The Suez and Panama rules differ in relatively minor details. They could without great change be brought into harmony with each other; and, when harmonized, the Suez-Panama rules would constitute a natural basis upon which to build an international code of measurement rules. Probably the major portion of the vessels engaged in overseas international trade will use the Suez or the Panama Canal or both. The Panama and Suez measurement codes are based upon sound principles and could logically be made the model of an international code.

The most effective method of inaugurating a movement for the international unification of tonnage rules would be for Great Britain, or for Great Britain and the United States jointly, to call an international conference to formulate a code to be recommended for adoption by the commercial nations of the world. The recommendations of such a conference would carry much weight, and if the recommendations were carried out by Great Britain and the United States, they would probably be adopted in course of time by other countries engaged in international maritime commerce.

CHAPTER XIV

COMMERCIAL ADMINISTRATION OF THE CANAL

By the Act of August 24, 1912, "the President is authorized . . . to govern and operate the Panama Canal and govern the Canal Zone . . . through a governor of the Panama Canal and such other persons as he may deem competent to discharge the various duties." The act also gives the President power "to make and from time to time amend regulations governing the operation of the Panama Canal, and the passage and control of vessels through the same or any part thereof, including the locks and approaches thereto, and all rules and regulations affecting pilots and pilotage in the canal or the approaches thereto through the adjacent waters."

"The President is also authorized to establish, maintain, and operate, through the Panama Rail Road Company or otherwise, 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 for vessels of the Government of the United States

and, incidentally, for supplying such at reasonable prices to passing vessels."

The administrative organization which the President, upon the recommendation of Major General George W. Goethals, has created for the operation of the canal provides for seven departments directly under the governor of the canal. The departments are the purchasing, accounting, executive, operation and maintenance, supply, health, and Panama Rail Road. The two departments having to do with the commercial administration of the canal are the "operation and maintenance" and the "supply" departments. One of the three parts of the department of operation and maintenance is the marine department headed by a marine superintendent who has direct supervision over the commercial administration of the canal.

As stated in the 1915 *Annual Report of the Governor of the Panama Canal,* the marine superintendent is "charged with the entry, conduct of vessels through The Panama Canal, and clearing them after transit, together with the supervision of the port captains, board of local inspectors, the pilots, the operation of lights and beacons, and the inspection and admeasuring of vessels." There is a captain of the port at Cristobal and another at Balboa, and these are the officials most directly concerned with the details of

the commercial administration of the canal. The captain of the port assigns vessels to wharves, provides for the docking and berthing of ships, furnishes pilot service, supervises the admeasurement of vessels, and has "general supervision and enforcement of the canal and harbor regulations relating to shipping."

The shops and terminal facilities and the mechanical operation of the canal are briefly described in Chapters XIX and XX of Sibert and Stevens, *The Construction of the Panama Canal.* It is not necessary to repeat what is stated in that excellent volume, and the following brief description of the way in which vessels are operated through the canal will suffice:[1]

The handling of a vessel all through the canal, except in the locks, is essentially the same as its handling through any charted channel where observance of signals, ranges, and turns is necessary. The canal channel throughout is very accurately charted, fully equipped with aids to navigation, and governed by explicit rules with which the pilots, of course, are thoroughly familiar.

In the locks, the vessel is under the control of the lock-operating force. As the vessel approaches the locks, the operator in charge at the control house indicates by an electrically operated signal at the outer end of the approach wall whether the vessel shall enter the locks, and, if so, on which side; or whether it shall keep back, or moor alongside the approach wall. If everything is

[1] *Official Handbook of the Panama Canal* (1915), pp. 20, 21.

ready for the transit of the locks, the vessel approaches the center approach wall, which is a pier extending about a thousand feet from the locks proper, lines are thrown out, and connections are made with the electric towing locomotives on the approach wall.

