other corral equipment and supplies.....	6,623.38	6,505.32
54. Hose.....	79,710.40	58,436.67
56. Instruments, equipment, and supplies, surgical, medical, and laboratory.....	1,797.36	2,371.74
57. Iron, in pigs.....	29,416.11	30,569.66
58. Iron and steel, in bars and sheets (ex G. I. roofing).....	715,916.26	570,239.11
59. Iron and steel, reinforcing.....	30,843.78	35,500.20
60. Ladders and scaffolds.....	429.64	106.04
61. Laundry apparatus, accessories and parts.....	1 9.42	826.99
62. Lawn mowers and rakes (other than hand operated).....	80.79	105.33
63. Leather and belting.....	10,233.46	13,574.96
64. Lime, plaster, and clay.....	6,838.22	8,593.21
65. Live stock and poultry.....	1.65	-----
66. Lumber, pine, fir, and redwood.....	453,853.92	186,124.12
67. Lumber, lancy.....	65,441.69	52,616.99
68. Magazines and newspapers.....	-----	136.22
69. Metals, in pigs (excepting iron).....	10,984.94	23,381.92
70. Metals, in sheets and bars (except iron) and steel.....	117,008.85	79,784.54
71. Meters, current, and parts.....	4,926.85	3,234.25
72. Meters, water, oil and air.....	902.95	1,037.77
73. Nails and spikes.....	39,803.44	39,941.53
74. Office supplies and stationery.....	4,198.54	3,630.96
75. Oilcloth and linoleum.....	4,756.34	4,053.01
76. Oils, illuminating.....	22,366.64	28,574.59
77. Oils, lubricating, and greases, graphite, welding and cutting compounds.....	36,656.61	86,605.33

<sup>1</sup> Indicates credit balances caused by credit to storehouses for issues of these articles, the charges for which were not received until after closing of books for credit fiscal year.

TABLE No. 56.—Comparative statement of store balance, July 1, 1918, and July 1, 1919—Continued.

Quartermaster Store (by comm.).	July 1, 1918.	July 1, 1919.
78. Packing, calking, and gaskets.....	\$55,816.62	\$57,860.70
79. Packing receptacles (expendable) and other packing supplies.....	118.38	6,023.85
80. Paints and painters' supplies, putty, varnishes, shellacs, linseed oils, dryer, filler, white, and red lead, etc.....	289,583.89	272,119.46
81. Paper, packing.....	1,355.62	1,040.26
82. Paper, printing.....	1.35	.....
83. Photographic supplies and parts.....	116.14	.....
84. Piling.....	1,608.65	6,533.43
85. Pipe and fitting (vitrified).....	8,831.28	12,149.13
86. Pipe and tubing (metal).....	150,803.80	142,819.08
87. Plumbing material (not otherwise specified).....	43,243.60	39,171.50
88. Police equipment (except arms and ammunition).....	47.35	36.70
89. Polishing and abradng supplies.....	4,573.18	5,234.60
90. Printing plant equipment and supplies (not including paper).....	458.31	377.13
91. Production equipment, accessories, and parts.....	55,498.24	53,162.00
92. Pumps, and parts, including electric.....	22,888.40	16,570.18
93. Rails.....	13,729.76	13,491.57
94. Recreational equipment and parts.....	640.12	757.56
95. Refrigerating equipment, accessories and parts.....	4,851.93	2,638.32
96. Refrigeration supplies.....	127.24	4,192.03
ROLLING STOCK, PARTS FOR—		
106. Locomotives.....	69,095.27	71,195.79
107. Freight and passenger trains car.....	220,706.72	253,427.90
108. Motor cars, R. R.....	6,825.51	9,524.13
109. Rope.....	102,863.09	78,246.54
110. Rubber products (except packing and belting and tires).....	219.15	352.85
111. Sashes, doors, blinds, moulding, and capping, screening strips, etc.....	17,597.53	7,820.50
112. Scales and parts.....	659.05	928.36
113. Scientific equipment and parts (except surgical and surveying).....	1,124.15	1,489.70
114. Screening, bronze and copper.....	18,361.27	81,145.81
115. Searchlights and lighthouse equipment and supplies.....	3,031.63	529.29
116. Signal material (automatic).....	12,371.40	15,873.43
117. Stone, sand, gravel, and slate.....	123.65	1,329.94
118. Subsistence, equipment.....	22,686.07	14,920.16
119. Subsistence supplies.....	115.49	1,497.65
120. Surveying instruments and supplies.....	839.42	33.37
121. Tanks.....	369.07	426.65
122. Telegraph and telephone equipment, accessories and parts.....	26,785.31	27,395.70
123. Tents and parts, flies and tarpaulins.....	4,761.73	2,970.39
124. Thermometers and barometers.....	885.86	1,022.07
125. Ties, cross and switch.....	15,130.69	1,331.93
126. Tiles, building.....	14,105.97	10,186.41
127. Tools, miscellaneous.....	82,954.62	76,572.27
128. Tools, pneumatic and electric.....	33,359.91	28,413.27
129. Track material (other than rails and ties).....	28,545.65	21,661.53
130. Trucks, warehouse, etc.....	571.73	1,424.86
131. Tubes, boiler and condenser.....	65,686.18	83,821.64
132. Vehicles, animal-drawn, accessories and parts.....	4,530.10	6,290.94
133. Vehicles, motor-drawn, accessories, and parts (railroad motor cars, and fire equipment excluded).....	42,687.25	86,565.88
134. Waste.....	11,675.34	33,824.84
135. Water cranes and standpipes.....	117.50	118.13
136. Wearing apparel and sewing supplies.....	2,277.75	1,385.81
137. Wire and wire cables.....	140,172.54	142,106.41
138. Wire, covered and coated.....	180,193.77	167,998.67
139. Woven products and fabrics.....	129,158.88	68,024.60
140. Steel, structural.....	3,607.68	3,267.62
141. Lock machinery and parts.....	1,682.98	1,718.73
143. Obsolete material.....	42,099.01	36,049.69
147. Lumber, native.....	6,619.28	19,218.32
148. Concrete blocks for breakwater repairs.....	40,498.34	40,498.34
149. Fuel, Diesel oil.....	226.23	2,203.95
151. Obsolete equipment.....	.....	3,366.20
Total quartermasters' stores.....	6,257,851.51	5,741,090.38
Miscellaneous district quartermasters' stores.....	5,862.31	13,713.54
Fuel oil store.....	264,988.99	285,744.32
Medical store.....	114,635.74	153,234.82
Stationery store.....	18,972.41	21,301.09
Panama Canal press.....	85,377.30	97,700.58
Total.....	6,747,688.26	6,312,784.73

1 Indicates credit balances caused by credit to storehouses for issues of these articles, the charges for which were not received until after closing of books for current fiscal year.

Table No. 57.—Supply department, commissary branch, cost of material and supplies purchased and sold during the year ended June 30, 1919.

Class.	On hand June 30, 1918.	Purchases.	On hand June 30, 1919.	Sold.
Groceries.....	\$827,466.66	\$2,274,325.07	\$572,132.48	\$2,529,659.25
Hardware.....	127,129.56	324,467.84	161,110.59	290,486.81
Dry goods.....	720,879.68	1,441,742.26	901,631.71	1,200,987.23
Boots and shoes.....	214,269.80	380,460.31	255,296.87	339,433.24
Cold storage.....	114,702.98	1,621,693.86	186,251.83	1,550,145.01
Tobacco.....	33,603.46	353,560.01	66,361.51	320,801.96
Raw material.....	357,336.33	1,381,618.38	625,957.60	3,112,997.11
Total.....	2,395,388.47	9,777,867.73	2,768,745.59	9,404,510.61

<sup>1</sup> Includes cattle, hogs, and poultry in amount of \$2,780,309.81.

## PERCENTAGE OF SURCHARGE EARNED ON COST.

	Sold.	Earned surcharge.	Percentage earned on cost.
Groceries.....	\$2,529,659.25	\$564,701.15	22.32
Hardware.....	290,486.81	88,521.77	30.47
Dry goods.....	1,200,987.23	356,162.85	28.24
Boots and shoes.....	339,433.24	90,407.76	26.63
Cold storage.....	1,550,145.01	295,374.26	19.05
Tobacco.....	320,801.96	153,959.72	47.99
Raw material.....	3,112,997.11	19,906.43	.63
Total.....	9,404,510.61	1,569,033.94	24.62

## LOCATION OF PURCHASES.

United States.....	\$5,975,582.64
Foreign.....	171,584.33
Costa Rica.....	104,506.04
Central and South America and West Indies.....	141,894.96
Local purchases.....	325,588.13
Panama Canal.....	123,280.13
Haiti.....	12,766.26
Cattle industry.....	2,922,665.24
Total.....	9,777,867.73

## CLASSIFICATION BY COMMODITIES.

Groceries.....	\$2,274,325.07
Hardware.....	324,467.81
Dry goods.....	1,441,742.26
Boots and shoes.....	380,460.31
Cold storage.....	1,621,693.86
Tobacco.....	353,560.01
Raw material.....	3,381,618.38
Total.....	9,777,867.73

Table No. 58.—Supply department, commissary branch, statement showing distribution of sales and selling value for the year ended June 30, 1919.

	1918	1919	Increase.
To United States Government.....	\$2,332,333.22	\$2,395,162.73	\$62,829.51
Panama Canal.....	1,216,769.72	1,458,762.36	241,992.64
Steamships.....	570,722.95	838,931.79	268,208.84
Panama Railroad.....	433,679.25	480,223.31	46,544.09
Individuals and companies.....	285,220.43	205,751.93	79,468.50
Coupon sales.....	5,400,977.80	5,858,814.18	457,836.38
Gross revenue from sales.....	10,239,703.37	11,237,646.33	997,942.96
Supplied for equipment:			
Commissaries for expense.....	167,065.76	173,561.79	6,496.03
General expense.....	1,114.18	1,205.55	91.37
Plants for expense.....	85,727.82	88,514.78	2,786.96
Total.....	253,907.76	263,282.12	9,374.36
Loss by condemnation, shrinkage, etc.....	117,837.87	118,817.40	979.53
Loss by clerical errors, pilfering, etc.....	30,684.56	66,973.39	36,288.83
Total.....	148,522.43	185,790.79	37,268.36
Grand total.....	10,642,133.56	11,686,719.24	1,044,585.68

## APPENDIX G.

### REPORT OF THE EXECUTIVE SECRETARY, EXECUTIVE DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 29, 1919.*

SIR: The report of this department is submitted as a statement of its activities for the fiscal year, and of the Canal Zone courts, considered as included within the executive department for administrative purposes only.

#### ORGANIZATION.

Except in personnel the organization has remained unchanged during the year. Following the signing of the armistice and demobilization of the Army forces in the States, quite a number of employees returned immediately to the Isthmus, resuming their former positions; others, returning from overseas service, did the same. Still a few are expected to return to the Isthmian service. The working force of the department, effective June 30 this year, and that for the same date last year, is shown below:

	Gold roll—	
	As of June 30, 1918.	As of June 30, 1919.
General bureau.....	16	17
Bureau of pay rolls.....	42	46
Personnel bureau.....	12	12
Record bureau.....	24	24
Correspondence bureau.....	22	23
Property bureau.....	15	18
Bureau of statistics.....	5	7
Bureau of clubs and playgrounds.....	25	31
Motor cars.....	3	3
Joint commission.....	4	5
Special attorney.....	5	5
Police and fire division.....	174	174
Division of civil affairs.....	113	96
Division of schools.....	65	72
Courts.....	14	14
	539	547

The discontinuance of the mail censorship on June 24 permitted the reduction of this force; a few employees remaining to clear up the work of the bureau will soon be relieved from duty. The customs force will be similarly reduced, so that the 1919 total number of employees will be approximately 520. The increase of force shown for the bureau of clubs and playgrounds is due to the fact that the 1918 report included the employees of the clubhouses only. The actual increase is but three employees.

## WAGE ADJUSTMENTS.

Compensation of employees of The Panama Canal on the gold roll (chiefly American citizens) is based upon two considerations: (1) Pay for similar employment in the United States; (2) proper coordination of positions in the canal service. So far as an exact comparison can be made, and within limits demanded by proper coordination on the Isthmus, rates of 25 per cent in excess of rates paid in the United States are allowed, by authority of the Panama Canal act and the Secretary of War, the Government service being used for comparison where like positions can be found in it. Increases in pay of various classes of workers in the United States during the past year have therefore been reflected in the canal service.

A congressional bonus of \$10 a month was granted to certain Government employees in the United States as of July 1, 1918, thus increasing the base pay of corresponding classes in the canal service. An adjustment was therefore made for clerks and related positions, construction and engineering foremen, and civil engineers and related positions as of July 1, increasing the pay for approximately 1,000 positions by \$12.50.

The congressional bonus referred to did not apply to navy yard mechanics, and the 5 or 10 per cent bonus of the fiscal year 1918 expired with the end of that year. It became necessary, therefore, to reduce the pay of Panama Canal mechanics and positions coordinated with those of mechanics, effective July 1, in accordance with the reduction made in the base rates. In the main the reductions were 2 or 3 cents an hour, and they affected approximately 1,000 men.

Building trades rates were also adjusted as of July 1 to keep pace with increases in the United States. The schedule of the Chicago Builders' Association was used as base, because no comparable work was being done by the Government in the United States at that time. The resulting scale increased by from 11 to 12 cents an hour the pay of journeymen in the building trades.

In May, 1918, a new schedule of rates for employees in various marine callings in the United States went into effect, and on July 1 employees of the engineer department of the Army on river and harbor work received the benefit of the \$10 a month bonus. Adjustments in the rates for employees of dredging, towing, and other floating craft became necessary, and these were made effective May 4 and October 1.

The navy yards in the United States made an adjustment of pay effective November 1, 1918. An adjustment dependent upon this was made by The Panama Canal effective November 1. It increased the rate for metal trades by 9 cents an hour and for woodworking trades by 10 cents an hour. This increase forced an increase for certain supervisory positions at the locks, coaling plants, and in power plants, filled by men who are first-class mechanics; and this adjustment was made as of December 1.

Increases in pay of supervisory forces in the navy yards were reflected on the Canal Zone by an increase in pay of supervisory positions in the mechanical division, effective February 15, 1919.

The adjustments made by the Railroad Administration in the United States were followed by the Panama Railroad in readjusting rates of pay for transportation men, station agents, and operators.

On the basis of the adjustment for longshoremen in the North Atlantic ports of the United States the pay of stevedore foremen at the docks and coaling plants was adjusted effective June 1.

The adjustments referred to above (except those for stevedores and transportation men) were made by the Governor on advice of a wage board composed of heads of departments and divisions; the same method that had been used since construction days. For three years organizations of employees had requested representation on the wage board. Following precedent of the Government in the United States, this point was finally yielded; and in order that the board might not be unwieldy, it was decided to compose it of two members only, one representing organized employees and one representing the administration. The Governor therefore issued the following circular letter on March 31, 1919:

To all concerned: 1. Under date of March 11, 1919, I addressed the following letter to the Engineer of Maintenance and to a representative appointed by the metal trades council:

You are hereby appointed as a board to advise me on wages for the Panama Canal and Panama Railroad employees on the gold roll who are members of the American Federation of Labor.

"(1) The board is an advisory one to recommend rates of pay to the Governor and is without authority to make promises except as to its recommendations.

"(2) This board will recommend wages for positions filled in whole or part by employees who are members of the American Federation of Labor.

"(3) Rates will generally be equal to States' rates plus 25 per cent for similar positions in the Government service in continental United States. If there are no similar Government positions, Canal rates may be based on nongovernment ones, plus 25 per cent; provided, however, such rates properly co-ordinate with similar or related ones in the Canal service which have been established directly on Government ones.

"(4) The board will not make recommendations for individuals but for positions.

"(5) Employees, who are members of the American Federation of Labor, will as heretofore take up matters of wages with their supervisory officers, including heads of divisions. If dissatisfied with the ruling received, they may then submit their claims through the American Federation of Labor to the Wage Board. If the Governor, after having received the report of the Wage Board, disapproves the request in whole or part, it shall not be resubmitted by the individual to the Governor or the board, but may again in not less than six months be resubmitted to the board through the American Federation of Labor local organization.

"(6) The board will hold regular meetings on the first Monday of each month, and such additional ones as are necessary. Requests by heads of divisions and departments, or by the American Federation of Labor for change in wages should be submitted to the Governor at least 10 days before the meeting at which they will be considered. All requests, whether from the American Federation of Labor or from heads of divisions and departments shall be submitted to the board through the Governor, and all replies by the board shall be to the Governor. The board, however, may, in considering rates of pay, ask for such information orally or in writing from any Canal employee as may be necessary or desirable.

"(7) The Bureau of Statistics will keep a record of all meetings, and will collect and arrange necessary data, and prepare the basic data of States' rates for use of the board.

"Additional instructions will be issued from time to time as may be necessary."

2. It is the intention of paragraph 5 of the letter above quoted that all matters for the consideration of the Wage Board come to the board through the Governor, as is definitely stated in paragraph 6.

3. All requests for changes in rates of pay should be accompanied by a statement of what is claimed and the reason therefor, only one subject to be treated in each letter.

4. The board will, upon request, hold hearings where those interested may be present in order further to explain their contention. The board desires to point out, however, that such hearings should not generally be requested. All complaints or requests should be clearly and fully stated in writing, so that the time of the board may not be unduly occupied with hearings.

At the close of the year this new board on rates of pay had completed two general adjustments (one placing the marine draftsmen on a navy-yard basis and the other changing apprentices in the mechanical division from the old to the new navy-yard basis), and had handled a score or more of special cases. The board acts upon data of wages received from the United States after consideration regarding changes has been given by heads of departments and divisions. Its functions are advisory and its recommendations become effective only upon approval of the Governor.

#### WAGES OF WEST INDIAN EMPLOYEES.

To ameliorate conditions incident to increase in the cost of living an adjustment was made in rates of pay for West Indian workers, commonly known as "employees on the silver roll." This took effect November 1, 1918, and provided an increase of 2 cents an hour for all grades up to \$75 a month, but no increase in the grades of \$75 or above.

An increase of 3 cents an hour was made to laborers at the docks as of May 1, 1919, when the hours of work were changed from 9 to 8 and the daily earnings decreased by an hour's pay. The 3 cents increase made the pay for eight hours the same as for nine hours.

A consideration of conditions among the West Indian workers by the heads of departments and divisions in May and June, 1919, resulted in a decision to erect quarters for 1,500 dock laborers at Cristobal, and to set aside the old village of Las Cascadas for occupancy by West Indians and their families, this to serve as a reservoir for laborers.

At the close of the fiscal year the board on rates of pay—silver roll—had prepared a recommendation and the Governor had approved it, providing for an increase of 2 cents an hour for rates of 20 cents and less and 1 cent an hour for rates of 21 to 28 cents, inclusive, effective at the beginning of the fiscal year 1920.

#### PUBLICITY.

The publication of statistics of navigation, which had been suspended on account of the war, was resumed in December, 1918. Information of this character is published in regular and special reports in *The Panama Canal Record* and in letters in response to special inquiries. With the return from the military service of men of the administrative force it has been possible to resume this work.

Letters have been written to shipping and related companies soliciting inquiry concerning the various services proffered by the canal, and articles with photographs have been prepared for publication. This service is at the command of the public without charge of any kind, because it is deemed desirable to attract business to the canal by all legitimate means of publicity.



Weekly and special reports of canal business; a monthly summary made by the Governor in his report to the Secretary of War; changes in prices of coal, oil, and other commodities at the canal; and other matters of value to patrons of the canal, and in keeping up the morale of the force; are published weekly in *The Panama Canal Record*. Nine thousand copies of this publication are issued.

Revision of the illustrated 64-page booklet, "Handbook of Information," has been begun, and some photographs showing views as of this time are being taken. Few photographs of the canal and its auxiliaries were taken during the war, because of the prohibition on publicity.

A pamphlet giving some facts about ship repair facilities at the canal has been authorized.

#### COMMODITY STATISTICS.

On December 13, 1918, the Governor announced that on and after January 1, 1919, ships making the transit of the canal without breaking cargo would be obliged to deposit copies of their cargo manifests, as ships breaking cargo at the canal have always done. The purpose, it was explained, was to make possible the compilation of complete statistics of commodities handled through the canal; showing port of origin and destination, class and measure of commodity, and flag of ship. Objection was made that this would make it possible that trade secrets of shippers be divulged. The rule requiring the submission of cargo manifests was suspended pending action by the diplomatic agents of the nations at interest. It will be impossible to present reliable commodity statistics until the details contained on cargo lists or manifests are placed at the disposal of the canal administration. The commodity data presented in special reports are considered in this light.

#### WORKING FORCE.

The following tables give details of the force for the fiscal year, and comparison by years since 1906:

TABLE No. 1.—Force actually at work on June 18, 1919.

Monthly.	Silver employees' wages specified in United States currency.																	Total.		Grand total.				
	Artisans.						Laborers.											Silver.	Gold.					
	Special.	20 cents.	24 cents.	23 cents.	22 cents.	20 cents.	23 cents.	21 cents.	20 cents.	19 cents.	18 cents.	17 cents.	15 cents.	14 cents.	13 cents.	12 cents.	11 cents.				9 cents.	Task.		
Operation and maintenance:																								
Office.....	47	1																					49	35
Building division.....	141	344				388	1																1,486	199
Electrical division.....	85	27				55	94																340	199
Municipal engineering division.....	418	129				112	22	15															2,656	101
Lock operation.....	470	24				21	11																628	124
Dredging division.....	657	23				36	21																808	110
Mechanical division.....	145	23				280	503																1,779	786
Marine division.....	320	30																					350	105
Fortifications.....	51	2				17	24																261	41
Total.....	2,334	56	660		859	23	1,061		15		1,122	1,801											8,357	1,700
Supply department:																								
Quartermaster.....	803	24				82	80		3		82	519											1,697	109
Subsistence.....	397	1				1	1				1												402	23
Commissary.....	1,270	15				6	3			2	11	59	2	123	195	27	25	13					1,777	221
Cattle industry—plantations.....	351	120	19			15	14					132											654	29
Total.....	2,821	159	120	4	104	3	108		5	11	88	710	2	123	195	27	33	14	3				4,530	382
Accounting department.....	12																						12	191
Health department.....	455	41				7					71	386				3							973	202
Executive department.....	215	1																					216	461
Total.....	682	41	7		7		2				71	386			3								1,201	854
Panama Railroad:																								
Superintendent and coaling stations.....	468	44				34			34			388											1,660	136
Transportation.....	246						1				2	17											266	140
Receiving and forwarding agent.....	153	93								11	128	672											1,057	78
Total.....	867	137	66	5	34	1	20	626	128	706	14	355											2,983	354
Grand total.....	6,704	393	853	9	1,004	27	1,191	626	128	726	11	1,295	3,342	2	123	198	27	72	63	277	17,071	3,290	20,361	

TABLE No. 2.—*Force reports, by months, fiscal year 1918-19.*

Year and month.	The Panama Canal.		Panama R. R. Co.		Grand total.
	Gold.	Silver.	Gold.	Silver.	
1918.					
July.....	2,696	12,871	327	2,709	18,602
August.....	2,600	12,866	328	3,275	19,070
September.....	2,639	12,812	334	2,722	18,507
October.....	2,657	13,607	337	2,780	19,380
November.....	2,861	14,156	344	3,432	20,793
December.....	2,976	14,608	345	2,908	20,835
1919.					
January.....	3,002	15,287	372	2,668	21,329
February.....	3,032	14,660	400	3,800	21,892
March.....	3,108	14,093	408	2,790	20,400
April.....	3,093	14,234	394	3,270	20,607
May.....	2,951	13,712	368	2,923	19,955
June.....	2,928	13,963	353	3,062	20,306

TABLE No. 3.—*High and low force records, December, 1906, to June 30, 1919, by fiscal years.*

	The Panama Canal.			Panama R. R.	Total Panama Canal and Panama R. R.
	Gold.	Silver.	Total.	Gold and silver.	
1906.					
December.....	3,881	15,604	19,485	4,416	23,901
1907.					
October.....	4,992	20,836	25,828	6,139	31,967
January.....	4,033	16,987	21,020	4,796	25,816
1908.					
April.....	4,950	21,168	26,118	7,052	33,170
November.....	4,161	19,803	23,964	5,863	29,827
1909.					
October.....	4,376	23,411	27,787	7,618	35,495
January.....	4,295	20,583	24,878	6,393	31,271
1910.					
March.....	4,553	26,284	30,837	7,829	38,676
December.....	4,705	24,383	29,098	6,044	35,142
1911.					
December.....	4,420	25,439	29,859	7,967	37,826
June.....	4,292	21,795	26,087	6,603	32,690
1912.					
January.....	4,332	25,818	30,150	8,024	38,174
August.....	4,122	24,860	28,982	5,855	34,837
1913.					
August.....	4,087	30,918	35,005	4,957	39,962
December.....	3,744	23,209	26,953	5,195	32,148
1914.					
January.....	3,944	23,824	27,768	5,502	33,270
June.....	3,790	21,499	25,289	4,343	29,632
1915.					
July.....	4,198	22,846	27,044	5,314	32,358
February.....	3,088	17,023	20,111	2,978	23,089
1916.					
July.....	3,208	17,982	21,190	5,349	26,539
September.....	3,129	17,160	20,289	2,447	22,736
1917.					
January.....	3,552	17,989	21,541	4,453	25,994
June.....	3,229	16,381	19,610	3,368	22,978
1918.					
July.....	3,186	17,152	21,338	4,645	24,983
June.....	2,763	12,798	15,561	3,067	18,628
1919.					
February.....	3,032	14,660	17,692	4,200	21,892
September.....	2,639	12,812	15,451	3,056	18,507

NOTE.—Figures do not include contractor's forces. If taken into consideration, the greatest working force ever reported was 44,733, on Mar. 26, 1913.

## BUREAU OF CLUBS AND PLAYGROUNDS.

This bureau was conducted with but little change in its line of activities, personnel, or organization during the year. It was aimed to vary the ordinary work only enough to prevent lagging of interest. The clubs and playgrounds continue to be the essential centers of social life and activities in our communities, and the particular object involved in their management is to improve and enlarge their best influence to this end. A special effort made last year to better certain conditions which were found to handicap the bureau's work produced beneficial results.

Funds have not been sufficient to provide for more than the most urgent improvements. A new silver clubhouse at Red Tank was erected and opened for use in June, its formal opening occurring July 1. An addition to the Balboa clubhouse of a moving picture auditorium is nearing completion. This clubhouse, due to its location and the large population it serves, became so overcrowded that either others of its activities had to be eliminated or moving pictures abandoned. Other than the considerable amount of repair work necessary in maintaining the wood structures of the different buildings, no other additions or alterations of importance have been attempted. The maintenance cost of these buildings, the greater number of which are very old, is constantly increasing; the better alternative of which will be the construction of permanent buildings whenever funds can be made available. Approximately one-third of the expenses of the clubhouses is met by their receipts; and this ratio of receipts to expenses could be substantially bettered by the erection of permanent buildings adequately equipped. It is with this idea in view that in the selection of the apparatus and furnishings purchased and installed during the year its adaptability as permanent equipment has been carefully considered.

The clubhouse at Paraiso, originally built for gold employees, was turned over to silver employees in October. Paraiso having been abandoned by its white population, and converted into a district for colored employees only, the clubhouse was well adapted to their needs.

Soda fountains and the necessary serving tables, all of the latest and most sanitary type, have been installed in all of the five gold clubhouses. No other refreshment service of the clubhouses is more appreciated in this tropical climate than their soda fountain products: and as it is rather more than self-sustaining, the best equipment was purchased and a competent man placed in direct charge of the entire service. Results have amply demonstrated the practicability of this course. A stock room established at the Balboa clubhouse for the storing and distribution of all the miscellaneous supplies of the different clubhouses of the system has resulted in an economy of supplies and a more satisfactory service.

Playgrounds at Balboa, Ancon, Cristobal, Gatun, and Pedro Miguel are being operated. Those at Gatun and Pedro Miguel were opened during the year. Each has been equipped as well as possible to meet the demands of the different communities. The largest and most completely equipped is that at Balboa, where this work was originated. Competent instructors are engaged in the work of directing the playground activities, a daily program arranged to provide for the differing ages and classes of children is carried out and

so effectually that there can be no doubt of the favorable results thus far accomplished or of the future benefits to accrue from the work. The playground program harmonizes directly with that of the schools, and playground instructors have had charge of the pupils during their recesses and intermissions in addition to providing instructive entertainment for the great number of children under school age. A playground for children of colored employees living in Panama and the vicinity of the Ancon silver commissary would greatly improve conditions for these employees and, in view of the excellent results obtained from the only playground yet provided for colored children, that at La Boca, should be provided for whenever funds permit.

The use of the clubhouses for the various social organizations in existence within the Zone has been unrestricted. In some of the towns the Red Cross work was centralized at the clubhouses, and they served as the bureaus from which much of the work connected with the campaigns for Liberty loans and other similar patriotic efforts were conducted. While conditions with respect to the entertainment of the Army and Navy forces at the clubhouses have been greatly relieved with the establishment of eight similar clubs by the United States Army and Navy Y. M. C. A. at post and garrison points, both soldiers and sailors continue to have the unrestricted privileges of the canal clubhouses, and their interests are as conscientiously looked after as those of the civilian population. The DeLesseps building at Cristobal which had been equipped by this bureau especially for the entertainment of the soldiers and sailors, was turned over to the Army and Navy Y. M. C. A. soon after they began operations on the Zone.

Educational or social work for either the children or the adult population of the Canal Zone has a greatly improved effect when combined with a sufficiently attractive presentation to relieve it of tedium. The utilization of moving pictures has been increased during the year, combining in them the educational as well as the merely amusing conceptions. There were 2,160 educational, dramatic, and comedy dramas screened during the year, making a total of 15,120,000 feet of film shown in the clubhouses with a total attendance of 456,896. It was arranged to extend such entertainment to the inmates of the Palo Seco Leper Asylum, Corozal Hospital for the Insane, and the Gamboa Stockade. To these people, many of whom had never before seen the "movies," no form of entertainment could have been more successful or greater appreciated.

The Balboa stadium and base ball grounds amply demonstrated their utility this year. Providing excellent facilities for the many audiences gathered at not only the base ball games but the entertainments given in loan campaigns and other patriotic demonstrations, the stadium and grounds were at different times occupied to their full capacity. Provision is warranted for similar facilities at the Atlantic end whenever it shall be practicable to provide them. While facilities are quite ample for such sports as tennis, bowling and swimming, base ball continues the favorite for the Zone people. The Panama Canal league is promoted by employees and officials of the canal and officers of the Army and Navy, and comprises eight teams, three of which are civilians, four from the Army, and one from the United States Navy. For the first time since league base ball was

organized here in 1914 the civilians failed to capture the Governor's pennant this season, losing to the Corozal Army team.

The swimming pools at Balboa and Cristobal have been centers of interest for both the children and adults, particularly that at Balboa. Competent instructors have been provided, and it has resulted that, in addition to the art of swimming, both the children and the adults have been sufficiently trained in resuscitation work to enable them to demonstrate the practical utility of this in saving the lives of two cases at the Balboa pool by former pupils. There were 51,638 admissions to the Balboa pool during the year, of which 51,276 were paid, the proceeds being applied in the maintenance of the pool and payment of the debt incurred in its construction. No admissions are charged at the Cristobal pool, and it was impossible to provide there the supervision and instruction given at the Balboa pool. Ability to swim is made compulsory with high-school graduates, and every member of the 1919 graduating class passed this test satisfactorily.

Physical training, in direct charge of a physical instructor, is provided at all the clubhouses, although this work has necessarily to be restricted on account of its conflicting with other programs of the clubhouses where facilities are inadequate to carry out both. Regular classes in mass calisthenics, gymnastics, and competitive indoor games are maintained in addition to special exercises and games for women and girls. This work, under the direction of the physical instructor, is carried into the schools as well, and classes instructed both within the schools and at the playgrounds.

Special instruction in boys' work could not be carried out as a part of the program of the bureau this year, due to inability to secure a competent instructor from the States. With the release of such instructors from their war duties it will be possible to secure a man for the work here, and arrangements are under way to promote this feature of the bureau's activities as fully as possible during the coming year.

Immediate needs of the bureau are chiefly books and periodicals for our libraries; the present books are very old and so greatly worn that it would be impracticable to attempt restoring them. Some new furniture will be required to replace the old still in use. A swimming pool at Pedro Miguel is very much desired by the population there, and should be provided if funds warrant. The desirability of providing playgrounds for the children of silver employees has been referred to in this report; they should be established at all the different colored towns whenever possible.

A summary of the financial transactions of the bureau is given in the auditor's report for the fiscal year. (See Tables Nos. 47 and 48.)

#### DIVISION OF CIVIL AFFAIRS.

The regulations incident to the war necessitated maintaining an increased force in the customs inspection and censorship bureaus, though the personnel and organization of the division was but slightly changed during the year. The former assistant chief of the division, who was also shipping commissioner and administrator of estates, resigned November 2, 1918, when the chief of the division was made shipping commissioner and administrator of estates.

## BUREAU OF POSTS.

Postal receipts decreased for the year, due principally to war restrictions and the removal of troops from the Canal Zone. Total receipts were \$136,627.50, those for the preceding year \$145,231.81. The withdrawal of money order funds on deposit for the purpose of purchasing Liberty bonds and war savings stamps is accountable for \$7,000 of the decreased receipts. The subsidy to the Panaman Government of 40 per cent of our total stamp sales amounted to \$32,950.69. This, in addition to the free handling of all the official mail of The Panama Canal and the Army and Navy, results in a considerable handicap to the bureau's financial returns.

The post office at Las Cascadas was abolished February 28, 1919, and an office at Coco Solo established March 1. The number of post offices in operation thus remains the same as last year, 16, of which 13 are money order offices. The reduction of allotments has made it impossible to comply with existing demands for lock box service in the different offices. Box rents collected for the year amounted to \$8,268.20, those for the preceding year, \$8,147.30. It is estimated that the installation of such lock boxes for which there would be an immediate demand would result in increasing these revenues about one-half.

The money order business decreased to the extent of 26,886 in the number of orders issued, \$264,271.89 in the aggregate amount of orders, and \$1,494.19 in the fees collected including deposit money orders issued on which no fees were charged, as compared with last year's business. Subscriptions to Liberty bonds, Victory notes, and the purchase of war savings stamps are responsible for this decrease; likewise for the decrease in deposit money orders of which there were issued during the year \$1,145,460, and payments of \$1,225,025 made. The balance on account of deposit money orders on June 30, 1919, was \$419,925, compared with \$499,490 the preceding year. The total amount on deposit on account of all funds at the post offices, June 30, 1919, was \$437,534.50, that for the same date last year, \$501,096.15. The net balance accruing from interest on deposit money orders during the fiscal year was \$17,141.96.

On March 31, 1919, a C. O. D. parcel post convention was ratified between the Republic of Panama and the Canal Zone, effective April 15, 1919. A C. O. D. service was established in the Canal Zone on May 5. Though in operation but a limited time, 6,217 insured parcels were mailed at Canal Zone post offices prior to June 30, and of this number no claims for indemnity were made for which this service in the Zone was found responsible.

In the registry division 292,698 parcels and letters were handled during the year, of which number 136,355 were dispatched, including 32,942 domestic letters, 1,028 domestic parcels, 16,716 foreign letters, 2,320 foreign parcels, 77,086 official letters and parcels registered free, and 6,263 domestic parcels insured. Compared with the preceding year there was an increase of 5,461 registered letters and registered and insured parcels dispatched. There were delivered during the year at all post offices 156,343 registered, insured, and C. O. D. parcels post packages, an increase of 20,370 over last year. Ancon and Cristobal, as exchange offices, handled 251,529 registers, an increase of 69,719 over the previous year. The rerouting of mail

intercepted on account of censorship accounted largely for this increase of exchange registry business. Approximately 58 per cent of the matter registered was official, from which no revenue was received, and the same ratio probably existed on the ordinary mail.

Canal employees, under their privilege of importing merchandise for their personal use free of Panaman duties, received 14,640 parcels during the year; duties were paid to the Republic of Panama in the amount of \$25,289.71 on 9,591 mail parcels for non-employees and dutiable articles imported by employees.

In addition to its other duties, the office of the director of posts issued 645 duplicates of lost or stolen money orders, investigated approximately 200 cases of the loss, rifling, or nondelivery of registered mail, and undertook special investigations for the United States Post Office Department of mail in transit through the Zone.

Violations of the postal laws and regulations consisted of the sending of lottery matter through the mails, of which three cases were discovered; misuse of the official penalty envelope, three cases being reported; and misuse of canceled postage stamps, one case discovered. Where practicable, offenders were taken into court and their cases prosecuted. One arrest was made for the rifling of mail by a postal employee and the offender was convicted, fined \$25, and sentenced to six months in the penitentiary.

The dispatch of all mail forwarded to exchange offices in the United States, all countries of South America except in Brazil, all Central American countries, Australia, New Zealand, Cuba, Haiti, and all islands comprising the British and French West Indies, continues to be made through the Cristobal post office. A total of 3,262 dispatches to 88 different exchange post offices was thus made during the year. In addition various countries now bill their mail on Cristobal rather than on Colon or Panama, as formerly.

The mail facilities to ships in transit of the canal under the arrangement put into effect in June of last year has proved very satisfactory. The method of handling ship's mail under this arrangement was detailed in the 1918 report. Boarding officers of the customs service are prepared to sell stamps, accept letters for registry, and take applications for money orders from passengers and crews of these vessels, issuing receipts in each case and transacting the business for them through Canal Zone post offices.

A considerable saving has been effected in the handling of United States transit mail through the director of posts instead, as formerly, of consigning it to the British packet agent at Panama. Where under the old arrangement approximately 45 per cent of this mail was transferred across the Isthmus via the Panama Railroad, instead of placing it directly aboard ship at Cristobal, but 4 per cent of such mail is now handled by the railroad, resulting in a saving estimated at approximately \$50,000 yearly.

During the year there was received and dispatched a total of 91,091 sacks of transit mail from New York and New Orleans, an increase of 10,482 over the previous year. Of this total 77,962 sacks originated in the United States, and 13,129 in foreign countries. This mail was received from 146 steamers, and dispatched on 211 connecting steamers, but 4,445 sacks being forwarded by rail to Balboa for connection with vessels at that point.



The censorship of all transit mail made necessary the continuance of the arrangement outlined in last year's report, viz., that all the mail of the Central and South American west coast countries having established postal agencies in the city of Panama be actually handled by this bureau instead of the different agencies. Under the provisions of the order abolishing the censorship, the handling of this mail reverted to its former status of November, 1917, and the postal agents were advised that all mail consigned to them would be turned over to their representatives on July 1, 1919. It is still considered that the establishment of a single agency on the Isthmus under the direction of the bureau of posts for the receipt and dispatch of all mail coming into or passing through the Canal Zone would constitute the most practicable method of handling this class of mail. This matter is now under consideration by the United States Post Office Department.

#### BUREAU OF CUSTOMS.

Shipping has increased at canal ports during the year; a total of 4,604 vessels entered and 4,590 cleared from Cristobal and Balboa. There were 1,959 American vessels entering and 1,940 clearing. The average increase in all vessels entering was 34 monthly, necessitating a considerable increase in force of this bureau, especially with the additional work involved during the war period.

Due to travel restrictions brought about by the war, the total number of prohibited aliens handled was less than the previous year; 210 arrived at Balboa and 41 at Cristobal, a total of 251. Of this number, 138 were admitted to the Republic of Panama by authority of that Government, the others proceeding to their destination or returning to their port of embarkation. These figures apply to passengers only. All ships' crews containing Chinese members are checked before leaving the Zone to see that no illegal landings have been made.

