JOHNSON

—

WHAT THE CANAL WILL ACCOMPLISH

PHOTOGRAPHS IN COLOR OF THE

PANAMA CANAL

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WHAT THE CANAL WILL ACCOMPLISH

BY EMORY R. JOHNSON

Special Commissioner on Traffic and Tolls

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FROM the days of Columbus the world has desired a canal across the American isthmus, and since the acquisition of California and a frontage on the Pacific the people of the United States have not ceased to consider how the isthmian barrier might be broken through. Now that the hope is about to be realized, what, it may well be asked, is it that the United States and the world are to gain by the expenditure of the $400,000,000 that it has cost to construct the water-way?

The Panama Canal has frequently been declared to be a commercial convenience and a military necessity for the people of the United States. This is such a generalization as would naturally be made by the military expert, and by those statesmen and publicists who place great emphasis upon the enhancement of the military power and naval prestige of the United States. This is not the point of view of business men and of the public generally; they regard the canal as a highway constructed to reduce the expenses and risks of commerce, to make possible the expansion of industry, and to enlarge the profitable employment of labor.

It is for peaceful purposes rather than for military uses that the canal has been built. The American people have not been animated mainly by military ambitions in the work they have done at Panama; their primary object has been to promote their domestic trade, and to remove the handicap under which they now compete with the people of Europe for the vast commerce of the Pacific.

Nevertheless, the Panama Canal will be a valuable, and most welcome, military asset. The United States is a world-power fronting the Atlantic and Pacific, upon both of which oceans it must maintain an efficient naval force. To-day the fleets that defend our eastern and western seaboards and hold the ægis of their protection over our foreign trade are thirteen thousand miles apart; they cannot support each other; each must be strong enough to do its own work, and to fight, unaided, its own battles.

The Panama Canal will bring the Atlantic and Pacific squadrons of the American navy closer to each other, and thus greatly increase the mobility of the fleets; and it will accomplish much more than that. The strong fortifications guarding the canal at the entrances will also protect coaling stations, docks, and machine-shops. The Canal Zone is thus made a secure and well-equipped naval base at which fleets may be assembled, from which a squadron may go forth to strike a blow, and to which it may confidently return for coal, supplies, and necessary repairs. The canal will thus practically unite the Atlantic and Pacific fleets.

Naval experts have said that the canal will double the efficiency of the American navy. This may be an exaggeration, but it is a roughly accurate generalization. Of course, one hardly needs to be a military expert to realize of what strategic value it will be to the United States to have strong fortifications and a secure naval base at the sole gateway between the Atlantic and Pacific.

By the Hay-Pauncefote treaty, as first drafted, the United States was not to fortify the canal, and the promise was made to Great Britain that treaties neutralizing the canal would be entered into with other nations. The Senate wisely took these provisions out of the proposed treaty, and the convention that was subsequently negotiated and ratified contained no references to fortifications. The existing Hay-Pauncefote treaty stipulates that "the canal shall be free and open to the vessels of commerce and war

of all nations"; but the United States is the sole guarantor of the neutral use of the water-way by the vessels of all nations upon terms of entire equality. The United States is free to take full advantage of the canal as a military asset, and it is wisely proceeding with the erection of fortifications and the construction of coaling stations, dry-docks, and repair-shops.

Most traffic now shipped by water between the two seaboards of the United States is sent via the isthmuses of Tehuantepec and Panama, where the double handling of freight and the haul by rail add largely to the costs of transportation, increase losses due to the damage of goods, and lengthen the time that goods are regularly in transit. In times of congested business, goods are often seriously delayed in transit, and shippers or consignees suffer serious losses.

Whatever may be the effect of the Panama Canal on the rates charged by coastwise carriers upon inter-coastal traffic shipped from seaboard and inland points, it is certain that the costs of transportation will be reduced fully one-third. The American-Hawaiian Steamship Company pays one-third of the through rate, or on the average about $3.50 per ton of 2,000 pounds, to the Mexican National Railway across the Isthmus of Tehuantepec, for transferring cargo from the ship in one ocean to the vessel in the other. Through shipments via Panama are likewise billed at through rates, the Panama Railroad Company taking an agreed share of the total rate. The average cost of transferring cargo across Panama, from one steamer to another, is fully $3.00 per ton.