The vessel then moves forward slowly until it is in the entrance chamber, when lines are thrown out on the other side and connections are made with towing locomotives on the side wall. Six locomotives are used for the larger vessels, three on each wall of the lock chamber. Two keep forward of the vessel, pulling and holding her head to the center of the chamber; two aft, holding the vessel in check; and two slightly forward of amidships, which do most of the towing of the vessel through the chamber. The locomotives are powerful affairs, secured against slipping by the engagement of cogs with a rack running along the center of the track, and equipped with a slip drum and towing windlass, which allow the prompt paying out and taking in of hawser as required. No trouble has been experienced in maintaining absolute control over the vessels.

The water within the lock chamber proper, beyond the entrance chamber, is brought to the level of that in the approach, the gates toward the vessel are opened, the fender chain is lowered, and the locomotives maneuver the vessel into the chamber and bring it to rest. The gates are then closed, the water raised or lowered, as the case may be, to the level of that in the next chamber, the gates at the other end are opened, and the vessel is moved forward. Three such steps are made at Gatun, two at Miraflores, and one at Pedro Miguel.

When the vessel has passed into the approach chamber at the end of the locks, the lines from the towing locomotives on the side wall are first cast off, then those

from the locomotives on the approach wall, and the vessel clears under its own power.

Vessels require from 8 to 10 hours to make the transit through the canal, about 3 hours being spent in getting through the locks. In the sea-level channels and in Gaillard Cut, the speed of vessels is limited to 6 knots, but in Gatun Lake the speed may be 15 knots, except in portions of the lake where the channels are narrowed to 1,000 feet and less, and there the speed must be brought down to 12 and 10 knots.

The supply department is of great assistance to the owners and masters of vessels using the Panama Canal. The policy followed in the administration of the canal is to provide shipping, at reasonable prices, with all useful facilities and all needed supplies and repairs. The charges made for facilities and supplies have been fixed with a view to covering expenses, including overhead charges. The United States does not seek to make commercial profit in providing facilities and supplies.

As stated in Chapter XI, the Government has provided large coaling stations at Cristobal and at Balboa. The coaling plant of the Panama Canal at Cristobal has a stowage capacity of over 400,000 tons, while the plant at Balboa has a capacity of 200,000 tons. The coaling facilities are maintained by the Government to supply not only

the naval vessels of the United States but also merchant ships, American and foreign.

At the end of April 1916, the fuel oil stowage facilities at the Isthmus included the following tanks: At Cristobal are two tanks belonging to the Panama Canal, each having a capacity of 42,000 barrels. Private companies have six tanks each with 55,000 barrels' capacity and three tanks holding 37,500 barrels each. At Balboa the Panama Canal has two oil tanks, each with 42,000 barrels' capacity, while private concerns have two tanks each holding 55,000 barrels, four of 37,500 barrels, and one of 25,000 barrels' capacity. It is stated that the International Petroleum Company is about to construct two tanks, one holding 65,000 barrels and another 20,000 barrels. Moreover, the Panama Canal had awarded contracts for the construction of two additional 55,000 barrel-tanks, one to be constructed at Mount Hope and the other at Balboa. The large number of fuel tanks that have been constructed and are in process of erection indicates the rapidly growing use of oil instead of coal as fuel for steamers.

Some private companies carry a stock of Diesel engine oil at the Isthmus, but up to the end of April 1916, the Panama Canal had not begun to handle oil for Diesel engines. Should there develop a large demand for Diesel oil, the Panama Canal will, presumably, keep it in stock.

The prices at which coal and oil are supplied at the Isthmus by the Panama Canal and the policy of the canal authorities in supplying fuel are indicated by the following announcement which appears from time to time in the *Canal Record:*[1]

Coal is supplied to vessels at both Cristobal and Balboa at the rate of between 600 and 1,500 tons per day. Present prices are: At Cristobal, from lighters, trimmed in bunkers, or from cars alongside wharf, handled by ship's gear, per ton, $6.00; use of steam hoist and crane per hour, $1; at Balboa, the price is $1 more per ton, either form of delivery.

Fuel oil may be obtained at Balboa or Cristobal, from plants of the Panama Canal, or from private corporations. The present price from the Canal is $1.25 per barrel. Prices from the corporations may be obtained on application to them.

Diesel engine oil is for sale by several companies at approximately 50 shillings per ton of seven barrels.