Opium traffic and attempted smuggling were at a minimum during the year. Eight arrests were made for violation of the espionage act, section 2, and convictions secured in each case. Canal employees received 1,128 freight shipments free of duty during the year, a decrease of 253 similar shipments from last year. The number of inspections of the household goods and personal effects of employees decreased from 611 in 1918 to 583 this year. The time spent in making these inspections was found to warrant a charge for the service, and effective July 1, 1919, \$1 an hour will be charged for the time consumed by each inspector in this work. The bureau certifies invoices covering ordinary shipments from the Canal Zone to the United States in the same manner and form as prescribed for certification by American consuls in foreign ports. There were 1,323 invoices thus certified during the year, in addition to those covering the shipments of employees' effects referred to. Fees collected for this service amounted to \$938.50. Permits for the release of 4,134 shipments of goods arriving at Cristobal and Balboa for persons or firms in the Republic of Panama were issued during the year, 4,083 at Cristobal and 51 at Balboa. These permits are granted upon submission of the necessary papers from Panaman officials showing that duty has been paid.

## SHIPPING COMMISSIONER.

The work of the shipping commissioner and deputies was considerably increased this year due to both the unusual number of ships handled and the particular care necessary to be exercised in the enforcement of the seaman's act, as well as the increased handling of shipping papers under war regulations. There were 4,182 seamen shipped on American vessels, and 3,453 discharged, an increase of 47 per cent over last year's record. Seamen's wages received for deposit at Balboa amounted to \$27,027.43, of which all but \$422.17 was disbursed. The estates of 11 American seamen whose deaths occurred on the Canal Zone were handled for settlement by the shipping commissioner, the proceeds of such estates, together with such wages as may have been due each deceased seaman, being remitted to the district courts of the United States having jurisdiction.

## ADMINISTRATION OF ESTATES.

There were 161 estates of deceased and insane employees of The Panama Canal and Panama Railroad settled through this bureau during the year, a decrease in number of 38. Of the estates settled 86 were delivered to the consular or diplomatic representative in the Republic of Panama or the United States, of the countries of which the deceased owners were citizens or subjects; 56 were settled directly with heirs; three with administrators; and one delivered to an employee found to have recovered his sanity. The net proceeds of 19 estates handled were absorbed in settling claims against them. No estates were escheated; 62 remained unsettled at the close of the fiscal year; and 13 on which no money or property had yet been received were being investigated. The amount involved in the settlement of the 161 estates was \$8,121.63, of which \$7,932.29 belonged to estates of deceased employees, and \$189.34 to the estates of insane persons. Table No. 2 accompanying the appendix to this report, shows in detail the amounts involved in the handling of all estates during the year.

## LICENSES AND TAXES.

The number of motor vehicles and bicycle licenses, and permits issued by this division for hunting, the keeping and carrying of firearms, and peddling of foodstuffs aggregated 2,942, of which 1,274 were for motor vehicles, 725 for bicycles, 443 for hunting and the keeping or carrying of firearms, and 500 for the peddling of foodstuffs. Fees collected for the year were \$7,681.94, an increase of \$322.79 over last year.

## SPECIAL WORK OF THE DIVISION UNDER WAR REGULATIONS.

The division of civil affairs continued to carry out the instructions of the Governor as representative of the following special bureaus and boards in Washington:

War Trade Board, bureau of exports.

War Trade Board, bureau of enemy trade.

War Trade Board, bureau of imports.

Treasury Department (inspection of passengers and baggage).

Treasury Department (war-risk insurance).

Federal Reserve Board (exportation of money).

State Department (travel control).

Mail censorship board.

National war-savings committee.

The countersigning of export licenses by the chief of this division was formally authorized on June 4, 1918. There were 2,370 export licenses issued during the fiscal year; these including cargo licenses for vessels as well as individual licenses for export from the Republic of Panama, or for cargo in transit through the canal, and for parcel-post shipments where the commodities were not covered by general export, or R. A. C. licenses. All cargo originating in the Canal Zone, or originating in or reexported from the Republic of Panama, was required to be covered by shippers' export declarations. At the port of Balboa 911 such declarations were issued, and at Cristobal, 4,306. Various regulations of the War Trade Board covering special export licenses were carried out, mainly providing for segregation of shipments to European countries, until on June 30, 1919, when shipments of all commodities from any country in the world to any other country were permitted, with the exception of the former enemy countries of Europe and to Holland and Switzerland which were not consigned to the Netherlands Oversea Trust and to the Societe Suisse Surveillance Economique, respectively.

In carrying out the provisions of the bureau of enemy trade of the War Trade Board, this division advised local merchants regarding submitting their applications to Washington. No licenses to trade with the enemy were issued, but any Washington licenses were recognized here in connection with export control. Copies of the enemy trading lists were supplied to local merchants and all steamship companies, and all corrections thereto furnish them. All enemy trading lists were withdrawn, effective April 29, 1919, and all cargo which had been detained at Cristobal, after inspection by this division, was ordered released on May 10.

The work performed for the bureau of imports of the War Trade Board consisted principally in refusing to permit shipments of restricted commodities to the United States without import license. Import control affected the continental United States only, and the license had to be procured by the importer from the bureau of imports. Export licenses for shipments from the Canal Zone to the United States were not required.

Treasury Department decision 37427 established the provisions regulating the inspection of passengers and their baggage. Formal instructions were issued to chief customs inspectors to proceed under these regulations on March 5, 1918, although customs inspectors had been examining all outgoing passengers and baggage since November, 1917. This work was continued during the fiscal year. All incoming passengers and their baggage were examined, likewise the baggage of all passengers destined to other than United States ports. Sworn declarations were required from both incoming and outgoing passengers describing all papers and other communications in their possession as well as the amount of gold, silver, or currency in excess of that prescribed by law. Other special examinations of individuals, as well as examinations and searches of entire ships have been made upon confidential information received from various sources.

War risk insurance of the officers and crews of American vessels as provided by the act of Congress of June 12, 1917, was not put into effect on the Canal Zone until August 15, 1917. From that time until August 12, 1918, insurance was mandatory only for the crews of American vessels clearing for European ports and ports on the Mediterranean coast of Africa, and vice versa. On August 12, 1918, this area was increased to include United States ports on the Atlantic and Gulf of Mexico coasts to foreign ports, or to other United States ports, and vice versa. Shortly thereafter, on August 17, the Canal Zone was included, and the original act was broadened to include the insurance of vessels of foreign friendly nations, their freights, treasure, officers and crews. Weekly reports of American vessels from and to all ports affected were made to the bureau of war risk insurance with the applications for such insurance as was requested. This work was discontinued upon notice of the Treasury Department, effective December 20, 1918.

The exportation of coin, bullion, and currency from the Canal Zone was placed under the control of this division; the necessary work connected therewith consisting of submitting the applications to the Governor with recommendations and preparing licenses for his signature. There were 116 permits granted during the fiscal year covering \$724,099.74 in American gold coin; \$14,200 in English gold coin; \$310 in gold certificates; \$2,622 in English paper currency and silver money; \$37.50 in miscellaneous silver money; \$105,860 in United States notes, Federal Reserve notes, or national bank notes; \$24,808 in gold dust or ore; and \$1,194.50 in other gold coin.

The President's proclamation of August 8, 1918, establishing the rules and regulations governing the granting of permits to enter and depart from the Canal Zone was made effective here November 15, 1918; the work of carrying out such provisions being delegated to this division, its representatives acting as departure control officers. From November 15, 1918, to June 30, 1919, the passports, departure permits, etc. of all outgoing passengers were examined and viséd, and the crews of all vessels departing from Balboa or Cristobal were mustered for examination prior to the sailing of the vessel.

Seamen's identification certificates were furnished all members of crews requesting them; 2,059 such seamen's identification cards were issued in duplicate at Balboa, and 6,447 in duplicate at Cristobal. The issuance of these seamen's identification cards was discontinued June 30, 1919.

The following mail matter was handled by the bureau of mail censorship during the fiscal year:

*Letters examined.*

Spanish .....	372, 681
English .....	111, 552
French .....	7, 041
Italian .....	3, 423
Miscellaneous .....	17, 548
Privileged communications (not examined) .....	32, 189
<hr/>	
Total letters .....	544, 434
Packages examined .....	27, 727
Magazines and papers examined .....	216, 360
<hr/>	
Total pieces examined .....	788, 521

There were 1,205 numbered confidential memoranda issued by the bureau of mail censorship. Thirty-three thousand and forty-seven sacks of mail and 2,408 packages of transit mail originating in or destined to Central and South American countries, consigned to postal agents in Panama and Colon, were handled by the Cristobal post office and diverted through this bureau. Thirty-six thousand, two hundred and seventy-six foreign transit registers were handled and diverted in the same manner. The censorship of mail between the Canal Zone and foreign countries, and transit foreign mail, was discontinued, June 24, 1919.

The decision of the Treasury Department confining sales of the 1919 series of war savings and thrift stamps to continental United States resulted in discontinuing the sales of such stamps in Canal Zone post offices, effective December 31, 1918.

## POLICE AND FIRE DIVISION.

### POLICE SECTION.

The work of this section in connection with the bureau of civil affairs was considerably devoted to carrying out the war regulations in existence. It was necessary to provide for these added duties without increase of force. While no changes occurred in the officials of the organization, 41 first-class and three colored policemen left the service during the year, while but 35 first-class, and three colored policemen were appointed.

The status of funds prevented the erection of any new buildings or extensive repairs to those in use. No new equipment could be provided other than one patrol wagon for the Ancon-Balboa district; this was placed in service May 20, 1919.

The total number of arrests made was 3,982, a decrease of 444 from the previous year. Of this total, 3,657 were males, and 325 females. Warrants were issued for 3,047 arrests, 460 were made without warrants, and 475 were disposed of without trial.

A monthly average of 102.83 prisoners served sentences in the common jails during the year. Employment of such of these prisoners as were physically able was made mandatory, mainly in the construction of roads, janitor and miscellaneous duties around the fire and police stations.

Two homicides, both black, one a female native of Barbados, the other a male Colombian, occurred during the year. There were six suicides, of which three were Americans, one an Englishman, one Chinese, and one Barbadian.

Six arrests for violation of the opium act were made. Four of the men arrested, all members of crews of ships transiting the canal, were released after it was ascertained that they were not transporting or distributing real opium. On April 9, 1919, an American oiler on the steamship *Anyox* was arrested for this offense, found guilty, and sentenced to pay a fine of \$50. A Panamanian arrested at Cristobal, May 25, 1919, for the same offense is held pending trial.

A continuous patrol of the harbors of Balboa and Cristobal as well as of Gatun Lake and the Chagres River was maintained throughout the year. Monthly patrols of the interior section of

the Zone were also made to determine whether new clearings of cultivations were being made by private parties in violation of the depopulation order. Three arrests for trespass on Zone lands were made and the same number of convictions secured.

Two motor-cycle patrolmen were continued in this service; one at Cristobal and the other at Balboa, for the enforcement of automobile and other vehicular speed and operation regulations and for special emergency police service.

There were 84 deportations of persons from the Zone by this division during the year; 53 were convicts who had completed terms of imprisonment, and 31 were persons who had been convicted of misdemeanor charges or who were deemed undesirable persons to be permitted to remain on the Zone. Plain-clothes officers effected 402 arrests on misdemeanor and felony charges, and investigated 573 cases which did not require arrest and many cases in which defendants could not be found.

The annual course of target practice for members of the police force was held in Balboa and Cristobal districts during March. Of the 171 officers participating, 36 obtained scores of 70 per cent or more, the highest score being 88½ per cent.

The usual police census of the Zone population was not made this year. It is desired, if it can be arranged, to take such a census later and simultaneously with a census in the cities of Colon and Panama to be taken by the Panaman Government.

No change was made in the penitentiary buildings or grounds at Gamboa. The old wooden buildings were maintained in as good a condition as possible. New buildings are urgently required, but no appropriation was received for them.

Forty-nine convicts were received at the penitentiary during the year, the aggregate sentences of whom amounted to 39 years and 11 months. Sixty-four convicts completed terms of imprisonment and were discharged, an increase of 12 over last year. At the close of the year 39 convicts remained in custody, as compared with 54 at the close of the previous year.

Most of the convicts were employed during the year on the construction of the Paraiso-Gamboa road, a few on the small farm adjacent to the penitentiary and for the maintenance of the prison buildings and grounds, manufacture and repair of prison clothing, and other maintenance labor. During the latter part of the year a considerable amount of convict labor was expended in clearing the site for the proposed new penitentiary at Darien. The penitentiary farm yielded a considerable quantity of yams, some corn, yucca, and other vegetables which were used in supplementing the food ration of the convicts, considerably offsetting the increased cost of food.

Ten convicts were pardoned by the Governor of The Panama Canal during the year. One convict escaped on April 27, but was recaptured the same date. Coroner investigations were made in 50 cases of death. Of these 11 were due to accidental drowning and 19 to accidental traumatism.

The following tables give in detail the number of arrests made on the Canal Zone since organization, those made during the fiscal year, and the disposition of persons arrested:

TABLE No. 4.—Number of arrests, by fiscal years, made on Canal Zone since organization.

Period.	Number of arrests.
June 2, 1904, to June 30, 1905.....	2,130
July 1, 1905, to June 30, 1906.....	3,748
July 1, 1906, to June 30, 1907.....	5,831
July 1, 1907, to June 30, 1908.....	6,075
July 1, 1908, to June 30, 1909.....	6,275
July 1, 1909, to June 30, 1910.....	6,947
July 1, 1910, to June 30, 1911.....	5,959
July 1, 1911, to June 30, 1912.....	7,055
July 1, 1912, to June 30, 1913.....	6,827
July 1, 1913, to June 30, 1914.....	4,911
July 1, 1914, to June 30, 1915.....	5,157
July 1, 1915, to June 30, 1916.....	4,480
July 1, 1916, to June 30, 1917.....	4,881
July 1, 1917, to June 30, 1918.....	4,426
July 1, 1918, to June 30, 1919.....	3,982
Total.....	78,684

TABLE No. 5.—Number of arrests, by months, made during fiscal year ended June 30, 1919.

Months.	Males.	Females.	Total.	With warrant.	Without warrant.	Disposed of without trial.
1918.						
July.....	346	28	374	39	281	54
August.....	348	28	376	42	273	61
September.....	286	17	303	29	241	33
October.....	296	36	332	33	240	59
November.....	317	42	359	45	277	37
December.....	233	23	256	33	194	29
1919.						
January.....	331	33	364	48	279	37
February.....	237	17	254	37	192	25
March.....	283	30	313	31	238	44
April.....	353	22	375	36	285	54
May.....	296	24	320	47	261	12
June.....	331	25	356	40	286	30
Total.....	3,657	325	3,982	460	3,047	475

TABLE No. 6.—Arrests, by stations, fiscal year ended June 30, 1919.

Station.	Substation.	Number of arrests.
Balboa Central Station.....	Ancon.....	1,286
	Pedro Miguel.....	513
Cristobal Central Station.....		226
	Gatun.....	1,763
	Monte Lirio.....	160
	Gamboa.....	9
		25
Total.....		3,982

TABLE NO. 7.—Statement of dispositions of persons arrested, fiscal year ended June 30, 1919.

Dispositions.	Number.	Per Cent.
Tried in courts:		
Convicted.....	2,705	77.13
Dismissed.....	697	19.88
Continued on June 30, 1919.....	105	2.99
Otherwise disposed of on proper authority.....	3,507	100.00
Total persons arrested.....	475	
	3,982	

## FIRE SECTION.

No change occurred in the organization of the fire force during the year. The rank of sergeant was established during February, 1919, and three positions in that grade authorized. Thirty-five members were appointed to the force and 34 separated from the service.

Fifteen volunteer fire companies, each composed of a minimum of 20 men, employees of The Panama Canal and Panama Railroad, were maintained; an increase of six companies over last year. Two of the new companies were organized at towns, and five new companies are distributed between the tugs *Cocoli* and *Porto Bello* and at the fuel oil plant at Balboa.

No changes were made in the buildings except a slight alteration at the Pedro Miguel station to accommodate a motor-hose wagon. The only new equipment or apparatus purchased consisted of a chassis for a hose wagon installed at Pedro Miguel.

The usual inspections of all Government buildings, docks, storehouses, yards, etc., were conducted by the department throughout the year; fire hose and extinguishers maintained in good condition were installed for special protection, and installations were made in the new buildings constructed.

Total losses sustained by fire for the year aggregate \$40,805.13, of which \$25,000 represents loss due to a fire on the schooner *Evelyn*, at Balboa docks; \$3,000 due to a fire on the schooner *Tacoma*, also at Balboa docks; and \$10,000 caused by the burning of a United States Navy aviation speed launch in Limon Bay, where it had drifted into shallow water and could not be reached by hose from the tugs. Aside from these, losses by fire on the Canal Zone were very low.

## DIVISION OF SCHOOLS.

The opening of the Balboa high school, Gatun white school, and all the colored schools occurred October 1, 1918, but due to the delayed arrival of 25 white teachers the other schools were opened October 7.

The total number of white teachers employed during the year was 72, seven more than for the preceding year. Twelve white teachers resigned between July 1 and September 30, 1918, six resigned during the school year, and at the close of the year 70 teachers were in actual employment. There were 20 colored teachers employed, 5 more than the preceding year.

At the opening of the schools the total attendance was 2,307—1,491 white and 816 colored; compared with 2,057, 1,420, and 637, respec-



tively, at the opening in 1917. The average daily attendance for the school year was 2,179.5; 1,423.3 in the white schools and 756.2 in the colored schools; compared with 1,963.2, 1,322.9, and 640.3, respectively, for 1917.

The following new positions were authorized and filled: One teacher of household arts, at \$150 monthly, for Cristobal industrial training school; one supervisor of penmanship, at \$150 monthly, for all schools; two train attendants, at \$50 a month each, to replace two brake attendants employed last year at \$35 monthly.

Sixteen buildings were used for school purposes, 10 for white schools, including one room in the Balboa lodge hall used to relieve the congested condition of the Balboa grade school, and the lower floor of the Washington House at Colon Beach for domestic science classes; and six for colored schools. The two-room annex to the Cristobal colored school building was moved to Empire for use as a colored school there, and was occupied on December 2, 1918. A building formerly used as silver quarters at Colon Beach was converted for use of the manual training school, and was occupied April 21, 1919.

The return of the Porto Rican regiment of Infantry to Porto Rico made it unnecessary to continue the white school at Empiré, and it was accordingly closed March 12, the few pupils remaining being transferred to Pedro Miguel.

It was possible this year to extend industrial instruction to every pupil in the white schools above the fifth grade. Manual training and household arts classes were maintained at Cristobal for the Gatun and Cristobal white pupils, and at Balboa for the Pedro Miguel, Ancon, and Balboa pupils. An additional teacher of household arts was employed and assigned to Cristobal. The faculty of this department consisted for the year of one supervisor of industrial training, one instructor of apprentices, one manual training teacher, and two household arts teachers. A total of 424 pupils was enrolled in this department during the last quarter of the year, an addition of 174 over the enrollment for the corresponding period last year.

On July 1, 1918, there were 38 apprentices taking the apprentice courses. Eighteen new apprentices were enrolled during the year, five graduated, and seven resigned before completing their course, leaving 44 apprentices under instruction at the close of the year. A new classification of the apprentice wage scale during the year resulted in quite a substantial raise in pay for the apprentices, their present wage scale running from 35 cents hourly to 78 cents for the fourth, or completing year of the course.

Physical training and athletics for all the white schools were under charge of the director of physical education, the greater activities being carried on in coordination with the bureau of clubs and playgrounds. Daily recess periods of 25 minutes each were wholly given over to systematic calisthenics and exercises for all the pupils.

Night schools for instruction in Spanish, English grammar, stenography, bookkeeping, mathematics, and mechanical drawing were continued at Cristobal and Balboa. Systematic work in music in all the schools, both white and colored, was maintained throughout the year. The director of music, by a system of periodic visits to each school, found it possible to keep directly in touch with this work, both pupils and teachers receiving any necessary instruction or advice. Penman-

ship under the direction of a specially trained supervisor was taught in all the schools for the first time this year, and with very gratifying results. A single method of penmanship has been adopted, and teachers not familiar with it have been required to take a course designed to make them entirely capable of instructing their pupils.

The Junior Red Cross work was continued in the white schools. Out of 1,461 children in eight schools and seven auxiliaries there were 1,346 members. The work, both in quality and quantity, was considerably improved, and the results of this work entirely gratifying.

There were 20 graduates from the two high schools, 16 from Balboa and 4 from Cristobal. The ninth annual commencement exercises were held in the National Theater in the city of Panama, June 20, 1919. Up to the present time 109 pupils have graduated from the Canal Zone high school.

The following table gives an epitome of the more important school statistics for the past four fiscal years:

TABLE No. 8.—*Epitome of more important statistics for the years ending June 30, 1916, 1917, 1918, and 1919.*

	1916	1917	1918	1919
Number of school buildings.....	16	19	17	16
Buildings erected and converted.....	1	3	.....	2
Number of employes in division.....	60	70	81	95
Number of supervisory force.....	1	2	3	3
Total expenditures (approximate).....	\$70,188.56	\$87,000	\$140,000	\$149,000
Estimated value of school property.....	\$110,000	\$100,000	\$550,000	\$550,000
Net enrollment.....	2,149	2,373	2,774	3,006
White schools.....	1,366	1,518	1,764	1,778
Colored schools.....	783	855	1,010	1,228
Per capita expense of maintenance (approximate) based on net enrollment.....	\$32.66	\$36.66	\$50.83	\$49.57
Total days of attendance.....	258,244	295,697	350,619.0	371,602.5
White schools.....	183,206	209,782	239,527.5	242,678.5
Colored schools.....	75,038	85,915	111,091.5	128,924.0
Average daily attendance.....	1,501.4	1,709.2	1,963.2	2,179.5
White schools.....	1,065.1	1,212.6	1,322.9	1,423.3
Colored schools.....	436.3	496.6	640.3	756.2
Absence of teachers on account of sickness, days.....	161	234.5	312.5	374.5
Average monthly wages of teachers:				
White.....	\$98.84	\$109.52	\$125.58	\$141.88
Colored.....	\$60.56	\$65.00	\$67.67	\$71.50
Tuition collected.....	\$2,562.32	\$3,510.19	\$4,364.64	\$4,057.00

Holidays: Panama Independence Day, November 3; Thanksgiving Day and Friday following, November 28 and 29; Christmas holidays, December 23 to January 3, inclusive; Washington's Birthday; Easter holidays, April 14 to 18; Memorial Day.

## THE COURTS.

The district courts, one each at Cristobal and Balboa, handled an increased number of cases this year as compared with last year's business. There were 222 cases pending at the beginning of the year; 1,097 were filed, 960 settled, and 359 pending on June 30, 1919. Of the cases pending the first of the year 100 were civil, 107 probate, and 15 criminal. Cases filed included 134 civil, 273 probate, and 690 criminal. Those settled included 77 civil actions, 62 of which were decided and 15 dismissed; 261 probate cases; and 622 criminal actions, 110 of which were acquitted, 389 convicted, 20 forfeited, 56 dismissed, and 47 nol prossed. There were 141 sessions of court. A total of 961 marriage licenses was issued, and 12 deeds recorded. Collection of costs, fines, forfeitures, fees, etc., amounted to \$6,936.83.

The magistrate's courts, one each at Cristobal and Balboa, had nine civil and one criminal cases over from last year's business. There were 3,850 cases docketed during the year, 3,671 criminal, and 179 civil; 3,840 cases were disposed of, leaving 13 civil and 4 criminal actions pending at the close of the year. Collections from all sources amounted to \$12,327.42.

Under the provisions of an Executive order of May 10, 1911, petitions were issued during the year from the magistrate's court to the district judge for the commitment of 86 persons to the Corozal Asylum for observation; these included 47 white persons, 45 males (including 37 soldiers) and 2 females; 39 negroes, 31 male and 8 female.

#### SPECIAL ATTORNEY AND DISTRICT ATTORNEY.

The reports of the special attorney and the district attorney are printed as appendixes of the Governor's report.

#### MARSHAL FOR THE CANAL ZONE.

The marshal for the Canal Zone received 494 writs, subpœnas, and other processes for service during the year, of which 434 were served and 60 unserved, as the parties concerned could not be located on the Zone. The marshal, or his deputy, attended at Balboa district court 107 days and at Cristobal district court 34 days. Fees collected and turned over to the collector of The Panama Canal totaled \$221.99, and the amount of fees paid witnesses for the Government during the year was \$128.20.

#### RELATIONS WITH PANAMA.

Negotiations by correspondence or personal conference between the executive secretary and the secretary of foreign affairs of the Republic of Panama included, among others, the following subjects in addition to routine matters:

Repatriation of certain insane French subjects.

Request to have boat service resumed with Palo Seco on visiting days.

Japanese subjects delivered to port captain, Balboa, after passing quarantine inspection.

Panama Canal to refuse to issue export licenses on rice, wheat flour, sugar, etc., unless sufficient stock to last 30 days.

Question of excluding West Indian soldiers returning to the Isthmus.

Insanitary conditions conducive to malaria at Taboga; possibility of yellow fever, etc.

Cession of land to United States by the Republic of Panama for permanent lights in the Bay of Panama.

Request that the Republic of Panama have uniform procedure and rates for issuance of chauffeur licenses in the Republic of Panama and the Canal Zone.

Anchorage for French sailing vessels in nitrate trade in the Bay of Panama.

Special license to the National Navigation Co. to operate boats across the restricted area to Palo Seco.

Decree No. 140 of the Republic of Panama authorizing use of postal service inviolable registry envelopes.

Handling of the fourth Liberty loan by Panaman authorities in Panama and Colon.

Exportation of Panaman silver by Panama Canal employees.

Establishment of postal censorship and requiring passengers departing from Colon to have permission from American authorities at Cristobal.

Treaty allows purchase of house in Colon for use of Army quartermaster.

Request of the municipality of Colon for certain land adjacent to the slaughterhouse at Folks River.

Report of the assistant chief health officer on trip of medical commission to the San Blas coast.

Report that food supplies are being smuggled out of Panama through the Canal Zone.

Report of the chief health officer re health conditions at New Providence.

Proposed inspection of slaughterhouse at Colon, etc.

Question of recognizing signatures of certain notaries in the Canal Zone in connection with refunds of duties by Panaman Government to the West India Oil Co.

Report of inspection made of old Panama experiment station.

Proposed amendment to Panaman sanitary regulations in so far as building regulations are concerned.

Property required for military purposes at Taboga.

Request for list of consular representatives of foreign governments accredited to Panama.

Request for permission to deliver Christmas presents to employees, waiving the usual formalities.

Reported sickness, malaria, etc., at El Vigia and San Juan, Republic of Panama.

Alleged strike of West Indian laborers of the United Fruit Co. at Bocas del Toro.

Information re commissary sales, number of employees, etc.

Proposed sewer extension for the city of Panama.

Appointment of H. A. A. Smith as a member of the board of directors of Santo Tomas Hospital.

List of Canal Zone autos bearing Panama license tags, etc.

Alleged interference with passage of cattle from the interior via Arrijan over the pontoon bridge at Paraiso.

Complaint of the Republic of Panama re difficulties of the natives in navigating the Chagres River at Gamboa.

Measures to prevent misuse of commissary privilege by residents of Panama and Colon not entitled to it.

Appointment of Lieut. Wm. J. Burke as quarantine officer at Bocas del Toro.

Proposed extension of C. O. D. parcels post service with the Republic of Panama.

Authority for increasing the number of beds at Santo Tomas Hospital over the 300 originally agreed upon in 1905.

Deposit to cover cost of design of powder magazine for the Republic of Panama.

List of diplomats granted charge accounts at Panama Canal commissaries.

Request for copies of various new codes adopted by the Republic of Panama.

Question of the Republic of Panama standing half the cost of proposed incinerator at Cristobal (Colon).

Notification of return from the United States of 27 alien enemies and suspects who had been interned.

List of outstanding bills against the Republic of Panama.

List of persons from whom missionary books were confiscated.

Request of the Republic of Panama for statement of the cost of public improvements in streets that form the dividing line between Panama and Ancon and Colon and Cristobal.

Report of the health department on the health conditions in the province of Chiriqui.

Alleged export of native products from Balboa and Cristobal without the payment of duty.

Clearing the channel of Rio Cana Quebrada.

Request for information as to the status of the Continental Bank's liquidation for the use of the Administrator of Estates, etc.

Protest of the Panama Association of Commerce against leasing of the Panama Railroad stables for other than stable purposes.

Request of the Republic of Panama re securing their approval before shipping inflammables or explosives.

Plans of proposed new Canal Zone penitentiary to be located at Darien.

Panama Railroad Company exempt from taxes on property in Panama by virtue of provisions of treaty.

Method of handling and making record of inflammables and explosives.

Regulations in force in Canal Zone prisons.

No legal authority in the Canal Zone to compel one to testify in connection with rogatory letters issued by a court of Colon.

Question of amount of bond required by the Republic of Panama to permit Chinese to enter the Republic of Panama to secure passport from the Chinese Consul General.

Information requested re decree requiring monthly inspections of all vehicles in Panama.

Policy followed in granting clearing permits to residents along the shore of Gatun Lake.

Modification of tariff regulations covering public passenger vehicles.

#### LEGISLATION.

The various acts of Congress and Executive orders affecting The Panama Canal and the Canal Zone appear as an appendix to the Governor's report.

Respectfully submitted.

C. A. McILVAINE,  
*Executive Secretary.*

Col. CHESTER HARDING, *United States Army,*  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

APPENDIX TO APPENDIX G.

REPORT OF CHIEF OF DIVISION OF CIVIL AFFAIRS, EXECUTIVE DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 28, 1919.*

SIR: I have the honor to submit the following report of the division of civil affairs for 1919:

The assistant chief of the division, who was also shipping commissioner and administrator of estates, resigned November 2, 1918, and the chief of the division was made shipping commissioner and administrator of estates. An office assistant was employed in the position formerly occupied by the assistant chief of the division.

BUREAU OF POSTS.

The total receipts from the postal service, including box rents, payments from the Panama Railroad Company, payments from the Panaman Government for handling its mail between Panama and Colon, and payments from the United States Post Office Department for handling United States transit mails, were \$136,627.40, as compared with \$145,231.81 for the preceding year, a decrease of \$8,604.41. Seven thousand dollars of this difference were caused by decreased receipts from interest derived from money-order funds on deposit, as the result of the withdrawal of money-order funds for purchase of United States Government bonds and war savings stamps. The sale of postage stamps and postal cards, including the receipts from the sale of stamp books, amounted to \$81,343.78, as compared with \$83,939.74 for the year ended June 30, 1918, and \$2,553.88 were collected for second-class matter, as compared with \$1,825.38 during the preceding year. The decrease in postal receipts was, no doubt, due to the war restrictions regarding the mailing of correspondence and parcel-post matter, and also to the transfer of troops from the Canal Zone, resulting in a reduced complement at all Army posts.

The Canal Zone postal service is still burdened with a subsidy to the Panaman Government equivalent to 40 per cent of its total stamp sales, aggregating \$32,950.69 during the fiscal year. The bureau of posts carries free the official mail of The Panama Canal and the Army and Navy within the Canal Zone, and pays transportation charges to the United States.

## NUMBER OF POST OFFICES.

The number of post offices in operation, 16, remained unchanged during the year. The post office of Las Cascadas was abolished February 28, and an office at Coco Solo was established March 1. Money-order business was discontinued at Empire on March 31 and established at Coco Solo on May 1, leaving 13 money-order offices in operation on June 30.

## LOCK BOXES.

Because of reduced allotments, no lock boxes were installed during the year, although the demand for the past two years has been greater than the supply. Not only do lock boxes give better service to patrons and reduce work in the general delivery, but the records show they have been found to pay for themselves within a year's time. Call and lock boxes are charged for at rates ranging from 50 cents to \$1.50 per quarter.

For the past three years estimates have been submitted and allotments requested for the installation of additional lock boxes, but the funds have not been made available. This has resulted in numerous complaints from patrons of post offices and a considerable loss in revenue to the Government.

The box rents collected during the year amounted to \$8,268.20, as compared with \$8,147.30 for the previous fiscal year. With the installation of additional boxes needed, it is thought the revenues would be increased about 50 per cent.

## MONEY ORDERS.

There were 140,618 money orders issued during the year, amounting to \$3,108,701.66, on which fees amounting to \$10,424.16 were collected. The average amount of each order was \$22.11. Compared with the preceding year, there was a decrease of 26,886 in the number of orders issued, and a decrease of \$264,271.89 in the amount, while there was a decrease of \$1,494.19 in the fees collected. These figures include deposit money orders on which no fee was collected. The decrease in money-order business was presumably due to heavy subscriptions to Liberty bonds, Victory notes, and war savings stamps. There was on deposit at the close of the year \$1,260.50 in the form of unpaid fee-paid money orders issued by and drawn on Canal Zone post offices in favor of the remitter.

## DEPOSIT MONEY ORDERS.

Deposit money orders issued during the year had a total value of \$1,145,460, and payments of deposit money orders during the same period aggregated \$1,225,025. The balance on deposit to this account on June 30, 1919, was \$419,925, compared with \$499,490 on deposit the previous year. There were still open on June 30, 1919, old postal savings accounts aggregating \$509, remaining from outstanding accounts which had been turned over to the accounting department on June 30, 1916. These accounts are paid direct by that department on request, instead of being handled by the post offices. The total amount on deposit at all post offices on June 30, 1919, was \$437,534.50, as compared with \$501,096.15 on June 30, 1918.

By the act of Congress of August 21, 1916, provision was made that deposit money orders shall bear interest at the rate of 2 per cent per annum, and also that the interest received from Canal Zone money order funds shall be available to pay any losses which are chargeable to the Canal Zone postal service. When deposit money orders are cashed, interest is figured for each full quarter during which the amount has been on deposit. Interest amounting to \$8,604.24 was paid on deposit money orders cashed during the fiscal year, as compared with \$8,440.71 for the year ended June 30, 1918. Interest received from banking institutions for money order funds on deposit amounted to \$25,746.20, thus leaving a net balance of \$17,141.96 in the money order interest account during the fiscal year.

#### REGISTERED, INSURED, AND C. O. D. MAIL.

On March 31, 1919, a C. O. D. parcel post convention was ratified between the Republic of Panama and the Canal Zone, to be effective April 15, 1919, for the handling of C. O. D. parcel post parcels originating in Panama and addressed for delivery within the Canal Zone. On May 5, 1919, a C. O. D. service was established in the Canal Zone, based upon the United States regulations. During the remainder of the fiscal year a total of 46 C. O. D. parcels were mailed at Canal Zone post offices. Insured parcels to the number of 6,217 were mailed at Canal Zone post offices, and of this number no claims for indemnity were made for which the Canal Zone postal service was found to be responsible for the loss or damage to parcels.

In the registry division of the post offices 292,698 parcels and letters were handled. Of this number, 136,355 registers were dispatched, subdivided as follows: 32,942 domestic letters, 1,028 domestic parcels, 16,716 foreign letters, 2,320 foreign parcels, 77,086 official letters and parcels registered free, and 6,263 domestic parcels insured. Compared with the preceding fiscal year there was an increase of 5,461 registered letters and registered and insured parcels dispatched. There were delivered during the year at all post offices 156,343 registered, insured, and C. O. D. parcel-post packages, an increase of 20,370 over the previous year. Ancon and Cristobal, as exchange offices, handled 251,529 registers, an increase of 69,719 over the previous year. Of these, 1,963 passed through the Ancon post office, and 249,566 through the Cristobal post office, to and from the United States and foreign countries. This abnormal increase was mainly due to the rerouting of mail through the Cristobal post office intercepted on account of censorship.

Approximately 58 per cent of the matter registered by the bureau of posts was official mail of The Panama Canal, from which no revenue was received, and the same ratio will probably hold true with regard to ordinary mail.

#### DUTIABLE PACKAGES.

Customs duty was paid to the Republic of Panama to the amount of \$25,289.71 on 9,591 mail parcels for nonemployees and on dutiable articles imported by employees, as compared with \$15,461.77 on 8,278 parcels during the preceding year. All payments for customs duties upon mail parcels arriving at Canal Zone post offices are made to the



postmasters of Panama and Colon, who affix revenue stamps equivalent to the amount of duty collected to the customs declarations prepared in the Canal Zone post offices. Employees of the United States Government on the Isthmus may import merchandise, intended for their personal use, through the mails free of duty by submitting a declaration to the postmaster on card form P. C. 1160. During the year 14,640 parcels were delivered at Canal Zone post offices on submission of this form, as compared with 15,629 during the previous year. The handling of this work by the postmasters is subject to the supervision of the postoffice inspector.

#### DUPLICATE MONEY ORDERS AND INVESTIGATIONS.

In addition to the direction and supervision of post offices and general correspondence pertaining thereto, the office of the director of posts issued 645 duplicates of lost or stolen money orders, investigated approximately 200 cases of the loss, rifling or nondelivery of registered mail, undertook special investigations for the United States Post Office Department regarding mail in transit through the Canal Zone, made inspections of all post offices, and issued 80 numbered circulars of instruction to all postmasters.

#### DEAD LETTER SECTION.

The unclaimed mail of local origin is opened in this office and disposed of in accordance with the Postal Laws and Regulations. Unclaimed ordinary mail matter addressed for delivery in the Canal Zone is returned to the countries of origin. Unclaimed registered mail and parcel post matter is disposed of by sale or destroyed as worthless. Insufficiently addressed letters are advertised in The Panama Canal Record and delivered or returned to the senders.

#### VIOLATIONS OF POSTAL LAWS AND REGULATIONS.

Governor's Circular No. 697-1 of June 25, 1915, quotes a part of the United States Postal Laws and Regulations regarding the exclusion from the mails of matter pertaining to lotteries and similar enterprises, and warns all patrons of the Canal Zone postal service against violations thereof. During the year there were three cases of the violation of the Postal Laws and Regulations by sending lottery matter through the mails. It has not been the practice to prosecute these cases, but all offenders are warned by letter.

Three cases were reported during the year of the misuse of the official business penalty envelope, but only one case was prosecuted, and the offender was convicted and fined \$5. The misuse of the official business penalty envelope in the Canal Zone is prevalent and is difficult to stop unless drastic action is taken.

There was one case of the misuse of canceled postage stamps reported. The case was not prosecuted, but the offender was warned that a second offense would result in action being taken against him.

One arrest was made for the rifling of mail by a postal employee, and the offender was convicted, fined \$25, and sentenced to six months in the penitentiary.

## DISPATCHES TO UNITED STATES AND OTHER COUNTRIES.

Mails are forwarded to the United States and to other countries on which direct dispatches are made in the manner calculated to insure quickest delivery. All dispatches are made by the Cristobal post office, which, on November 6, 1916, was made an exchange office for the dispatch of mail to all countries, and various countries now bill their mail on Cristobal rather than on Colon or Panama, as formerly. In addition to dispatches to United States exchange post offices, direct dispatches are now made to all countries in South America except Brazil, to all Central American countries, to Australia, New Zealand, Cuba, Haiti, and to all islands comprising the British and French West Indies. During the fiscal year a total of 3,262 dispatches was made to 88 different exchange post offices.

## DELIVERY OF MAIL TO SHIPS IN TRANSIT.

During the latter part of June, 1918, all mail for crews and passengers of ships in transit through the canal and for ships touching at canal ports was gathered from steamship agencies, consulates, and the Colon and Panama post offices and concentrated at the Cristobal post office. Delivery is effected through boarding inspectors or pilots upon arrival of ships, and through the Gatun and Pedro Miguel post offices while ships are in transit through the locks. In this manner very efficient service is rendered. Reports are received three times daily regarding the movement of ships, and by the concentration of all mail at one place there is little possibility of any of it missing connection with the ship. This arrangement has greatly improved the service to ships, and numerous expressions of appreciation have been received.

Boarding officers of the customs service are prepared to sell stamps, accept letters for registry, and take applications for money orders from passengers and crews of vessels in transit, issuing receipts in each case and transacting the business for them through Canal Zone post offices.

## UNITED STATES TRANSIT MAIL.

All transit United States mail and closed foreign mail, via the United States, destined to the west coast of Central and South America is consigned to the care of the director of posts of the Canal Zone. Formerly this mail was consigned to the British packet agent at Panama. When this division took over the matter it was found that approximately 45 per cent of the mail was being forwarded over the railroad to connect with steamers at Balboa, instead of being placed aboard at Cristobal before the vessel started through the canal. This was, in part, a useless expenditure of money, amounting approximately to \$50,000 per annum. During the fiscal year ended June 30, 1918, the amount of mails forwarded by rail to Balboa was approximately 12 per cent, and during the year ended June 30, 1919, less than 4 per cent. It is evident that the handling of this mail by the Canal Zone postal bureau has saved the United States Post Office Department a large amount of money.