This saving of $3.00 to $3.50 per cargo-ton will be only partially offset by the tolls of $1.20 per net vessel-ton charged for transit through the canal. A vessel-ton is 100 cubic feet of space, while a cargo-ton may be either 2,000 pounds of weight (more often 2,240 pounds on the ocean), or 40 cubic feet of space. Freight-vessels can transport between two and three tons of cargo for each net ton, and in actual service they average nearly two freight-tons per vessel-ton. Thus the tolls that have been fixed by the President will amount to about 60 cents per ton of freight, or, roughly, one-fifth the present average cost of transferring goods across the isthmuses of Tehuantepec and Panama.

The canal will do much more than to provide a cheaper route for existing traffic. By making possible the through shipment of freight without transfer it will permit the movement of a heavy tonnage of lumber, ore, coal, and other commodities, which can seldom bear the expense of a double handling *en route*. The canal will bring into the channels of commerce the basic materials produced in large quantities by the extractive industries of the southern and western sections of the United States. The expenses of trade will be reduced and its volume expanded.

This, at least, is possible and probable; but it will be well to bear in mind that the freight rates charged by the carriers coastwise between the two seaboards of the United States will not necessarily be lowered by the amount which the canal will reduce the costs of transportation. This might happen if the rates were determined solely, or mainly, by the cost of the service; but cost is not the sole basis, nor the principal determinant, of rate schedules. Keen and unrestrained competition among the steam-ship lines would cause the carriers to adjust their charges with reference to the costs of service; but the competition of the coastwise lines will be effectively regulated by means of "conferences," or organizations, of the lines. The rates between the two seaboards will be the same by all the rival lines, and the charges for most of the freight are more apt to be what the traffic will bear than to be what the costs of the service would compel the carriers to charge.

The coastwise steam-ship lines will have to meet outside competition. The exceptionally large producer or shipper of lumber, coal, ore, or grain will, or may, transport his goods in vessels which he owns or charters, and his transportation expenses will depend upon the cost of owning and operating his vessels, or upon the rates which he must pay to charter ships. Charter rates are truly competitive.

It is not to be expected, however, that the individual vessel owned or chartered by the producer or trader will do much to regulate the rates of the steam-ship lines.

Only a few commodities can be handled in full vessel-loads, and but comparatively few individuals and corporations will buy and sell in cargo-lots. Most of the traffic between the two seaboards will be carried by the regular steam-ship lines, which will probably serve ninety-nine out of every hundred shippers.

The transcontinental railroads and the coastwise carriers will be traffic rivals, but it remains to be seen how actively they will compete. Will the railroads make large reductions in their coast-to-coast rates to keep traffic from going coastwise, or will the rail lines maintain their through rates at the present level, and deliberately lose such shipments as can secure satisfactory service and lower rates from the coastwise carriers?

If the transcontinental railroads do not cut their through rates, they may lose ten per cent (but not more than ten per cent) of their tonnage moving between the eastern and western sections of the United States; if they lower the through rates, they will not only decrease their revenues from nine-tenths of their through business, but, because of the interdependence of intermediate and through tariffs, their entire schedule of charges must be modified and their revenues therefrom must be lowered.

Again, should the railroads decide that their net profits will be larger if they maintain their present rate schedules and lose some of the through traffic, will the coastwise steam-ship lines, or rather their "conferences," fix their rates with reference to the stable schedules of railroad tariffs, making the charges by water such differentials under the railroad rates as will secure for the steam-ship lines the volume of traffic required to fill the vessels in service?