The general supplies obtainable from the Panama Canal authorities at the Isthmus include practically everything that a vessel may need en route. "All standard lubricants, light and heavy hardware, cordage, and miscellaneous ship chandlery supplies are sold from the storehouses at Cristobal and Balboa." From the commissary department of the Panama Canal, merchandise and all kinds of food may be purchased, including

[1] *Canal Record,* April 19, 1916, p. 308.

fresh meats, vegetables, and fruit. Fresh water is sold at 25 cents per 1,000 gallons; and ice at 33 cents per 100 pounds. A vessel arriving at the canal may send its accumulated laundry by rail across the Isthmus and receive back the laundry on the same day, after the vessel has made the transit through the canal.

The large and fully equipped machine shops at Balboa enable the canal authorities to make repairs to vessels; and in the huge dry dock at Balboa, which was finished during the year 1916, it is possible to dock any vessel that can pass through the canal. Other services rendered vessels include towage at the terminals and, if necessary, through the canal. Pilotage into and out of the ports and through the canal is compulsory, but no charge is made for pilotage in the case of vessels that pass directly "through the canal without stopping at either terminal port to take on or to discharge cargo or passengers." This rule, however, does not prevent through passengers from landing. The cable and radio facilities at the canal are available for commercial uses at reasonable rates.

It is the policy of the canal authorities to provide shipowners with all useful information. From time to time "Notices to Mariners" are issued containing information regarding aids to the navigation of the canal; "Notices to Steamship

Companies" and "Sailing Directions" are published at intervals with a view to keeping shipowners fully informed as to the interpretations of the rules and as to other matters that may be of assistance to owners and masters of vessels operated through the Panama Canal.

The financial methods followed in the commercial administration of the canal are simple and impose minimum expenses and delays upon vessels using the waterway. As the *Official Handbook of The Panama Canal* states:

> For a steamship owner or agent to send a vessel through the canal is one of the simplest matters in all his business. Practically all he has to do is to make a deposit with the Government to cover the vessel's canal expenses. The Government will attend to everything else, and return his change as soon as the vessel has cleared from the canal.

Steamship companies and the owners of individual vessels may avoid carrying the cash required to pay tolls and to purchase supplies at the canal by making a deposit with an assistant treasurer of the United States at any of the larger ports of the country, and the assistant treasurer will cable to the Panama Canal giving notice of the amount thus placed on deposit. From the amount thus placed to the credit of the steamship company or shipowner, settlement may be made at the Isthmus for canal tolls and for whatever

supplies may be purchased. Shipowners in foreign countries may readily arrange through their banks for the deposit, with an assistant treasurer at an American port, of sums from which to make payments for tolls and to meet other expenses at the canal.

The Panama Canal authorities much prefer to have the shipowner deal directly with them instead of through the medium of a local agent. As the marine superintendent states in the 1915 *Annual Report of the Governor of the Panama Canal*:[1]

> Experience has fully demonstrated that the interests of vessels using the canal for transit and purchase of coal, supplies, provisions, and attendant services are much easier, better, and satisfactorily handled when placed in the hands of the canal authorities than when in the hands of local agents. In this respect, as well as in others, every effort has been made to eliminate any unnecessary or duplication of work and to make our business methods as simple as possible. To such an extent has this been accomplished that if owners or agents will follow our advice a vessel may automatically enter and pass through the canal without her master leaving his ship or signing a paper.

The admirable organization for the mechanical and commercial operation of the Panama Canal reflects the administrative skill and the exceptional foresight of Major General Goethals, the

[1] p. 224.

builder and first governor of the canal. A great engineer, aided by an able corps of trained assistants, has successfully accomplished an executive task of the first magnitude, and has thereby rendered a most valuable service to the commerce of the United States and other countries. It is especially fortunate that the operation of the canal was inaugurated by the man who directed its construction.

CHAPTER XV

WHAT HAPPENED WHEN THE SLIDES CLOSED THE CANAL

After the Panama Canal had been in operation for more than a year and the trade of the United States and other countries had come to depend upon the services and facilities afforded by the waterway, it was suddenly closed to all shipping. It remained closed until April 15, 1916, a period of seven months. The inconvenience and losses that resulted from the closing of the canal indicate concretely its usefulness to the commerce and industries of the United States and of the world generally.