During the year ended June 30, 1919, there was received and dispatched a total of 91,091 sacks of transit mail from New York and

New Orleans, an increase of 10,482 over the previous fiscal year. Of this total 77,962 sacks originated in the United States and 13,129 in foreign countries. This mail was received from 146 steamers, and dispatched on 211 connecting steamers. A total of 4,445 sacks was forwarded by rail to connecting steamers at Balboa, and of this total 4,108 originated in the United States and 337 in foreign countries.

#### HANDLING OF ALL TRANSIT MAIL.

On account of the censorship of mail, the details of which are covered in a separate report, the bureau of posts assumed charge of the handling of all mail coming into and dispatched from the Canal Zone during the entire fiscal year. Three of the countries of Central America, and all of the countries of the West Coast of South America, maintain postal agencies in the city of Panama, and although the mail was consigned to the respective agencies, the receipt and dispatch of it by them was symbolical only. The actual work was performed by the bureau of posts and all mail recorded on transit waybills especially designed for that purpose. At the close of business on June 30, 1919, the handling of this mail reverted to its former status as of November, 1917, and postal agents were advised that all mail consigned to them would be turned over to their representatives on July 1, 1919.

During the fiscal year a total of 33,047 sacks and 2,408 packages of mail, consigned to the postal agents, were handled by the Cristobal post office, under the supervision of this office. The handling of this mail demonstrated the fact that better service could be afforded by having the mail handled by one agency. This method is more advantageous to steamship lines conveying the mail to destination, and the logical solution is to establish one agency on the Isthmus under the direction of this office for the receipt and dispatch of all mail coming into or passing through the Canal Zone. This matter has already been taken up with the United States Post Office Department, which has it under consideration.

#### BUREAU OF CUSTOMS.

The bureau of customs has been conducted under regulations embodied in Governor's Circular No. 679 of July 14, 1914, as revised on November 21, 1914. The work is closely allied to that of the marine division, the quarantine service, the division of police, and the Panama Railroad Company, and the bureau of customs cooperates with all of these branches in order to avoid unnecessary duplication of work in connection with the handling of passengers, shipping, and cargoes.

#### PROHIBITED ALIENS.

Section 10 of the act of Congress of August 21, 1916, gives the President authority to make rules and regulations touching the right of any person to enter or remain on or pass over any part of the Canal Zone, and further provides that an undesirable person arriving in the Canal Zone may be returned from whence he came "on the vessel bringing such person to the Canal Zone, or any other vessel belonging to the same owner or interest, and at the expense of

such owner or interest." By virtue of this authority the President signed the Executive order of February 6, 1917, published as Governor's Circular No. 601-60, relating to the exclusion of Chinese. Section 8 of this Executive order authorizes the Governor of The Panama Canal to establish rules and regulations to carry out this order. The Governor issued Circular No. 714-1 on April 25, 1917, charging the bureau of customs with the exclusion of the Chinese referred to in the Executive order.

During the fiscal year, 210 prohibited aliens arrived at Balboa and 41 at Cristobal in transit to the Republic of Panama and other countries, making a total of 251. Of this number 138 were admitted to the Republic of Panama by authority of that Government, and the others either proceeded to their ultimate destination or were returned to the port of embarkation. Prohibited aliens in transit can make arrangements to be released in the Canal Zone by putting up a bond. The above figures apply to passengers only, and not to members of crews. It is customary to check the number of Chinese members of crews before a ship leaves a Canal Zone port, in order to see that no illegal landings have been made, and 324 crews have been so checked during the year.

The total number of prohibited aliens handled during the year was less than the previous year, due to travel restrictions brought about by the war.

#### OPIUM TRAFFIC.

It is probable that attempts to smuggle opium through the Canal Zone into the Republic of Panama have not been so frequent as in former years, because, in spite of the constant vigilance of the bureau of customs, only five arrests have been made since July 1, 1918. One man was fined \$50 for violating the opium act, approved January 17, 1914 (Public No. 223), and four men were discharged because the substance in their possession which was thought to be gum opium was found, upon analysis, to contain no opium, morphine, or cocaine. All confiscated drugs are delivered to the health department.

#### ATTEMPTED SMUGGLING.

There were no arrests during the year for attempted smuggling.

#### VIOLATIONS OF ESPIONAGE ACT.

There were eight arrests during the year for violation of Title VII, section 2, of the espionage act, which reads in part as follows:

Sec. 2. Any person who shall export, ship, or take out, or deliver or attempt to deliver for export, shipment, or taking out, any article in violation of this title, or of any regulation or order made hereunder shall be fined not more than \$10,000, or, if a natural person, imprisoned for not more than two years, or both; \* \* \*.

Each of the persons arrested was convicted and fined \$10. In one other case which was pending on June 30, 1918, defendant was found guilty and fined \$400. In all of the above cases the goods were ordered confiscated by the court.

## FREE ENTRY OF MERCHANDISE.

Employees of the United States Government are allowed the free entry of goods shipped by freight or express for their personal use. After the requests for free entry on form P. C. 164 have been approved by this office for the executive secretary, three copies of each request are forwarded to the chief customs inspector at Cristobal, who secures approval and release from the Panaman customs officials, and makes distribution of the three copies of the form. Two of the remaining copies of the request are distributed by the executive office after approval, and one retained for file. During the fiscal year 1919, the number of requests accomplished was 1,128, as compared with 1,381 for the previous year.

## HOUSEHOLD INSPECTIONS.

Under an agreement with the United States Treasury Department, the bureau of customs is authorized to inspect and seal household goods and miscellaneous effects of American manufacture belonging to employees of The Panama Canal, the Panama Railroad Company, and the United States Government which are intended for shipment by freight to the United States. These goods are then admitted into the United States free of duty without further inspection. There have been 583 such inspections during the fiscal year, covering 4,467 pieces of freight, as compared with 611 inspections and 7,329 pieces of freight in 1918.

It is frequently necessary for an inspector to spend several hours making the inspection of the household goods of one person, and Circular No. 679-7 was issued by the Governor under date of June 21, 1919, directing that, effective July 1, 1919, in addition to the charge of \$1 for declaration of inspected household goods, a charge of \$1 per hour shall be made for the time spent by customs inspectors away from their regular duties in the inspection of household goods.

## CERTIFICATION OF INVOICES.

The bureau of customs certifies invoices covering ordinary shipments from the Canal Zone to the United States, using forms identical with those prescribed for certification by American consuls in foreign ports. In addition to the invoices for household inspections, mentioned in the preceding paragraph, there were 1,323 invoices thus certified during the year, as compared with 1,288 in 1918.

The act of Congress of August 21, 1916, published as Governor's Circular No. 600-24, provides that certain fees shall be charged by customs officers for the certification of the above invoices. Fees for this service amounted to \$505.50 at Balboa, and to \$433 at Cristobal.

## MERCHANDISE FOR REPUBLIC OF PANAMA.

All merchandise arriving at Cristobal, destined to persons or firms in the Republic of Panama not connected with The Panama Canal or the Panama Railroad Company, is released by Canal Zone customs inspectors upon submission of the necessary papers from Panaman officials showing that duty has been paid. Permits for

4,083 such releases were granted at Cristobal during the year, and 51 releases were issued at Balboa, where the greater part of such cargo is forwarded by railroad to Panama, there to be taken in charge by the Panaman customs officials.

#### MOVEMENTS OF VESSELS.

There has been an increase in shipping at canal ports during the past year. The total number of vessels entered was 4,604, and the total number cleared was 4,590, as compared with 4,447 entered and 4,443 cleared during the previous fiscal year.

The total number of American vessels entered was 1,959, and the total number of American vessels cleared was 1,940, as compared with 1,546 entered and 1,537 cleared during the fiscal year 1918.

It should be noted that this is an increase averaging 34 vessels a month, or more than 1 a day, and it has resulted in a great increase in the work of the force.

#### SHIPPING COMMISSIONER.

The Executive order of January 27, 1914, provides that the executive secretary shall "in person or through one of his assistants perform the duties of a shipping commissioner," and these duties have been delegated to the division of civil affairs. The chief of the division is also shipping commissioner. The chief customs inspectors are also deputy shipping commissioners. Section 9 of the act of Congress of August 21, 1916, provides:

SEC. 9. The laws relating to seamen of vessels of the United States on foreign voyages shall apply to seamen of all vessels of the United States at the Panama Canal Zone, whether such vessels be registered or enrolled and licensed, and the powers in respect of such seamen of such vessels bestowed by law upon consular officers of the United States in foreign ports and upon shipping commissioners in ports of the United States are hereby bestowed upon the shipping commissioner and deputy shipping commissioners on the Panama Canal Zone.

The annual appropriation act for the diplomatic and consular service includes the Panama Canal Zone with the foreign countries for which money is appropriated for the relief and protection of American seamen.

The work of the shipping commissioner and deputies, in addition to the signing on and discharging of American seamen (i. e., seamen on American vessels), and supervision of their payment, includes the settlement of disputes between masters and members of crews regarding wages, advances, fines, and general treatment. Provision has been made for the medical treatment of sick and injured American seamen in the Canal Zone hospitals under the public health service, and when such seamen are discharged they are maintained and returned to the United States by the deputy shipping commissioners. In cases where American seamen die in such hospitals their effects are sold by the shipping commissioner and the proceeds of the sale, together with the wages due the seamen, remitted to the district courts in the United States having jurisdiction over such cases. The wages and effects of 11 deceased American seamen were handled during the year.

The increase of 413 American vessels entered and 403 American vessels cleared from Canal Zone ports during the present year, as

compared with the year 1918, and the frequent changes of routing, due to war conditions, involving the changing of shipping articles, have created a great deal of additional work. No seaman is discharged in the Canal Zone without the consent of a quarantine officer, excepting American seamen discharged according to law by deputy shipping commissioners.

There were 4,182 seamen shipped on American vessels and 3,453 seamen discharged, as compared with 2,638 shipped and 2,549 discharged during the preceding year, an increase of 47 per cent.

Seamen's wages were received for deposit at the port of Balboa during the year amounting to \$27,027.43, of which all but \$422.17 was disbursed. At Cristobal \$34,547.16 were received, and a balance of \$780.21 remained on hand on June 30, 1919.

#### ADMINISTRATION OF ESTATES.

During the year 161 estates of deceased and insane employees of The Panama Canal and the Panama Railroad Company were administered, and there were 62 estates in course of settlement on June 30, 1919.

Of the 161 estates settled during the year, 86 were delivered to the consular or diplomatic representatives in the Republic of Panama or the United States, of the countries of which the deceased or insane persons were citizens or subjects; 56 estates were settled direct with heirs upon satisfactory evidence of heirship being furnished; 3 estates were settled with administrators; 1 estate was delivered to an insane employee who recovered his sanity; and the net proceeds of 19 estates were used to settle claims against them. No estates were escheated during this fiscal year.

The amount involved in the settlement of the 161 estates was \$8,121.63, of which \$7,932.29 belonged to the estates of deceased employees and \$189.34 to the estates of insane persons.

In addition to the 62 estates remaining unsettled on June 30, 1919, 13 additional cases were being investigated in which no money or property had yet been received.

There is attached hereto a statement showing the number of estates received and settled during each month of the year, including the amount of funds handled, together with a statement giving the number, by nationalities, of the estates of deceased and insane employees settled during the fiscal year.

#### LICENSES AND PERMITS.

Motor vehicle and bicycle licenses were issued by the division of civil affairs as well as permits for hunting and the keeping and carrying of firearms and the peddling of foodstuffs. During the fiscal year 1919 there were 2,942 such licenses and permits issued, of which 1,274 were for motor vehicles, 725 for bicycles, 443 for hunting and the keeping or carrying of firearms, and 500 for the peddling of foodstuffs. Agreements are in force with the municipalities of Panama and Colon providing for reduced reciprocal license fees on motor vehicles. The sum of \$7,681.94 was collected by this office during the past year for license fees, as compared with \$7,359.15 in the previous year.

## INSURANCE COMPANIES AND CORPORATIONS.

Correspondence with insurance companies licensed to do business in the Canal Zone is handled by this office for the executive secretary, and the annual report of insurance business transacted in the Canal Zone during the calendar year is made up by this office. The Manufacturers Life Insurance Co., of Toronto, Canada, did not renew its license to do business for the year commencing January 7, 1919, as it is not now actively engaged in the solicitation of business in the Canal Zone. As this company has insurance in force here, however, it is required to keep securities on deposit and to pay the insurance tax of  $1\frac{1}{2}$  per cent on its gross premium receipts collected in the Canal Zone. During the past year seven other insurance companies were authorized to transact business and did transact business in the Canal Zone.

The division of civil affairs handles for the executive secretary correspondence relating to foreign corporations which do business or desire to do business in the Canal Zone, under the provisions of the Executive order of March 20, 1913. The one corporation which was authorized to do business in the Canal Zone on July 1, 1918, renewed its license during the year. Correspondence was had with one other company, but it did not take the steps necessary to authorize it to transact business here.

## WAR ACTIVITIES.

A special report is being submitted on the activities of this division in connection with the prosecution of the war.

Respectfully,

C. H. CALHOÚN,  
*Chief, Division of Civil Affairs.*

Mr. C. A. McILVAINE,  
*Executive Secretary,*  
*The Panama Canal, Balboa Heights, Canal Zone.*

TABLE NO. 1.—Statement of vessels entered and cleared and of seamen shipped and discharged at Balboa and Cristobal, fiscal year 1919.

	Vessels entered.			Vessels cleared.			Seamen shipped.			Seamen discharged.		
	Bal- boa.	Cristo- bal.	Total.	Bal- boa.	Cristo- bal.	Total.	Bal- boa.	Cristo- bal.	Total.	Bal- boa.	Cristo- bal.	Total.
<b>1918.</b>												
July.....	185	191	376	182	196	378	19	233	252	63	191	254
August.....	158	190	348	158	186	344	64	207	271	125	171	296
September.....	185	208	393	184	207	391	201	228	429	300	135	435
October.....	199	204	403	201	211	412	46	236	282	55	130	185
November.....	194	193	387	186	181	367	113	210	323	141	230	371
December.....	185	202	387	180	202	382	32	182	214	69	166	235
<b>1919.</b>												
January.....	192	195	387	193	193	386	83	385	468	19	255	274
February.....	158	191	349	161	189	350	162	175	337	36	145	181
March.....	198	218	416	197	224	421	73	236	309	100	179	279
April.....	173	206	379	173	202	375	236	292	528	195	167	362
May.....	180	219	399	186	222	408	187	291	478	132	205	337
June.....	173	207	380	168	208	376	46	245	291	58	186	244
Total.....	2,180	2,424	4,604	2,169	2,421	4,590	1,262	2,920	4,182	1,293	2,160	3,453



TABLE No. 2.—Statement showing number of estates received and settled and amount of funds handled during fiscal year ended June 30, 1919.

Month.	Number received.	Number settled.	Amount of funds collected.	Value of estates settled.
Balance of unsettled estates on hand on July 1, 1918, and amount collected in same.....	35		\$5,364.07	
1918.				
July.....	26	24	600.73	\$1,150.18
August.....	16	12	2,630.60	990.24
September.....	8	12	1,458.35	181.28
October.....	10	15	1,002.90	1,078.56
November.....	12	14	798.86	234.88
December.....	13	18	728.87	935.22
1919.				
January.....	10	12	185.58	1,681.69
February.....	12	16	462.63	526.87
March.....	25	22	444.04	340.65
April.....	14	14	1,077.98	960.44
May.....	29	1	1,094.24	13.12
June.....	13	1	1,031.05	28.50
	—188			
Total estates and cash handled.....	223	161	16,879.90	8,121.63

Number of unsettled estates on hand, June 30, 1919, 62.

Amount collected in unsettled estates on hand, June 30, 1919, \$8,758.27.

TABLE No. 3.—Statement showing number of estates of deceased and insane employes, by nationalities, settled by administrator of estates during fiscal year ended on June 30, 1919.

Native of—	Deceased.	Insane.	Totals.
Chile.....	1		1
Colombia.....	6		6
France.....	1		1
Nicaragua.....	1		1
Panama.....	10		10
Spain.....	4		4
United States.....	16	1	17
West Indies, British.....	108	5	113
West Indies, Danish.....	2		2
West Indies, French.....	6		6
Total.....	155	6	161

TABLE No. 4.—Number of mail parcels released free of duty, number on which duty has been paid to the Government of Panama, and the amount of duty as shown by receipts on file, by offices, during the fiscal year ended June 30, 1919.

Name of post office.	Number admitted free of duty.	Number on which duty was paid.	Amount of duty.
Ancon.....	1,760	5,560	\$14,450.00
Balboa.....	3,287	85	90.23
Balboa Heights.....	1,968	14	23.72
Corozal.....	1,068		
Coco Solo <sup>1</sup> .....			
Cristobal.....	3,439	3,826	10,518.88
Culebra.....	446	45	42.48
Empire.....	138	8	5.29
Fort Amador.....	452		
Fort Randolph.....	283		
Fort Sherman.....	460		
Gamboa.....	36		
Gatun.....	613	2	1.80
Las Cascadas <sup>2</sup> .....	152	9	6.99
Monte Lirio.....			
Paraiso.....	146	36	9.67
Pedro Miguel.....	392	6	131.65
Total.....	14,640	9,591	52,280.71

<sup>1</sup> Established Mar. 1, 1919.<sup>2</sup> Discontinued Feb. 28, 1919.

TABLE No. 5.—*Number of insured and C. O. D. parcel-post parcels and registered articles delivered, by offices, during fiscal year ended June 30, 1919.*

Name of post office.	Number of insured and C. O. D. parcels.	Number of registered articles.	Total.
Ancon.....	5,619	15,429	21,048
Balboa.....	3,386	11,511	14,897
Balboa Heights.....	1,636	21,785	23,421
Corozal.....	1,807	3,689	5,496
Coco Solo <sup>1</sup> .....	316	774	1,090
Cristobal.....	6,521	36,600	43,121
Culebra.....	2,091	4,031	6,122
Empire.....	1,337	3,880	5,217
Fort Amador.....	1,296	2,081	3,327
Fort Randolph.....	777	527	1,304
Fort Sherman.....	597	885	1,482
Gamboa.....	52	2,463	2,515
Gatun.....	1,815	8,200	10,015
Las Cascadas <sup>2</sup> .....	1,000	3,006	4,006
Monte Lirio.....	.....	250	250
Paraiso.....	122	5,025	5,147
Pedro Miguel.....	687	7,198	7,885
Total.....	29,059	127,284	156,343

<sup>1</sup> Established Mar. 1, 1919.<sup>2</sup> Discontinued Feb. 28, 1919.TABLE No. 6.—*Letters and parcels registered and insured, by offices, during the fiscal year ended June 30, 1919.*

Name of post office.	Domestic letters registered.	Domestic parcels registered.	Foreign letters registered.	Foreign parcels registered.	Official registered free.	Insured and C. O. D.	Total.
Ancon.....	7,033	149	5,559	1,339	5,796	912	20,788
Balboa.....	3,512	154	1,502	42	5,874	653	11,737
Balboa Heights.....	1,296	33	208	15	39,530	259	41,341
Corozal.....	1,256	56	89	13	373	351	2,138
Coco Solo <sup>1</sup> .....	577	5	2	.....	71	174	829
Cristobal.....	9,677	180	8,308	843	11,528	1,397	31,933
Culebra.....	1,270	18	86	1	1,359	345	3,079
Empire.....	2,745	88	57	1	1,237	473	4,601
Fort Amador.....	760	79	61	17	443	176	1,536
Fort Randolph.....	365	.....	15	.....	115	168	663
Fort Sherman.....	605	92	15	7	205	653	1,577
Gamboa.....	275	7	161	7	1,440	6	1,896
Gatun.....	992	115	125	20	3,525	163	4,940
Las Cascadas <sup>2</sup> .....	1,874	45	23	.....	187	342	2,471
Monte Lirio.....	38	.....	10	.....	25	.....	73
Paraiso.....	126	.....	183	1	1,874	21	2,205
Pedro Miguel.....	541	7	312	14	3,504	170	4,548
Total.....	32,942	1,028	16,716	2,320	77,086	6,263	136,355

<sup>1</sup> Established Mar. 1, 1919.<sup>2</sup> Discontinued Feb. 28, 1919.

TABLE No. 7.—Number and amount of money orders issued, and amount of money on deposit at post offices, by offices, as reported by postmasters, for fiscal year ended June 30, 1919.

	Number of orders.	Amount.	Fees.	Amount of unpaid money orders June 30.	
				Deposit.	Fee paid.
Ancon.....	26,992	\$500,745.31	\$1,918.30	\$88,675.00	\$41.00
Balboa.....	23,079	651,441.65	1,809.09	138,180.00	568.50
Balboa Heights.....	9,699	226,946.71	843.19	24,575.00	50.00
Coco Solo <sup>1</sup> .....	337	8,586.56	35.82	425.00	19.00
Corozal.....	4,642	124,775.07	238.37	18,335.00	287.50
Cristobal.....	39,679	789,681.27	3,269.85	80,860.00	115.00
Culebra.....	3,761	104,814.36	244.60	13,810.00	<sup>2</sup> 65.00
Empire <sup>3</sup> .....	5,174	103,158.19	330.71	.....	.....
Fort Amador.....	3,191	93,931.47	174.21	15,355.00	14.00
Fort Randolph.....	1,079	34,036.76	64.25	3,165.00	.....
Fort Sherman.....	1,382	38,320.45	85.41	5,230.00	.....
Gatun.....	8,266	176,688.97	536.31	32,200.00	93.00
Las Cascadas <sup>4</sup> .....	4,685	89,627.77	319.24	.....	.....
Paraiso.....	1,964	24,084.63	101.51	9,810.00	.....
Pedro Miguel.....	6,688	141,757.40	452.66	23,145.00	7.50
Adjustments.....	140,618	3,108,596.57 105.09	10,423.55 .61	453,765.00	1,260.50
Total.....	140,618	3,108,701.66	10,424.16	<sup>5</sup> 453,765.00	1,260.50

<sup>1</sup> Money-order business established May 1, 1919.

<sup>2</sup> Includes outstanding accounts from Las Cascadas and Empire.

<sup>3</sup> Money-order business discontinued Mar. 31, 1919.

<sup>4</sup> Post office discontinued Feb. 28, 1919.

<sup>5</sup> Figures taken from advices by postmaster. Auditor's records show \$419,925.

TABLE No. 8.—Receipts.

	1918	1919
Interest on deposit money-order funds.....	\$32,940.22	\$25,746.20
Sales of postage stamps and other stamped paper.....	83,939.74	81,343.78
Second-class mail.....	1,825.38	2,553.88
Money-order fees.....	11,918.35	10,426.16
Panama Railroad mail.....	1,200.00	1,200.00
Handling mail between Panama and Colon for Republic of Panama.....	600.00	600.00
Handling of United States transit mail and credit from other departments of the Government.....	4,516.07	4,175.93
Box rents.....	8,147.30	8,268.20
Miscellaneous receipts <sup>1</sup> .....	144.75	2,313.25
Total.....	145,231.81	136,627.40

<sup>1</sup> Includes credits from other departments of the Government.



## APPENDIX II.

### REPORT OF THE DISTRICT ATTORNEY FOR THE CANAL ZONE.

ANCON, CANAL ZONE, *July 1, 1919.*

SIR: There is attached hereto a tabulated statement of all criminal prosecutions in the district court of the Canal Zone for the fiscal year ended June 30, 1919.

There was a total of 737 cases disposed of in the district court, with the results shown in the table.

In the 115 cases dismissed are included 6 cases in which the district court granted new trials in cases which previously had resulted in convictions, and which were dismissed on new trial. The court also granted new trials in three other cases, and upon conviction imposed a lighter sentence than that originally inflicted.

Of the total of 737 cases, 126 were appeals from the magistrates' courts. These cases resulted as follows:

Guilty.....	76
Not guilty.....	20
Dismissed.....	20
Appeals withdrawn, original fines paid.....	7
Nol-pros.....	2
To insane asylum.....	1

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There were two judges of the district court of the Canal Zone for the past fiscal year. The term of Judge William H. Jackson expired in November, 1918, and he held court for the first five months of the fiscal year. Judge John W. Hanan assumed the duties of district judge in December, 1918, and held court until May 1, 1919, when he went on vacation. No court was held during the months of May and June, 1919, and as a result 97 criminal cases were pending at the close of the fiscal year. Of this number 10 cases had been continued by the judge until his return from his vacation. The remainder arose during his absence.

There is still pending the case of the Government of the Canal Zone *v. E. F. Bataille*, arising out of the failure of the Continental Banking & Trust Co., which has been referred to at length in the annual reports of the district attorney for the last two years. Warrants of extradition were granted by the Governors of New Jersey and New York, and these warrants of arrest have been lodged with the Department of Justice at Washington, with the request that Bataille be apprehended. To date nothing seems to have been heard or seen of Bataille.

There was one criminal case appealed to the Circuit Court of Appeals for the Fifth Circuit in New Orleans. This was a case against a party in Colon named Bulchand Asanmah, charged with violation

of liquor regulations. He was tried and convicted in the Cristobal division in September, 1918, and sentenced to pay a fine of \$25 and serve 30 days in jail. The appeal was dismissed by the circuit court and the original fine paid, the jail sentence having been remitted by the Governor of The Panama Canal.

It will be noted that by far the largest increase in criminal cases over the previous fiscal year arose out of violations of liquor regulations. Three hundred cases of this character were tried in the district court, approximating 40 per cent of the entire number of cases disposed of. The large increase in cases of this character was brought about by the new regulations promulgated by the commanding officer of the United States troops stationed on the Canal Zone, under whom the civil government of the Zone had been placed for a large portion of the year as a war measure by Executive order of the President of the United States. These regulations were considered necessary for the protection and welfare of the military forces of the United States stationed on the Canal Zone, and were supplemental to the general regulations issued by the President regulating the transportation and use of intoxicating liquors in and around all military encampments.

It will be noted from the tabulated statement that there were 41 prosecutions for violations of the provisions of the various war measures. Thirty-seven of these cases resulted in conviction.

There was one application for a writ of habeas corpus. A party arrived on the Isthmus under rather suspicious circumstances, and was held pending investigation. She sued for a writ of habeas corpus, which was granted, was released and sailed for the States. It has since been learned that the Federal authorities did not permit her to enter the United States and that she returned to some South American country.

Four defendants requested trial by jury, and of these one was convicted, two were acquitted, and one trial resulted in a disagreement of the jury and the case was dismissed later.

The following civil cases were disposed of during the year:

R. P. Dixon, as guardian of Francisco Ayala, an insane person, brought suit against H. A. A. Smith, auditor of The Panama Canal, to compel payment of an award made by the umpire of the joint land commission. The plaintiff was appointed guardian of the insane person by the district court of the Canal Zone and another guardian was appointed by the circuit court of Panama, where the insane person resided. Before the case came to trial an agreement was reached between the parties and the award paid.

One L. S. Carrington instituted an action against B. J. Robinson to obtain possession of a buck deer, which was claimed by both parties to the action, and which for some time had been kept and maintained on land of the Government of the Canal Zone which was being used by the cattle industry. The magistrate's court rendered judgment in favor of the plaintiff. Upon appeal by the defendant to the district court, the Government of the Canal Zone filed a petition for intervention, alleging that the property in question belonged to the intervenor. Decision was rendered in favor of the Canal Zone Government.

Jose Martin and Julian Martin instituted a suit for libel against A. S. Boyd, an employee of The Panama Canal. The action arose out of statements alleged to have been made by the defendant to the chief of police in an investigation conducted by him. Prior to the trial the action was changed to one for slander. The district attorney defended the action under instructions from the Governor. Verdict was rendered in favor of defendant.

John H. McCathran, libellant, filed a libel in admiralty against the steamship *San Blas* for an accident occurring while said steamer was under lease to a private enterprise. Libellant attached the steamer in the district court of

the Canal Zone, and the Government of the Republic of Panama questioned the jurisdiction of the district court to issue said attachment, alleging that said steamer was a public vessel and the property of the Republic of Panama. The Department of Justice instructed the district attorney to present the contention of the Panaman Government to the district court and secure the withdrawal of the attachment on the ground of lack of jurisdiction. The vessel has been returned to the Republic of Panama and the Department of Justice instructed the district attorney to take no further action in the premises.

The following civil cases in law and admiralty were pending at the close of the fiscal year:

Houlder, Middleton & Co. (Ltd.), a corporation, has filed a libel in admiralty against Chester Harding, Governor of The Panama Canal, asking damages in the sum of \$55,000 for injuries alleged to have been sustained by the steamship *Lautaro* during transit of the canal on August 25, 1916. The case is now pending on respondent's demurrer to the bill of the libellant. The demurrer has not been urged pending a determination of the authority of the respondent to adjust the claim outside of court.

An action for trespass, false imprisonment, and malicious prosecution has been filed by David Osborne against Charles Hill, a police officer of the Canal Zone. Damages are asked in the sum of \$1,552. The district attorney is defending the action at the request of the Governor of The Panama Canal, and the matter is pending on defendant's demurrer to the complaint.

In September, 1918, Medrano de Idiaquez was tried in the district court of the Canal Zone on a charge of violation of Title VII of the espionage act. The defendant was purser of a steamer of the Compañía Sud Americana de Vapores, which passed through the canal on June 24, 1918. At the time of the defendant's arrest he had in his possession gold coin of the value of \$2,323.20. The Government of the Canal Zone charged the defendant with attempting to carry away said gold from the Canal Zone contrary to the provisions of the espionage act referred to above. The defendant was acquitted in the district court. He later filed his libel in admiralty against a portion of the money in question, and against Mauremus Petersen, a police officer of the Canal Zone, as holder and custodian thereof. The district attorney, representing the respondent, filed exceptions to the libel for nonjoinder, alleging that the steamship company in whose employ libellant had been at the time of his arrest claimed to have an interest in the gold in question and should be made a party to the suit. The district court sustained the exceptions of the respondent and the matter is now pending, awaiting compliance with the order of the court requiring that the steamship company be made a party.

Mr. Charles R. Williams, the former district attorney, tendered his resignation effective July 18, 1918. During practically the entire fiscal year the district attorney's office was conducted by Mr. J. W. Blackburn, under appointment by the Governor of The Panama Canal as acting district attorney. The present district attorney assumed the duties of the office June 1, 1919.

Respectfully,

A. C. HINDMAN,  
*District Attorney.*

Col. CHESTER HARDING, *United States Army,*  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

TABLE No. 1.—*Criminal prosecutions, 1918-1919.*

	Number.	Guilty.	Bail forfeited.	Not guilty.	Disposed of otherwise.	Remarks.
Adultery.....	4	2		1	1 dismissed.....	
Assault.....	1				1 nol. pros.....	
Assault and battery on high seas.....	3				3 dismissed.....	
Assault and battery.....	15	10		3	2 dismissed.....	
Assault with deadly weapon.....	15	{ 9			do.....	
Attempt to depart from United States.....	4	4			1 nol. pros.....	3 assault and battery.
Automobile regulations, violation of.....	18	12		2	2 withdrawn, 2 dismissed.....	
Automobile and coach tariff regulations, violation of.....	3	1			2 dismissed.....	
Battery.....	2	1		1		
Bringing stolen property into Canal Zone.....	7	7				
Burglary.....	36	{ 9		2	24 dismissed.....	
Burglary with intent to commit rape.....	1	1			1.....	1 loitering. To military authorities.
Contempt of court.....	1	1				
Defensive area act, violation of.....	9	8	1			
Deportation, returning to Canal Zone.....	10	5		1	2 nol. pros., 2 dismissed.....	
Disorderly conduct.....	32	17		6	1 nol. pros., 4 dismissed, 4 withdrawn, 1 nol. pros.....	
Disturbing the peace.....	1					
Drunk and disorderly.....	3	3				
Embezzlement.....	7	3		3	1 nol. pros.....	
Escaping from prison.....	3	3				
Espionage act, violation of.....	21	18			1 dismissed, 2 nol. pros.....	
Exclusion of undesirable persons, violation of regulations.....	1		1			
False personation.....	1				1 nol. pros.....	
Falsifying evidence.....	1				1 dismissed.....	
Forgery.....	9	{ 1		4	1 nol. pros., 2 dismissed.....	
Fraud.....	4	1		2	1 nol. pros.....	1 attempt to defraud.
Gambling.....	1	1				
Grand larceny.....	51	{ 27		5	8 dismissed, 1 nol. pros.....	
Ill-treatment of seamen.....	2	10			2 dismissed.....	10 petit larceny.
Liquor regulations, violation of.....	300	187	16	58	12 nol. pros., 27 dismissed.....	
Loitering.....	32	19		4	8 dismissed, 1 withdrawn.....	
Lottery laws, violation of.....	1	1			1.....	
Mutiny.....	10	{ 4		5		
National defense act, violation of.....	6	6				
Navigation laws, violation of.....	19	17	2			
Obstructing officer in discharge of his duty.....	1				1 dismissed.....	
Obstructing traffic.....	1				1 dismissed.....	
Opium act, violation of.....	1	1				
Perjury.....	5	1		1	2 dismissed, 1 nol. pros.....	
Petit larceny.....	13	8		5		
Postal laws, violation of.....	2	2				
Quarantine regulations, violation of.....	1	1				
Receiving money under false pretenses.....	1				1 dismissed.....	
Receiving stolen property.....	1	1				
Registering an officer.....	1				1 nol. pros.....	
Resisting and breaking from arrest.....	1				1 dismissed.....	
Robbery.....	4	4				
Subornation of perjury.....	1				1 dismissed.....	
Trading with the enemy act, violation of.....	1	1				
Unlawfully entering Canal Zone.....	56	27		17	1 nol. pros., 10 dismissed, 1 insane asylum.....	
Vagrancy.....	9	6			3 dismissed.....	
White slave act, violation of.....	4				4 dismissed.....	
Total.....	737	444	20	121	152. 115 dismissed, 28 nol. pros, 7 appeals withdrawn, 1 insane asylum, 1 to military authorities. Total, 152.	



APPENDIX I.  
REPORT OF THE SPECIAL ATTORNEY

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ANCON, CANAL ZONE, *July 30, 1919.*

SIR: I have the honor to submit herewith my annual report as special attorney for The Panama Canal for the fiscal year ended June 30, 1919. The report also includes the business transacted by me as counsel for the Panama Railroad Company on the Isthmus, and I am also including a statement of the operations of the land office of The Panama Canal, and the real estate transactions of the Panama Railroad Company.

The organization of the special attorney's office consists of the special attorney, an assistant to the special attorney, two land inspectors, one clerk, and one draftsman, on the gold roll; and one messenger on the silver roll. The assistant to the special attorney is also the land agent for The Panama Canal.

LAND MATTERS OF THE PANAMA CANAL.

LAND CLAIMS.

Seventy-four land and improvement claims were settled by the land office during the fiscal year 1918-19. They aggregated the sum of \$49,099.40.

A total of 4,492 land and improvement claims were settled and paid by the land office since the work of clearing the Canal Zone commenced under the President's depopulation order of December 5, 1912, aggregating the sum of \$1,121,236.60. These settlements were made direct by the land office with claimants, and no awards made by the joint commission or the umpire are included in the foregoing statement.

Under the old organization, during the construction period, the law department of The Panama Canal was authorized to adjust and settle land claims on August 6, 1908, by virtue of the Executive order of the President. Since that date the law department, and afterwards the office of the special attorney, under authority of the act of Congress of April 7, 1914, have settled directly with the claimants 5,554 claims for damages to land and improvements claimed by private parties and taken over by our Government for canal and railroad purposes. These claims aggregated the sum of \$1,370,139.90.

During the fiscal year just ended the joint commission disposed of 18 claims in 19 awards, 3 awards being for improvements and 16 for land. The awards aggregated the sum of \$79,971.80. The total amount claimed in these cases was \$1,487,537.05.

The umpire for the joint commission, appointed by President of the United States and the President of Panama, under the provisions of Article XV of the Panama Canal treaty of November 18, 1903, disposed of 4 claims by 4 awards during the fiscal year.

The 4 awards aggregated in amount the sum of \$11,433.

The total number of awards made by the joint commission and umpire since the promulgation of the President's depopulation order of December 5, 1912, to the end of the fiscal year, was 891, covered by 196 award numbers, aggregating the sum of \$1,210,505.20. The practice of the joint commission is to include several small claims under one general award, which is given its number in sequence as the awards are made.

The various joint commissions and umpires, appointed under Articles VI and XV of the Panama Canal treaty, made 21 awards prior to the President's depopulation order of December 5, 1912, and these 21 awards aggregated the sum of \$304,588.

We thus have a grand total of 913 claims settled and paid for under awards made by all of the joint commissions and umpires, appointed under the treaty, aggregating the sum of \$1,486,646.82.

The aggregate amount paid by the United States for land and improvements through the law department and special attorney's office, and by virtue of awards of the joint commissions and umpires to the end of the fiscal year 1918-19, is \$2,856,886.72, covering 6,366 claims.

During the fiscal year just ended the joint commission dismissed the following claims: Six because the same had been adjusted by direct settlement between the Government and the claimants; 3 because of the nonappearance of the claimants; 5 for lack of sufficient evidence to support the claims; and 2 were dismissed on motion by the attorneys for the claimants.

During the fiscal year 15 claims were certified to the umpire by the joint commission. At the end of the fiscal year 1918 there were 4 claims before the umpire for his consideration. He disposed of 2 claims by dismissal and 4 by award during the fiscal year. He had 13 claims before him at the end of the fiscal year, all of which are in a class known as land claims.

There were 104 claims, involving the aggregate sum of \$5,591,448.17, appearing on the joint commission's and umpire's dockets on June 30, 1919. Forty-eight of these claims are based upon Panama Railroad leases, which have been withdrawn from the jurisdiction of the joint commission by section 2 of the appropriation act of Congress for sundry civil expenses of the Government, approved July 1, 1916. These claims aggregate the sum of \$226,790.55.

Therefore, there remain 43 claims for adjudication and settlement by the joint commission, not including the 13 claims pending before the umpire and the 48 claims based on Panama Railroad leases. They aggregate the sum of \$1,679,296.56.

A total of 3,598 claims have been filed with the joint commission since February, 1913. Of this number 3,522 have been disposed of by the joint commission and the umpire.

According to our estimate, there are 76 claims pending before the joint commission, including the claims based on Panama Railroad leases. As a matter of fact, however, the commission's and umpire's

dockets show the pendency of 104 claims and parts of claims. The discrepancy may be explained by saying that in many instances, especially in the early Gorgona trials, a part of the claim would be awarded, another part would be certified to the umpire; and in other instances awards were made for the improvements only, leaving the part of the claim for the land undisposed of; and in several recent claims separate awards were made for the land and the improvements on the land, and in another recent instance, separate awards were made for areas of land in conflict, for land not in conflict, and for improvements, all involved in the same claim.

The action of Congress in withdrawing the 48 claims based upon Panama Railroad leases from the jurisdiction of the joint commission needs some explanation.

At the time that the President's depopulation order was issued, a considerable number of persons held parcels of land in the Canal Zone under leases from the Panama Railroad Company, and the lessees continued in possession of the lands for a year and a half or more after the date of the President's order, and paid their rent to the Panama Railroad, and, in turn, collected rents from their subtenants. The joint commission, in the claim of Antonio Enseñt, docket No. 1884, held that the title and possession to all privately owned land in the Canal Zone were extinguished *eo instanti* by the President's Executive order of December 5, 1912, notwithstanding that the status of landlord and tenant did, in fact, continue between the Panama Railroad Company and the lessees for a period of a year and a half or more after the Executive order was issued. It was at this later period that the Panama Railroad Company, acting under the terms of the leases, terminated the leaseholds by written notice to the lessees.

A difference of opinion arose as to the interpretation of the leases, and counsel for the railroad company informed the lessees that they were willing to submit the issue to the courts of the Canal Zone. But the claimants, instead of instituting suits in the district court of the Canal Zone, presented their claims to the joint commission, demanding damages from the United States. Counsel for the United States attacked the jurisdiction of the commission, upon the ground that the issues involved depended upon lease contracts between the Panama Railroad Company and its lessees, and the ordinary tribunals of the Canal Zone were the ones to determine the issues, and that an international tribunal, like the joint commission, had no jurisdiction in the matter.