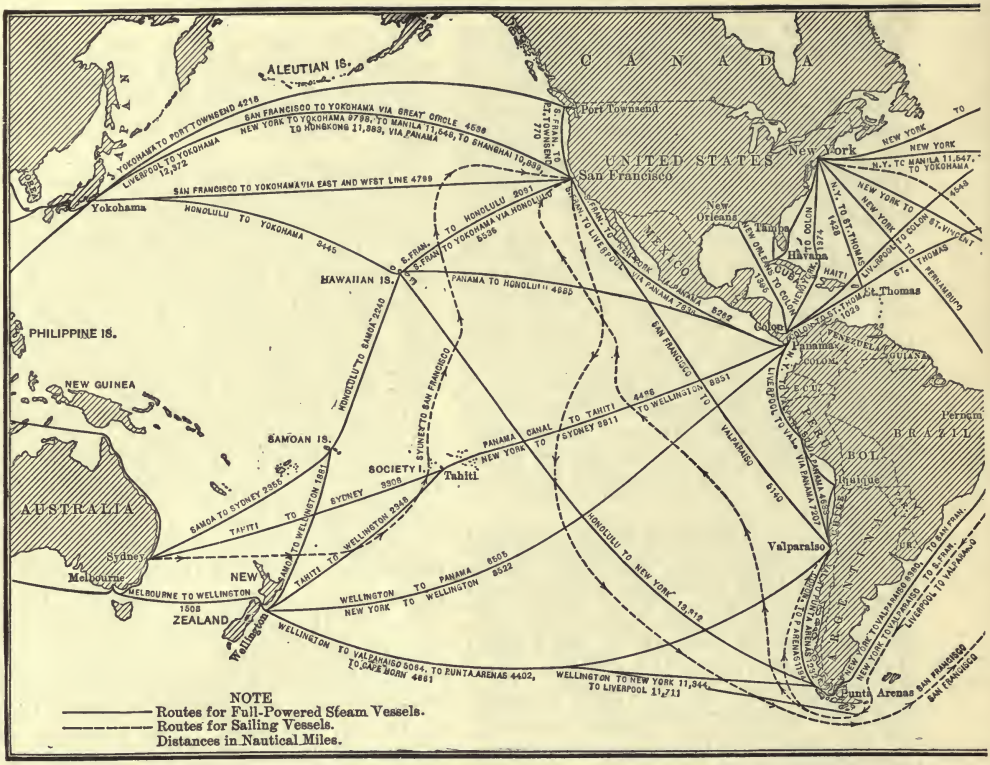
The known facts as to rate-making by railroads and by steam-ship lines do not presage keen competition among the steam-ship lines, or between the coastwise carriers and the railroads. It is not probable that the steam-ship lines operated through the canal will compete so actively with each other and with the railroads as to bring the rates by water as low as the cost of service will allow. It is rather to be expected that the steam-ship lines will so effectually restrict their competition with each other as to be able to fix and maintain their rates, not primarily with reference to the cost of the service, but mainly with regard to what the traffic will bear.

The coastwise rates, for the most part, will be what the shippers can and will pay for transportation by water instead of by rail. The rates now charged by way of the Isthmus of Tehuantepec are, in fact, adjusted with reference to the tariffs by rail. This policy is the one that the coastwise carriers may be expected to maintain after the opening of the canal.

This analysis does not point toward a revolution in coast-to-coast rates as a result of the lower costs of transportation by the canal. Rates, however, on many commodities will be lower. Cost of service is not without its influence upon rates—and the larger volume of traffic, and the increase in the number of steam-ship lines, will affect the policy of the coastwise carriers in making rates. Competition may be regulated and mitigated, but it cannot be eliminated; and much the same is true of public sentiment. The pressure of public opinion, exerted by business organizations and by the newspapers, and embodied in laws against trusts and monopolies, is not without influence upon the action taken by the makers of rates.

Competition alone will not insure cheap transportation via the Panama Canal. The benefits to which the public as a whole is entitled will not be secured merely by opening the canal, and by designating what carriers may and may not use the water-way. It will be found necessary to apply to the regulation of the services and rates of the regular coastwise lines the principles that have been effectively applied to the railroads. A public demand for the regulation of coastwise carriers is one of the results that will follow from the opening of the Panama Canal.

The simplest and most concrete measure of the service rendered by the Panama Canal will be the tonnage of ships that use the water-way. This can be forecast with a fair degree of certainty, because it is possible to ascertain how much traffic now moves by routes that would be abandoned in favor of the canal route, and it is easy to find out how fast this available canal traffic is increasing.