In spite of the fact that international trade was greatly reduced by the Europeon War, the traffic through the canal had reached a relatively large volume before the waterway was closed by the slides that occurred September 18, 1915. During July of that year 170 vessels loaded with 705,000 tons of cargo were passed through the canal; and, although this was the largest traffic of any month preceding the closing of the canal, the volume for that month was not greatly above the

monthly average which the traffic had attained. During June, July, and August 1915, 474 vessels, carrying 1,884,000 tons of cargo, made use of the waterway. The sudden stopping of so large a current of traffic necessarily involved many expensive readjustments of industry and trade.

The readjustments could not be made immediately. During the three weeks following the date on which the slides occurred, more than 100 vessels, bearing 375,000 tons of cargo, arrived at the termini of the canal and were prevented from proceeding through the waterway to their destinations. Many more vessels would have reached the canal during these three weeks had not their sailings been canceled or their routes changed by the owners upon receiving notice of the closing of the canal.

The variety and value of the commerce interrupted by the closing of the canal are even more impressive than the volume of the trade affected. The traffic westbound between the Atlantic and Pacific ports of the United States is of much greater variety than that eastbound, but the manifests (some of which were published) of steamers that were held up at the canal en route from San Francisco to New York show that many kinds of articles were being shipped between the two seaboards and that some of these articles were of high value.

The *Ohioan,* of the American-Hawaiian Line, which sailed from San Francisco for New York, September 8, 1915, had in its cargo 49 different varieties of articles for New York and 38 different kinds of commodities for Boston. These were goods from San Francisco, and, in addition to them, there were large shipments of merchandise for New York and Boston from west coast ports north of San Francisco. The *Alaskan,* of the same line, which sailed from San Francisco for New York, September 16, 1915, had on board 62 different kinds of commodities for New York and 18 for Boston. This vessel also took out from San Francisco $385,000 worth of "bonded goods," which must have been imports being shipped to New York from foreign Pacific countries. The *Alaskan's* manifest shows that the lading included copper with a value of $33,750, dry goods valued at $35,095, hops at $22,700, potash at $23,911, wool at $240,293, and wine at $35,042. These few selected commodities give some suggestion of the value of the commerce interrupted by the closing of the canal.

When the Culebra slides suddenly closed the canal, an effort was made to substitute the Panama Rail Road for the canal as the agency for the transfer of freight from ocean to ocean, but it was at once realized that this single-track railroad was able to handle only a small part of the

traffic to be transported. By working seven train crews "in chain gangs, or rounds, first in, first out, on the through freight traffic, the railroad was able to handle between 4,000 and 5,000 tons of trans-isthmian freight daily." That, however, was barely equal to the average cargo of a single vessel. Most vessels were soon withdrawn from the coastwise trade between the two seaboards of the United States, but some lines engaged in foreign commerce via canal routes were continued in service; and the Panama Rail Road, while the canal was closed, transferred as much freight as possible in each direction between Cristobal and Balboa. The scarcity of vessels in ocean commerce and the irregularity of these sailings increased the difficulty of the Panama Rail Road and made the congestion more serious.

For a short time after the closing of the canal the Panama Rail Road transferred through traffic across the Isthmus at its regular classified schedule of rates for such traffic, but on the 6th of October, 1915, when it was realized that the canal would be closed for some considerable time, the Rail Road Company gave the steamship companies the option of a flat rate on through traffic of $3 per ton for all kinds of commodities. This flat rate, like the classified tariff, covered terminal services and the handling of freight out of and into vessels.

Only one company, the Luckenbach Steamship Company, which was engaged in the coastwise trade, availed itself of the $3 flat rate for all traffic. The vice-president of the Panama Rail Road Company, Mr. E. A. Drake, states that "in addition there were some individual instances of its use for single lots of cargo, but every other line engaged in transshipping through cargo elected to avail of the option that was publicly offered them to select the classified rates which have since applied to all cargo transshipped including cargo en route under bills of lading dated up to April 14th [1916]."