The commission held otherwise upon the theory, already stated, that the President's Executive order of December 5, 1912, extinguished all private titles, and that the possession of private property passed *eo instanti* to the United States by virtue of the order. We wish to say that the counsel for claimants did not agree with this theory of the commission, and based their claims rather upon the ground that the depopulation order itself caused the damages because it precluded the lessees from continuing to live in the Canal Zone, and thus forced them to abandon their leasehold interests.

Since the month of February, 1913, when the joint commission was first organized, after the promulgation of the President's depopulation order, of December 5, 1912, 3,598 claims were filed with the commission, which aggregated the sum of \$19,922,752.17. Sev-

eral hundred of the claims above mentioned were filed by members of the joint commission of 1913, on their own motion on behalf of claimants, and in many instances the amount of money was not stated in the claim. Hence, the aggregate sum given above relates to those claims only in which the amount of the demand was expressed. It may be stated that the aggregate amount shown above represents the sums demanded on the face of the claims as originally filed. In some few cases the demand was decreased by amendment, in many other cases the demands were increased by amendment. It is not practical to take note of these amendments, some of which were made verbally during the trial of the claims.

It might be well to divide all of these claims into groups, giving the aggregate amount claimed in each group, and the disposition made of each group and the aggregate amount of money paid by the United States, if any, for obtaining the adjustment of each respective group.

Since February, 1913, the joint commission made awards in 891 claims, or parts of claims. The aggregate sum demanded in these claims was \$7,431,361.05. The aggregate amount awarded by the commission for these 891 claims, and parts of claims, was \$1,210,505.20.

There were 2,042 claims, and parts of claims, dismissed by the joint commission since February, 1913, upon the ground that such claims were shown to have been settled by the claimants directly with the representatives of the United States. The aggregate demand made upon the United States was \$4,195,029.57. The claims were settled by the United States for an aggregate of \$722,998.56. I wish to say that in all of these claims the agents of the Government were liberal in making settlements, but, of course, they could not recognize the grossly exaggerated demands of the claimants.

One hundred and thirty-seven claims, and parts of claims, were dismissed by the joint commission since February, 1913, under the ruling of the Augusta Dunlop decision. The aggregate demand made in these 137 claims was \$188,295.85. The ruling in the Dunlop decision was to the effect that where the claimants had entered upon the land under a revocable lease from the Government, wherein they agreed that they would vacate the premises when notified to do so by the Government's agents, no demand against the Government could arise by reason of their being required to vacate the premises in conformity with the terms of the revocable lease.

There were 21 claims dismissed by the joint commission since February, 1912, on account of the fact that the lands or improvements having already been awarded for as a result of the hearing of a prior claim filed by the same party. The amount involved in these claims was \$22,029.27.

During the same period the joint commission dismissed eight claims which were shown to be duplicates of other claims filed by the same person, and which had either been disposed of or were still pending, involving a demand for \$2,955.50.

There was one claim withdrawn on the claimant's motion, wherein the sum of \$40.825 was being demanded against the United States.

Five claims for improvements which were shown to have been long abandoned were dismissed by the commission. These claims aggregated the sum of \$2,363.

Twenty-one claims proved to have arisen out of post treaty occupancy, and were, in fact, trespasses upon lands, dedicated to the works of The Panama Canal. They were dismissed by the joint commission. They aggregated a demand of \$67,149.35.

One claim was proved to be for lands and improvements outside of the Canal Zone, outside of any property taken by the Government for canal purposes, and therefore not within the jurisdiction of the commission, and was accordingly dismissed. It involved a demand for \$17,500.

On motion of claimants, the commission has dismissed two claims since February, 1913, for which an aggregate demand was made of \$3,473.30.

Because of lack of evidence, the joint commission dismissed 79 claims, aggregating a demand of \$991,385.70, and the umpire, for the same reasons, has dismissed 6 claims, 3 of which were consolidated by the commission as one claim. These 6 claims aggregated a demand of \$185,740.

Lack of jurisdiction caused the commission to dismiss 19 claims aggregating a demand of \$1,113,857.90.

Three hundred and twelve claims were dismissed by the joint commission under rules of default, wherein the aggregate amount claimed was \$341,192.65. In at least 80 per cent of these cases the claimants did not appear before the commission on the date set for the hearing of their claims, for the reason that they had already effected settlements of their claims directly with the agents of the United States prior to or since the filing of the claims with the joint commission.

I would say that a number of cases were filed on behalf of claimants who had already settled with the United States. The filing was done either by members of the joint commission themselves, as organized in 1913, or by a so-called commission of Panamans, who had assumed to act as representatives of the claimants, and this without the sanction on the part of the Government of the United States.

One claim was dismissed by the joint commission for the reason that it was filed after the time limit fixed by the rules established by the two Governments. The sum demanded was \$200.

The time limit for the filing of claims was established by a joint rule promulgated by the State Department of the United States jointly with the secretary of foreign affairs of Panama. The rule provided that no claims for property taken by the United States under the President's depopulation order of December 5, 1912, could be filed after December 27, 1914, provided that for good cause shown to the satisfaction of the commission, claims might be filed after December 27, 1914, and up to March 27, 1915, but not after the latter date.

#### TABULATION OF AFOREMENTIONED CLAIMS.

There were 3,598 claims filed before the joint commission since February, 1913, wherein the total amount claimed was \$19,922,752.17. These claims may be placed in the following classes or categories:

	Number of claims involved.	Amount claimed.	Amount paid in settlement or awarded.
Dismissed because of payment to claimants by agents of the United States . . . . .	2,042	\$4,195,027.57	\$722,998.56
Dismissed under the Augusta Dunlop decision . . . . .	137	188,295.85	-----
Dismissed because of previous award of the joint commission in a prior claim . . . . .	21	22,029.27	-----
Dismissed because of being duplicates of other claims filed by same person . . . . .	8	2,955.50	-----
Withdrawn . . . . .	1	40,825.00	-----
Dismissed on account of long abandonment of property claimed . . . . .	5	2,363.00	-----
Dismissed because of post treaty occupancy . . . . .	21	67,149.35	-----
Dismissed because the property lay outside the Canal Zone . . . . .	1	17,500.00	-----
Dismissed on motion of claimants . . . . .	2	3,473.30	-----
Dismissed because of lack of evidence . . . . .	79	991,385.70	-----
Dismissed because of lack of jurisdiction . . . . .	19	1,113,857.00	-----
Dismissed under rules of default . . . . .	312	341,192.65	-----
Dismissed because filed beyond time limit . . . . .	1	200.00	-----
Awarded for by the joint commission and the umpire . . . . .	891	7,431,361.07	1,210,505.20
Pending before the joint commission and the umpire . . . . .	104	5,591,448.17	-----

There is a discrepancy of 46 claims between the total number of claims shown in the tabulation and the number of claims actually filed, and a discrepancy of \$86,312.16 between the aggregate amounts of the claims shown in the tabulation and the aggregate amount of the claims as actually filed. These discrepancies between this report and the commission's and umpire's dockets have already been referred to in another connection, and they are due to the splitting up of claims in making awards, dismissals and certifications to the umpire of parts of claims only, and verbal amendments affecting the amounts claimed made by the claimants at the trial of the cases. In order to be more specific, I may say that the 891 awards noted above include partial awards in cases where the balance of the claim was dismissed or certified to the umpire. Again, some of the awards were made in cases docketed by members of the commission in which the amount claimed was not stated on the face of the claim. There were 472 such claims. It would be extremely difficult to clear up the discrepancy, and no useful purpose could be accomplished in so doing at this particular time. It might be done when the business before the commission has terminated.

#### PANAMA CANAL LAND LICENSES.

On June 30, 1919, there were 51 lot licenses in effect in the Canal Zone, which had been issued by the land agent on behalf of The Panama Canal. Of this number 4 licenses were issued during the fiscal year 1918-19. The licenses were granted to steamship companies, oil companies, and the cable company for lots on which to erect steamship office buildings, oil tanks, and the offices of the cable company, as well as residences for the employees of all of said companies. The licenses also included lots for churches and lodge halls. The revenues collected on these licenses for the fiscal year 1918-19 aggregated \$14,290.02. No rental, however, was collected on lots occupied by churches and used for religious purposes.

#### PANAMA RAILROAD MATTERS.

The special attorney for The Panama Canal also acts as counsel for the Panama Railroad Company, and the assistant to the special at-

torney is assistant counsel for the railroad company. The land agent of The Panama Canal acts as land agent for the Panama Railroad, under a contract between The Panama Canal and the Panama Railroad Company, by the terms of which the latter pays to the former the sum of \$9,000 per annum for such service.

The counsel has a clerk on the gold roll, paid by the Panama Railroad Company. The assistant counsel is paid by the Panama Railroad Company. The counsel receives no salary from the Panama Railroad.

PANAMA RAILROAD LEASES AND LICENSES REPORTED BY THE LAND AGENT.

I am submitting herewith a statement of leases and licenses from the Panama Railroad Company to various parties in effect July 1, 1919, as shown by the land office records:

*Statement of Panama railroad leases and licenses in effect July 1, 1919.*

Location.	Leases.		Lots.		Rental.	
	July 1, 1918.	July 1, 1919.	July 1, 1918.	July 1, 1919.	July 1, 1918.	July 1, 1919.
Colon.....	825	823	833	830	\$83,090.28	\$82,282.28
Fox River, R. P.....	52	52	54	54	2,642.00	2,926.40
Stable lots (Colon).....	9	8	12	11	576.00	534.00
Las Esplanadas.....	103	103	122	122	3,987.00	3,987.00
Guachapali.....	153	153	194	194	8,378.93	8,378.93
Santa Cruz.....	88	89	106½	107½	3,977.28	4,001.28
Panama yard, including English wharf and bulkhead.....	17	17	29½	29½	4,314.00	5,368.00
Juan Ponce.....	1	1	1	1	60.00	60.00
Total for leases.....	1,248	1,246	1,352	1,349	107,025.49	107,537.89

Location.	Licenses and permissions.		Lots.		Rental.	
	July 1, 1918.	July 1, 1919.	July 1, 1918.	July 1, 1919.	July 1, 1918.	July 1, 1919.
Miscellaneous (Colon).....	8	3			\$246.00	\$114.00
Buildings, rooms, and stores, Colon-Cristobal.....	23	24			21,633.00	21,180.00
Cristobal.....	6	6	8	8	1,505.52	1,505.52
News agency.....	1	1			1,500.00	1,560.00
Huerta-Sandoval.....	2	2	2	2	360.00	360.00
Miscellaneous (Panama).....	1	1	1	1	1.00	1.00
Javillo Fill.....	1	2	1	2	60.00	120.00
Room in Panama R. R. Station, Balboa Heights.....	1	1			120.00	120.00
Total for licenses and permissions.....	43	40	12	13	25,485.52	24,960.52
Grand total for all leases, licenses, and permissions...	1,291	1,286	1,365	1,362	132,511.01	132,498.41

The foregoing statement relates to lots leased by the railroad company in the cities of Panama and Colon, and includes a few lots leased to steamship companies within the Canal Zone by The Panama Canal, from which the railroad company is receiving the rentals to reimburse it for expenses incurred by the company in filling in the lots so leased; and also includes the rentals collected from some buildings in the Canal Zone.

A slight decrease is shown in the amount of approximated land rental bills issued during the fiscal year just ended, for the city of Colon, as compared with the approximated rental bills issued during the fiscal year 1917-18, which can be accounted for by the fact that during the year just ended one lease on a lot in the neighborhood of the Washington Hotel, and which lot was designated as lot "U" and which was leased to the strangers' club at an annual rental of \$650, was canceled at the request of the lessees. The reduction referred to can be further accounted for by the incidental cancellation of several short termed leases by the direction of the health officer of Colon-Cristobal; to the cancellation of one lot in the stable district; and to some minor cancellations.

A slight increase is shown in this report in the amount of approximated rentals on lots leased in the Fox River district, Colon, as compared to the fiscal year 1917-18, accounted for by the fact that certain leases calling for merely a nominal rental rate on lots in that district were canceled and new leases substituted therefor, calling for a commercial rate of rental.

A slight decrease is shown in this report in the amount of approximated rentals on buildings, rooms and stores, Colon and Cristobal, accounted for as follows: Reduction in the rental on the Masonic lodge hall, third and mezzanine floors, Masonic temple, Cristobal, on account of the occupancy by the district court of the Canal Zone of a part of these floors for use as a court room; cancellation of lease to room 8, second floor, Masonic temple, Cristobal, for use of the clerk of the district court; reduction in rental, Gilbert House, Colon. These aggregate a yearly reduction of rentals in the sum of \$1,485.

Offsetting this reduction there were three increases of revenue as follows: increase in rental of room 5, first floor, Masonic temple, Cristobal; the joint occupancy of room 7-A, second floor, Masonic temple, Cristobal, by a steamship service corporation with the land office, formerly used only by the latter; and increase in rental of room 2, first floor, Masonic temple, Cristobal. These aggregate a yearly increase in the rental in the sum of \$1,032, showing a net loss of \$453 in the amount of approximated rentals on buildings, rooms and stores, Colon and Cristobal, for the fiscal year 1918-19, as compared to the fiscal year 1917-18. This is a "paper" loss only, due to the fact that the district court of the Canal Zone is now enjoying the use of the Masonic hall on court days, and the clerk of the district court at Cristobal has entire possession of a room on the second floor of the same building, as above stated.

The total of leases, licenses, and permits issued by the railroad company on lots and for buildings and rooms in the cities of Panama, Colon, and Cristobal, including, as well, licenses for the use of lots in Cristobal issued by The Panama Canal, from which the railroad receives the rentals to reimburse it for expenditures in filling the lots in question, in effect on July 1, 1919, was 1,286, covering 1,362 lots, and for which bills were issued in the amount of \$132,498.41, during the fiscal year 1918-19, as shown by the records of the land office, which figures are \$12.60 less than those shown for the corresponding item in the report for the fiscal year 1917-18.

The total amount of money actually collected on account of the items covered in the preceding paragraph during the fiscal year just ended, as indicated by figures submitted to this office by the



auditor, is \$132,352.69, and which represents an increase of \$822.21 over the actual collections on account of the same items for the year 1917-18.

Four new leases were issued during the year 1918-19, covering 4½ lots in the cities of Panama and Colon.

On the morning of August 9, 1918, a fire occurred in Colon, involving the destruction of four privately owned buildings situate on Panama Railroad lots Nos. 1933½ Hudson Lane, 1935, 1937, and 1939. These lots are comprised within the block bounded on the east by Broadway or E Street, on the west by Hudson Lane, and on the north and south by Thirteenth and Fourteenth Streets, respectively. The total value of these buildings, according to the records of the Panaman Government tax office, was \$17,000 United States currency. New 25-year leases have been issued dating from August 1, 1918, to all of the lessees of the aforementioned lots. The new form of lease contract provides for the termination of same on one year's notice from the Panama Railroad Company, the lessee to be compensated for the actual physical value of the improvements placed upon the lot, but not for any intangible value which may exist by reason of the location, nature of business, or other cause, nor for any value of the unexpired portion of the lease period. The Panama Railroad Company owned no buildings within the area swept by the fire of August 9, 1918.

#### PANAMA RAILROAD LITIGATION.

The litigation against the Panama Railroad Company in the Canal Zone has increased to a considerable degree. This has been due to some extent to the action of the courts, including the Supreme Court of the United States, in holding that the local courts may resort to the principles of common law to aid them in the interpretation of Statutes of Colombian and Panamanian origin; and largely to the railroad wreck which occurred on the 20th of May, 1918, in which some of the passenger cars of the company were demolished and others seriously damaged, at a place near the Gamboa stockade.

As a result of this wreck, 112 claims for damages because of personal injuries were filed against the railroad. Out of this number, 17 persons filed suits for damages in the courts of the Canal Zone, 10 of which suits, including 2 which have been but partially affected, have been disposed of, either by judgment against the railroad or amicable settlement with the plaintiffs by counsel for the railroad company. The aggregate amount of such judgments and amicable settlements effected is \$8,675. Out of the aforementioned 112 persons, 3 who had filed suits against the railroad company were settled with through the claim officer under the injury compensation act of Congress of 1916, upon payment to the claimants of the sum of \$17,496.21. Sixty-two of the aforementioned number of claimants were settled with by the claim officer for the sum of \$4,935.03. This leaves unsettled 37 of the aforementioned 112 claims, including the claims of 9 persons whose suits remain pending in the courts of the Canal Zone, and in which suits the aggregate demand for damages being made is \$117,823.60. The nine pending suits just mentioned include two which have been above referred to

wherein settlement has already been effected for such injuries to the person as may have been sustained by the plaintiffs, but in which there remains to be disposed of the issue as to whether or not the railroad company is liable for large sums of money which these plaintiffs allege were lost from their persons at the time of and as a direct consequence of the wreck.

The following Panama Railroad cases were disposed of either by judgment or compromise settlement during the fiscal year 1918-19:

THE DISTRICT COURT, DIVISION OF BALBOA.

*Amanda Evans v. Panama Railroad Company, civil docket No. 244.*—This was a suit for \$20,000 damages on account of personal injuries sustained in the Gamboa wreck of May 20, 1918. A compromise settlement was effected by the railroad company with the plaintiff, by which the latter received the sum of \$4,500, and the case was dismissed on plaintiff's motion.

*Walter Fairman v. Panama Railroad Company, civil docket No. 221.*—This was a suit for \$10,000 damages on account of personal injuries received in the Gamboa wreck. The case was settled by paying the plaintiff the sum of \$800, and the case was dismissed on plaintiff's motion.

*Charles Grant v. Panama Railroad Company, civil docket No. 247.*—This was a suit for \$30,000 damages on account of personal injuries sustained as a result of the Gamboa wreck of May 20, 1918. The case was tried by a jury on January 30, 1919, and a verdict returned in favor of the plaintiff for \$500, which judgment was paid on February 8, 1919.

*William Green v. Panama Railroad Company, civil docket No. 256.*—This was a suit for \$5,000 damages on account of personal injuries sustained in the Gamboa wreck. The suit was compromised and dismissed by the plaintiff upon the payment to him of the sum of \$300 damages by the Panama Railroad Company.

*Samuel Harrison v. Panama Railroad Company, civil docket No. 294.*—This was a suit for damages in the sum of \$2,000, on account of the alleged false arrest and malicious prosecution by the servants and agents of the railroad company, during the time that the plaintiff was a passenger on one of the trains of the railroad. The plaintiff obtained a judgment against the railroad in the sum of \$300, which was satisfied on April 23, 1919.

*Amelia Lopez v. Panama Railroad Company, civil docket No. 246.*—This was a suit for \$5,000 damages on account of personal injuries received in the Gamboa wreck of May 20, 1918. The plaintiff obtained a judgment in the sum of \$900, which was paid by the railroad company on October 18, 1918.

*Richard Laughlin v. Panama Railroad Company, civil docket No. 272.*—This was a suit for \$582.02 damages, on account of the withholding of wages claimed by the plaintiff as a locomotive engineer of the Panama Railroad Company. The case was dismissed on motion of the plaintiff on January 22, 1919.

*Obidiah Miller v. Panama Railroad Company, civil docket No. 125.*—This was a suit for damages in the sum of \$20,000, on account of personal injuries sustained in the Gamboa wreck. The case was compromised, and the plaintiff received the sum of \$300 in full settlement of his claim. The case was dismissed on the plaintiff's motion on February 8, 1919.

*N. K. Ovalle and R. J. Calvo v. Panama Railroad Company, civil docket No. 239.*—This was a suit for damages in the sum of \$2,000, on account of the alleged loss and breakage of laundry machinery and supplies. The settlement of the claim was effected on the payment to the plaintiff by the railroad company of the sum of \$200 and thereupon the claim was dismissed on plaintiff's motion.

*George S. Robb v. Panama Railroad Company, civil docket No. 234.*—This suit was filed for \$450 damages, on account of the alleged collision of one of the company's trains with an automobile belonging to the plaintiff. Judgment was rendered in favor of the railroad company on July 12, 1918.

*Isias de La Rosa v. Panama Railroad Company, civil docket No. 262.*—This was a suit for \$7,500 damages on account of personal injuries received, involving the loss of a finger. Settlement was effected with the plaintiff, by which he received the sum of \$100 from the railroad company, and the suit was dismissed on April 19, 1919, on the plaintiff's motion.

*William Walton v. Panama Railroad Company, civil docket No. 220.*—This was a suit for \$5,000 damages on account of personal injuries received in the Gamboa wreck. A compromise settlement was effected with the plaintiff, by which he received the sum of \$750, and the case was dismissed on August 23, 1918, on the motion of the plaintiff.

*Samuel T. Winters v. Panama Railroad Company, civil docket No. 252.*—This was a suit for \$5,000 damages on account of personal injuries received in the Gamboa wreck. A compromise settlement was made by which the plaintiff received \$150 in satisfaction of his claim, and the suit was dismissed upon the plaintiff's motion.

## DISTRICT COURT, DIVISION OF CRISTOBAL.

*Ben Barnett v. Panama Railroad Company, civil docket No. 181.*—This was a suit for \$659.50 damages on account of breach of contract. The plaintiff recovered a judgment in the sum of \$100 against the railroad company, which was satisfied on February 24, 1917.

*Leonidas Bennett v. Panama Railroad Company, civil docket No. 253.*—Suit for damages in the sum of \$5,000, on account of personal injuries received on the Panama Railroad docks. Compromise was effected with the plaintiff, by which he was paid the sum of \$329.19, and the suit was dismissed upon his motion.

*Tecfillo Carrillo v. Panama Railroad Company, civil docket No. 249.*—Suit for \$20,000 damages on account of personal injuries sustained on the railroad company's docks. Compromise settlement under the compensation act of Congress of 1916 was effected, and the plaintiff was paid the sum of \$2,394.87, and the case was dismissed upon his motion.

*Eustace Holligan v. Panama Railroad Company, civil docket No. 246.*—This was a suit for \$10,000 for damages on account of personal injuries received while the plaintiff was working on the railroad company's docks. The plaintiff's claim was settled by the Panama Railroad Company for the sum of \$250, under the provisions of the compensation act of Congress of 1916. The case was dismissed upon the plaintiff's motion.

*James Johnson v. Panama Railroad Company, civil docket No. 254.*—Suit for \$7,500 on account of personal injuries received on the railroad company's docks. This case was settled under the compensation act of Congress of 1916, and the plaintiff received the sum of \$531.08 and thereupon dismissed his suit against the company.

*James Lynch v. Panama Railroad Company, civil docket No. 233.*—This was a suit for \$25,000 damages on account of personal injuries sustained at the Cristobal coaling plant. Settlement was effected with the plaintiff upon the payment to him of \$3,000 under the injury compensation act of 1916, and the suit was dismissed upon the plaintiff's motion.

*The Muller Company v. Panama Railroad Company, civil docket No. 188.*—This was a suit for damages in the sum of \$497.46 on account of the loss of freight. The plaintiff recovered a judgment for \$472.48 and costs. The judgment was satisfied by the railroad company on September 25, 1918.

*John Payne v. Panama Railroad Company, civil docket No. 167.*—This was a suit for \$2,000 damages on account of personal injuries alleged to have been received on a train at Coco Solo. A motion for security of costs was filed on behalf of the Panama Railroad Company, and the plaintiff failing to comply with the order, the case was dismissed on November 22, 1918.

*Hugh Rance v. Panama Railroad Company, civil docket No. 199.*—This was a suit for \$5,000 damages on account of personal injuries sustained by the plaintiff on the company's docks. Settlement was effected with the plaintiff under the compensation act of 1916 upon payment to him of the sum of \$2,000, and thereupon the plaintiff caused the suit to be dismissed.

No suits were disposed of in the magistrate's court at Balboa during the fiscal year ending June 30, 1919.

## MAGISTRATE'S COURT, DIVISION OF CRISTOBAL.

*Segal & Brockman v. Panama Railroad Company, civil docket No. 409.*—This was a suit for \$200 damages on account of the alleged loss of freight. The case went to trial on December 7, 1918, and during the progress thereof the plaintiff took a nonsuit.

*Henry D. Burke v. Panama Railroad Company, civil docket No. 414.*—This suit was instituted for the recovery of \$300 damages on account of damages to a coach owned by the plaintiff, said damages being caused by a commissary automobile truck. The plaintiff recovered the sum of \$67.20, and the judgment was satisfied by the railroad company on December 21, 1918.

The following Panama Railroad cases were pending at the end of the fiscal year 1918-19:

DISTRICT COURT, DIVISION OF BALBOA.

*Stanley Bailey v. Panama Railroad Company, civil docket No. 274.*—This is a suit for \$10,000 damages on account of personal injuries. The complaint was filed on October 15, 1918. Demurrers were filed by the Panama Railroad Company, which had not been acted upon by the court at the end of the fiscal year.

*Camilia Castilla v. Panama Railroad Company, civil docket No. 232.*—This is a suit filed by Camilia Castilla, claiming she is the mother of Lorenzo Ferrero, an infant, who was killed in the Gamboa wreck of May 20, 1918. She seeks to recover the sum of \$50,000. The Panama Railroad Company filed demurrers to the complaint, which had not been acted upon at the end of the fiscal year.

*Bienvenida Cabeza v. Panama Railroad Company, civil docket No. 303.*—This is a suit for \$15,000 damages for personal injuries alleged to have been sustained by the plaintiff in the Gamboa wreck. Suit was filed on March 10, 1919, and the defendant's answer was filed on April 16, 1919.

*D'Hillip Singh v. Panama Railroad Company, civil docket No. 260.*—This suit was brought for the recovery of \$973 damages on account of alleged personal injuries and the alleged loss of personal property in the Gamboa wreck. Suit was filed on January 20, 1919. At the suggestion of the district judge settlement was made with the plaintiff for the sum of \$175 covering his personal injuries and loss and damage to his clothing, but not including the money alleged to have been lost from his person; and thereupon the plaintiff filed an amended complaint praying damages for the loss of money. A demurrer was filed to the amended complaint on March 16, 1919, which had not been acted upon by the court at the end of the fiscal year.

*Grace Garrison v. Panama Railroad Company, civil docket No. 316.*—This suit was instituted on May 19, 1919, for the sum of \$5,000 on account of personal injuries alleged to have been sustained in the Gamboa wreck. Answer was filed on behalf of the Panama Railroad Company on June 3, 1919.

*Llewelyn Malcolm v. Panama Railroad Company, civil docket No. 248.*—This suit was instituted on July 31, 1918, for the sum of \$2,000 on account of personal injuries received in the Gamboa wreck. A demurrer to the complaint was filed by the Panama Railroad Company on August 6, 1918, which was overruled by the court on September 10, 1918; and answer was filed by the railroad company on September 14, 1918.

*James Rock v. Panama Railroad Company, civil docket No. 310.*—This suit was filed on April 10, 1919, for alleged injuries resulting in the death of Rachael Rock, wife of the plaintiff, in the Gamboa wreck. The defendant company filed its demurrer to the complaint on May 21, 1919, which had not been acted upon by the court at the end of the fiscal year.

*George Scott v. Panama Railroad Company, civil docket No. 238.*—This suit was instituted on October 11, 1918, for the sum of \$7,500, on account of injuries alleged to have been sustained in the Gamboa wreck. A demurrer and plea in bar was filed by the defendant company on November 20, 1918, which had not been acted upon by the court at the end of the fiscal year.

*Louis Strobel v. Panama Railroad Company, civil docket No. 277.*—This suit was filed on May 10, 1919, for the sum of \$20,000 damages on account of personal injuries alleged to have been received in the Gamboa wreck. The defendant company interposed a demurrer to his complaint on June 3, 1919, and no action had been taken thereon by the court at the end of the fiscal year.

*James J. Towey v. Panama Railroad Company, civil docket No. 259.*—This is a suit for damages on account of alleged personal injuries and alleged loss of personal property in the Gamboa wreck. Suit was filed on January 20, 1919, in which the plaintiff sought to recover the sum of \$2,350.60. Settlement was effected with the plaintiff in the sum of \$300 for the personal injuries received by him, and a demurrer was filed by the defendant to that part of the complaint in which the plaintiff sought to recover damages for the loss

of personal property in the wreck. No action had been taken on the demurrer by the court at the end of the fiscal year.

*Matco Ugalde v. Panama Railroad Company, civil docket No. 235.*—This suit was instituted on May 24, 1918, for the recovery of \$7,500 damages on account of personal injuries. On June 11, 1918, the defendant filed a plea to the jurisdiction, which plea was overruled by the court on July 26, 1918, and a plea in bar was filed by the defendant on August 1, 1918.

## DISTRICT COURT—DIVISION OF CRISTOBAL.

*John A. Brown v. Panama Railroad Company, civil docket No. 231.*—This suit was instituted by John A. Brown as administrator of the estate of Adolphus Brown, for the sum of \$10,000 damages on account of personal injuries resulting in death. Complaint was filed on August 22, 1918, to which the defendant filed a demurrer on November 7, 1918. The plaintiff filed an amended complaint on November 30, 1918.

*Louise Bennett v. Panama Railroad Company, civil docket No. 240.*—This suit was instituted on October 30, 1918, for \$15,000 damages on account of personal injuries. The defendant interposed a demurrer to the plaintiff's pleadings, which demurrer had not been acted upon by the court at the end of the fiscal year.

*Alsace Carrina v. Panama Railroad Company, civil docket No. 268.*—This is a suit for \$5,000 damages for slander, libel, and being black listed. Complaint was filed on March 12, 1919, and the defendant entered its appearance on March 15, 1919. Demurrer will be interposed by the defendant company in this case upon the return of the district judge from his vacation.

*Pedro C. Cereso v. Eusebio Diaz et al., Panama Railroad Company, intervenors.*—This is an action brought by the plaintiff to establish title to real property. Petition was filed on June 24, 1909. No action was taken in this case prior to the President's depopulation order of December 5, 1912, and no action can be taken on it by the court at this time, except to dismiss the case, inasmuch as the land involved in the controversy has been taken over by the United States. Our efforts to have the case dismissed have not been successful, owing to the plaintiff's objection. I may add that the parties claiming interest in this land have filed their claims before the joint commission. The district court of the Canal Zone has ceased to have jurisdiction over the subject matter of the litigation, and the joint commission is the tribunal that has the exclusive jurisdiction over the case, in accordance with the ruling of the United States Circuit Court of Appeals at New Orleans in the case of a like nature as this one.

*James Daley v. Panama Railroad Company, civil docket No. 70.*—This case was filed on January 30, 1915. The plaintiff seeks to recover the sum of \$440.80, as damages on account of an alleged breach of contract for the furnishing of ties for the railroad company. The case has been delayed due to the absence of witnesses.

*T. A. Green v. Panama Railroad Company, civil docket No. 197.*—This case was filed on July 3, 1915, and the plaintiff seeks damages in the sum of \$1,000, on account of injuries to a horse, resulting in its death. The plaintiff died since the filing of the suit, and the trial of the cause was delayed awaiting the appointment of an administrator to represent the plaintiff's interest. The regularity of the administrator's appointment is questioned by one of the interested parties, and this has resulted in delaying a final disposition of the case.

*Louis Harewood v. Panama Railroad Company, civil docket No. 256.*—This case was instituted on January 16, 1919, in which the plaintiff seeks to recover the sum of \$450, as damages for the demolition of a coach. The defendant filed a demurrer on February 3, 1919, which had not been acted upon by the court at the end of the fiscal year.

*Evans Herbert v. Panama Railroad Company, civil docket No. 273.*—This is a suit in which plaintiff seeks to recover \$5,000 damages for alleged assault and battery by a conductor of the Panama Railroad. The complaint was filed on April 3, 1919, to which the defendant filed its answer on June 3, 1919.

*Joseph Liscomb v. Panama Railroad Company, civil docket No. 237.*—This suit was filed on May 25, 1918, for the sum of \$5,500 damages, on account of the alleged breach of contract of carriage. The defendant filed a plea to the jurisdiction on June 12, 1918. On October 31, 1918, defendant filed a motion

to make more definite and certain, which motion was allowed on January 24, 1919. No further action has been taken in the case.

*Panama Railroad Company v. United Fruit Company, civil docket No. 278.*—This suit was instituted on May 14, 1919, for damages in the sum of \$314.21 for the loss of a shipment of lettuce in transit from New Orleans to Cristobal.

*Panama Railroad Company v. A. S. Mendez et al.*—This is a suit brought for the recovery of land. Petition was filed on March 6, 1912. Some time after the President's depopulation order of December 5, 1912, the Panama Railroad Company asked for the dismissal of this case without prejudice, upon the ground that the United States had taken over the property, and that the defendants had filed their claim before the joint commission for damages on account of the Government having taken over the land. The motion was denied by the court. The claim of A. S. Mendez and others was tried by the joint commission and was dismissed for the want of merit in the claim by the commission under ruling made on the 2d day of July, 1918. The ruling of the commission will be brought to the attention of the district court and the railroad company's motion to dismiss will be renewed.

*Panama Railroad Company v. Eufracio C. de Villalobos and Porfirio Melendez.*—This suit was instituted by the Panama Railroad Company for recovery of lands. The petition was filed on March 1, 1912. After the suit was filed Porfirio Melendez filed a disclaimer in the suit, stating that he had no interest in the subject-matter of the litigation. The land involved in the suit was taken over by the United States by virtue of the President's depopulation order of December 5, 1912. The fact that the land was taken over by the United States was called to the court's attention and the railroad company asked for a dismissal of the case without prejudice. The railroad company's motion was opposed by counsel for Villalobos, and was thereupon denied by the court.

*Hyman Magnus, a minor, by Josephine Gray, his guardian, v. Panama Railroad Company, civil docket No. 263.*—This is a suit for \$50,000 damages, on account of alleged personal injuries. The defendant filed a demurrer to the complaint on March 18, 1919, which had not been acted upon by the court at the end of the fiscal year.

*Fitz Gerald Oxley and Louise Oxley v. Panama Railroad Company, civil docket No. 279.*—This is a suit for \$3,000 damages on account of injuries sustained by plaintiff, Louise Oxley, while alighting from a moving train. Complaint was filed on May 16, 1919. The defendant filed its answer on June 3, 1919.

*Catherine Rice v. Panama Railroad Company, civil docket No. 252.*—Suit was instituted by plaintiff for \$25,000 damages, on account of personal injuries sustained by her son, resulting in death. Complaint was filed on January 10, 1919. The defendant filed a demurrer on March 17, 1919, which had not been acted upon by the court at the end of the fiscal year.

*Arnold Valencia v. Panama Railroad Company, civil docket No. 168.*—This is a suit for damages in the sum of \$2,000, on account of failure to transport baggage. It was filed on April 18, 1917. Answer has been filed by the railroad company and the case has been continued from time to time by the plaintiff.

*Alexander White v. Panama Railroad Company, civil docket No. 262.*—Suit was instituted on January 25, 1919, for \$12,500 damages on account of personal injuries. The defendant filed a demurrer to the plaintiff's complaint on May 21, 1919. No action thereon has been had by the court.

*Alpheus Williams v. Panama Railroad Company, civil docket No. 270.*—This suit was instituted by Alpheus Williams as administrator of the estate of Samuel Augustus Williams, for \$10,000 damages on account of injuries resulting in death. Complaint was filed on March 22, 1919. The defendant filed a demurrer on May 21, 1919, which has not been acted upon by the court.

*Fred Warden v. Panama Railroad Company, civil docket No. 280.*—This is a suit for \$5,000 damages on account of personal injuries. The complaint was filed on June 24, 1919. The defendant entered its appearance on June 26, 1919.

*Segal & Brockman v. Panama Railroad Company, civil docket No. 242.*—This is a suit for \$469.15 damages on account of the loss of freight. The complaint was filed on November 7, 1918. Defendant filed a motion for a continuance on November 11, 1918.

The following cases were finally disposed of in the appellate courts:

*Theodore Bosse v. Panama Railroad Company.*—This was a suit instituted by Bosse for the sum of \$10,000 damages on account of personal injuries, filed in the district court of the Canal Zone, division of Balboa, on July 12, 1916. A

trial was had which resulted in a judgment against the railroad company in the sum of \$2,500, and the company obtained a writ of error from the United States Circuit Court of Appeals at New Orleans. That court affirmed the judgment of the trial court on February 6, 1917, and thereafter a writ of error was perfected in the Supreme Court of the United States by the railroad company. The rulings of the trial court and the Circuit Court of Appeals was affirmed by the Supreme Court of the United States on March 3, 1919. The judgment was satisfied on July 12, 1919.

*Mrs. T. T. Curran and T. T. Curran, her husband, v. Panama Railroad Company, civil docket No. 168.*—This suit was instituted against the Panama Railroad Company on May 24, 1917, in the Balboa division of the district court. The plaintiffs demanded the sum of \$25,000 on account of personal injuries sustained by Mrs. Curran. They recovered a judgment against the Panama Railroad Company on December 5, 1917, in the sum of \$12,020.83. A writ of error was perfected by the Panama Railroad Company from the Circuit Court of Appeals at New Orleans. A judgment was rendered by that court, sustaining the trial court, on March 24, 1919. The judgment was satisfied on July 12, 1919.

*Tomas Reina v. Beatriz Bracho et al, and the Panama Railroad Company, civil docket No. 139.*—This was a suit for the partition of lands known as Rio Indio and Mindi. It was filed May 29, 1916, some time after the land had been taken over by the United States under the depopulation order of the President of December 5, 1912. Suggestion was filed by the district attorney on behalf of the United States that the lands had passed to the United States, and disclaimer of any interest in the subject matter of the litigation was filed by the Panama Railroad, wherein it was stated that the United States had taken over the property and had extinguished the title and possession of the Panama Railroad Company. Pleas to the jurisdiction were filed by the remaining defendants. The district court dismissed the case upon the coming in of the suggestion of the district attorney, and after hearing the various pleas filed by the other parties to the case. The plaintiff, Tomas Reina, perfected an appeal to the United States Circuit Court of Appeals at New Orleans, and that court affirmed the decision of the trial court by judgment rendered on March 25, 1919.

*Evclina Robert v. Panama Railroad Company, civil docket No. 219.*—This suit was instituted on February 21, 1918, for the sum of \$20,000, on account of personal injuries. The plaintiff recovered a judgment against the Panama Railroad Company on July 26, 1918, for the sum of \$2,500. A writ of error was perfected by the Panama Railroad Company from the Circuit Court of Appeals at New Orleans. A judgment was rendered by that court, sustaining the trial court, on March 24, 1919. The judgment was satisfied on July 12, 1919.

The effect of the ruling of the Supreme Court in the Bosse case, above mentioned, was to sustain the district court of the Canal Zone in so far as it held that in construing the Colombian and Panamanian statutes the district courts of the Canal Zone might resort to common law principles to aid them. The Supreme Court held that the rule of decision of the Colombian courts had become exotic in the Canal Zone, since the depopulation order of the President of December 5, 1912. The court did not rule that the Colombian and Panamanian statutes in force in the Canal Zone on February 26, 1904, when the Panama Canal treaty was promulgated, had become exotic in the Canal Zone. The court simply held that the Canal Zone courts were not bound by the decisions of the Colombian and Panamanian courts in the interpretation of those statutes.

The following Panama Railroad cases were pending in the appellate courts at the end of the fiscal year 1918-19:

*Joseph T. Toppin v. Panama Railroad Company, civil docket No. 96.*—This was a suit for damages for personal injuries in the sum of \$15,000. The complaint was filed in the Cristobal division of the district court on July 3, 1915. The plaintiff obtained a judgment against the Panama Railroad Company on July 14, 1917, in the sum of \$10,000. A writ of error was perfected by the Panama Railroad Company in the United States Circuit Court of Appeals at

New Orleans. That court affirmed the judgment of the trial court on April 17, 1918. Thereafter a writ of error was perfected by the Panama Railroad Company from the Supreme Court of the United States, and the case is now pending in that court.

*Noel Pigott, a minor, by his guardian ad litem George Morrell, v. Panama Railroad Company, civil docket No. 174.*—This was a suit for \$50,000 damages on account of personal injuries sustained by Noel Pigott, a minor. Complaint was filed on May 18, 1917, in the Cristobal division of the district court. Several trials were had of this case, and finally a judgment was rendered against the Panama Railroad on February 15, 1918, for the sum of \$7,500. A writ of error was perfected by the Panama Railroad Company from the Circuit Court of Appeals at New Orleans, where the judgment of the trial court was affirmed on March 27, 1919. Thereafter a writ of error was perfected by the Panama Railroad from the Supreme Court of the United States, and the case is now pending in that court.

#### LITIGATION IN PANAMAN COURTS.

It has been necessary to enforce collection of rentals through the company's attorney in Panama, due to the company from some of its lessees of lots in the cities of Panama and Colon. In some instances it was necessary to institute suits in the Panaman courts to recover the possession of the lot from the lessees; and action has had to be taken through the courts and the various departments of Panama to protect the company's possessions of its real estate in the two cities.

#### SERVICES OF AN ADVISORY NATURE.

This office, during the last fiscal year, has rendered services of an advisory character to the Governor and to the various department heads of The Panama Canal, and in some instances, to the commanding officer of the military forces. The special attorney has also rendered legal advice to the American minister in Panama.

The special attorney is also counsel for the Panama Railroad on the Isthmus, and has rendered legal service of an advisory character to the president of the railroad and to the various executive officers of the railroad.

#### LEGISLATION.

There was no congressional enactment during the last fiscal year which was limited in its scope to the Canal Zone, although the Canal Zone and the Panama Canal adjuncts were included in several acts of Congress during the fiscal year.

Several Executive orders have been issued by the President during the fiscal year, affecting The Panama Canal and the Canal Zone. The practice established by the Governor, with the approval of the Secretary of War, requires that all proposed Executive orders should be either drafted in this office or submitted to this office for examination before the Governor gives his approval of them and forwards the same to Washington for presidential approval.

The following orders were either drafted in this office, or this office intervened in their preparation:

On July 9, 1918, the President issued an Executive order relating to the anchorage and movement of vessels, under the provisions of Section I, Title II of the act of Congress approved June 15, 1917, commonly known as the espionage act. The purpose of the Execu-



tive order was to remove any doubt as to the authority of the Governor to exercise within the territory and waters of the Canal Zone the same powers as those conferred upon the Secretary of the Treasury with regard to the territory and waters of the United States under the said Section I, Title II of the said act of Congress. The authority so granted to the Governor permits him to regulate the anchorage and movement of vessels in the Canal Zone waters.

On July 26, 1918, the President issued an Executive order fixing the responsibility for accidents to vessels transiting the canal. The order was an amendment to paragraph 20 of the Navigation Rules and Regulations of The Panama Canal, which were issued in conformity with the Panama Canal act. The purpose of the Executive order was to permit the adjustment of claims presented against The Panama Canal for injuries to vessels while transiting the canal outside of the locks, in cases where the Governor found that the injury was due to the negligence or want of care on the part of the agents or employees of The Panama Canal. This Executive order was prepared jointly by this office and the auditor's office.

An Executive order relating to the licensing of chauffeurs was promulgated by the President on October 9, 1918. The order was issued under the authority of the act of Congress approved August 21, 1916, by virtue of which the President is authorized to establish rules and regulations affecting public roads, self-propelled vehicles, etc. The order was promulgated in lieu of the Isthmian Canal Commission ordinance of April 15, 1911, and the ordinance of the Isthmian Canal Commission of February 21, 1914, and took the place of previous Executive orders relating to the licensing of chauffeurs.

The Navy Department desired a naval station at Guarapo Island, which lies immediately in front of the spillway in Gatun Lake. By Executive order of the President of November 4, 1918, the island of Guarapo, in its entirety, as well as certain water areas contiguous thereto, set forth in the order, were assigned to the Navy Department for the purpose of a naval air station, under the control of the Secretary of the Navy, but subject to the civil jurisdiction of the Canal Zone authorities, in conformity with the Panama Canal act.

The form of Panama Canal tonnage certificates issued under Article XVIII of the rules of measurement of vessels for The Panama Canal was found to be inconvenient, and a new form of certificate was drafted and approved by the President by Executive order dated March 4, 1919, entitled "An Order to Amend the Form of Panama Canal Tonnage Certificates." This Executive order was obtained at the instance of the marine superintendent, and was prepared by him, with the aid of this office.

In conclusion I may say that the work of adjusting land claims has advanced very far toward completion, and I am confident that the claims now pending on the joint commission's docket will be disposed of within the next six months, at which time the force of this office may be greatly reduced without detriment to the service.

Respectfully,

FRANK FEUILLE,  
*Special Attorney.*

Col. CHESTER HARDING, United States Army,  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*



## APPENDIX J.

### REPORT OF THE CHIEF HEALTH OFFICER, HEALTH DEPARTMENT.

BALBOA HEIGHTS, CANAL ZONE, *July 20, 1919.*

SIR: I have the honor to submit the following report of the operations of the health department for the fiscal year ended June 30, 1919:

#### PERSONNEL.

Lieut. Col. A. T. McCormack, chief health officer, was relieved from duty January 23, 1919, by War Department orders, and Maj. R. L. Loughran, superintendent of Ancon Hospital, was made acting chief health officer pending the arrival of the undersigned, who was appointed chief health officer, effective March 31, 1919.

Col. L. T. Hess was appointed superintendent, Ancon Hospital, May 12, 1919.

Capt. D. P. Curry was appointed chief sanitary inspector July 24, 1918.

Dr. S. B. Grubbs, surgeon, United States Public Health Service, was appointed chief quarantine officer November 24, 1918, vice Dr. M. C. Guthrie, transferred to United States Public Health Service duty in the States.

Capt. G. G. Marshall, chief of the eye and ear clinic, was relieved by Lieut. A. F. Ryan, March 1, 1919.

Lieut. C. M. Ming, chief of X-ray clinic, was relieved by Capt. L. S. Townsend March 20, 1919.

Capt. J. N. Force, bacteriologist, board of health laboratory, was relieved February 14, 1919, by the return of Capt. L. B. Bates.

Maj. Oscar Teague was relieved from duty as chief of laboratory October 14, 1918, and the pathologist, Capt. W. L. McFarland, was appointed as chief. Lieut. L. W. Gorton was appointed pathologist November 1, 1918. Capt. W. L. McFarland resigned as chief of laboratory March 14, 1919, and Capt. L. B. Bates succeeded him. Lieut. J. H. St. John was appointed bacteriologist, vice Capt. Bates, June 9, 1919.

Dr. M. J. Hoey, quarantine officer, Balboa, resigned March 25, 1919, and Dr. H. C. Watts was appointed to this position.

In addition to the above, many Army physicians were detailed for duty with the health department during the year, due to our inability to secure civilian physicians. Since the signing of the armistice, many of the above officers have secured their discharge from the Army, and are continuing in their positions in civilian capacity.

## GENERAL REMARKS.

The health of the Canal Zone and terminal cities has continued good. The most remarkable change in a disease rate was in venereal disease incidence among soldiers; for this year it was 15.5 per thousand—as against an average of 102.1 per thousand for the previous three years—due to General Order 26, excluding soldiers from Panaman territory.

One case of yellow fever arrived at the Balboa quarantine station from Guayaquil, Ecuador, on January 30, 1919. Seventeen cases of leprosy were admitted to Palo Seco Leper Asylum. One hundred and eighty-seven cases of smallpox occurred during the year; they were all treated at Ancon Hospital, and no deaths occurred. The epidemic originated in the interior of the Republic, but cases were admitted from the terminal cities and the Zone. The last case was admitted May 22, 1919. The entire population of the terminal cities and of the Zone, as well as many residents in interior towns, were vaccinated except where recent vaccination was shown or the person had had smallpox previously.

No other cases of maritime quarantinable disease arrived at or originated on the Isthmus during the year.

## VITAL STATISTICS.

## EMPLOYEES.

The average number of employees on the rolls of The Panama Canal, the Panama Railroad, and contractors doing work for The Panama Canal for the year was 25,610, as compared with 28,938 for the fiscal year ended June 30, 1918.

The total admission rate to hospitals and quarters was 469.72, as compared with 381.33 for 1918. The total admission rate to hospitals only, for the year was 185.74, as compared with 176.55 for 1918, and for disease alone 160.76 as compared with 142.89 for 1918. This increase was, in a measure, due to the physical examination of silver employees, which was inaugurated during the first half of the year, and from which several hundred employees with curable defects were sent to the hospital.

The total death rate for 1919 was 6.66, as compared with 7.95 for 1918, and the death rate for disease was 6.02, as against 6.74 for 1918. The noneffective rate for 1919 was 13.34, as compared with 10.42 for 1918.

The total admission rate for malaria was 23.31 as compared with 20 for 1918, and 13.47 for 1917. The constantly noneffective rate, hospitals and quarters, was 2.68, as against .72 for 1918, and .49 for 1917. The death rate for malaria was .07, as compared with .03 for 1918 and .09 for 1917.

The admission rate for typhoid fever was .08, as against .28 for 1918; there were no deaths from typhoid fever in the years 1918 and 1919.

The death rate from tuberculosis (various organs) was 1.17, as compared with 1.27 for 1918. The death rate for pneumonia (lobar) was .78, as against .79 for 1918.

The five diseases causing the highest number of hospital admissions, with their rates, were as follows:

	Number of admissions.		Rate per 1,000.	
	1917-18	1918-19	1917-18	1918-19
Influenza.....	269	596	9.29	23.27
Malaria.....	579	516	20.00	20.15
Veneral disease.....	563	459	19.45	17.92
Diseases of the eyes and annexa.....	86	124	2.97	4.84
Tuberculosis.....	67	52	2.31	2.03

The five diseases causing the highest number of deaths, with their rates, were as follows:

	Number of deaths.		Rate per 1,000.	
	1917-18	1918-19	1917-18	1918-19
Tuberculosis (various organs).....	37	30	1.27	1.17
Lobar pneumonia.....	23	20	.79	.78
Organic diseases of the heart.....	23	16	.79	.62
Chronic nephritis.....	22	8	.76	.31
Apoplexy.....	4	8	.13	.31

#### EFFECTS OF RACE.

For disease only, the admission rate to hospitals and the death rate for white employees was 239.03 and 1.99, as compared with 144.26 and 6.88 for black employees. The noneffective rate for disease and injuries for white employees was 17.01, as compared with 12.56 for black employees.

#### CANAL ZONE.

The average civil population of the Canal Zone for the year was 21,707, as compared with 24,032 for the last year.<sup>1</sup>

From this civil population 218 deaths occurred during the year, 204 of which were from disease, giving a rate of 9.40 for disease alone, as compared with 10.61 for 1918.

The death rate from tuberculosis was 1.34, as compared with 1.79 for the year 1918. Deaths from tuberculosis this year were 13 per cent of all deaths.

The birth rate for the year was 31.14. The infant mortality rate, based on the number of births reported for the year, was 21 for white and 117 for black children, with a general average of 84.05. Of the total births reported, 6 per cent were stillbirths.

Of the total deaths reported, 41 per cent occurred among children under five years of age.

<sup>1</sup> The military population is not included in any of the statistical rates of this report, except in the table under sanitation showing total malaria cases and percentages.

## PANAMA CITY.

The average population of the city for the year was 61,369, the census not having been taken during the past year. From this population, 1,377 deaths occurred during the year, of which 1,341 were from disease, giving a rate of 21.85 for disease alone, as compared with 24.18 for the preceding year. Tuberculosis gave a death rate of 4.30 as compared with 4.53 for 1918; this was 19 per cent of the total deaths, as compared with 18 per cent for last year.

The principal causes of death as compared with last year were as follows:

	1917-18	1918-19
Tuberculosis (various organs).....	278	264
Pneumonia.....	123	168
Diarrhea and enteritis.....	247	130

There were 2,106 births reported for the year, giving a rate of 34.31. The infant mortality rate, based on the above number of births was 178.27. Of the total births reported 7 per cent were stillbirths.

Of the total deaths reported 44 per cent occurred among children under five years of age.

## COLON.

The average population of the city for the year was 26,078, the same as for the preceding year. From this population, 636 deaths occurred during the year, of which 607 were from disease, giving a rate of 23.02 for disease alone, as compared with 24.96 for the preceding year.

The principal causes of death as compared with last year were:

	1917-18	1918-19
Tuberculosis (various organs).....	117	108
Pneumonia.....	89	89
Diarrhea and enteritis.....	64	58

There were 784 births reported for the year, giving a rate of 30.05. The infant mortality rate, based on the number of births, was 187.53. Of the total births reported, 9 per cent were stillbirths.

Of the total deaths, 35 per cent occurred among children under 5 years of age.

## ANCON HOSPITAL.

*Permanent buildings.*—The fiscal year just ended marked the completion and occupancy of the authorized permanent buildings of Ancon Hospital, construction of which began in the summer of 1915. The buildings, all of reinforced concrete construction with roofs of red tile, are well planned and attractively situated on the eastern slope of Ancon Hill, 150 to 175 feet above sea level.

The equipment is complete, modern in every respect, and conforms to tropical requirements. In the different buildings there are six

passenger electric elevators, one freight elevator, and eight automatic electric dumb-waiters. Each unit is equipped with latest conveniences in hospital construction, including hot and cold water, steam supply, ice-water fountains, laundry chutes, sterilizers, semidirect lighting, electric signal systems, telephones, etc.

Sheltered passageways connect all wards with the administration-clinics building which houses the operating rooms. Surgical wards are located on same levels as passageways so that operative cases may be transferred to and from the operating rooms with minimum use of elevators or stairways and always under cover.

The patient capacity, based on 5-foot space between beds, 7-foot width of center aisle, and with beds 1-foot from wall, is 689 beds. By placing beds 30 inches apart the number of beds has been increased to 849. By placing cots on porches which are wide and well protected, and similarly utilizing space in wards, 1,400 patients can be properly and efficiently cared for. The following table shows the class of patients cared for in each unit of the hospital, and the number of beds:

Section.	Present number of beds.	Class of patients.
A.....	172	White American male.
B.....	102	Private rooms, white female, nursery.
C.....	247	White foreign male, colored male.
D.....	229	White children, colored children, colored female.
Isolation.....	99	All contagious diseases.

The hospital garage, also a reinforced concrete structure, designed to harmonize with other hospital buildings, was completed during the year, and is located in rear of the dispensary and admitting office. Space is provided for six cars, workshop the width of two stalls and pit, with suitable equipment to effect light repairs. Hospital transportation needs are amply provided for by three ambulances, two trucks and one hearse.

The nurses' home, three stories in height with a small service basement, was also completed during the year; it occupies a site on the spur at the base of the main stair entrance to the hospital. It provides quarters for 70 nurses and suite for chief nurse.

*Grounds and roads.*—Hospital roads of permanent type have been completed, as well as ground improvements. All slopes are now well sodded, and shrubbery has been planted, while the landscape work on terraces in front of administration-clinics building gives promise of great beauty in the future.

*Buildings evacuated.*—All of the former hospital buildings were finally cleared of patients, section E remaining vacant and section F being utilized by supply department as temporary quarters for white bachelors.

*Linen room.*—This was moved from basement of administration-clinics building to enlarged quarters in basement of section C, which has been provided with necessary shelves and other fixtures and apparatus needed to properly issue and care for hospital linen.

*Maintenance and repairs.*—In addition to the usual routine repairs and maintenance work by hospital artisans, considerable small equipment, furniture and fittings were manufactured and put into service

at much less than cost of similar material imported from the United States. Among other things, there were manufactured:

- Shelving for all sections;
- Tables and tray racks for sections C and D;
- Specimen carrier for laboratory;
- Food carts and dining room tables for C and D;
- Bins for condemned linen, etc.

#### COROZAL HOSPITAL.

*Buildings.*—During the year a new two-story male ward was undertaken and at present is being completed. This building will accommodate about eighty patients and will contain a hydrotherapeutic outfit. It is constructed on a plan similar to the insane hospitals in the United States. This additional building will reduce the congestion on the male wards and will enable us to isolate tubercular insane patients, which has not been possible heretofore; it will also probably enable us to look after the chronic patients now kept at Ancon Hospital.

Cottage No. 267, Ancon Hospital grounds, was removed here and reerected for use as married quarters. The exteriors of all ward buildings and the interiors of several wards were painted by the working patients.

A 15,000-gallon tank has been installed whereby we will be able to utilize the water from a near-by stream, and thus reduce the cost of water supply at this hospital.

*Hospital department—Insane patients.*—The general admission rate has been about the same as in the past, but toward the end of the year a number of the patients were deported to their native homes. The number of patients is now 393.

Various forms of amusement were continued as in previous years. Occupational treatment has been continued with great success, and during the past season we have been successful in encouraging our patients to do some manual labor, thus relieving their minds of their mental conflicts. With their help we have been able to cultivate between 25 and 30 acres of land in the vicinity of the hospital, where we have planted yams, yucca, and various vegetables. Several female patients who show no tendency to make hats, rugs, etc., in the sewing room and laundry were turned out in the vegetable garden, where an acre of land was turned over to them to produce various vegetables. All patients who show a tendency to work are compensated to the extent of from \$1 to \$4 per month. This is not given to them in cash, but they are allowed to draw a certain amount of supplies from the hospital store and the balance of the money is given to them when they are discharged from the hospital. It is believed that this money will help these patients to get along better in the outside world on their discharge.

A training school for orderlies and maids is being organized; they will be trained to assume charge of the wards, administer cold packs, medicines, etc., but will be under the supervision of a gold employée.

*Grounds.*—Several flower beds have been placed in the hospital inclosure, from which fresh flowers are cut daily for the use of the wards. Vines have been planted along the inclosure fence. One thousand feet of drain has been laid within the hospital inclosure, to



eliminate wet and mosquito breeding areas. All walks within the grounds have been worked over and put in proper condition.

*Farm department.*—The farm uses only cripple labor, and it has been a great problem to make it a financial success. In order to reduce expenses the position of assistant farm manager was abolished and the farm, dairy, and piggery were all placed immediately under the farm manager; this proved too much work for one man and an assistant farm manager was again employed and the work divided between the two to obtain the best possible results.

*Dairy.*—The dairy herd consists of 64 cows and 1 registered Jersey bull. No new cows have been purchased since 1916. Most of the cows are old and should be replaced. The herd is partially replenished by raising heifer calves from the better producing mothers. Due to the State's food regulations, we were compelled to accept a substitute for our regular cow feed, and there has been a slight reduction in the milk for the past several months on this account and also by reason of shortage in pasture during the dry season. We are now obtaining our regular cow feed and it is hoped that the normal supply of milk will soon be reached. All milk is pasteurized at the dairy immediately after milking; the bacteria count is usually below 100. The tuberculin test is made regularly.

*Piggery.*—After immunizing all our hogs against cholera they were sold to the cattle industry for breeding purposes. The immunized pigs which were purchased for the purpose of making serum were also sold, as it was impracticable to manufacture serum here. Some new pigs were purchased in the local market, fattened, and sold to the cattle industry at a profit. At present we have only 48 pigs, native stock.

*Hennery.*—All our chickens were disposed of as this part of the farm had been conducted at a loss.

*Garden.*—Several cripples were admitted to the institution and placed to work in the garden. A few accepted the injury compensation allowed them and were returned to their native homes. In spite of the cripples doing their best, the garden has proven a financial loss and it will probably continue to be such, due to the fact that in order to allow these cripples a living wage it is necessary to pay them more than they produce.

*General.*—With the new building for the male population nearing completion, steps should be taken to erect an industrial hall whereby we would be able to segregate all our working patients. Machinery and material should be purchased and placed where we would be able to instruct the male as well as the female patients to make brooms, brushes, and mattresses. At present we have no industrial room for our male patients, and are only able to send them out to work in the fields; with an additional structure for use as an industrial hall they could be taught to make brooms, brushes, shoes, etc., for the use of the health department and for sale. Our female working patients are at present installed in three different buildings, owing to the fact that we have no place where we can accommodate and supervise them. If all were in one building they could be easily managed and their efficiency increased. If an industrial hall were built we could also place some of our cripple employees there and teach them a trade other than gardening—in other words, reeducate

them, whereby they would become self-supporting and not remain a permanent charity charge against the health department. A cripple with one leg could make a good tailor, but makes a very poor farmer. This accounts to a great extent for the financial loss of the farm. Most of our laundry is done in the hospital by our female patients, but we have no laundry machinery; with proper machinery we would be able to do all the laundry for both Corozal and Ancon hospitals.

#### COLON HOSPITAL.

*Grounds.*—During the past year, through the generosity of one of our patients, a great deal has been done to beautify the hospital grounds. This has consisted in the laying out of hedges and flower beds both around the hospital and nurses' quarters. Plants and shrubs and royal palms have been obtained from Ancon and Corozal and with the advent of the rainy season things are well under way and the grounds quite presentable.

*Hospital work.*—Early in the beginning of the fiscal year just ended an attempt was made to clean up the Red Light district of Colon. This was done in connection with General Order No. 20. It consisted of a thorough physical examination at Colon Hospital of all registered women of the segregated district. All diseased women, and practically all of them were found to be so, we put under the control of the prophylactic station, where proper treatment was instituted. Many were admitted to Colon Hospital for surgical treatment, and following discharge from the hospital were returned to the prophylactic station where they were kept under observation and treatment until pronounced cured.

During the past year a general examination of all silver employees on the Isthmus was made. All defectives were ordered to the hospital for correction. About 350 were operated on at Colon Hospital. The work consisted mainly in correction of hernias, hydroceles, varicoceles, varicose veins, etc. There were no deaths. A physical examination of all new silver employees was also inaugurated; for awhile the small force of doctors at Colon Hospital was overwhelmed, but the situation has been gradually controlled and at present we are well able to cope with it.

Recently the hospital acquired a new Ford ambulance. This has been in constant use and has proved very satisfactory. Our old ambulance is utilized for commissary work and night calls.

Everywhere in the interior of the hospital the paint has cracked and peeled off. This was evidently due to the fact that it was applied while the walls were still too green. The condition at present is both unsightly and insanitary, and the hospital should be painted as soon as funds are available; the cost will be about \$1,000.

With the addition of two internes and the reduction in the number of beds in the hospital to fifty, the present force of doctors and nurses is considered adequate to perform the necessary duties of the dispensary and hospital. Although Colon Hospital is to be considered only as an emergency institution, an adequate surgical staff must be maintained to meet such conditions as might arise. The importance of this fact can not be overestimated because the frequent occurrence of skull fractures, acute appendicitis, strangulated hernias, fractures

and traumatic amputations make this hospital at all times liable for the proper treatment and care of such emergency conditions.

#### SANTO TOMAS HOSPITAL.

The work of this hospital was greatly increased by the venereal disease campaign; one Army physician and eight enlisted men were detailed there the greater part of the year, on the venereal disease ward and examination of prostitutes. The hospital is crowded to capacity, and there is not proper accommodation for tuberculosis patients. A new hospital is being planned by the Panaman Government to be located in the suburbs, and to have ample room for probable maximum number of patients.

#### DISTRICT DISPENSARIES.

Our district physicians have continued to care for the medical needs outside of hospital treatment, of employees, their families, ships passing through the canal, etc., at a minimum of expense. Due to the inauguration of physical examination of all new silver employees, and a more rigid examination of all employees handling food, the work of the district physicians has considerably increased, but no addition to their number was made.

#### DISTRICT DENTISTS.

Due to the amount of dental work required by employees and their families, an additional dentist has been ordered for Balboa. Another one is needed at Ancon. All our dentists are on a no-salary basis except the one on duty at Ancon Hospital.

#### PALO SECO LEPER ASYLUM.

The number of cases on hand at the first of the year was 70, and at the end of the year 74. There were 17 cases admitted, 6 deaths, and 7 escapes. The population of the asylum has increased each year, and a layout for future expansion was considered necessary. A new site on the plateau above the present station was therefore selected and surveyed, and a wharf and road leading to it is now being constructed entirely by patient labor.

The method of admission has been modified to require all patients to pass through Ancon Hospital, where, after a thorough clinic and laboratory study, the diagnosis must be certified by a board consisting of the chief quarantine officer, the chief of the medical clinic and the chief of the board of health laboratory. In addition, this board has reviewed all cases at the asylum, in order to have records of all patients uniform. Several cases have been put under special observation as arrested and possibly noncontagious.

Changes have been made in the social organization of the colony in order that it may resemble a well ordered village rather than an institution. A certain amount of self-government has been encouraged, and a system of graded allowances—less to the able-bodied and more to the incapacitated—has been instituted. By this system

subsistence and actual necessities will be supplied all patients, as heretofore, but other articles such as tobacco, toilet articles, etc., must be purchased by the patients from their allowances and from any money they secure by sale of produce to the asylum or by working for the asylum. To encourage local food production a demonstration garden has been maintained, and pigs have been purchased. Opportunities for work have thus increased, and it is expected that instead of being entirely subjects of charity and being treated as paupers, patients will now be encouraged to acquire property and conduct farming or other business much as in the outside world. A local coinage has been ordered and will be used in all business by patients.

During the year \$619.22 were paid to patients for produce. It is believed that both the variety and amount of vegetables will be greatly increased, and that a part of the meat supply may also be raised at the asylum.

The immediate supervision of this institution is under the chief quarantine officer, to whom credit for the above improvements is due.

### SANITATION.

#### CANAL ZONE.

The Zone is divided into four sanitary districts, each under charge of a sanitary inspector with a force of silver employees, the whole being supervised by a chief sanitary inspector, who acts as the responsible health officer of the Zone.

The Gatun sanitary district extends from Mindi dairy on the north to Darien on the south, and includes the residential city and locks of Gatun, the dam and spillway, a goodly portion of Gatun Lake, and large areas of swamp and cattle pastures north and west of the lock city.

The Pedro Miguel district contains the town and locks of Pedro Miguel, the silver settlements of Paraiso and Red Tank, and the almost abandoned settlements on the west side of the canal; the southern end of Gatun Lake and the Chagres River, and several large cattle pastures on both sides of the canal, from Darien to Miraflores tunnel.

Ancon district includes the eastern part of the Pacific end of the Canal Zone from Miraflores tunnel to the boundary of Panama City and the Corundu River.

Balboa district includes the city of Balboa and the important areas of docks and shops along the water front, and large cattle pastures lying across the canal from this section.

During the past year the malarial incidence of the Zone ran well within the expected rate, as determined by the statistics of the last three or four years. During the present wet season there was first noted the usual seasonal rise in the catch of *Anopheles* mosquitoes, especially at Gatun, Pedro Miguel, and Colon-Cristobal, following which the malaria rate showed a corresponding increase, especially at the latter place, and the highest rate of the last four years was approached just at the close of the year.

*Gatun district.*—A year ago, when the catch at Gatun was again high, it was decided to ditch a large swamp at Mindi in order to reduce the breeding in this area that was thought to be sending flights into Gatun. This was done during the last dry season, but developments in May and June just past, show that the situation was little, if any, bettered. The entire force of available sanitary inspectors and the entomologist of the board of health laboratory were then called upon to hold flight observations at Gatun, and after several nights spent in this work during the month of June they came to the unanimous conclusion that the chief source of the breeding from which Gatun received flights of *Anopheles albimanus* and *Anopheles tarsimaculata* was to be found in the swamp back of fill "3" lying between the spillway and the old French canal. A survey of this swamp reveals that it can be drained into the dredging basin at the south, and this work will begin this month.

Considerable breeding is going on in the big swamps and wet pasture lands north of Gatun, near Mindi and Mount Hope, and on Telfer's Island—upon which the Cristobal coaling plant is located. These places more nearly affect the population of Cristobal-Colon and the employees of the dry dock, coaling plant, and cold-storage plant, than they do Gatun, and the large increase in malaria cases noted at those places this present season can be attributed to these swamps. The only way to control this condition is to provide an extensive system of sea-level tidal ditches through Telfer's Island and the swamps on the east bank of the French canal and diversion, extending this work back as far as is found necessary to control the flight of mosquitoes into the places where night labor must necessarily be performed, or by filling—the expense of which is prohibitive.

About half a mile north of Gatun the Army is building a large permanent post for a regiment of infantry. This post is situated within easy flight distance of the pastures of Mindi dairy and the cattle industry, in which the cattle have the range of large flat areas that are inundated throughout the greater part of the year and in which *Anopheles* breeding occurs profusely. Some intensive sanitation will have to be done in this area before it can be pronounced safe for occupation by a military post. Under these conditions it is extremely doubtful if a body of men can exist in such close proximity to cattle.

The malaria rate of Gatun itself continues fairly low, in spite of the large number of *Anopheles* that are caught in quarters daily during the wet season; this can probably be attributed in part to the thoroughness with which the quarters are freed of mosquitoes by the sanitary inspector and his laborers before they reach the infective stage.

*Pedro Miguel district*, situated along Galliard Cut and Miraflores Lake, has many breeding areas in the small lakes and rivers that require constant attention to control, yet the comparatively small incidence of malaria here has been most gratifying.

Owing to the fact that some of the oldest settlements of the Zone are in this district, and the buildings therefore dilapidated by time, it has been found necessary to request the abandonment of a number of houses in Paraiso and other places. The old native "Jamaica town" was evacuated and razed during the past year and there are

other houses that should be treated likewise as soon as proper quarters can be provided for the employees living in them. Absence of screens, poor ventilation, and overcrowding are the chief objections to these houses, which are so old and decrepit that extensive repairs or alterations are not justified. Because of the extreme difficulty of excluding the possibility of *Anopheles* gaining admittance to town sites, especially in such border line settlements as these, it has been found necessary to recommend that no employees be quartered on the Zone in unscreened houses.

The sanitary inspector of this district has contributed much to the sanitation of the Gamboa stockade, Summit farm, and other camps, so that, though by no means attempting to achieve perfect sanitary conditions at these places, he has been able to show a satisfactory response in the low malarial incidence.

To completely protect Pedro Miguel from invasion it will be necessary to do extensive work on the banks of the surrounding streams and lakes, deepening and straightening channels, and filling in low, grassy, overflowed spots.

*Ancon District.*—The new concrete sanitary office and larvacide factory at Ancon was completed and occupied in October, 1918, and the old office abandoned.

The malaria rate of this district is low, this being one of the best sanitated parts of the Zone because of extensive fills and permanent drainage installed in past years in the worst part of the district. The occasional occurrence of cases within the district and the adjacent section of Panama City has, however, determined us to sanitize still farther beyond the previously worked section, so that now the streams and wet lowlands beyond the old Panama-Corozal road are receiving attention, and permanent drainage will be installed there as rapidly as funds permit. It is of equal importance that the extensive Savanas region of Panama be sanitated also, as these two districts are closely related.

Due to the close proximity of the new Army camp being erected on the Miraflores dump, it has been necessary to recommend the lowering of the level of the Cardenas River, in which extensive breeding was found to be taking place, and the draining of certain smaller swamps back of this location on the old road. When this is done, the chances of infection at Miraflores and Corozal also, should be much lessened.

Considerable numbers of flies appeared in Ancon and Balboa at the beginning of the 1919 wet season which were found to be breeding in the imperfectly cured manure at the dump north of Ancon on which the corral manure was being placed, and at the Army incinerator at Corozal; after conditions at these places were corrected, the fly nuisance rapidly dwindled to minimum proportions. At Corozal all Army manure is now being incinerated; that from the Ancon corral and Corozal Hospital farm is cured in concrete compost pits before being used for agricultural purposes.

*Balboa District.*—In this district are the large industrial plants and docks of the Pacific end of the canal, requiring constant effort against rat breeding and harboring, fly breeding, and other forms of sanitary nuisances in addition to the regular anti-malarial work. Owing to the large amount of night work performed in this district, both on land and water, it is necessary to take the utmost precautions

against mosquito breeding within flight distance. This requires that the west side of the canal be carefully protected also, and that the large swampy areas on that side be kept under control. Part of the tidal swamp back of Diablo Hill on the east side of the canal is being filled by the dredging division with spoil pumped from the canal so that ultimately this troublesome place may be drained, but in the meantime it is made even more dangerous because of the constantly changing conditions there.

Generally over the Zone it is being recognized that the flight of *Anopheles*, especially of the strong flying *albimanus-tarsimaculata* group, is much farther than was imagined during the early days of sanitation on the Isthmus. Invasion is now known to occur from places more than a mile distant. It has become necessary to extend the sanitized areas in every district, with a full realization that the area to be worked increases as the square of the distance. Fortunately, it has been the rule in the past to put in permanent drainage whenever possible, so that, so far at least, this additional work has been done without in any way neglecting the near-by sections that can never be slighted. It is the present policy of this department to endeavor to keep ever in sight and mind the high standard of sanitation set by former years, and at the same time, as means and time and the exigency indicate, to push out in whatever direction danger threatens, hoping ultimately to reach the definite limit, that must exist somewhere, within which we shall be reasonably safe from invasion by disease-carrying mosquitoes.

*Cattle camps.*—A somewhat recent innovation in Canal Zone industries is the raising of beef cattle on a large scale by the supply department for the local market and shipping trade of the canal ports. On June 30, 1919, there were 42,347 acres of cleared pastures, and 12,922 cattle grazing on them.

In the preparation of land for grazing purposes, gangs of 400 to 600 men are sent out into the jungle at the beginning of the dry season, under conditions that are similar to those found in pioneer days on the Isthmus. For four or more months they live in open, unscreened thatched bunk houses, continually exposed to the attacks of the increasing number of *Anopheles* mosquitoes that appear always to follow changed conditions in the jungle, as vegetation is cleared away from streams and the low wet spots are trampled into miry holes, with only such protection as is to be obtained from mosquito bars while sleeping—inefficient always when used by the unthinking and untaught laborer, and which are not used at all during the dangerous period between dusk and bedtime.

Pasture clearing was begun on the present scale in January, 1916, and each year thereafter the men engaged in this work have contributed a large proportion of the malaria rate of the Zone. The health department aids, as far as possible, in the sanitation of these camps. The locations were selected after consultation with the department, and instructions were given as to drainage, sewage disposal, water supply, fly and mosquito breeding, etc. The sanitary inspector of the district in which the camp is located makes regular visits of inspection, and a colored laborer is maintained there who makes a daily catch of mosquitoes in the bunk houses—thus getting rid of the great majority of them before they become infectious—and

also superintends the oiling of breeding places, latrines, and other matters of sanitation in the vicinity.

In spite of such measures the malarial incidence among the laborers was high. During the first quarter of the calendar year 1919 there entered the hospital for treatment for malaria 182 employees from the cattle camps and plantations, and but 28 from the sanitated areas of the Zone. The jungle-cutting gangs are largely recruited from the native Panamans, many of whom are afflicted with chronic malaria, and some of those entering the hospital were doubtless old or recurrent cases.

Because of the temporary nature of the camps it is not deemed advisable to attempt to sanitize them as extensively as is done about the permanent settlements, so, as a tentative measure, on April 9 of this year the routine administration of quinine solution to all cattle camp and plantation employees was begun, with apparently immediate results; so that in this quarter (the beginning of the rainy season) the malaria rate of the cattle camps and plantations steadily diminished, while that of the Zone underwent the usual increase. In this quarter there were admitted to the hospitals with malaria 50 employees from the cattle camps and plantations, and 69 from the sanitated areas.

For the fiscal year there were admitted 292 cattle camp employees with malaria, as compared with 184 employees from the sanitated area of the Zone. While quinine prophylaxis is admittedly an unscientific method of combating endemic malaria, it has undoubtedly proven its value under these circumstances. A suitable type of mosquito-proof portable or knock-down building should be used that would be of value in preventing infection.

Another serious feature of the cattle industry is the relation of cattle in the vicinity of permanent settlements to the breeding of *Anopheles* mosquitoes. It is well known that certain species of *Anopheles* have a strong preference for breeding in hoof prints in which water has gathered, and frequently these will be seen in close proximity to streams and pools that to human eyes seem equally desirable, yet the latter will prove barren, while the adjacent hoof prints will be teeming with *Anopheles* larvæ. Bodies of water deeply shaded and sheltered in the jungle do not, as a rule, breed *Anopheles* prolifically; but once the vegetation is cleared away, admitting sunlight and the development of algæ, especially in places trampled by cattle, the cattle themselves furnishing the meal of blood which is a necessity to the female mosquito, ideal conditions are established for the propagation of the malaria bearing species of mosquitoes.

Experiments at Gatun and Mindi previously referred to conclusively indicate that *Anopheles* flights occur over distances of at least a mile and a quarter, with a possibility of even longer flight with favorable weather when necessary to obtain blood. With the extension of the drainage, oiling, and intensive sanitation beyond each of the previously sanitated areas, it also becomes necessary to prohibit these newly included areas from being used as pastures for cattle, especially when the ground is wet or of such a nature as easily to be punched up by hoofprints, and at present a general zone of a mile to a mile and a half from residential or industrial districts has been established, within which cattle should not be permitted to



graze except when in the opinion of the health department it can be done with perfect safety.

In every case, before establishing cattle pastures in the vicinity of existing or proposed inhabited areas, the advice and approval of the health department should be secured before work is begun or any expense incurred. The production of meat, milk, and other food products has a very vital relation to health and it is the constant desire of this department to cooperate in such a way as to favor this laudable work in every respect, without however losing sight of the fact that our very first duty is to protect the inhabitants of the Zone from the danger of contracting infectious diseases.

#### PANAMA HEALTH OFFICE.

*Malaria.*—Although the malaria rate has remained low, it was higher this year than last year, as shown by the following table showing number of cases reported for the past five fiscal years:

	1915	1916	1917	1918	1919
Number of cases.....	1,582	304	236	108	142
Annual rate per thousand.....	26.2	5.02	3.72	1.76	2.31

The drainage of San Miguel swamp and that of Bella Vista has been improved within the past 12 months, but there remains much work to be done in these areas and the Savanas beyond, before the city of Panama and its suburbs can be made safe from malarial infection. There have been 2,780 yards of new ditches constructed, and all old ditches and drains kept clean. Many former water pools have been filled, thus not only abating nuisances but permanently doing away with cost of caring for them.

*Smallpox.*—The majority of cases in the smallpox epidemic came from Panama City, and a special vaccinator was employed. During the year 66,773 vaccinations have been made in the city, and 4,962 in outlying towns. On several occasions our vaccinator has gone to the interior at the request of the Republic, twice to Chepo and Chepillo, and several times to Chorrera. At the latter place there was a very severe epidemic of smallpox and owing to its nearness to the Zone it was deemed advisable to have the entire population vaccinated.

*Schools.*—A survey has been made of all schools within the city; the majority were found to be overcrowded, especially the West Indian schools. Those of the Republic, as a rule, have more than sufficient space for the pupils. What might be called the Rosenau rule has been applied, giving 15 square feet per person.

*Milk and dairy inspection.*—This has been done almost entirely by the veterinarian. By rigid inspection and enforcement of cleanliness, we are more than gradually getting the milk conditions here in good shape, as the almost daily reports from Ancon laboratory demonstrate. A number of dairies have been closed and those remaining open are making the improvements ordered.

*Veterinary inspection.*—All cattle and hogs shipped through Panama City to the Zone are inspected by the veterinarian attached to the Panama health office. All hides and skins for export from the

city are inspected and disinfected under his supervision. The income from this work for the year totaled \$3,777.69.

As far as his time permits, this veterinarian inspects the slaughtering of animals at the Panama City slaughterhouse. During the past three months one of our sanitary inspectors has put in three hours each evening in the microscopic examination of viscera from the slaughtered animals immediately after the killing of the animals, being assisted and directed by the veterinarian. Since the inauguration of this work, 7 cattle and 142 hogs have been rejected and 7 carcasses and 5 quarters were condemned. An endeavor is being made to have the city council of Panama authorize an extra tax of 25 cents per head upon cattle and 10 cents per head upon swine slaughtered, and turn the resultant funds over to the Panama health office; this tax would amount to over \$300 per month, which would more than pay the salary of a first-class veterinarian. If we are unable to have this tax imposed, a veterinarian should be employed at the expense of The Panama Canal, as it is as important that the population of Panama be afforded wholesome food and milk as it is that they be protected from disease, and it will be impossible to continue much longer the extra work imposed upon our one veterinarian and the sanitary inspector. The municipality has recently commenced the construction of a new slaughterhouse according to plans approved by The Panama Canal and located on the Huerta Sandoval tract.

With the improvement in the quality of the milk supply, an increase in the quantity will follow, which will largely tend to decrease the high rate of infant mortality.

*Stables.*—One stable has been eliminated during the year, and those remaining are in good condition; fly breeding at these has been practically eliminated, owing to the at least biweekly larvaciding of all stalls and areas immediately adjacent thereto, together with the placing of fly paper of our own manufacture in each stall of every stable.