Mr. Drake also states that "with the reopening of the canal the transshipment of cargo, in which the railroad was temporarily engaged in discontinued." It should be explained that when the canal was opened in 1914, the Panama Rail Road ceased to transport through traffic, all such traffic being required to use the canal. The Panama Rail Road has, however, established, "applicable to any future interruption of canal traffic, a uniform classified tariff that will apply indiscriminately to all cargo transshipped whether domestic or foreign. The discrimination in past years in favor of coastwise traffic was maintained under the most adverse criticism from foreign interests and is now effectually done away with."

The closing of the canal imposed a large ex-

pense upon traffic across the Isthmus. The tolls charged for the use of the canal amount to about 90 cents per ton of cargo, on the average, and thus the closing of the canal added at least $2.10 per ton to the cost of getting cargo across the Isthmus. This, however, was only a small part of the expense that commerce had to bear. The most serious burden was due to the delay to traffic, to the uncertainty of the services that could be secured from the railroad, and to the inability to ship more than a small amount of freight, even at the higher costs of transportation, under the adverse conditions that prevailed.

The Culebra slides, with the consequent closing of the canal, could hardly have come at a more inopportune time. The industries and trade of the United States, after about three years of business depression, had entered upon a period of exceptional prosperity in August 1915. Transportation facilities within the United States proved inadequate to handle the tonnage offered to the railroads. Ocean shipping was entirely incapable of moving the exports and imports; and the congestion of freight at the terminals and in the yards of American railroads was made more serious by the closing of the canal route to coastwise carriers and to shipping engaged in the foreign trade of the United States. The closing of the canal made a bad situation worse and prolonged

the period of traffic congestion in the United States.

It is obvious that the closing of an interoceanic highway like the Panama Canal would have a world-wide effect upon commerce and industry. For example, sugar from Hawaii for the refineries at Philadelphia and New York, instead of moving over the short route via Panama, had to be sent around South America, or be transferred to the railroads at the Pacific seaboard of the United States for expensive transportation more than 3,000 miles by rail across the continent. The Bethlehem Steel Company, at South Bethlehem, Pa., was prevented from securing ore from Chile and had to obtain ore at higher cost from Michigan and Minnesota. Indeed, the company has been unable to secure ore in sufficient quantity and has been obliged to buy pig iron.

The effect of the closing of the canal upon the manufactures of the United States is illustrated by the difficulty that was experienced in shipping locomotives, boilers, and wheels to the Far East for delivery to the Manchurian and Siberian railroads. Long after these locomotives should have been on the way to their destination they were in the cars on the tracks of the Jersey Central Railroad, adding to the already serious congestion in the railroad yards. Munitions manufactured in Bridgeport, Connecticut, for delivery in the Far

East accumulated in the railroad yards at Bridgeport and increased the difficulties experienced by the New Haven Railroad in keeping its line and terminals from being completely choked up. Illustrations similar to these might be cited in great number.

An interruption to business such as was caused by the closing of the Panama Canal results in large direct and indirect losses to men engaged in many lines of business. Mention may be made of the fact that manufacturers of iron and steel in the eastern part of the United States had contracts to deliver their products to consignees on the Pacific coast of the United States and in foreign Pacific countries. These contracts were made upon the assumption that the goods could be shipped via the canal at much lower freight rates than were obtainable after the canal was closed. Numerous business men on both the Atlantic and Pacific seaboards of the United States found that the business which they had built up by making use of the services through the canal had to be abandoned when the canal services were discontinued. What they had spent in building up the business was lost wholly or in part.

With the reopening of the canal, the trade that was interrupted by the closing of the waterway is being resumed, as far as possible; but when shippers lose trade to competitors it usually takes

time to regain the business. Moreover, the opening of the canal will not immediately restore the conditions that prevailed prior to September 1915. The vessels that were being operated through the canal have been put upon other routes and employed in other services, and the facilities for transportation between the two seaboards of the United States via Panama will be less in 1916 and 1917 than they were during the first eight months of 1915.