The manure is being regularly deposited either in cans or bins, carried through the streets in covered vehicles to the manure dump, where it is deposited, covered with a few inches of earth, and larvacided twice a day for a period of 10 days; it is held for a period of 90 days and then sold to the gardeners round about for 25 cents gold per small cartload. This price just about covers the cost of handling. Owing to the high cost of commercial fertilizer, the composting of manure by this office is an economic necessity, as without it few vegetables could be had here.

*Markets.*—During the past few months, at the request of the Republic of Panama, the health office has taken over the active handling of the labor in the central market, Panama City. We direct the labor and the Republic pays the bill. This is handled direct with the Panamanian authorities by the health office. It works much more satisfactorily than when the health office had the inspection only of the market, and the market is in much better shape than before. It is our hope and intention to see that the market is thoroughly renovated within the next 12 months. Heretofore the authorities of the Republic have received practically no income from market rentals. The market is now on a paying basis, and some of the income should be expended upon improvements.

*Building inspection.*—A most satisfactory condition prevails in this work. Our building inspector is now engaged in going systematically through the city, square by square, giving the necessary directions as to repairs regarding light and ventilation, and in instances where necessary ordering condemnation of buildings. This is much more satisfactory than the previous method followed, of going from place to place over the city as cases of tuberculosis were reported, which made the follow-up work difficult so that in many instances it was overlooked entirely. Now that the work is being taken up square by square and building by building, the supervision can be easily maintained, it all being practically in one location as the work progresses. The method is for the inspector to examine a building and a letter is then written recommending detailed improvements, which is followed by a personal visit to explain. In no instance have we had any difficulty, either in condemnation or in repair work.

*Garbage collection and street cleaning.*—The street cleaning work has been carried on as in the past; all garbage collections are now made with motor trucks. We have one horse-drawn vehicle, a large wagon, which is kept continuously busy in collecting tin cans and rubbish which can not be incinerated, all of which is carried out to the Pinel slough and covered by the owners of that property without cost to the canal.

From December 1 to 18, 1918, the health officer, Panama, inaugurated what was termed the Philippine method of garbage disposal. This was done most successfully at the old garbage dump at a cost of approximately 30 cents per yard, as against the then cost of approximately \$1.50 per yard for the incineration of garbage at the Gavilan Island incinerator. This method covered swampy places, did away permanently with ditches and therefore the necessity for the upkeep and oiling of same, and was practically odorless and bred no flies, but by orders from the acting governor the method was discontinued. Now all garbage, with the exception of the coarser unburnable material and manure, is hauled to the Gavilan Island incinerator.

*Savanas district.*—Attention is called to the necessity for a thorough sanitation of the Savanas district. During the past fiscal year at least 98 cases of malaria were reported as actually having entered the hospitals from this district; many additional cases existed throughout the district which were never reported.

*Miscellaneous.*—Routine house to house inspections are made, and where necessary the premises are cleaned by our forces, but this is rarely done, as by our system of fines there is little trouble in having the tenants, janitors, and owners attend to the cleaning of their own premises; however, it means continuous work on the part of each inspector and his gang to see that the work is done. During the year house cards have been placed in each building in Panama. These cards are signed every week or 10 days by the inspector, and it can therefore be seen at any time how often the premises have been visited by the inspector, and the date of his last visit. One additional inspector could be well used in the city, giving five sanitary districts, instead of four as at present.

All grass cutting and ditching has been placed under the direction of one inspector, which enables us to keep gangs of men doing this

work continuously busy and not switch them from place to place under a number of inspectors.

During the past year the entire golf club area has been thoroughly sanitized. This was done with the approval of the Governor of The Panama Canal, and entails considerable extra work, although it has not been necessary to hire additional labor for this work.

During the year 258,455 square yards of oiling of pools was done, as compared with 2,238,881 square yards during the previous year. To accomplish this improvement, 6,300 linear yards of new ditches were constructed, and many small fills made. During the past year there were 81,869 water containers treated or destroyed, 3,689 mosquito breeding places destroyed, 2,546 fly breeding places destroyed, 11,491 rats caught, 421 acres of grass cut, 876 fines imposed for violation of sanitary regulations, and 4,279 notices served to abate nuisances. The 876 fines imposed shows quite an increase over 277 for the previous year, and 159 in the fiscal year 1917.

#### COLON-CRISTOBAL HEALTH OFFICE.

*Tuberculosis.*—There were 96 deaths from tuberculosis, compared with 117 last year, and 100 the year before. The prevalence of tuberculosis will no doubt remain high until the living and economic conditions are improved among the laboring people of Colon.

*Smallpox.*—Twelve cases occurred in Colon during the year, the focus of infections being probably some place in the interior, the same as at Panama, as smallpox is invariably present in the interior.

*Meat inspection.*—The usual high standard of meat inspection was continued at the Cristobal abattoir, with several changes. Head inspection will be started as soon as killing is begun in the new abattoir at Mount Hope. Meat inspection, ante and post mortem, is being instituted with the fiscal year just beginning, at the Colon abattoir, where the meat supply for the residents of Colon is obtained.

*Garbage disposal.*—A rail incinerator was recently constructed at Mount Hope, and the combustion was excellent. However, it was too small, and the contemplated additional unit was not added as we were compelled to abandon it on account of the bad road to same. Until the new incinerator is erected, we have gone back to the former method of dumping near the outskirts of Colon and burning as best we can.

*Malaria.*—Reference has been made under Zone sanitation to the increase in the malaria rate of Colon-Cristobal, which occurred suddenly the latter part of June. The greater number of these cases were among employees residing in Camp Bierd and the Folks River section. Many of these work on night shifts at the coaling station, dry dock, cold storage plant, and docks and piers.

The mosquito catch in quarters at Camp Bierd and vicinity suddenly jumped from a catch of 24 *Anopheles* on May 23, to a catch of 251 on May 25, 1919, showing that we had a large flight of *Anopheles* from the Telfer's Island and Mount Hope swamps at this time. The malarial incidence shows a similar sudden rise just one month following this rise in the mosquito catch.

The principal cause for this unusual rise in the malaria incidence was probably due to the large number of malaria carriers present

among the 1,500 new employees at the docks who were recruited from the interior of Panama during the recent strike at the docks and coaling station, together with the large flight of *Anopheles* mosquitoes that occurred during May from the Telfers Island and Mount Hope swamps. The high malaria rate at France Field and Coco Solo was probably another contributing cause, as the swamps in the vicinity of those places are breeding *Anopheles* and are only about 1 mile from Colon; large flights of mosquitoes from these swamps came into this district during the first part of June, and as many of these mosquitoes were probably already infected from the cases at Coco Solo and France Field, they readily carried the infection throughout Colon and Cristobal.

The Telfers Island swamp is one-half mile south of the coaling station, and as it is the nearest prolific *Anopheles* breeding area about Camp Bird and the coaling station, it is probably responsible for most of the malaria among the people at these places.

There are several other large swamps within less than 1 mile of Mount Hope in which *Anopheles* breeding abounds, and they have probably contributed their portion of mosquitoes to the many flights.

Provision has been made to put sea level ditches through Telfers Island and the swamps around Mount Hope. The presence of cattle in the wet pastures of the latter area greatly magnifies the difficulty of draining, and these will have to be removed to a safe distance beyond the inhabited section. The sanitary inspector of the Army is attempting to ditch the Coco Solo or Margarita road swamp, with considerable promise of success.

It is probable that ideal conditions can not be obtained in these areas without extensive fills being made, the cost of which is at present prohibitive. The sea level system of ditching, while satisfactory as a rule, requires considerable maintenance work to develop its maximum efficiency.

The following table shows the place of infection of all malaria cases reported during the year:

Place of infection.	Employees.		Nonemployees.		Total.	
	Number of cases.	Annual rate per thousand.	Number of cases.	Annual rate per thousand.	Number of cases.	Annual rate per thousand.
Sanitized areas of the Canal Zone.....	184	19.58	779	37.18	963	31.73
Pasture camps and plantations.....	292	240.53	<sup>1</sup> 35	.....	327	269.36
Other areas outside sanitized districts in the Zone <sup>2</sup> .....	21	.....	90	.....	111	.....
Colon.....	36	5.14	63	3.30	99	3.80
Panama.....	32	4.00	110	2.06	142	2.31
Areas outside the Zone and the terminal cities <sup>3</sup> .....	32	.....	550	.....	582	.....
Total.....	597	23.31	1,627	17.42	2,224	18.69

<sup>1</sup> Patients not working at the time admitted to hospital, but whose infection was probably received at the pasture camps or plantations.

<sup>2</sup> There are practically no residents in these areas. All cases received were from residents of the Zone or terminal cities, who received their infection while hunting, riding, etc.

<sup>3</sup> These cases are from interior towns, other countries, steamships, etc.

## QUARANTINE.

During the fiscal year the quarantine situation has improved in regard to yellow fever, the number of cases reported from near-by

countries having decreased remarkably. Practically all ports in Colombia, Venezuela, Ecuador, and the Pacific coast of South America are still under suspicion, however, and fumigation at port of departure and quarantine of six days from date of departure has been maintained. There were 2,299 passengers from suspected yellow-fever ports held at Balboa and 2,070 at Colon—a total of 4,369. These passengers were detained 9,051 days. In addition all transit passengers from these ports and members of the crew were detained on board ship if six days had not expired. No cases of yellow fever occurred in quarantine, but one case was detected upon the arrival of a steamer from Guayaquil.

The plague situation is unchanged. Ports of Ecuador, Chile, Peru, and Venezuela are considered as harboring the infection among rats, and human cases of plague have been reported from time to time. The practice of quarantining persons until seven days had expired since leaving plague-infected ports was discontinued on May 1, 1919; from July 1, 1918, to that time 724 passengers had been quarantined on this account a total of 927 days, in addition to transit passengers held on board ship.

The fumigation of vessels for the destruction of rats was changed on April 1, 1919. This was previously done before sailing from Callao, Guayaquil, and other ports, and again just before arrival at Balboa. Examinations made after such fumigations failed to show dead rats. The present procedure is to fumigate every three months every vessel from the west coast which makes Cristobal its terminal port. Vessels must be entirely empty and have all dead spaces opened up prior to fumigation. During April, May, and June 20 vessels were so fumigated and 1,922 rats recovered.

Typhus fever is reported at present in three South American as well as many European ports, but no passengers have been detained on this account. It has been considered sufficient to rely on a careful examination and the fact that body lice are practically non-existent on the Canal Zone.

Influenza, which swept over the world during the close of 1918, touched this region but lightly. We may doubtless attribute this in part to a special quarantine against this disease that was put into effect November 1, 1918.

On April 1, 1919, the hours of quarantine inspection at Cristobal were extended from sunset to 10 p. m., which has greatly benefited shipping and prevented the mooring congestion at the locks and coal piers.

In concluding this report I desire to commend the personnel of the health department for the results accomplished during the year. This department, no less than other branches of the Government, felt the effects of the World War in diminished personnel, lack of many necessary medical and surgical supplies, and restricted food supplies. That our employees responded to the needs of the situation is evidenced by hospital statistics which show that patients were properly and efficiently cared for, and by the continuation of the general excellent sanitary conditions of the Zone and terminal cities. Our employees subscribed liberally to Liberty loans and war savings stamps, as well as to the many calls for relief funds. Many doctors,

nurses, sanitary inspectors, and other employees entered into active Army or Navy service.

Respectfully submitted.

H. C. FISHER,  
Chief Health Officer.

Col. CHESTER HARDING, *United States Army,*  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

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THE CHIEF HEALTH OFFICER.

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TABLE I.—DISCHARGES, DEATHS, AND NONEFFECTIVE RATES FOR EMPLOYEES.  
ABSOLUTE NUMBERS.

Color.	Average number of employees.	Discharges and deaths from hospitals.			Deaths.			Noneffective from sickness.	
		Total.	Dis-eases.	Exter-nal causes.	Total.	Dis-ease.	Exter-nal causes.	Days treated.	Constantly noneffective.
Year 1918-19:									
White.....	4,475	1,161	1,068	93	10	9	1	27,413	76.15
Colored.....	21,135	3,596	3,049	547	160	144	16	96,919	265.53
Total.....	25,610	4,757	4,117	640	170	153	17	124,332	341.68
Year 1917-18:									
White.....	4,648	1,437	1,265	172	28	22	6	28,172	77.27
Colored.....	24,290	3,672	2,870	802	202	173	29	81,819	224.22
Total.....	28,938	5,109	4,135	974	230	195	35	109,991	301.49

TABLE I.—DISCHARGES, DEATHS, AND NONEFFECTIVE RATES FOR EMPLOYEES—  
Continued.

PROPORTIONATE NUMBERS.

Year 1918-19:									
White .....	4,475	259.78	239.03	20.78	2.21	1.99	0.21		17.01
Colored.....	21,135	169.05	144.26	25.80	7.63	6.88	.75		12.56
Total.....	25,610	185.74	160.76	24.90	6.66	6.02	.66		13.34
Year 1917-18:									
White .....	4,648	309.17	272.16	37.01	6.02	4.73	1.29		16.62
Colored.....	24,290	151.17	118.16	33.02	8.32	7.12	1.19		9.23
Total.....	28,938	176.55	142.89	33.66	7.95	6.74	1.21		10.42

TABLE I-A.—DEATHS IN THE CANAL ZONE AND THE CITIES OF PANAMA AND COLON.

	Average popula- tion.	Deaths.			Annual average per 1,000.		
		Total.	Disease.	External causes.	Total.	Disease.	External causes.
Year 1918-19:							
Panama.....	61,369	1,377	1,341	36	22.43	21.85	0.60
Colon.....	26,078	636	607	29	24.38	23.02	1.16
Canal Zone.....	21,707	218	204	14	10.05	9.40	.64
Total.....	109,154	2,231	2,153	79	20.44	19.71	.72
Year 1917-18:							
Panama.....	61,369	1,523	1,484	39	24.82	24.18	.64
Colon.....	26,078	678	651	27	26.00	24.96	1.04
Canal Zone.....	24,038	286	255	31	11.88	10.59	1.29
Total.....	111,565	2,487	2,390	97	22.21	21.43	.87







<i>Diseases of the skin and of the cellular tissue.</i>																			
Carbuncle.....	1	1												1					
Acute abscess.....	1	1												1					
Empygm contagiosa.....	1	1												1					
<i>Malformations.</i>																			
Congenital malformations.....	4	5	3	1				1	1	1				7	2				
<i>Diseases of early infancy.</i>																			
Newborn child.....	6	5		1										10					
Congenital debility, icterus and sclerema.....	4	4		2										4	2				
Premature birth.....	20	20	2	38	1			1						22	14				
Congenital debility.....	12	9	2	19	4			1	2					14	7				
Malnutrition.....	28	25	1	52	1			6	8	2	3	4	5	32	9				
Other causes peculiar to early infancy (including various consequences of labor).....	12	7	3	16	19									13	6				
Other accidents of labor.....	1	1		1										1					
<i>Affections produced by external causes.</i>																			
Acute poisonings.....	2			2					1					2					
Conflagration.....	1	1		1										1	1				
Burns (conflagration excepted).....	1	1		2					1					1	1				
Other external violence.....	2			2										2					
<i>Ill-defined diseases.</i>																			
Cause of death not specified or ill-defined.....	4	3		7	1									6					
Infections of undetermined origin.....	1			1										1	1				
Total.....	302	274	32	544	121	30	42	54	42	34	25	36	40	42	38	375	146	55	576

TABLE III.—DEATHS BY NATIONALITY OR NATIVITY.

Country.	Em- ployees.	Nonem- ployees.	Total.	Country.	Em- ployees.	Nonem- ployees.	Total.
Antigua.....	6	20	26	Ireland.....		6	6
Antilles.....	1	1	2	Italy.....		10	10
Argentina.....		1	1	Jamaica.....	46	521	567
Austria.....		1	1	Martinique.....	5	56	61
Barbados.....	46	343	389	Mexico.....		5	5
Bavaria.....	1		1	Montserrat.....	3	11	14
Bermuda.....		2	2	Nicaragua.....	2	7	9
Bocas del Toro.....		1	1	Panama.....	8	640	648
Chile.....	1	4	5	Persia.....		1	1
China.....		36	36	Peru.....	3	18	21
Colombia.....	10	113	123	Porto Rico.....		5	5
Costa Rica.....	1	7	8	Scotland.....		1	1
Cuba.....		6	6	St. Andrews.....		1	1
Demerara.....		8	8	St. Kitts.....	1	1	2
Dominica.....	1	4	5	St. Lucia.....	4	38	42
Ecuador.....		4	4	St. Thomas.....	2	6	8
England.....		5	5	St. Vincent.....	4	10	14
Fortune Island.....	3	2	5	Santo Domingo.....		1	1
France.....		8	8	Spain.....	1	20	21
Germany.....		1	1	Trinidad.....	2	31	33
Greece.....		8	8	United States.....	7	26	33
Grenada.....	4	25	29	Venezuela.....		14	14
Guadeloupe.....	5	13	19	Veraguas.....		1	1
Guatemala.....		1	1	Virgin Islands.....		2	2
Guiana, British.....	1	7	8	Unknown.....		5	5
Haiti.....	2	2	4				
Honduras.....		1	1	Total.....	170	2,061	2,231



TABLE IV.—DEATHS OF EMPLOYEES, BY COLOR, AGE, AND LENGTH OF RESIDENCE ON ISTHMUS—Continued.

	Color.		Age (in years).										Length of residence on Isthmus (in years).										Un- known.	Total.					
			W. B.					D.					Un- known.					Life.											
	15- 20	21- 25	26- 30	31- 35	36- 40	41- 45	46- 50	51- 55	56- 60	61- 65	66- 70	71- 75	Un- known.	-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8- 10	10- 15	15- Life.	Un- known.	Total.			
EXTERNAL CAUSES.																													
Drowning, accidental.....	1	3	1	2					1																				
Homicide by cutting or piercing instruments.....			1	1												1													
Homicide by other means.....		1		1																									
Poisoning, acute.....		1		1																									
Starvation.....				2	1																								
Traumatism by crushing.....		1		1														2											
Traumatism by fall.....		1		1																									
Traumatism by machines.....		1		1																									
Traumatism by railroad.....		1		1																									
Total.....	10	160	5	18	36	25	29	17	22	8	4	2	4	2	4	5	2	4	5	10	9	11	8	17	52	11	9	27	170

TABLE V.—STATISTICS RE AMERICAN EMPLOYEES AND THEIR FAMILIES.

	Annual average per 1,000.
White employees from the United States:	
Disease.....	2.35
External causes.....	1.02
Total.....	3.37
White women and children from the United States:	
Disease.....	4.65
External causes.....	.52
Total.....	5.08
White employees and their families from the United States:	
Disease.....	3.89
External causes.....	.69
Total.....	4.58

TABLE VI.—CONSOLIDATED HOSPITAL REPORT.

[A=White Americans; F=White foreigners; B=Black.]

	Remaining July 1, 1918.			Admitted.			Died.			Discharged.			Transferred.			Remaining June 30, 1919.		
	A	F	B	A	F	B	A	F	B	A	F	B	A	F	B	A	F	B
		15	11	148	759	188	3,150	5	3	118	737	182	2,964	1	2	46	31	12
Ancon Hospital:	92			3,762			21			3,745			32			56		
Employees.....																		
Soldiers.....																		
Panama pay patients.....	39	22	49	1,375	750	1,673	15	25	137	1,358	710	1,470	2	4	33	39	33	76
Other pay patients.....	8	2	16	216	69	513	1	5	26	213	58	447	1	5	40	9	3	16
Charity patients.....																		
Total.....	154	35	213	6,112	1,007	5,342	42	33	282	6,053	950	4,887	36	11	124	135	48	262
Corozal Hospital (insane):																		
Employees.....	1	2	8	2		18	1		1	1	1	5			1	1	1	19
Soldiers.....	9			37						45			1					
Panama pay patients.....	3	51	209	81	31	21		11	39		18	32			3	3	53	216
Other pay patients.....		5	4	1	3	21			6		1	4					4	12
Charity patients.....	1	10	71	1	3	27			11		2	16					10	71
Total.....	14	68	292	41	37	147	1	11	57	49	26	60	1		4	4	68	318
Grand total.....	168	103	505	6,153	1,044	5,489	43	44	339	6,102	976	4,947	37	11	128	139	116	580
Corozal farm (orriples): Employees.....		8	43		7	25					6	23					9	45
Chronic ward: Charity patients.....			28			9						2						29
Colon Hospital:																		
Employees.....	3		17	210	45	611			16	194	37	403	13	7	104	6	1	15
Soldiers.....	7	1		393	75	1	17			315	60	1	62	14		6	2	
Panama pay patients.....				14	118			2	13	1	10	62			43			1
Other pay patients.....	8	7	14	* 361	265	379	5	8	33	314	189	295	39	70	57	11	5	8
Charity patients.....	2		1	80	14	62		1		71	11	39	7	2	18	4		
Total.....	20	8	33	1,045	413	1,171	22	11	68	895	307	890	121	95	222	27	8	24





TABLE VII.—CONSOLIDATED REPORT OF EMPLOYEES TREATED IN QUARTERS.

Stations.	Remaining July 1, 1918.		Admitted.		Died.		Discharged.		Transferred.		Remaining June 30, 1919.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
Aneon.....	1	.....	1,196	536	.....	.....	1,169	500	24	28	4	8
Balboa.....	3	.....	1,997	105	.....	.....	1,981	71	16	33	3	1
Pedro Miguel.....	.....	.....	201	66	.....	.....	192	61	7	2	2	3
Gamboa.....	.....	.....	.....	3	.....	.....	.....	3	.....	.....	.....	.....
Gatun.....	.....	.....	178	158	.....	.....	135	128	41	25	.....	3
Cristobal.....	2	45	990	2,017	.....	.....	987	2,008	3	22	2	32
Total.....	6	46	4,562	2,885	.....	.....	4,464	2,771	91	113	13	47

Gamboa dispensary closed, effective August 1, 1918.

TABLE VII-A.—CONSOLIDATED REPORT OF DAYS LOST IN QUARTERS.

Stations.	White	Colored	Total.
Aneon.....	2,559	1,933	4,492
Balboa.....	5,145	451	5,596
Pedro Miguel.....	570	168	738
Gamboa.....	.....	4	4
Gatun.....	489	1,308	1,797
Colon.....	3,009	19,452	22,461
Total.....	11,772	23,316	35,088

TABLE VIII.—CONSOLIDATED HOSPITAL AND EMPLOYEES TREATED IN QUARTERS REPORT.

	Remain- ing July 1, 1918.		Admitted.		Died.		Discharged.		Trans-ferred.		Remain- ing June 30, 1919.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
Hospitals.....	40	216	1,211	3,804	9	135	1,158	3,485	23	151	61	249
Quarters.....	6	46	4,562	2,885	.....	.....	4,464	2,771	91	113	13	47
Total.....	46	262	5,773	6,689	9	135	5,622	6,256	114	264	74	296

	White.	Colored.	Total.
Total admissions to hospitals, excluding Corozal farm and chronic ward....	8,977	6,679	15,656
Total admissions of employees to quarters.....	4,562	2,885	7,447
Total admissions to hospitals and quarters.....	13,539	9,564	23,103
Less number of patients transferred from quarters to hospitals and between hospitals, whose admissions are duplicated in above figures.....	361	467	828
Net admissions to hospitals and quarters.....	13,178	9,097	22,275
Total admissions of employees to quarters.....	4,562	2,885	7,447
Total admissions of employees to hospitals.....	1,206	3,794	5,000
Total admissions of employees.....	5,768	6,679	12,447
Less number transferred between hospitals, etc.....	114	261	375
Net admissions of employees to hospitals and quarters.....	5,654	6,418	12,072
Annual average per 1,000 admissions of employees.....	1,266.07	300.33	469.72

TABLE VIII-A.—CONSOLIDATED DISPENSARY REPORT OF ALL CASES TREATED BUT NOT EXCUSED.

Stations.	Employees.			Nonemployees.			Total.		
	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.
Aneon.....	10,011	46,574	56,585	12,250	18,832	31,082	22,261	65,406	87,667
Balboa.....	49,832	25,989	75,821	35,441	13,321	48,762	85,273	39,310	124,583
Pedro Miguel.....	19,971	27,293	47,264	17,464	18,558	36,022	37,435	45,851	83,286
Gamboa.....	31	331	362	13	431	444	44	762	80
Gatun.....	4,297	10,900	15,197	5,208	6,201	11,409	9,505	17,101	26,606
Cristobal.....	12,107	42,822	54,989	13,788	17,917	31,735	25,895	60,829	86,724
	96,249	153,969	250,218	84,164	75,290	159,454	180,413	229,259	409,672

Gamboa dispensary closed, effective August 1, 1918.

TABLE IX.—AVERAGE NUMBER OF EMPLOYEES CONSTANTLY SICK IN HOSPITAL AND QUARTERS.

	White.	Colored.	Total.
HOSPITALS.			
Aneon Hospital.....	35.47	175.52	210.99
Colon Hospital.....	5.68	19.04	24.72
Palo Seco Leper Asylum.....			
Total.....	41.15	194.56	235.71
QUARTERS.			
Aneon.....	5.53	5.37	10.90
Balboa.....	10.69	1.85	12.54
Pedro Miguel.....	1.74	.79	2.53
Gamboa.....		.33	.33
Gatun.....	1.60	5.04	6.64
Cristobal.....	7.40	47.02	54.42
Total.....	26.96	60.40	87.36

TABLE IX-A.—AVERAGE NUMBER OF EMPLOYEES CONSTANTLY SICK.

	White.	Colored.	Total.
Hospitals.....	41.14	194.58	235.72
Quarters.....	25.79	58.12	83.91
Total.....	66.93	252.70	319.63

TABLE IX-B.—AVERAGE NUMBER OF EMPLOYEES CONSTANTLY SICK PER 1,000.

	White.	Colored.	Total.
Hospitals.....	9.60	9.52	9.53
Quarters.....	5.87	2.79	3.33
Total.....	15.47	12.31	12.86

TABLE X.—AVERAGE NUMBER OF DAYS' STAY IN HOSPITALS OR QUARTERS FOR EACH ADMISSION OF SICK EMPLOYEES.

		White.	Colored.	Total.
HOSPITALS.				
Ancon Hospital.....		11.91	18.08	16.57
Colon Hospital.....		9.82	11.14	10.16
QUARTERS.				
Dispensary carried by—				
Ancon.....		2.25	2.14	2.69
Balboa.....		2.57	4.79	2.66
Pedro Miguel.....		2.92	2.10	2.91
Gamboa.....			.33	.33
Gatun.....		2.80	8.42	7.66
Colon.....		3.11	12.02	8.80

TABLE XI.—SURGICAL OPERATIONS PERFORMED.

	Ancon Hospital.		Colon Hospital.		Total.	
	Number.	Died.	Number.	Died.	Number.	Died.
Amputations:						
Foot.....	1				1	
Hand.....			1		1	
Thigh.....	2		3	2	5	2
Leg.....	6		1		7	
Digits, single.....	8				8	
Digits, multiple.....	13		4		17	
Operations on bones:						
Craniectomy, decompressive.....	3		11	5	14	5
Resection of hip.....			2		2	
Wiring of fractures, simple.....	14		2		16	
Wiring of fractures, compound.....	2				2	
Plating of fractures, compound.....	1				1	
Lane plate, femur.....			3		3	
Lane plate, tibia.....			1		1	
Lane plate, humerus.....			1		1	
Lane plate, ulna.....			1		1	
Laminectomy.....			1	1	1	1
Osteotomy.....	4		6		10	
Anthrotomy of knee.....	1				1	
Bone transplantation.....	5				5	
Excision of maxilla.....	1				1	
Resection of elbow.....	2				2	
Nailing of fractures, simple.....	3		1		4	
Arthroplasty.....	1		1		2	
Dislocations:						
Reduction of humerus.....	1				1	
Reduction of forearm.....	3				3	
Reduction of Pott's fracture.....	1				1	
Dislocation of elbow.....	1				1	
Dislocation of shoulder.....	1				1	
Open reduction of metacarpal.....	1				1	
Adenectomy:						
Cervical.....	8		3		11	
Inguinal, single.....	174		39		213	
Inguinal, double.....	34		7		41	
Femoral.....	17				17	
Axillary.....	2				2	
Herniotomy:						
Inguinal, single.....	215	2	142		357	2
Inguinal, double.....	48		46		94	
Ventral.....	13		7		20	
Strangulated.....	3	1	2		5	1
Femoral.....	1		2		3	
Genito-urinary tract:						
Nephropexy.....	1				1	
Cystotomy.....	1		3		4	
Urethrotomy, internal.....	5				5	
Urethrotomy, external.....	20				20	
Varicocele, radical cure.....	45		38		83	
Hydrocele, single, radical cure.....	95		80		175	
Hydrocele, double, radical cure.....	11		3		14	
Orchidectomy.....	6		6		12	
Epididymotomy.....	48				48	
Amputation of scrotum.....	25				25	
Curettagc uteri.....	198		12		210	
Perineoplasty.....	22		8		30	
Trachelorrhaphy.....	3		9		12	
Vaginal section.....						
Circumcision.....	277				277	
Nephrotomy.....	4				4	
Nephrectomy.....	2				2	
Prostatectomy.....	3		1		4	

TABLE XI.—SURGICAL OPERATIONS PERFORMED—Continued.

	Ancon Hospital.		Colon Hospital.		Total.	
	Number.	Died.	Number.	Died.	Number.	Died.
<b>Obstetrical:</b>						
Cesarian section, abdominal.....	5		2	2	7	2
Cesarian section, vaginal.....	1				1	
Low forceps.....	8		6		14	
Version.....	1		8		9	
Perineorrhaphy.....	23				23	
Accouchement, forceps.....	5		1		6	
Breech extraction.....	2		2		4	
High forceps.....			1		1	
Placenta praevia.....			2	1	2	1
Precipitate of twins, with adherent placentas, gas bacillus.....			1	1	1	1
<b>Thorax:</b>						
Excision of breast.....	1		2		3	
Thoracotomy.....	5		1	1	6	1
<b>Rectum:</b>						
Hemorrhoids, radical cure.....	124		17		141	
Fistula in ano, excision of.....	12		9		21	
Prolapse of rectum, radical excision.....	1		4		5	
<b>General:</b>						
Thyroidectomy.....	12				12	
Varicose veins, excision of.....	18		12		30	
Myorrhaphy.....	1				1	
Excision of surface neoplasms.....	21		8		29	
Stab wounds of soft parts, operation for.....	2	1	8	3	10	4
Extensive injuries to soft parts, operation for.....	7	1	1		8	1
Plastic operation for congenital defects.....	5	1	1		6	
Plastic operation for effects of disease.....	3		26	1	29	1
Plastic operation for severe injuries.....	1		5	1	6	1
Skin graft.....	4		5	5	9	5
Gunshot wounds of soft parts, operation for.....	5		4		9	
Tenorrhaphy.....	4				4	
Nerve stretching.....	2				2	
General peritonitis (traumatic of appendi- ceal).....	2	1	1	1	3	2
Tuberculous peritonitis.....			1		1	
Intestinal obstruction.....			1		1	
Excision of lower hip.....			1		1	
Plastic tatoo.....	1				1	
<b>Laparotomy:</b>						
General peritonitis (not traumatic of appen- diceal).....	2		4	2	6	2
Tuberculous peritonitis.....	2		2		4	
Intestinal obstruction.....	1		2	2	3	2
Exploratory.....	12	1	6		18	1
Gasto-enterostomy.....	9		4	1	13	1
Enterectomy.....	1		1		2	
Appendectomy.....	137		126		263	
Appendectomy, with local peritonitis.....	20	1	13		33	1
Appendectomy, with general peritonitis.....	7	3	20	2	27	5
Cholecystotomy.....	6		3		9	
Abscess of liver, laparo-hepatotomy.....	6	3	3		9	3
Abscess of liver, thoraco-hepatotomy.....	6	1	1		7	1
Pan-hysterostomy.....	3		4		7	
Splenectomy.....	2	2			2	2
Supravaginal hysterectomy.....	58	2	43		101	2
Hysteromyomectomy.....	18		7	1	25	1
Salpingo-ophorectomy.....	20		51	1	71	1
Ovarian cystectomy.....	10		18		28	
Oophorectomy.....	2		21		23	
Suspensio-uteri.....	60		73		133	
Ectopic gestation.....	3		1		4	
General peritonitis.....	2	1			2	1
Rupture of liver.....	1				1	
Major operations, various others.....	27				27	
Minor operations, various.....	2,010		97		2,107	
Entero-enterostomy.....	2				2	
Colostomy.....	1	1			1	1
Cholecystectomy.....	6		1		7	
Salpingectomy, single.....	4		6		10	
Salpingectomy, double.....			41		41	
Gunshot wound of abdomen.....			1	1	1	1
Stab wound of abdomen.....			2		2	
<b>Arsphenamine, intravenous.....</b>						
	1,798				1,798	
Cauterization of chancrels.....	47				47	
Excision of tatoo marks.....	13				13	
Excision of bunions.....	4				4	
<b>Total.....</b>	<b>5,932</b>	<b>21</b>	<b>1,128</b>	<b>34</b>	<b>7,060</b>	<b>55</b>

TABLE XII.—REPORT OF EYE AND EAR DEPARTMENTS—ANCON HOSPITAL.

Operations performed.	Number.	Operations performed.	Number.
Adenoidectomy.....	238	Operation maxillary sinus.....	1
Cataract, extraction.....	12	Paracentesis.....	51
Cautery, turbinate.....	15	Pterygium.....	52
Cautery, inner side left cheek.....	2	Plastic on eyelid.....	5
Chalazion, curettément of.....	33	Plastic on nose.....	1
Emulceation.....	5	Polyp of larynx, removal of.....	1
Expression of eye.....	2	Polyyps, nasal, removal of.....	8
Foreign bodies, removal of.....	8	Phinoplasty.....	9
Incision and drainage, abscess epiglottis.....	1	Removal of lacrymal gland.....	1
Incision and drainage of peri-tonsililar abscess.....	35	Skin graft on nose.....	2
Incision and drainage, furnicle ear.....	4	Spur, nasal, removal of.....	5
Incision and drainage, abscess of ear.....	3	Submucous resection.....	73
Iridectomy.....	3	Tonsillectomy.....	470
Lacrymal sac, removal of.....	1	Turbinectomy.....	34
Mastoidectomy.....	22	Total.....	1,120
Needling of eye.....	22	Refractions.....	1,407
Aural polyp, removal of.....	1		

TABLE XIII.—WARD LABORATORY REPORTS.

	Ancon Hospital.	Colon Hospital.		Ancon Hospital.	Colon Hospital.
Blood examinations (total number).....	9,616	1,090	Urine examinations (total number)—Continued.....		
Estivo-autumnal.....	733	163	Casts.....	3,985	337
Crescents.....	14		Granular casts.....		16
Quartan.....	15		Hayline casts.....		11
Tertian.....	248	42	Diabetic.....	1	
Differential counts.....	346	69	Epithelia.....	4,276	8
Hemoglobin estimations.....	4,437	11	Guaiaac tests.....	115	
White blood counts.....	995	201	Indican.....	760	3
Red blood counts.....	145	5	Pus and blood.....	7,974	59
Mixed.....	1		Sugar.....	4,120	22
Filaria.....	17		Ciliated monads.....	55	
Spirocheta obermeyerii.....		2	Red blood cells.....	18	8
Stool examinations (total number).....	9,582	110	Pus.....		660
Ameba.....	135	2	Mucus and pus.....		25
Cercomonas intestinalis.....	3		Blood.....		4
Ciliated monads.....	136		Blood and blood casts.....		5
Entameba (histolytica and tetragena).....	15		Phosphates.....		7
Guaiaac tests.....	107		Hemin crystals.....	48	
Pus and blood.....	420		Sediment.....		61
Ascaris lumbricoides.....	199		Trichomonas vaginalis.....	4	
Strongyloides.....	308	1	Sputum examinations (total number).....	6,232	85
Tinea saginata.....	19		Positive for tubercle bacilli.....	420	13
Tricocephalus dispar.....	750	4	Smear examinations (total number).....	1,030	9
Uncinaria (ova).....	917		Urethral.....	480	
Bilharzia.....	19		Vaginal.....	191	
Balantidium coli.....	1		Functional kidney test.....	3	
Mucus and blood.....	26		Spinal fluid.....	417	
Urine examinations (total number).....	23,253	2,925	Prostatic fluid.....	8	
Acetone.....	1	20	Eye.....	15	
Albumen.....	5,353	452	Nasal.....	21	
Bile.....	127		Smear from foot.....	1	

TABLE XIV.—SANTO TOMAS HOSPITAL, PANAMA CITY.

	Remain- ing July 1, 1918.	Admit- ted.	Died.	Dis- charged.	Remain- ing June 30, 1919.
Pay patients.....	31	937	35	916	17
Charity patients.....	386	8,653	811	7,881	347
Total.....	417	9,590	846	8,797	364

Average number of days' treatment per patient.....	11
Average number of patients constantly sick.....	474
Number of days relief furnished patients.....	173,432
Cost of subsistence per patient per day.....	\$0.33

TABLE XIV.—SANTO TOMAS HOSPITAL, PANAMA CITY—Continued.  
SURGICAL OPERATIONS.

	Number.		Number.
<b>Amputations:</b>		<b>Rectum:</b>	
Thigh.....	1	Hemorrhoids, radical cure.....	88
Digits, multiple.....	14	Fistula in ano, excision of.....	17
Leg.....	1	<b>General:</b>	
Hand.....	4	Tyrholddectomy.....	3
Foot.....	2	Tenorrhaphy.....	1
<b>Operations on bones:</b>		Varicose veins, excision of.....	1
Resection of ankle.....	1	Skin graft.....	35
Laminectomy.....	1	Gunshot wounds of soft parts.....	1
Ostectomy.....	1	Plastic operation for severe injury.....	1
<b>Adenectomy:</b>		For intestinal obstruction.....	3
Inguinal, single.....	69	<b>Laparotomy:</b>	
Inguinal, double.....	21	Exploratory.....	17
Cervical.....	6	For tuberculous peritonitis.....	1
Femoral.....	1	Appendectomy.....	144
<b>Herniotomy:</b>		Appendectomy with local peritonitis.....	1
Inguinal, single.....	61	Appendectomy with general peritonitis.....	2
Inguinal, double.....	9	Cholecystotomy.....	13
Ventral.....	5	Abscess of liver, laparo-hepatotomy.....	8
Strangulated.....	5	Splenectomy.....	7
<b>Genito-urinary tract:</b>		Pan-hysterectomy.....	90
Urethrotomy, internal.....	31	Supravaginal hysterectomy.....	57
Urethrotomy, external.....	13	Salpingectomy, single.....	74
Variocoele, radical cure.....	3	Salpingectomy, double.....	36
Hydrocoeel, single, radical cure.....	14	Salpingo-oophorectomy.....	132
Hydrocoeel, double, radical cure.....	1	Gastro enterostomy.....	4
Amputation of scrotum.....	3	Oophorectomy.....	64
Amputation of penis.....	1	Suspensio-uteri.....	77
Curettage uteri.....	51	Hysteromyectomy.....	12
Orchidectomy.....	6	Major operations, various others.....	15
Hephotomy.....	2	Minor operations, various others.....	494
Vaginal section.....	4	Circumcision.....	222
Cystotomy.....	2		
Perineoplasty.....	2	<b>Total.....</b>	<b>1,961</b>
Trachelorrhaphy.....	3		
<b>Thorax:</b>			
Thoracotomy.....	1		
Excision of breast.....	2		

TABLE XV.—REPORT OF BOARD OF HEALTH LABORATORY.