This will be the most serious consequence of the closing of the canal. The slow return of vessels to Panama routes will keep the revenues, obtained by the Government from canal tolls, small in comparison with what they would have been had the traffic continued uninterruptedly to develop at the rate it was increasing during the first eight months of 1915. The slides have not only added many millions of dollars to the cost of constructing the canal, but have cut down the returns which the people of the United States will receive from their large investment. During July and August 1915, the last two full months that the canal was operated before being closed by the slides, the tolls earned by the canal amounted to $1,070,157.

The losses sustained by the Government, however, are of much less importance than those incurred by the manufacturers and traders of the United States whose business depends upon the

transportation facilities afforded by the canal. The losses sustained by individuals cannot be so definitely measured as can the losses in tolls, but they must have been larger and of more serious consequence.

The tonnage of shipping engaged in the international trade by way of the canal will be much less during 1916 and during the continuance of the European War than it was at the time the slides temporarily put the canal out of service. In April 1916, Mr. H. E. D. Jackson, vice-president of the American-Hawaiian Steamship Company, in testifying before the Interstate Commerce Commission, stated that the company had been compelled to discontinue its intercoastal services not only because of the closing of the canal by the slides, but also because the prevailing rates by rail between the two seaboards of the United States made it necessary for vessels in the coastwise trade to charge lower rates than could be obtained by placing their vessels in the foreign trade. Under existing conditions the company finds it more profitable to operate or charter their vessels in the foreign trade. Concerning the disposition made of the vessels early in 1916, Mr. Jackson testified:

We chartered three of our vessels the other day to the United States Steel Corporation for a year, at much higher figures than we had ever obtained by operating

them. Four of our vessels are under charter till December 1917, three are chartered for a year, and the others are chartered for from three to six months each, with ample opportunity for renewing the charters as they may expire.

Although vessels are now being built for the American-Hawaiian Steamship Company, these vessels will not go immediately into the canal trade, because of the greater revenues to be obtained in foreign commerce. Special reference is here made to the American-Hawaiian Steamship Company because it is by far the largest steamship line that has been engaged in the intercoastal trade. During the twelve months ending with the first of July 1915, this company carried 55.57 per cent. of the trade from the Atlantic ports of the United States through the canal to California terminals. At the present time the company has a fleet of 26 vessels, the number of which will be increased with the vessels now under construction.

The second largest steamship line that has been in the intercoastal service is the Luckenbach Steamship Company which regularly has a fleet of 10 vessels, and which operates an additional number of vessels under charter as its business may require. Mr. H. P. Hamilton, general manager of the Luckenbach Steamship Company, in testifying at the hearings above referred to, stated that the Luckenbach Company will probably not resume the

coast-to-coast service during the next two years. This company, during the year ending July 1, 1915, carried 29.64 per cent. of the traffic from Atlantic ports through the canal to California terminals. The testimony of these officials of two steamship lines that were developed with reference to the intercoastal trade, and which before the closing of the canal carried the larger part of the commerce coastwise between the two seaboards of the United States, is rather discouraging as to the early resumption of the intercoastal business via the canal.

With the restoration of peace and the return of commerce to its usual volume and to its customary routes, and with the decline of freight rates to a fairly normal level, the traffic of the Panama Canal may be expected to overcome the setback it has suffered because of the war and in consequence of the closing of the waterway for a long period while the war was in progress. The present unhappy state of the world must be temporary, and, when commerce is again permitted to expand, the use of the canal will increase with the growth of international trade.

It is to be expected, however, that the demand for ships will be greater than the supply and that ocean freight rates will be high for some time after the close of the European War. If these conditions prevail, vessels will not quickly return

to the intercoastal trade of the United States where carriers by water must make rates in competition with railroad rates that are subject to government control; but, at most, the restoration of the interrupted coastwise trade through the canal can only be delayed. Indeed, the turn of the tide from ebb to flood may come sooner than present conditions would indicate. It is to be hoped that this may come to pass.

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[1] Unless used with a qualifying word, "Canal" in this index refers to the Panama Canal.

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