	Number.		Number.
<b>Bacteriological examinations:</b>		<b>Bacteriological examinations—Contd.</b>	
Autogenous vaccines prepared.....	50	Smears examined for gonococci.....	6
Blood agglutinations.....	16	Milk examinations—	
Blood cultures.....	140	Corozal Hospital farm.....	105
Blood smears examined for malarial parasites.....	517	Miscellaneous milks.....	2
Blood smears for differential, count.....	5	Mindí farm dairy.....	91
Blood smears examined for anemia.....	2	Panama dairies, bacteriological count.....	111
Cultures from tonsils.....	41	Vincent's angina examinations.....	5
Dark field examination for spirocheta pallida.....	18	Vaginal smears.....	5
Smears examined for leprosy.....	14	Leper suspect.....	1
Smears examined for leprosy at Palo Seco Asylum.....	101	Blood smears examined for piroplasm.....	4
Smears examined for Rigg's disease.....	1	Conjunctival smears.....	41
Miscellaneous smears.....	25	Examinations for yaws.....	1
Naso pharyngeal smears.....	206	Pus smears—miscellaneous.....	9
Pleural fluid, cultured.....	1	Cultures of stools from food handlers.....	595
Skin lesions examined.....	85	Blood smears examined for relapsing fever.....	1
Spinal fluids, cultured.....	27	Culture from ulcer.....	2
Sputum cultures.....	126	Typhoid vaccinations.....	3
Sputum examined for tuberculosis.....	674	Smallpox vaccinations.....	7
Stools, cultures.....	22	Knee fluid cultures.....	3
Stools, examined for ameba.....	152	<b>Pathological examinations:</b>	
Stools examined for intestinal parasites.....	10	Tissues prepared.....	842
Synovial fluid.....	2	Autopsies performed, human.....	212
Plural effusions.....	1	Autopsies performed, animal.....	6
Chest fluid cultures.....	688	Autopsies performed, fowl.....	12
Throat cultures.....	35	Rats examined.....	13,623
Throat smears, examined for Vincent's angina.....	1,231	<b>General:</b>	
Urines cultured.....	32	Wasserman reactions.....	11,953
Urethral smears.....	13	Cattle ears examined for anthrax.....	4
Autopsy specimens.....	3	Examination of blood of native cattle for trypanosomes.....	3
Blood smears examined for filaria.....		Imported cattle injected with blood of native animals for tick fever immunization.....	43

TABLE XV.—REPORT OF BOARD OF HEALTH LABORATORY—Continued.

	Number.		Number.
General—Continued.		Chemical examinations—Continued.	
Examinations of cattle blood for piroplasmata after immunization..	43	Milk.....	105
Blood smears from army mules.....	2	Milk, Borden's Eagle Brand.....	1
Examination of cattle spleen for anthrax.....	53	Milk, Sheffield.....	19
Ear of horse examined for anthrax.....	1	Milk, Corozal dairy.....	5
For murrina.....	3	Milk, mother's (complete analysis).....	21
Smears from prostitutes.....	2,976	Milk, supply department.....	7
Blood smears examined for malaria.....	2	Milk, condensed (complete analysis).....	42
Examination of mule ear for anthrax.....	1	Milk, St. Charles Brand.....	1
Examination for yaws.....	1	Spinal fluids.....	1,325
Chemical examinations:		Miscellaneous.....	261
Blood analysis for sugar.....	2	Gasoline.....	8
Stomach contents.....	10	Water.....	2
Urine.....	173	Undertaking department:	
Milk for health officer, Panama.....	1	Bodies cremated.....	181
		Bodies embalmed.....	45
		Bodies shipped to United States.....	33

TABLE XVI.—QUARANTINE SERVICE AT THE PORTS OF BALBOA-PANAMA AND CRISTOBAL-COLON.

	Number		Number.
Vessels inspected and passed.....	2,695	Persons vaccinated at port of arrival....	2,250
Vessels held in quarantine.....	87	Persons vaccinated at port of departure or en route.....	4,632
Vessels inspected and transiting the canal in quarantine.....	94	Total persons vaccinated.....	6,882
Total vessels entered.....	2,876	Persons held at quarantine station to complete the period of incubation of yellow fever and bubonic plague.....	3,058
Supplemental inspections of detained vessels.....	90	Persons held in quarantine aboard vessels.....	14,196
Supplemental inspections of vessels at docks.....	1,059	Total persons detained in quarantine.....	17,254
Vessels fumigated on arrival.....	131	Persons in transit passing through the canal.....	41,591
Vessels fumigated prior to departure.....	36	Persons in transit from Pacific ports and passing through the Canal on arriving vessels.....	2,539
Bills of health issued.....	2,228	Passengers in transit for Atlantic ports..	4,536
Bills of health viséé.....	1,856	Immigrants rejected and deported.....	474
Passengers inspected on arrival.....	62,100		
Crew inspected on arrival.....	112,094		
Total persons inspected on arrival.....	174,194		
Crew passed on medical officer's certificate.....	43,266		
Supplementary inspections of passengers and crew.....	12,630		

TABLE XVII.—PERSONNEL REPORT OF THE HEALTH DEPARTMENT.

[Number of employees on June 30, each year.]

	Gold.		Silver.		Total.	
	1918	1919	1918	1919	1918	1919
Chief health office.....	4	4			4	4
Medical storehouse.....	4	5	4	5	8	10
Quarantine service.....	11	6	61	38	72	44
Health office, Panama.....	17	10	148	150	165	160
Health office, Colon.....	14	15	148	154	162	169
Ancon Hospital.....	129	123	228	236	357	359
Colon Hospital.....	19	18	32	32	51	50
Santo Tomas Hospital.....	9	6			9	6
Palo Seco Leper Asylum.....	2	2	40	21	42	23
Zone sanitation.....	6	5	193	306	199	311
Corozal Hospital.....	16	16	104	96	120	112
Line dispensaries.....	11	9	9	8	20	17
Total.....	242	219	967	1,046	1,209	1,265



## APPENDIX K.

### REPORT OF THE GENERAL PURCHASING OFFICER AND CHIEF OF THE WASHINGTON OFFICE.

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THE PANAMA CANAL,  
*Washington, D. C., July 15, 1919.*

SIR: I have the honor to submit the following report on the work of the Washington office of The Panama Canal for the fiscal year ended June 30, 1919:

The undersigned has remained in charge throughout the year as general purchasing officer and chief of office, with the following divisions under his supervision: Administrative office, including the appointment division and the correspondence and record division; office of the assistant auditor; and the purchasing department.

There have been no important changes in the organization during the fiscal year.

The employment work has greatly increased over the preceding year and has been handicapped in meeting the need for skilled help on the Isthmus which covered a wide variety of positions, often requiring special qualifications, on account of the demand in the United States for skilled workers at high rates of pay. In many lines, particularly in the shipbuilding trades, it has been practically impossible to establish or maintain waiting lists. Forty per cent of those tendered employment failed to accept. Sixteen hundred and ten persons were tendered employment in the grades above that of laborer, of which number 962 accepted and were appointed covering 105 different positions, as compared with 1,094 tenders and with 432 acceptances covering 65 positions during the preceding year. Thirty-one hundred and thirty-three persons, including new appointees, those returning from leave of absence, and members of employees' families were provided with transportation from the United States to the Isthmus; and in response to inquiries and applications for employment during this period, and in the issuance of appointments, 20,606 letters were written, 6,663 telegrams sent, and 38,181 circulars mailed.

The work of the correspondence and record division has continued about the same as during the preceding year, embracing the handling of correspondence relating to matters of general policy, the preparation and submission to Congress of estimates of appropriations and special items of legislation desired by The Panama Canal, the dissemination of canal literature and information, the demand for which has been quite heavy on the part of shipbuilding and shipping concerns since the signing of the armistice, as well as the handling

of cablegrams and the recording and filing of general correspondence pertaining to the canal.

The assistant auditor's office prepares all vouchers for payment to be made in the Washington office; keeps all records relative to payments and financial transactions; conducts correspondence relative to payment of claims; has charge of collections; examines and approves transfer settlements; gives the disbursing clerk's accounts an administrative examination before submission to the Auditor for the War Department; prepares the statistical data required to show the distribution of the expenses of the Washington office; makes reports on all claims submitted to the Auditor for the War Department for settlement; prepares all contracts and bonds; has charge of all work in connection with deposits for tolls made with the Treasurer and Assistant Treasurers of the United States; and passes upon all legal questions involved in the transactions of the business of the Washington office of The Panama Canal. The following statements show the volume of the transactions in the assistant auditor's office, which include the work of the disbursing clerk:

*Claim statement.*

On hand July 1, 1918.....	382
Received from July 1, 1918, to June 30, 1919.....	14, 787
	<hr/>
To be accounted for.....	15, 169
Passed for payment from July 1, 1918, to June 30, 1919.....	14, 871
	<hr/>
On hand June 30, 1919.....	298

There was a decrease of 1,237 claims received, and a decrease of 1,128 claims examined and passed for payment from the preceding year.

*Financial statement of receipts and disbursements.*

July 1, 1918, to June 30, 1919.

Disbursing clerk's balance, July 1, 1918.....		\$971, 340. 92
Receipts:		
From United States Treasury.....	\$8, 501, 500. 00	
Miscellaneous collections.....	540, 248. 65	
	<hr/>	9, 041, 748. 65
To be accounted for.....		10, 013, 089. 57
Disbursements:		
Vouchered expenditures.....	8, 756, 004. 38	
Repayments to appropriations.....	104, 534. 56	
Refundments and disbursements on collections.....	28, 774. 67	
Collections deposited to appropriations and miscellaneous receipts.....	502, 700. 81	
	<hr/>	9, 392, 014. 42
		<hr/>
		621, 075. 15
Disbursing clerk's balance June 30, 1919:		
General account as disbursing clerk.....	521, 094. 47	
Special deposit account.....	99, 980. 68	
	<hr/>	621, 075. 15

During the fiscal year 12,473 disbursement vouchers, amounting to \$8,756,004.38 and 264 collection vouchers, amounting to \$540,248.65, were prepared. Two thousand one hundred and three settlements by transfer of appropriations, aggregating \$1,329,299.85, were given an administrative examination and recommendation made thereon. There was a decrease of 1,001 disbursement vouchers and a decrease in disbursements of \$887,728.43, as compared with the last fiscal year. There was an increase, however, of \$205,208.50 in miscellaneous collections made.

Reports were made upon 34 claims submitted to the auditor for the War Department, either for direct settlement or for settlement by the auditor after claims had been filed by the contractor. The amount involved in these claims to be passed upon by the auditor for the War Department upon the reports of this office was \$131,559.98.

During the fiscal year 84 contracts were prepared, amounting to \$3,452,637.58. This was a decrease of 20 in number and of \$68,836.95 in amount in comparison with the fiscal year 1918.

The assistant auditor, as legal adviser in the United States for The Panama Canal, has, by direction of the chief of office, continued to render assistance to the Department of Justice in connection with the preparation for trial and at the trial in the courts of all cases in connection with action brought by or against The Panama Canal. During this fiscal year suits have been pending against The Panama Canal involving claims for \$156,392.91. The disposition of these suits, so far as they have been completed, is as follows:

Walter S. Dickey *v.* United States, Court of Claims No. 32759, petition dismissed January 20, 1919. This case involved the question as to the validity of the liquidated damage clause in the Panama Canal contracts authorizing the Governor of The Panama Canal to waive the delay. The contract was sustained.

Wm. F. Brothers *v.* United States, Supreme Court No. 309, October term, 1918, Washington order No. 14813. The amount of the claim in this case was \$137,600 for a violation of a patent. The petition was dismissed by the Court of Claims, and this judgment was affirmed by the Supreme Court May 19, 1919.

The case of Toberman, Mackey & Co. *v.* United States, Court of Claims No. 33854, Washington order No. 67474, for \$3,261.80 damages, was decided in favor of The Panama Canal on May 19, 1919.

The case of Patrick Corr & Sons, under annual contract No. 1033, Court of Claims No. 33298, is still pending. The amount involved in this suit is \$9,553.89.

The case of the Pelton Water Wheel Company *v.* United States, in the Court of Claims, for \$5,220.52, damages under Washington order No. 29725 and supplements thereto, is still pending.

The case of J. Edward Ogden & Co. *v.* United States, in the District Court for the Southern District of New York, Washington order No. 60890, is still pending. This suit is for \$1,468.89 damages. During the fiscal year a recommendation was made to the attorney general to compromise the suit for one-half of the amount claimed.

Suit was brought in the District Court for the Southern District of Maryland against George R. Johnson, Washington order No. 62856, for \$1,507.82, and judgment was obtained for this amount. This

judgment, however, has not yet been collected, but the probability is that it will be collected.

No new suits were brought against The Panama Canal during this fiscal year.

The work of the purchasing department has been conducted in general in the same manner as heretofore. War conditions existed during the first five months of the present fiscal year, and during this period the same practice relative to methods of purchase was continued, as outlined in my report for the previous fiscal year. This method of purchase has reference to the necessity of referring certain items in quantity appearing on the "Clearance List" to the clearance committee of the War Industries Board for determination as to "clearance" for purchase under our usual methods, or allocation by the War Industries Board to certain firms for furnishing the articles.

Since the signing of the armistice on November 11, 1918, considerable quantities of material hitherto required in connection with the prosecution of the war have been released by the War Department and other departments as surplus material, and have been offered for disposal to the other departments of the Government. The purchasing department has endeavored to cooperate as far as possible with the War Department and other departments having surplus material on hand, owing to the cessation of war activities, with a view to taking off their hands such material as The Panama Canal is in the market for at the time. A plan has been arrived at by mutual agreement whereby the War Department receives our circulars and inquiries inviting bids for supplies, with the understanding that the same are to be immediately examined and this office advised as to whether surplus material of the kind required is on hand for disposal. If so, arrangement has been made whereby the department is to advise The Panama Canal as to whether the material offered complies substantially with our specifications, the price paid for same, the price at which offered, and the place of delivery. Similar arrangements have been made with the Navy Department and other departments having surplus material available.

It is also the practice of the purchasing department, when requisitions are received from the Isthmus for material which there is reason to believe is available as surplus stock in the hands of any department, to take up by special communication the question of procurement of such material from that department before inviting bids for the material in our circulars. The lists of surplus material which the War Department issues from time to time also are examined and, if The Panama Canal is in the market for any of the material listed, a special letter is written making inquiries as to whether such material complies with our specifications, and as to price, place of delivery, etc. It has been the policy to pursue the above mentioned methods in order to extend the fullest cooperation possible by The Panama Canal toward the disposal of the surplus war material possessed by any department, purchases of such material being made whenever practicable.

While considerable surplus material has been procured from other departments, it is still necessary to secure the bulk of canal supplies

by purchase by the usual methods. This is due to the fact that frequently the surplus material available does not even approximately meet the Panama Canal specifications, and is therefore not suitable for the purpose intended. Furthermore, there are no surplus stocks of a great many articles and raw materials which it is necessary for The Panama Canal to buy.

In connection with the general purchase of supplies, it has been noted during the last few months that the business interests of the country seem to be getting into a more stable condition, and that prices have a tendency to fall, except in a few instances where prices have increased even since the armistice, due probably to the greater commercial demand and the abolishment of the system of regulating prices by the Government. It is also noted that competition is getting keener and that more bids are being received under our circular invitations for furnishing supplies, and that better deliveries are being offered.

I might state in passing that the extra work and long hours necessitated during the last year or two, owing to war conditions, and since the war owing to readjustment of conditions, have been extraordinary and very trying on the office force; however, the office force has handled the situation with efficiency and cheerfulness, accomplishing excellent results. It is thought, now that the treaty of peace has been signed, that the conditions will soon return to normal, and accordingly allow a "breathing spell" in the rush work caused by the unusual war conditions. These remarks apply not only to the purchasing department but to all other branches of the Washington office and field forces.

As heretofore, the principal purchases have been made by the Washington office, although offices in charge of assistant purchasing agents have been continued at New York, New Orleans, and San Francisco. These offices, as stated in previous reports, also act as receiving and forwarding agencies for such materials as have been purchased for forwarding to the Isthmus through their respective ports. A small force of employees has been continued in the Medical Supply Depot, United States Army, New York City, for the purpose of assisting the officer in charge in making purchases of medical and hospital supplies for the Isthmus, most of which supplies have been purchased through that depot.

The same system as heretofore has been continued relative to the preliminary inspection of materials purchased, and a corps of inspectors under the supervision of the inspecting engineer, located at Washington, has been maintained. The work of inspection has been facilitated as heretofore by assistance rendered by the field officers of the Corps of Engineers, and by the Bureau of Standards, the Bureau of Mines, Bureau of Chemistry, Medical Department, Ordnance Department, the Signal Corps, and the Quartermaster Corps of the United States Army.

The number of orders issued during the fiscal year was 7,469, an increase of 861, or 13.03 per cent, as compared with the fiscal year 1918, the number of orders issued during the latter fiscal year being 6,608. The number of orders placed during the fiscal year 1919 compares favorably with the fiscal years 1914 and 1915, and exceeds the

number issued in any one fiscal year from 1904 to 1914, inclusive, and 1918. During the fiscal year ending June 30, 1917, the largest number of orders in any one year was issued, being 8,908.

The number of orders issued during each fiscal year from 1904 to 1919 is as follows: 1904, 8; 1905, 1,585; 1906, 2,563; 1907, 4,187; 1908, 4,523; 1909, 5,458; 1910, 5,765; 1911, 4,363; 1912, 5,960; 1913, 7,087; 1914, 7,426; 1915, 8,066; 1916, 8,856; 1917, 8,908; 1918, 6,608; 1919, 7,469.

Below is a summary of orders placed through the Washington office of The Panama Canal during each month in the fiscal years 1918 and 1919:

Month.	1917-18	1918-19	Month.	1917-18	1918-19
July.....	622	541	February.....	416	601
August.....	760	625	March.....	483	760
September.....	677	481	April.....	558	754
October.....	586	629	May.....	518	659
November.....	600	482	June.....	469	667
December.....	465	594			
January.....	449	676	Total.....	6,608	7,469

The total value of orders placed by the Washington office during the fiscal year was \$6,764,278.62, as compared with \$8,019,608.90 in the fiscal year 1918, making the grand total of purchases since the year 1904 of \$143,347,119.05.

The amount stated above covering the fiscal year 1919 does not include \$277,042.70 paid during the fiscal year for cement ordered under the continuing contract with the Atlas Portland Cement Co. entered into in the year 1909, nor does the grand total given for purchases since the year 1904 include \$8,232,239.44 paid since 1909 up to the end of the fiscal year 1919 for cement placed under the above-mentioned contract. These amounts have not been included in the reports heretofore, but will be included in the future reports. Adding the amount, \$8,232,239.44, paid for cement since 1909 to the end of the fiscal year 1919 makes the grand total for purchases since the year 1904, \$151,579,358.49.

There is submitted with this report a table showing increases in salaries authorized over the organization of July 1, 1917, as required by the act of Congress approved July 1, 1918. There was no increase in the number of persons employed over the number specified in the 1919 Book of Estimates.

Very respectfully,

A. L. FLINT,  
*General Purchasing Officer and Chief of Office.*

Col. CHESTER HARDING, Corps of Engineers, United States Army,  
*Governor, The Panama Canal, Balboa Heights, Canal Zone.*

Table showing increases in salaries authorized over organization of July 1, 1917.

Designation.	Increase in pay.	
	Rate authorized in organization, July 1, 1917.	Increased to—
<i>Purchasing department.</i>		
Inspecting engineer.....	\$4,000	\$4,400
Clerk.....	2,250	2,400
Do.....	2,100	2,250
Do.....	1,600	1,800
Do.....	1,200	1,400
Do.....	1,200	1,300
<i>Administrative department.</i>		
Chief of division.....	2,250	2,400
Clerk.....	1,800	1,980
Do.....	1,600	1,800
Do.....	1,200	1,300
Clerks (2).....	1,000	1,200
Laborers (2).....	720	780
<i>Accounting department.</i>		
Clerk.....	2,000	2,250
<i>Inspection force.</i>		
Assistant engineer.....	3,600	3,720
Chief inspector.....	2,750	3,000
Inspector.....	2,220	2,280
Do.....	1,980	2,100
Do.....	1,920	2,040

NOTE.—Owing to the continuation of the abnormal conditions in the labor market during the war and since the signing of the armistice, and in order to retain the services of necessary employees with special qualifications, and also to meet the competition of various Government departments and business establishments, it was necessary to increase the salaries of certain positions, as indicated above. However, six positions were abolished, the net result being that the total amount allotted for salaries was not exceeded.





## APPENDIX I.

### ACTS OF CONGRESS AND EXECUTIVE ORDERS RELATING TO THE PANAMA CANAL AND TO THE CANAL ZONE.

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**ACTS OF CONGRESS AND EXECUTIVE ORDERS RELATING TO THE PANAMA CANAL AND TO THE CANAL ZONE.**

AN ACT Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1920, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June 30, 1920, namely:

\* \* \* \* \*

**NAVY DEPARTMENT.**

\* \* \* \* \*

**HYDROGRAPHIC OFFICE.**

\* \* \* \* \*

Contingent expenses of branch offices at Boston, New York, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans, San Francisco, Portland (Oregon), Portland (Maine), Chicago, Cleveland, Buffalo, Duluth, Sault Sainte Marie, Seattle, Panama, and Galveston, including furniture, fuel, lights, works, and periodicals relating to hydrography, marine meteorology, navigation, surveying, oceanography, and terrestrial magnetism, stationery, miscellaneous articles, rent, and care of offices, care of time balls, car fare and ferriage in visiting merchant vessels, freight and express charges, telegrams, and other necessary expenses incurred in collecting the latest information for pilot charts, and for other purposes for which the offices were established, \$12,500.

\* \* \* \* \*

Sec. 7. That all civilian employees of the Governments of the United States and the District of Columbia who receive a total of compensation at the rate of \$2,500 per annum or less, except as otherwise provided in this section, shall receive, during the fiscal year ending June 30, 1920, additional compensation at the rate of \$240 per annum: Provided, That such employees as receive a total of annual compensation at a rate more than \$2,500 and less than \$2,740 shall receive additional compensation at such a rate per annum as may be necessary to make their salaries, plus their additional compensation, at the rate of \$2,740 per annum, and no employee shall receive additional compensation under this section at a rate which is more than sixty per centum of the rate of the total annual compensation received by such employee: Provided further, That the increased compensation at the rate of \$120 per annum for the fiscal year ending June 30, 1919, shall not be computed as salary in construing this section: Provided further, There where an employee in the service on June 30, 1918, has received during the fiscal year 1919, or shall receive during the fiscal year 1920 an increase of salary at a rate in excess of \$200 per annum, or where an employee whether previously in the service or not, has entered the service since June 30, 1918, whether such employee has received an increase in salary or not, such employees shall be granted the increased compensation provided herein only when and upon the certification of the person in the legislative branch or the head of the department or establishment employing such persons of the ability and qualifications personal to such employees as would justify such increased compensation: Provided further, That the increased compensation provided in this section to employees whose pay is adjusted from time to time through wage boards or similar authority shall be taken into consideration by such wage boards or similar authority in adjusting the pay of such employees.

The provisions of this section shall not apply to the following: Employees paid from the postal revenues and sums which may be advanced from the Treasury to meet deficiencies in the postal revenues; employees of the Panama Canal on the Canal Zone;

\* \* \* \* \*

Approved, March 1, 1919.

AN ACT TO provide for the fourteenth and subsequent decennial censuses.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That a census of the population, agriculture, manufactures, forestry and forest products, and mines and quarries of the United States shall be taken by the Director of the Census in the year nineteen hundred and twenty and every ten years thereafter. The census herein provided for shall include each State, the District of Columbia, Alaska, Hawaii, and Porto Rico. A census of Guam and Samoa shall be taken in the same year by the respective governors of said islands and a census of the Panama Canal Zone by the governor of the Canal Zone in accordance with plans prescribed or approved by the Director of the Census.

\* \* \* \* \*

Approved, March 3, 1919.

AN ACT MAKING appropriations for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service, for the fiscal year ending June 30, 1920, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service, for the fiscal year ending June 30, 1920, and for other purposes, to be available immediately, namely:

FORTIFICATIONS AND OTHER WORKS OF DEFENSE

ENGINEER DEPARTMENT.

\* \* \* \* \*

The sum of \$1,250,000 of the unexpended balance of the appropriation "For the installation and replacement of electric light and power plants at sea-coast fortifications in the United States; the purchase and installation of searchlights for sea-coast defenses in the United States, including searchlights for antiaircraft defenses and accessories therefor; and the procurement and installation of sound-ranging equipment for use in the United States, the insular possessions, and the Panama Canal, and for salaries of electrical experts, engineers, and other employees necessary to procure and install the same," shall be covered into the Treasury immediately upon the approval of this Act.

\* \* \* \* \*

PANAMA CANAL FORTIFICATIONS

- For fortifications and armament thereof for the Panama Canal:
- For maintenance of clearings and trails, \$30,000;
- For protection, preservation, and repair of fortifications, including structures erected for torpedo defense, and for maintaining channels for access to torpedo wharves, \$25,000;
- For maintenance and repair of searchlights and electric light and power equipment for fortifications, and for tools, electrical and other supplies, and appliances to be used in their operation, \$20,000;
- For the construction of sea-coast batteries, \$135,500;
- For the purchase and installation of electric light and power plants for the sea-coast fortifications on the Canal Zone, \$20,000;
- For land defenses, Panama Canal, including the procurement and installation of searchlights, purchase of armored cars and locomotives, construction of roads and surveys incidental thereto, \$14,000;
- For reserve engineer equipment for the Panama Canal, \$7,500;
- For operation and maintenance of fire-control installations at sea-coast defenses, \$10,000;
- For the alteration and maintenance of the sea-coast artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work, and expenses of civilian mechanics, and extra-duty pay of enlisted men engaged thereon, \$100,000;

The sum of \$14,000 of the unexpended balance of appropriations heretofore made "for the alteration, maintenance, and repair of submarine mine matériel," for the Panama Canal shall be covered into the Treasury immediately upon the approval of this Act;

For the construction of barracks, quarters, and other necessary buildings for the accommodation of two regiments of Infantry, including water and sewer systems, roads, walks, and so forth, \$3,986,849;

For the construction of barracks, quarters, and other necessary buildings for Coast Artillery troops at Fort Sherman, including water and sewer systems, roads, walks, and so forth, \$140,000;

No part of the two foregoing appropriations shall be expended for the construction of officers' quarters to cost in excess of the limits established by the sundry civil appropriation Act, approved June 25, 1910;

For the construction of a new wharf at Fort Sherman, \$35,000;

The Governor of the Panama Canal, so far as the expenditure of appropriations contained in this Act may be under his direction, shall purchase needed materials, supplies, and equipment from available surplus stocks of the War Department;

In all, specifically for fortifications and armament thereof for the Panama Canal, \$4,523,849.

SEC. 2. That all material purchased under the provisions of this Act shall be of American manufacture, except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases abroad, which material shall be admitted free of duty.

SEC. 3. That except as expressly otherwise authorized herein no part of the sums appropriated by this Act shall be expended in the purchase from private manufacturers of any material at a price in excess of 25 per centum more than the cost of manufacturing such material by the Government, or, where such material is not or has not been manufactured by the Government, at a price in excess of 25 per centum more than the estimated cost of manufacture by the Government: *Provided*, That whenever in the opinion of the President the situation is such as to justify such action he may waive the limitations contained in this section.

SEC. 4. That expenditures for carrying out the provisions of this Act shall not be made in such manner as to prevent the operation of the Government arsenals at their most economical rate of production, except when a special exigency requires the operation of a portion of an arsenal's equipment at a different rate: *Provided*, That no part of the appropriations made in this Act shall be available for the salary or pay of any officer, manager, superintendent, foreman, or other person having charge of the work of any employee of the United States Government while making or causing to be made with a stop watch or other time-measuring device a time study of any job of any such employee between the starting and completion thereof, or of the movements of any such employee while engaged upon such work.

SEC. 5. That appropriations for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service, heretofore made in fortifications or sundry civil appropriation Acts shall not be available for obligation after June 30, 1920, and all unexpended balances of such appropriations which remain upon the books of the Treasury Department on June 30, 1921, shall be covered into the Treasury and carried to the surplus fund.

SEC. 6. That estimates of appropriations for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service shall be submitted to Congress in the Book of Estimates for the fiscal year 1921 and each fiscal year thereafter upon an annual basis. And section 5 of the legislative, executive, and judicial appropriation Act approved June 20, 1874, and section 7 of the sundry civil appropriation Act approved August 24, 1912, so far as they except appropriations for "fortifications" from the operations thereof, are repealed.

\* \* \* \* \*

SEC. 8. That no part of the moneys appropriated in each or any section of this Act shall be used or expended for the purchase or acquirement of any article or articles that at the time of the proposed acquirement can be manufactured or produced in each or any of the Government arsenals of the United States for a sum less than it can be purchased or procured otherwise.

Approved, March 3, 1919.

AN ACT Making appropriations for the Diplomatic and Consular Service for the fiscal year ending June 30, 1920.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and they are hereby, severally appropriated, in full compensation for the Diplomatic and Consular Service for the fiscal year ending June 30, 1920, out of any money in the Treasury not otherwise appropriated, for the objects hereinafter expressed, namely:

\* \* \* \* \*

PAYMENT TO THE GOVERNMENT OF PANAMA.

To enable the Secretary of State to pay to the Government of Panama the eighth annual payment due on February 26, 1920, from the Government of the United States to the Government of Panama under article 14 of the treaty of November 18, 1903, \$250,000.

\* \* \* \* \*

RELIEF AND PROTECTION OF AMERICAN SEAMEN.

Relief and protection of American seamen in foreign countries, and in the Panama Canal Zone, and shipwrecked American seamen in the Territory of Alaska, in the Hawaiian Islands, Porto Rico, and the Philippine Islands, \$100,000.

\* \* \* \* \*

Approved, March 4, 1919.

AN ACT Making appropriations to supply deficiencies in appropriations for the fiscal year ending June 30, 1919, and prior fiscal years, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in appropriations for the fiscal year ending June 30, 1919, and prior fiscal years, and for other purposes, namely:

\* \* \* \* \*

DEPARTMENT OF STATE.

\* \* \* \* \*

FOREIGN INTERCOURSE.

\* \* \* \* \*

For relief and protection of American seamen in foreign countries, and in the Panama Canal Zone, and shipwrecked American seamen in the Territory of Alaska, in the Hawaiian Islands, Porto Rico, and the Philippine Islands, \$60,000.

\* \* \* \* \*

DEPARTMENT OF THE INTERIOR.

\* \* \* \* \*

SAINT ELIZABETHS HOSPITAL.

For support, clothing, and treatment in Saint Elizabeths Hospital of the insane from the Army, Navy, Marine Corps, Coast Guard, inmates of the National Home for Disabled Volunteer Soldiers, persons charged with or convicted of crimes against the United States who are insane, all persons who

have become insane since their entry into the military and naval service of the United States, civilians in the Quartermaster's service of the Army, persons, transferred from the Canal Zone, who have been admitted to the hospital and who are indigent. \* \* \* \$100,000, to be available until expended.

\* \* \* \* \*

Approved, July 11, 1919.

---

AN ACT Making appropriations for the support of the Army for the fiscal year ending June 30, 1920, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June 30, 1920:

\* \* \* \* \*

### MEDICAL DEPARTMENT.

#### MEDICAL AND HOSPITAL DEPARTMENT.

For the manufacture and purchase of medical and hospital supplies, including disinfectants for military posts, camps, hospitals, hospital ships, and transports, for laundry work for enlisted men and Army nurses while patients in a hospital, and supplies required for mosquito destruction in and about military posts in the Canal Zone: \* \* \* \$4,500,000.

\* \* \* \* \*

#### HOSPITAL CARE, CANAL ZONE GARRISONS.

For paying the Panama Canal such reasonable charges, exclusive of subsistence, as may be approved by the Secretary of War, for caring in its hospitals for officers, enlisted men, military prisoners, and civilian employees of the Army admitted thereto upon the request of proper military authority: *Provided*, That the subsistence of the said patients, except commissioned officers, shall be paid to said hospitals out of the appropriation for subsistence of the Army at the rates provided therein for commutation of rations for enlisted patients in general hospitals, \$50,000.

\* \* \* \* \*

Approved, July 11, 1919.

---

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1920, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June 30, 1920, namely:

\* \* \* \* \*

### WAR DEPARTMENT.

\* \* \* \* \*

#### QUARTERMASTER CORPS.

\* \* \* \* \*

Disposition of remains of officers, soldiers, and civilian employees: For interment, or of preparation and transportation to their homes or to such national cemeteries as may be designated by proper authority, in the discretion of the Secretary of War, of the remains of officers, cadets, United States Military Academy, including acting assistant surgeons and enlisted men in active service; interment, or of preparation and transportation to their homes, of the remains

of civil employees of the Army in the employ of the War Department who die abroad, in Alaska, in the Canal Zone, or on Army transports, \* \* \* \$8,451,000; *Provided*, That during the continuance of the present war the above provisions shall be applicable in the cases of officers and enlisted men on the retired list of the Army who have died or may hereafter die while on active duty by proper assignment.

DEPARTMENT OF THE INTERIOR.

\* \* \* \* \*

SAINT ELIZABETHS HOSPITAL.

For support, clothing, and treatment in Saint Elizabeths Hospital of the insane from the Army, Navy, Marine Corps, Coast Guard, inmates of the National Home for Disabled Volunteer Soldiers, persons charged with or convicted of crimes against the United States who are insane, all persons who have become insane since their entry into the military and naval service of the United States, civilians in the quartermaster's service of the Army, persons transferred from the Canal Zone, who have been admitted to the hospital and who are indigent, \* \* \* \$1,000,000; \* \* \*

\* \* \* \* \*

DEPARTMENT OF COMMERCE.

\* \* \* \* \*

COAST AND GEODETIC SURVEY.

\* \* \* \* \*

Field expenses: For surveys and necessary resurveys of the Atlantic and Gulf coasts of the United States, including the coasts of outlying islands under the jurisdiction of the United States: *Provided*, That not more than \$45,000 of this amount shall be expended on the coasts of said outlying islands, and the Atlantic entrance to the Panama Canal, \$115,000;

\* \* \* \* \*

THE PANAMA CANAL.

For every expenditure requisite for and incident to the maintenance and operation, sanitation, and civil government of the Panama Canal and Canal Zone, including the following: Compensation of all officials and employees, including \$1,000 additional compensation to the Auditor for the War Department for extra services in auditing accounts for the Panama Canal; foreign and domestic newspapers and periodicals; law books not exceeding \$500, textbooks and books of reference; printing and binding, including printing of annual report; rent and personal services in the District of Columbia; purchase or exchange of typewriting, adding, and other machines; purchase or exchange, maintenance, repair, and operation of motor-propelled and horse-drawn passenger-carrying vehicles; claims for damages to vessels passing through the locks of the Panama Canal, as authorized by the Panama Canal Act; claims for losses of or damages to property arising from the conduct of authorized business operations; claims for damages to property arising from the maintenance and operation, sanitation, and civil government of the Panama Canal; acquisition of land and land under water, as authorized in the Panama Canal Act; expenses incurred in assembling, assorting, storing, repairing, and selling material, machinery, and equipment heretofore or hereafter purchased or acquired for the construction of the Panama Canal which are unserviceable or no longer needed, to be reimbursed from the proceeds of such sales; expenses incident to conducting hearings and examining estimates for appropriations on the Isthmus; expenses incident to any emergency arising because of calamity by flood, fire, pestilence, or like character not foreseen or otherwise provided for herein; per diem allowance in lieu of subsistence when prescribed by the Governor of the Panama Canal, to persons engaged in field work or traveling on official business, pursuant to section 13 of the Sundry Civil Appropriation Act approved August 1, 1914; and for such other expenses not in the United States as the Governor of the Panama Canal may deem necessary best to promote the maintenance and operation, sanitation, and civil government of the

Panama Canal, all to be expended under the direction of the Governor of the Panama Canal and accounted for as follows:

For maintenance and operation of the Panama Canal, salary of governor, \$10,000; purchase, inspection, delivery, handling, and storing of material, supplies, and equipment for issue to all departments of the Panama Canal, the Panama Railroad, other branches of the United States Government, and for authorized sales, payment in lump sums of not exceeding the amounts authorized by the Injury Compensation Act approved September 7, 1916, to alien cripples who are now a charge upon the Panama Canal by reason of injuries sustained while employed in the construction of the Panama Canal, \$7,547,939, together with all moneys arising from the conduct of business operations authorized by the Panama Canal Act;

For sanitation, quarantine, hospitals, and medical aid and support of the insane and of lepers, and aid and support of indigent persons legally within the Canal Zone, including expenses of their deportation when practicable, and including additional compensation to any officer of the United States Public Health Service detailed with the Panama Canal as chief quarantine officer, \$850,000;

For civil government of the Panama Canal and Canal Zone, district judge at the rate of \$7,500 per annum from March 1, 1919, district attorney, \$5,000, marshal \$5,000, and for gratuities and necessary clothing for indigent discharged prisoners, \$702,000;

For completing in every detail two sea-going coal barges now under construction by contract entered into by the United States Shipping Board Emergency Fleet Corporation acting for the Panama Canal, to the extent that it was acting within the limits of the authority of the Panama Canal under the act approved June 12, 1917 (Fortieth Statutes at Large, page 177), \$364,949 each, or so much thereof as may be necessary, in addition to \$800,000 each appropriated for two sea-going barges in said Act: *Provided*, That the limitation contained in said Act that the total cost of each barge shall not exceed \$800,000 each is hereby removed, \$729,898.

In all, \$9,829,837, to continue available until expended.

Except in cases of emergency, or conditions arising subsequent to and unforeseen at the time of submitting the annual estimates to Congress, and except for those employed in connection with the construction of permanent quarters, offices, and other necessary buildings, dry docks, repair shops, yards, docks, wharves, warehouses, storehouses, and other necessary facilities and appurtenances for the purpose of providing coal and other materials, labor, repairs, and supplies, and except for the permanent operating organization under which the compensation of the various positions is limited by section 4 of the Panama Canal Act, there shall not be employed at any time during the fiscal year 1920 under any of the foregoing appropriations for the Panama Canal any greater number of persons than are specified in the notes submitted, respectively, in connection with the estimates for each of said appropriations in the annual Book of Estimates for said year, nor shall there be paid to any such person during that fiscal year any greater rate of compensation than was authorized to be paid to persons occupying the same or like positions on July 1, 1918; and all employments made or compensation increased because of emergencies or conditions so arising shall be specifically set forth, with the reasons therefor, by the governor in his report for the fiscal year 1920.

In addition to the foregoing sums there is appropriated, for the fiscal year 1920 for expenditures and reinvestment under the several heads of appropriation aforesaid without being covered into the Treasury of the United States, all moneys received by the Panama Canal from services rendered or materials and supplies furnished to the United States, the Panama Railroad Company, the Canal Zone government, or to their employees, respectively, or to the Panama Government, from hotel and hospital supplies and services; from rentals, wharfage, and like service; from labor, materials, and supplies and other services furnished to vessels other than those passing through the canal, and to others unable to obtain the same elsewhere; from the sale of scrap and other by-products of manufacturing and shop operations; from the sale of obsolete and unserviceable materials, supplies, and equipment purchased or acquired for the operation, maintenance, protection, sanitation, and government of the canal and Canal Zone; and any net profits accruing from such business to the Panama Canal shall annually be covered into the Treasury of the United States.

In addition there is appropriated for the operation, maintenance, and extension of waterworks, sewers, and pavements in the cities of Panama and Colon,



during the fiscal year 1920, the necessary portions of such sums as shall be paid as water rentals or directly by the Government of Panama for such expenses.

SEC. 2. That all sums appropriated by this Act for salaries of officers and employees of the Government shall be in full for such salaries for the fiscal year 1920, and all laws or parts of laws to the extent they are in conflict with the provisions of this Act are repealed.

\* \* \* \* \*

Approved, July 19, 1919.

AN ACT Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1920.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and they are hereby, appropriated, out of any money in the Treasury of the United States not otherwise appropriated, in full compensation for the fiscal year ending June 30, 1920, for the purposes and objects hereinafter expressed, namely:

DEPARTMENT OF AGRICULTURE.

\* \* \* \* \*

WEATHER BUREAU.

\* \* \* \* \*

General Expenses, Weather Bureau: For carrying into effect in the District of Columbia and elsewhere in the United States, in the West Indies, in the Panama Canal, the Caribbean Sea, and on adjacent coasts, in the Hawaiian Islands, in Bermuda, and in Alaska, the provisions of an Act approved October 1, 1890, so far as they relate to the weather service transferred thereby to the Department of Agriculture. \* \* \*

Total for Weather Bureau, \$1,880,210.

\* \* \* \* \*

Approved, July 24, 1919.

Joint Resolution to ratify and confirm from and including July 1, 1919, obligations incurred pursuant to the terms of certain appropriations for the fiscal year 1920.

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,* That appropriations for the service of the fiscal year 1920, contained in the Agricultural, Army, District of Columbia, Navy, and Sundry Civil Appropriations Acts, and the "Third Deficiency Appropriation Act, fiscal year 1919," shall be available from and including July 1, 1919, for the purposes respectively provided in the said appropriations for the service of the said fiscal year. And all obligations incurred pursuant to the terms of such appropriations in the aforesaid Acts as approved are ratified and confirmed from and including July 1, 1919.

Approved, July 31, 1919.

AN ACT To prohibit intoxicating beverages, and to regulate the manufacture, production, use, and sale of high-proof spirits for other than beverage purposes, and to insure an ample supply of alcohol and promote its use in scientific research and in the development of fuel, dye, and other lawful industries.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the short title of this act shall be the "National Prohibition Act."

\* \* \* \* \*

TITLE III.

\* \* \* \* \*

GENERAL PROVISIONS.

\* \* \* \* \*

SEC. 20. That it shall be unlawful to import or introduce into the Canal Zone, or to manufacture, sell, give away, dispose of, transport, or have in one's possession or under one's control within the Canal Zone, any alcoholic, fermented, brewed, distilled, vinous, malt, or spirituous liquors, except for sacramental, scientific, pharmaceutical, industrial, or medicinal purposes, under regulations to be made by the President, and any such liquors within the Canal Zone in violation hereof shall be forfeited to the United States and seized: *Provided*, That this section shall not apply to liquor in transit through the Panama Canal or on the Panama Railroad.

That each and every violation of any of the provisions of this section shall be punished by a fine of not more than \$1,000 or imprisonment not exceeding six months for a first offense, and by a fine not less than \$200 nor more than \$2,000 and imprisonment not less than one month nor more than five years for a second or subsequent offense.

That all offenses heretofore committed within the Canal Zone may be prosecuted and all penalties therefor enforced in the same manner and to the same extent as if this act had not been passed.

SEC. 21. Titles I and III and sections 1, 27, 37, and 38 of Title II of this act shall take effect and be in force from and after the passage and approval of the act. The other sections of Title II shall take effect and be in force from and after the date when the eighteenth amendment of the Constitution of the United States goes into effect.

F. H. GILLETT,

*Speaker of the House of Representatives.*

THOS. R. MARSHALL,

*Vice President of the United States and President of the Senate.*

IN THE HOUSE OF REPRESENTATIVES OF THE UNITED STATES,

*October 27, 1919.*

The President of the United States having returned to the House of Representatives, in which it originated, the bill (H. R. 6810) entitled "An Act to prohibit intoxicating beverages, and to regulate the manufacture, production, use, and sale of high-proof spirits for other than beverage purposes, and to insure an ample supply of alcohol and promote its use in scientific research and in the development of fuel, dye, and other lawful industries," with his objections thereto, the House proceeded in pursuance of the Constitution to reconsider the same; and

*Resolved*, That the said bill pass, two-thirds of the House of Representatives agreeing to pass the same.

Attest:

WM. TYLER PAGE, *Clerk.*

IN THE SENATE OF THE UNITED STATES,

*Legislative day, October 22, 1919; calendar day, October 28, 1919.*

The Senate having proceeded to reconsider the bill (H. R. 6810), "An Act to prohibit intoxicating beverages, and to regulate the manufacture, production, use, and sale of high-proof spirits for other than beverage purposes, and to insure an ample supply of alcohol and promote its use in scientific research and in the development of fuel, dye, and other lawful industries," returned by the President of the United States to the House of Representatives, in which it originated, with his objections, and passed by the House on a reconsideration of the same, it was

*Resolved*, That the said bill pass, two-thirds of the Senators present having voted in the affirmative.

Attest:

GEORGE A. SANDERSON, *Secretary.*

3.40 p. m.

AN ACT Making appropriations to supply deficiencies in appropriations for the fiscal year ending June 30, 1920, and prior fiscal years, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in appropriations for the fiscal year ending June 30, 1920, and prior fiscal years, and for other purposes, namely:

\* \* \* \* \*

## PANAMA CANAL.

For civil government of the Panama Canal and Canal Zone, salaries of district judge \$7,500, district attorney \$5,000, marshal \$5,000, and for gratuities and necessary clothing for indigent discharged prisoners, \$150,000, to continue available until expended.

\* \* \* \* \*

SEC. 6. That this Act hereafter may be referred to as the "First Deficiency Appropriation Act, fiscal year 1920."

Approved, November 4, 1919.

AN ACT To regulate further the entry of aliens into the United States.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That if the President shall find that the public safety requires that restrictions and prohibitions in addition to those provided otherwise than by this Act be imposed upon the entry of aliens into the United States, and shall make public proclamation thereof, it shall, until otherwise ordered by the President or Congress, be unlawful—

(a) For any alien to enter or attempt to enter the United States except under such reasonable rules, regulations, and orders, and subject to such passport, visé, or other limitations and exceptions as the President shall prescribe;

(b) For any person to transport or attempt to transport into the United States another person with knowledge or reasonable cause to believe that the entry of such other person is forbidden by this Act;

(c) For any person knowingly to make any false statement in an application for a passport or other permission to enter the United States with intent to induce or secure the granting of such permission, either for himself or for another;

(d) For any person knowingly to furnish or attempt to furnish or assist in furnishing to another a viséed passport or other permit or evidence of permission to enter, not issued and designed for such other person's use;

(e) For any person knowingly to use or attempt to use any viséed passport or other permit or evidence of permission to enter not issued and designed for his use;

(f) For any person to forge, counterfeit, mutilate, or alter, or cause or procure to be forged, counterfeited, mutilated, or altered, any passport, visé, or other permit or evidence of permission to enter the United States;

(g) For any person knowingly to use or attempt to use or furnish to another for use any false, forged, counterfeited, mutilated, or altered passport, permit, or evidence of permission, or any passport, permit, or evidence of permission which, though originally valid, has become or been made void or invalid.

SEC. 2. That any person who shall willfully violate any of the provisions of this Act, or of any order or proclamation of the President promulgated, or of any permit, rule, or regulation issued thereunder, shall, upon conviction, be fined not more than \$5,000, or, if a natural person, imprisoned for not more than five years, or both; and the officer, director, or agent of any corporation who knowingly participates in such violation shall be punished by like fine or imprisonment, or both; and any vehicle or any vessel, together with its or her appurtenances, equipment, tackle, apparel, and furniture, concerned in any such violation, shall be forfeited to the United States.

SEC. 3. That the term "United States" as used in this Act includes the Canal Zone and all territory and waters, continental or insular, subject to the jurisdiction of the United States.

The word "person" as used herein shall be deemed to mean any individual, partnership, association, company, or other unincorporated body of individuals, or corporation, or body politic.

SEC. 4. That in order to carry out the purposes and provisions of this Act the sum of \$600,000 is hereby appropriated.

SEC. 5. That this Act shall take effect upon the date when the provisions of the Act of Congress approved the 22d day of May, 1918, entitled "An Act to prevent in time of war departure from and entry into the United States,

contrary to the public safety," shall cease to be operative, and shall continue in force and effect until and including the 4th day of March, 1921.

Received by the President, October 29, 1919.

(Note by State Department.—The foregoing act having been presented to the President of the United States for his approval, and not having been returned by him to the House of Congress in which it originated within the time prescribed by the Constitution of the United States, has become a law without his approval.)

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EXECUTIVE ORDER.

Whereas a national emergency exists of the character contemplated in Section 1 under Title II of the Act of Congress approved June 15, 1917, commonly known as the Espionage Act;

Therefore, I, WOODROW WILSON, President of the United States of America, by virtue of the powers conferred upon me by the said Act of Congress, do hereby authorize the Governor of The Panama Canal to exercise, within the territory and waters of the Canal Zone, all the powers mentioned in said Section 1, Title II, of said Act, to the same extent as is conferred therein on the Secretary of the Treasury with regard to the territorial waters of the United States, and all acts heretofore done by the Governor of the Panama Canal or under his authority pursuant to said section of said act are hereby ratified and confirmed.

This order supersedes Executive Order Number 2867 dated May 28, 1918.

WOODROW WILSON.

THE WHITE HOUSE,  
9 July, 1918.

[No. 2907]

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PROCLAMATION.

WHEREAS by Act of Congress approved the twenty-second day of May, one thousand nine hundred and eighteen, entitled "An Act to prevent in time of war departure from and entry into the United States contrary to the public safety," it is provided as follows:

\* \* \* \* \*

AND WHEREAS other provisions relating to departure from and entry into the United States are contained in section 3, sub-section (b), of the Trading with the Enemy Act, approved October 6, 1917, and in section four thousand and sixty-seven of the Revised Statutes, as amended by the Act of April 16, 1918, and sections four thousand and sixty-eight, four thousand and sixty-nine, and four thousand and seventy of the Revised Statutes, and in the regulations prescribed in the President's proclamations of April 6, 1917, November 16, 1917, December 11, 1917, and April 19, 1918;

AND WHEREAS the Act of May 20, 1918, authorizes me to coordinate and consolidate executive agencies and bureaus in the interest of economy and more efficient concentration of the Government;

NOW, THEREFORE, I, WOODROW WILSON, President of the United States of America, acting under and by virtue of the aforesaid authority vested in me, do hereby find and publicly proclaim and declare that the public safety requires that restrictions and prohibitions in addition to those provided otherwise than by the Act of May 22, 1918, above mentioned, shall be imposed upon the departure of persons from and their entry into the United States; and I make the following orders thereunder:

1. No citizen of the United States shall receive a passport entitling him to leave or enter the United States, unless it shall affirmatively appear that there are adequate reasons for such departure or entry and that such departure or entry is not prejudicial to the interests of the United States.

2. No alien shall receive permission to depart from or enter the United States unless it shall affirmatively appear that there is reasonable necessity for such

departure or entry and that such departure or entry is not prejudicial to the interests of the United States.

3. The provisions of this proclamation and the rules and regulations promulgated in pursuance hereof, shall not be held to suspend or supersede in any respect, except as herein expressly provided the President's proclamations of April 6, 1917, November 16, 1917, December 11, 1917, and April 19, 1918, above referred to; nor shall anything contained herein be construed to suspend or supersede any rules or regulations issued under the Chinese Exclusion law or the immigration laws except as herein expressly provided; but the provisions hereof shall, subject to the provisos above mentioned, be regarded as additional to such rules and regulations. Compliance with this Proclamation and the rules and regulations promulgated in pursuance hereof shall not exempt any individual from the duty of complying with any statute, proclamation, order, rule, or regulations not referred to herein.

4. I hereby designate the Secretary of State as the official who shall grant, or in whose name shall be granted, permission to aliens to depart from or enter the United States; I reaffirm sections 25, 26, and 27 of the Executive Order of October 12, 1917, vesting in the Secretary of State the administration of the provisions of Section 3, sub-section (b), of the Trading with the Enemy Act; I transfer to the Secretary of State the executive administration of Regulations 9 and 10 of the President's Proclamation of April 6, 1917, of Regulation 15 of the President's Proclamation of November 16, 1917, and of Regulations 1 and 2 of the President's Proclamation of December 11, 1917, and the executive administration of the aforesaid regulations as extended by the President's Proclamation of April 19, 1918, said executive administration heretofore having been delegated to the Attorney General under dates of April 6, 1917, November 16, 1917, December 11, 1917, and April 19, 1918. The Rules and Regulations made by the Secretary of the Treasury as authorized by Title II, Section 1, of the Espionage Act approved June 15, 1917, and by the Executive Order of December 3, 1917, shall be superseded by this Proclamation and the rules and regulations promulgated in pursuance hereof in so far as they are inconsistent therewith.

I hereby direct all departments of the Government to co-operate with the Secretary of State in the execution of his duties under this Proclamation and the rules and regulations promulgated in pursuance hereof. They shall upon his request make available to him for that purpose the services of their respective officials and agents. The Secretary of the Treasury, the Secretary of War, the Attorney General, the Secretary of the Navy, the Secretary of Commerce, and the Secretary of Labor shall, at the request of the Secretary of State, each appoint a representative to render to the Secretary of State, or his representative, such assistance and advice as he may desire respecting the administration of this Proclamation and of the rules and regulations aforesaid.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done in the District of Columbia, this 8th day of August in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States the one hundred and forty-third.

WOODROW WILSON.

BY THE PRESIDENT:

ROBERT LANSING,

*Secretary of State.*

[No. 1473]

EXECUTIVE ORDER.

Rules and Regulations Governing the Issuance of Permits to Enter and Leave the United States.

Supplemental to the Presidential Proclamation of August 8, 1918, and by virtue of the authority set forth therein, I hereby prescribe the following rules and regulations governing departure from and entry into the United States.

SECTION 1. The present system of controlling entry into and departure from the United States by alien enemies and other persons, as administered by the Department of State, the Department of the Treasury, the Department of Justice, the Department of Commerce, and the Department of Labor, is hereby confirmed and established by virtue of the authority vested in me as aforesaid

and shall continue in full force and effect in the continental United States as defined herein until 6 o'clock in the forenoon of September 15, 1918, and in the outlying possessions of the United States until such time or times as the Secretary of State shall designate; when the following rules and regulations shall become operative and shall supersede all rules, regulations, and orders of the present system inconsistent with them; but the Secretary of State may direct at any time subsequent to the date thereof that seamen be kept on their vessels. (See sec. 10 (c), *infra*.) The Secretary of State is hereby authorized, in his discretion, to prescribe exceptions to these rules and regulations governing the entry into and departure from the United States of citizens and subjects of the nations associated with the United States in the prosecution of the war.

#### TITLE 1.—Definitions.

SEC. 2. The term "United States" as defined in the Act of May 22, 1918, and as used herein includes the Canal Zone and all territory and waters, continental and insular, subject to the jurisdiction of the United States.

SEC. 3. The term "continental United States" as used herein includes the territory of the several States of the United States and Alaska.

SEC. 4. The term "departure from the United States" as used herein includes, in addition to any entry whatever upon foreign territory or waters, any trip or journey on or over (1) the Great Lakes or their connecting waters, (2) any rivers or other waters coinciding with or covering the boundary of the United States, or (3) tidal waters beyond the shore line of the United States, said shore line being hereby defined as the line of seacoast and the shores of all waters of the United States and its territorial possessions connected with the high seas and navigable by ocean-going vessels. Provided, however, That no trip or journey upon a public ferry having both termini in the United States and not touching foreign territory or waters shall be deemed a departure from the United States.

SEC. 5. The term "passport" as used herein includes any document in the nature of a passport issued by the United States or by a foreign Government, which shows the identity and nationality of the individual for whose use it was issued and bears his signed and certified photograph.

SEC. 6. The granting of a "permit" or "permission" to leave or enter the United States, as the terms are used herein, shall be construed to include the granting of a license under section 3 (b) of the "Trading with the Enemy Act" whenever such license is essential to the lawful transportation of the person to whom the permit is granted. Wherever it is provided explicitly or by implication that any person may depart from or enter the United States without a permit or permission under these regulations, such provision of itself shall be construed as a license under said section 3 (b) authorizing the transportation of such persons within the limits covered by the provision.

SEC. 7. The term "seaman" as used herein includes, in addition to the persons ordinarily described thereby, sea-going fishermen and all owners, masters, officers, and members of crews and other persons employed on vessels which for purposes of business or pleasure cruise on tidal waters beyond the shore line or on the Great Lakes.

SEC. 8. The term "hostile aliens" includes (a) all persons who are alien enemies as now or hereafter defined by statute, or by proclamation of the President; and (b) all subjects or citizens of enemy or ally of enemy nations.

#### TITLE 2.

##### *Limitations upon and Exceptions to the Application of the Act of May 22, 1918.*

SEC. 9. The following general limitations upon and exceptions to the application of the Act of May 22, 1918, are authorized and prescribed:

(a) No passports or permits to depart from or enter the United States shall be required of persons *other than hostile aliens* traveling between ports of the continental United States on vessels making no intermediate calls at foreign or non-continental ports. *Hostile aliens must obtain permits for all departures from, and entries, into the United States.*

(b) No passports or permits to depart from or enter the United States shall be required of persons *other than hostile aliens* traveling between points in the continental United States and points in Canada or Bermuda, or passing through

Canada on a trip between two points in the continental United States, except as provided and required by Title 3 of these regulations. This exception is not applicable to persons going from the continental United States via Canada to other places outside of the continental United States. Persons *other than hostile aliens* starting from Newfoundland for the United States shall not be required to obtain visas or verifications from the American consul in Newfoundland. (As to hostile aliens, see 9 (a), supra.)

(c) No passports or permits to depart from or enter the United States shall be required of persons in or attached to the military or naval forces of the United States or of any nation associated with the United States in the prosecution of the war, provided that such persons when in or attached to the military or naval forces of a nation so associated with the United States shall be identified and vouched for to the Secretary of State by a duly authorized representative of such nation, and provided further that when persons in or attached to such military or naval forces travel separately or otherwise than in regular commands they shall bear certificates issued by the War or Navy Department of the United States or by a duly authorized representative of an associated nation, adequately establishing the identity of the bearers and their connection with the military or naval forces aforesaid. Nothing herein shall be construed to prevent a citizen of the United States, if a member of or attached to the military or naval forces of any country, from entering or leaving the United States provided he bears a valid passport in lieu of the certificate of identification above described. All such departures shall, however, be subject to the requirements of Title 3 of these regulations. The limitations and exceptions aforesaid are subject to the provisions of section 38 hereof.

SEC. 10. \* \* \* (c) Aliens who are seamen on vessels arriving at ports of the United States and who desire to land in the country shall apply to an immigrant inspector. They shall submit to such immigrant inspector satisfactory evidence of their nationality and furnish such photographs and execute such forms and applications as the immigrant inspector shall require. The immigrant inspector may thereupon issue identity cards authorizing such seamen to land in the United States, unless the Secretary of State directs that they be kept on their vessels.

(d) Alien seamen desiring to sail from the United States shall submit satisfactory evidence of nationality to the United States customs inspectors stationed at the port of departure. If such applicants have landed in the United States since the date on which these regulations became effective at their port of arrival they shall further submit the identity cards issued by the immigrant inspector permitting them to land in the country. Said identity cards shall be stamped by the customs officials, if permission is given the applicants to depart, and such cards so stamped shall be the evidence of such permission. In case an applicant for permission to sail under this paragraph has not entered the United States since these regulations became effective, he shall apply to a collector of customs for an identity card and permission to sail. In making such application he shall submit satisfactory evidence of his nationality and furnish such photographs and execute such forms and applications as the collector of customs shall require.

(e) Identity cards issued to alien seamen as provided by the foregoing paragraphs (c) and (d) shall be retained by the seamen to whom they are issued and used by the holders from time to time as they land in and sail from the United States. An alien seaman bearing such card shall have the same validated for landing or sailing by the immigration or customs authorities respectively on each occasion when he applies for permission to land at or sail from a United States port.

(f) Aliens passing through the United States en route between two foreign points and not remaining in the United States more than 30 days shall make application for permission to depart through the immigration official acting as control officer at the point where they enter the United States. Such permission, if granted, will be given by the official acting as control officer at the designated point of departure. Nothing herein shall be construed as requiring a permit for departure from a transient alien in case such permit would not have been necessary if the journey to his final destination had commenced in the United States. A transient will be required to depart from the United States at the earliest date practicable. He shall submit to the immigrant inspector his itinerary to the port of departure, which shall be by the most direct route reasonably available, and upon obtaining approval of the same he

shall proceed immediately to the port of departure. Upon arrival at said port he shall report forthwith to the customs officers. For all deviations and delays special permission must be obtained from the Secretary of State.

(g) No permits to depart from or enter the United States shall be required of officials or representatives of foreign countries duly accredited to the United States or a friendly country provided that such persons bear valid passports and provided further that the Department of State is notified in advance of their intended entry or departure and consents thereto. Such officials, however, when desiring to enter the United States shall have their passports visaed by a diplomatic or consular officer of the United States in the country from which they come and in the country from which they embark for or enter the United States; and such officials desiring to depart from the United States shall have their passports visaed by the Department of State.

Nothing in the foregoing paragraphs (a) to (g), inclusive, shall be construed to prevent the entry or departure of an alien at the Mexican or Canadian border, of an alien seaman at a United States port, or of a transient alien at any point, provided he bears a valid permit for such entry or departure issued in accordance with Title 6 or Title 7 hereof.

SEC. 11. The following limitations upon and exceptions to the application of section 2 of the Act of May 22, 1918, are authorized and prescribed:

(a) Citizens of the United States traveling between United States ports not within the continental United States, or between such ports and ports within the continental United States, on vessels making no intermediate calls at foreign ports other than those of Canada or Bermuda, shall not be required to bear passports provided that they have received from the immigrant inspector at the port of departure United States citizens' identity cards. Applicants for such cards shall supply such photographs and execute such forms and applications as the immigrant inspectors require. When applications for such cards are made in dependencies of the United States where no immigrant inspectors are stationed they shall be made to the governors of such dependencies or their representatives duly appointed for the purpose: *provided*, that employees of The Panama Canal and the Panama Railroad Company, and members of their families, civilian employees of the United States and members of their families, and the families of members of the Army and Navy, traveling between the continental United States and the Panama Canal Zone, may carry identity certificates issued by The Panama Canal in lieu of passports or identity cards issued by immigration officials.

\* \* \* \* \*

(c) Citizens of the United States who are seamen upon vessels entering or leaving ports of the United States shall not be required to bear passports provided that they bear seamen's certificates of American citizenship issued by collectors of the ports of the United States as provided for in section 4588 of the Revised Statutes. Citizens applying for such certificates shall supply such photographs and execute such forms and applications as the collectors shall require. No identity card other than a passport or a seamen's certificate shall be issued to a seaman who is a citizen of the United States.

Nothing in the foregoing paragraphs (a), (b), and (c) shall be construed to prevent the use of a valid passport by any seaman or other citizen referred to in said paragraphs in lieu of a seamen's certificate or identity card as described therein.

### TITLE 3.—*General regulations—Persons liable to military service.*

SEC. 12. No person registered or enrolled or subject to registry or enrollment for military service in the United States shall depart from the United States without the previous consent of the Secretary of War or such person or persons as he may appoint to give such consent. The Secretary of State shall issue no passport or permit entitling such person to depart without securing satisfactory evidence of such consent. Reference should be had to Section 156, Selective Service Regulations, and amendments thereto.

### TITLE 4.—*American citizens—Departure and entry.*

#### ISSUE OF PASSPORTS.

SEC. 13. The "Rules Governing the Granting and Issuing of Passports in the United States" as established on January 24, 1917, are continued in force without change.



## VERIFICATION OF PASSPORTS IN FOREIGN COUNTRIES.

SEC. 14. Passports are not valid for return to the United States unless verified in the country from which the holder starts on his journey to the United States and further verified in the foreign country from which he embarks for or enters the United States. No fee shall be collected by diplomatic or consular officers of the United States for or in connection with such verification.

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TITLE 8.—*Control at point of entry and departure.*

SEC. 36. The actual control of persons departing from the United States at all seaboard and lake ports shall be exercised by the representatives of the customs service of the Department of the Treasury, who shall act as control officers for this purpose. The actual control of persons departing from the United States by land and of all persons entering the United States shall be exercised by the representatives of the Bureau of Immigration of the Department of Labor, who shall act as control officers for this purpose. The Secretary of State may from time to time designate other persons to act as control officers at any place. In all cases where passports or/and permits to enter or depart are required under these regulations each traveler before entering or departing from the United States shall present his passport or/and permit to the Control Officer at the point of entry or departure. He shall also answer such questions and undergo such examination as the Control Officer shall direct. If, as the result of such questioning and examinations, the Control Officer decides that the entry or departure of the holder of the passport or permit would be prejudicial to the interests of the United States, such person shall not be allowed to enter or depart. Under such circumstances the Control Officer shall immediately notify the Secretary of State by telegraph of his decision and shall as soon as practicable, and in no case later than two days after such decision, forward to the Secretary of State a full report giving the reasons for detention and a full transcript of any testimony or information bearing on such decision.

SEC. 37. If the Control Officer shall be satisfied that the permit and passport are valid and regular and have been properly visaed and that the holder presenting them is the person described therein, that neither of them has been altered or tampered with, and that the holder's departure or entry is not prejudicial to the interests of the United States, he shall allow the holder to depart from or enter the United States.

SEC. 38. In addition to the control as above set forth of persons generally required to secure permission to depart from or enter the United States, control may be exercised over individuals belonging to classes of persons generally allowed to depart or enter without permits or passports. A Control Officer may temporarily prevent the departure or entry of any such individual, in case he considers such departure or entry prejudicial to the interests of United States. Such action shall be immediately reported to the Secretary of State with a full statement of the reasons therefor. An individual so prevented from departing or entering shall not be entitled to the benefit of any of the limitations or exceptions contained in Section 9 hereof and his departure or entry is forbidden unless, if an alien, he obtains permission from the Secretary of State, or, if a United States citizen, he obtains a valid passport.

TITLE 9.—*Additional regulations.*

SEC. 39. The Secretary of State is authorized to make regulations on the subject of departure from and entry into the United States additional to these rules and regulations and not inconsistent with them.

WOODROW WILSON.

THE WHITE HOUSE,  
8 August, 1918.

[No. 2932]

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EXECUTIVE ORDER.

WHEREAS, by an Executive Order dated August 8, 1918, and supplemental to the Presidential Proclamation of the same date, rules and regulations governing the issuance of permits to enter and leave the United States were promul-

gated in pursuance of an Act of Congress approved the twenty-second day of May, 1918, entitled "An Act to Prevent in Time of War Departure From and Entry Into the United States Contrary to the Public Safety;" and

WHEREAS, said Executive Order provides that said law and said rules and regulations shall become operative at six o'clock in the forenoon of September 15, 1918, for the continental United States, and for the outlying possessions of the United States at such time or times as the Secretary of State shall designate;

NOW, THEREFORE, I, Robert Lansing, Secretary of State of the United States of America, acting under and by virtue of the authority vested in me, do hereby designate the following dates when said rules and regulations shall become operative in the outlying possessions of the United States, to wit: October 15, 1918, at six o'clock in the forenoon for Porto Rico and the Virgin Islands; October 30, 1918, at six o'clock in the forenoon for the territory of Hawaii; November 15, 1918, at six o'clock in the forenoon for the Panama Canal Zone; November 30, 1918, at six o'clock in the forenoon for the Philippine Islands.

ROBERT LANSING,  
*Secretary of State.*

DEPARTMENT OF STATE,  
WASHINGTON, D. C.,  
*September 4, 1918.*

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EXECUTIVE ORDER.

Authorizing the Granting of Sick Leave to Alien Employees in Panama Canal and Panama Railroad Service.

By virtue of the authority vested in me by law, the Governor of The Panama Canal is authorized to grant to alien employees of The Panama Canal and the Panama Railroad Company who are not entitled to leave privileges under the conditions of employment now in effect, compensation for time lost due to illness, with such restrictions as to time and rates of pay as may be prescribed by him in regulations in regard thereto, which he is hereby authorized to issue.

WOODROW WILSON

THE WHITE HOUSE,  
*14 November, 1918.*

[No. 2993]

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EXECUTIVE ORDER.

Section 4 of the Executive Order dated February 2, 1914, providing conditions of employment for the permanent force for The Panama Canal, and paragraph 15, subdivision I, schedule A, of the civil service rules, as amended by the Executive Order of April 5, 1918, are hereby amended so as to permit appointments to clerical positions in the Federal Service on the Isthmus of Panama paying not more than \$106 a month, without examination under the civil service rules. This order shall remain in effect only so long as the unusual conditions due to the present war exist and no longer than six months from the end of the war.

WOODROW WILSON

THE WHITE HOUSE,  
*16 November, 1918.*

[No. 2996]

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EXECUTIVE ORDER.

Under authority conferred by "An Act authorizing the President to coordinate or consolidate executive bureaus, agencies, and offices, and for other purposes, in the interest of economy and the more efficient concentration of the Government," approved May 20, 1918, it is hereby directed that Fifty Thousand

Dollars (\$50,000) appropriated by "An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and nineteen, and for other purposes," approved July 1, 1918, "For expenses of the War Trade Board created under authority contained in the Act entitled 'An Act to punish acts of interference with the foreign relations, the neutrality, and the foreign commerce of the United States, to punish espionage, and better to enforce the criminal laws of the United States, and for other purposes,' approved June fifteen, nineteen hundred and seventeen, and the 'Trading with the enemy Act,' approved October sixth, nineteen hundred and seventeen, including personal and other services and rent of offices in the District of Columbia and elsewhere, traveling expenses, per diem in lieu of subsistence not exceeding \$4, law books, books of reference, periodicals, rent of grounds, supplies and equipment, printing and binding, maintenance, operation and repair of motor propelled vehicles, \$3,500,000," be transferred from said appropriation and allotted to the Secretary of War for expenditure in the Canal Zone during the fiscal year ending June 30, 1919, under the direction of said Secretary of War for the purpose for which it was appropriated.

This sum will be deducted from the appropriations made for the War Trade Board for the current fiscal year and charged to the War Department.

WOODROW WILSON

THE WHITE HOUSE,  
27 November, 1918.

#### PROCLAMATION.

Abrogating, Annulling, and Rescinding Certain Regulations Prescribing the Conduct of Alien Enemies.

WHEREAS under and by virtue of the authority vested in me by the Constitution of the United States and by Sections four thousand and sixty seven, four thousand and sixty eight, four thousand and sixty nine, and four thousand and seventy, of the Revised Statutes, I declared and established by Proclamations dated April 6th, 1917, November 16th, 1917, December 11th, 1917, and April 19th, 1918, certain regulations prescribing the conduct of alien enemies;

I, WOODROW WILSON, President of the United States of America, do hereby proclaim to all whom it may concern that as of Christmas Day, December 25, 1918, Regulations numbered one to eight inclusive and Regulation eleven of the Proclamation of April 6th, 1917; Regulations numbered thirteen to twenty inclusive of the Proclamation of November 16th, 1917; and all of said Regulations as extended to women by the Proclamation of April 19th, 1918, shall be and they are hereby abrogated, annulled, and rescinded;

PROVIDED that the abrogation, annulment, and rescission of the Regulations aforesaid shall not affect the disposition of the case of any alien enemy detained, arrested, confined, or interned for the violation of any of said regulations, or release any alien enemy from the obligations of a parole imposed upon him by or with the authorization of the Attorney General.

This Proclamation shall extend and apply to all land and water, continental or insular, to which the above mentioned sections of the Revised Statutes extend and apply.

*In Witness Whereof* I have hereto set my hand and caused the seal of the United States to be affixed.

[SEAL] DONE at the City of Paris in the Republic of France, this 23rd day of December, in the year of our Lord one thousand nine hundred and eighteen, and of the independence of the United States the one hundred and forty third.

WOODROW WILSON

By the President:

FRANK L. POLK,  
*Acting Secretary of State.*

## EXECUTIVE ORDER.

By virtue of the authority vested in me I do hereby establish the following Executive Order for the Canal Zone:

Employees of The Panama Canal or Panama Railroad Company who have entered the Military or Naval service of the United States or Service overseas directly connected with the present war, including those who resigned to enter any of such services and failed to do so only because of the cessation of hostilities or on account of physical disability, and who were promised that they would be reinstated in the same or like positions within a period of ninety days after their honorable discharge from such service or within a period of 120 days after their resignation from The Panama Canal or Panama Railroad Company if unable to enter such service, shall, upon return to duty with The Panama Canal or Panama Railroad Company within the periods designated, be credited with leave at the rate of 1/12th of the year's allowance of leave, for each full month served prior to their separation from the service of The Panama Canal or Panama Railroad Company, where a loss of such leave resulted from the employees' separation from that service for the purposes named.

WOODROW WILSON

THE WHITE HOUSE,  
25 January, 1919.

[No. 3031]

## EXECUTIVE ORDER

By virtue of the power and authority vested in and conferred upon me by the Panama Canal Act approved August 24, 1912 (37 Statutes at Large, 560, 569), the Executive Order, dated April 9, 1917, placing the Panama Canal and all its adjuncts, appendants, and appurtenances, including the entire control and government of the Canal Zone, under the jurisdiction and authority of the Officer of the Army commanding the United States Troops stationed in the Canal Zone, is hereby terminated and shall be no longer in force.

WOODROW WILSON

THE WHITE HOUSE,  
25 January, 1919.

[No. 3032.]

## EXECUTIVE ORDER

To Amend the Form of Panama Canal Tonnage Certificate.

The form of Panama Canal tonnage certificates heretofore provided for under Article XVIII of the rules for the measurement of vessels for The Panama Canal is hereby amended to correspond in form and substance to the sample certificate appended to this order.

This order shall be effective sixty days from and after this date.

WOODROW WILSON

THE WHITE HOUSE,  
4 March, 1919.

[No. 3062.]

## EXECUTIVE ORDER

Tariff and Regulations Governing Public Passenger Conveyances in the Canal Zone.

By virtue of the authority vested in the President by Act of Congress approved August 21, 1916, the following regulation modifying the Executive Order of January 12, 1918, establishing maximum rates of fare and governing transportation of passengers for hire in the Canal Zone, is established:

SECTION 1. The rates and regulations provided in Sections 5 and 8 of above-mentioned Executive Order for automobiles intended for special service shall

hereafter apply only when cars are ordered from a garage for special service. In all other cases the legal rate shall be that provided in Sections 1, 2, 3 and 4 of the Executive Order of January 12, 1918.

NEWTON D. BAKER,  
*Secretary of War.*

*May 29, 1919.*  
By the President.

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EXECUTIVE ORDER

Mr. Frank H. Wang may be reinstated in the Panama Canal Service as a postal clerk without regard to the year limitation upon reinstatement contained in Civil Service Rule IX. Mr. Wang entered the service as a postal clerk on June 10, 1910, and on May 20, 1917, was granted leave of absence to go to France as a volunteer ambulance driver. After the expiration of his leave he resigned from the Red Cross, enlisted in the Foreign Legion of the French Army, completed the course at the French Officers' training school at Fontainebleau, held the grade of aspirant, and was demobilized on February 17, 1919. In view of his experience on the Panama Canal and his services in the cause of the allies, the Civil Service Commission recommends the waiver of the one-year limitation.

WOODROW WILSON

THE WHITE HOUSE,  
*31 May, 1919.*

[No. 3093.]

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EXECUTIVE ORDER.

1. The area of land hereinafter described as Fort Amador and Fort Grant Reservations, situated in the Canal Zone, is hereby set apart and assigned to the uses and purposes of a Military Reservation and shall be under the control of the Secretary of War; but said area shall be subject to the civil jurisdiction of the Canal Zone authorities in conformity with the Panama Canal Act.

2. The said area is described as follows:

FORT AMADOR AND FORT GRANT RESERVATIONS

Starting at monument "V" which is a concrete monument whose location is latitude  $8^{\circ} 56'$  plus 3602.8 feet, longitude  $79^{\circ} 33'$  plus 1556.9 feet, shown on a map on file in the District Engineer Office, Balboa Heights, C. Z., entitled "Reservations of Fort Amador and Fort Grant, C. Z." File No. GP-2308, dated December 28, 1918; thence on a line (azimuth  $97^{\circ} 06'$ ) connecting the said monument "V" with the center of the most southerly foot of the south radio tower, to the intersection of said line with the top of slope, a distance of 63 feet, more or less, which intersection is marked by a monument, marked "Mon. A" on the map; thence a distance of 534 feet on a line making an azimuth of  $80^{\circ} 44'$  to a point just west of the main road to Fort Amador and marked by a peg set into a concrete pad in the gutter, marked "Mon. B" on the map; thence a distance of 405.3 feet on a line making an azimuth  $70^{\circ} 0'$  to the intersection with the present boundary line at Balboa Radio Station WZ (Shown on a plan dated March 17, 1915, scale 1 to 600, entitled "U. S. Naval Radio Station, Balboa, C. Z." submitted by F. H. Cooke) marked by a monument called "Mon. C" on the map; thence a distance of 635.4 feet, more or less, on a line making an azimuth of  $307^{\circ} 40'$  to a point marked by a monument known as "Monument Z"; thence a distance of 652.4 feet, more or less, on a line making an azimuth of  $37^{\circ} 40'$  to a concrete monument, marked "Mon. D" on the map, which monument is on the extreme high water line on the shore of Balboa Harbor; thence along the extreme high water line in a general southeasterly direction along the west bank of the breakwater, around the former islands of Naos, Culebra, Perico and Flamenco back on the east bank of the breakwater and around the east bank of the present Fort Amador post site, on the extreme high water line to a concrete monument marked "Mon. G" on the map; thence on a line the azimuth of which is  $37^{\circ} 40'$  for a distance of 63.8 feet to the concrete monument marked "V" on the map which is the point of beginning.

Besides the area included in this boundary, the islands of San Jose, Panamarca, Changarmi, Tortolita, Tortola, Cocoviceta, Cocovi and Venado, are also within the reservation of Fort Grant.

All Azimuths are true and read from south.

3. All land in this area, north of latitude  $8^{\circ} 56'$  will be known as Fort Amador Reservation and all land South, including the islands of San Jose, Panamarca, Changarmi, Tortolita, Tortola, Cocoviceta, Cocovi and Venado, will be known as Fort Grant Reservation. The monuments, marked "Mon. E." and "Mon. F." on the map locating this east and west line (Lat.  $8^{\circ} 56'$ ) are placed on the extreme high water mark about 730 feet south of gun No. 1, Battery Birney.

4. Executive Order of May 28, 1918, relating to the transferring of a certain portion of land within the Balboa Radio Station Reservation from the control of the Secretary of the Navy to the control of the Secretary of War is hereby rescinded.

5. The following described portion of that certain tract of land situated at Balboa, Canal Zone, and placed under the control of the Secretary of the Navy by the Executive Order of May 26, 1914, No. 1948, is hereby transferred from the control of the Secretary of the Navy and placed under the control of the Secretary of War for military purposes:

Starting at monument "V" which is a concrete monument whose location is latitude  $8^{\circ} 56'$  plus 3602.8 feet, longitude  $79^{\circ} 33'$  plus 1556.9 feet, shown on a map on file in the District Engineer Office, Balboa Heights, C. Z., entitled "Reservations of Fort Amador and Fort Grant, C. Z., File No. GP-2308 dated December 28, 1918; thence on a line (azimuth  $97^{\circ} 06'$ ) connecting the said monument "V" with the center of the most southerly foot of the south radio tower, to the intersection of said line with the top of slope, a distance of 63 feet, more or less, which intersection is marked by a monument, marked "Mon. A" on the map; thence a distance of 534 feet on a line making an azimuth of  $80^{\circ} 44'$  to a point just west of the main road to Fort Amador and marked by a peg set into a concrete pad in the gutter, marked "Mon. B" on the map; thence a distance of 405.3 feet on a line making an azimuth of  $70^{\circ} 0'$  to the intersection with the present boundary line at Balboa Radio Station WZ (shown on a plan dated March 17, 1915, scale 1 to 600 entitled "U. S. Naval Radio Station, Balboa, C. Z." submitted by F. H. Cooke) marked by a monument called "Mon. C", on the map; thence a distance of 635.4 feet on a line making an azimuth of  $307^{\circ} 40'$  to a point marked by a monument known as "Monument Z" thence a distance of 765 feet, more or less on a line making an azimuth of  $217^{\circ} 40'$  to Monument "V" which is the point of beginning.

All azimuths are true and read from south.

6. The transfer of the above described tract of land is made subject to the continued right of the Navy Department to lay and maintain therein underground antennae receiving wires needed in connection with the maintenance and operation of the Naval Radio Station at Balboa, C. Z.

7. This portion of land herein transferred is included in the above description of Fort Amador.

8. In addition to the above the Secretary of War shall have control of all lands and water for a distance of one hundred yards out to sea from the high water line on all shores of Fort Amador and Fort Grant Reservations, terminating at the prolongation of boundary lines towards the sea from points marked "Mon. D" and "Mon. G" on the map.

WOODROW WILSON

THE WHITE HOUSE,  
25th July, 1919.

[No. 3130.]

















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