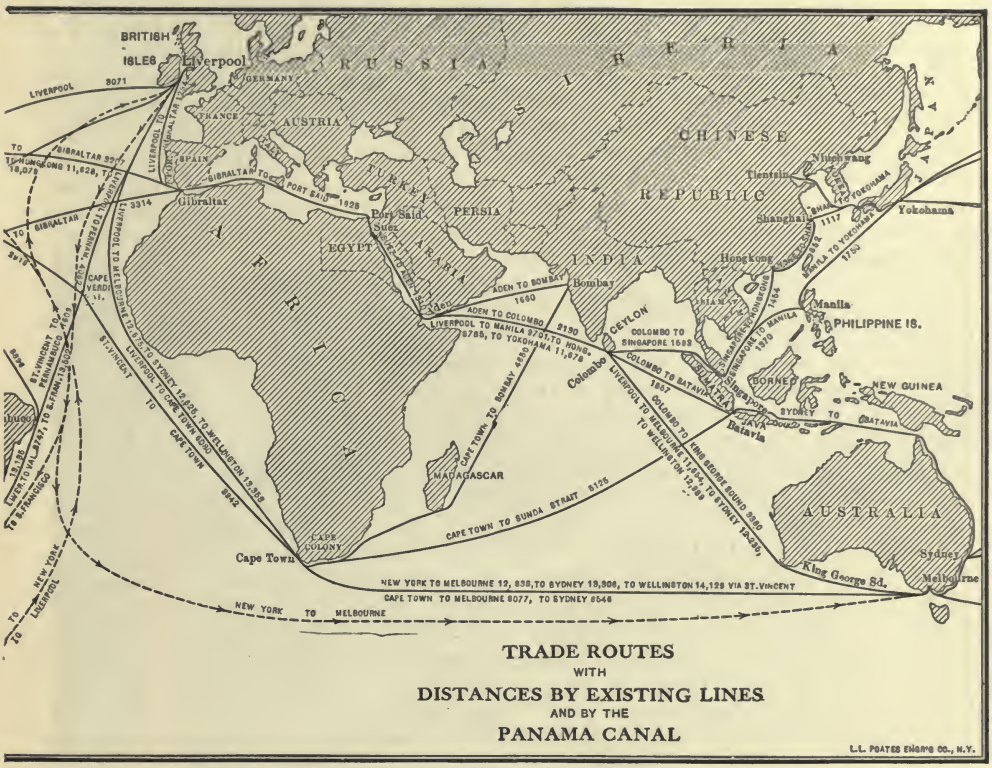


The history of the Suez Canal, the great inter-oceanic highway with which the Panama Canal is closely comparable, is an open book. Last year, 5,373 ships, having a net tonnage of 20,275,000 tons, passed through the Suez water-way. The growth of tonnage in ten years had been more than seventy per cent.

The shipping using the Panama Canal annually during the first year or two of its operation, that is in 1915 and 1916, will amount to about 10,500,000 net tons. At the end of ten years the tonnage will doubtless have reached 17,000,000 net tons. The prospect thus is that the Panama Canal will start with less than half the tonnage which will then be making use of the Suez Canal. Moreover, it will be a long time before the Panama Canal catches up with the Suez water-way in volume of traffic. Should the Suez tonnage continue to increase at the present rate, the volume of shipping served by the Suez Canal in 1925 will be double that passing through the Panama water-way. It is hardly probable that the Suez tonnage will continue to increase at its present high rate; while it may well happen that the stimulating effect of the Panama Canal upon industry and trade has been underestimated. Eventually, at the end of two or three decades, let us say, the traffic at Panama may equal or exceed that at Suez.

The Panama Canal is always thought of, first of all, with reference to the commerce between the two seaboards of the United States; yet it is probable that only one-tenth of the ships that pass through the canal in 1915 will be employed in the inter-coastal trade. The canal may so assist the growth of this coast-to-coast traffic as to cause it to double in a decade; but, even so, it will amount to only one-eighth of the total tonnage of shipping passing the Panama locks.

The foreign trade of the United States will employ a third of the ships that use the Panama Canal; and the trade that is strictly foreign to the United States, that does not touch our shores, will be served by more than half of all the vessels that take the Panama short cut between the Atlantic and Pacific.



TRADE ROUTES
WITH
DISTANCES BY EXISTING LINES
AND BY THE
PANAMA CANAL

L.L. POATES Engrg Co., N.Y.

The west coast of South America originates a large tonnage. Two million five hundred thousand weight-tons of nitrate are now shipped from northern Chili each year, four-fifths of it being sent to Europe, and one-fifth to the United States. Copper shipments from the west coast of South America are also important, and as soon as the canal is opened large quantities of iron ore are to be brought to the United States and taken to Europe by way of the canal. The exports of Chilian grain will also be larger after the costs of transportation have been reduced by the canal.

Under present conditions most of this large west-coast South American commerce is secured by Europe. The tonnage of shipping serving the European trade with western South America is six times that employed in the commerce of the eastern seaboard of the United States with that section of the world. This should gradually change as the result of the opening of the canal, which will bring the United States nearer than Europe to western South America by the distance across the north Atlantic.

Australia and New Zealand have a large commerce, of which the United States has a fair share in spite of the fact that the eastern part of the United States, the section from which most of our manufactures are exported, and to which the wool, hides, and other materials from Australasia are imported, is farther from Australia than is Europe. The Panama Canal will place the United States and Europe on a par, as far as distance is a controlling factor, in competing for the commerce of Australasia.

The same is true of Japan, China, and the Philippines. The short route from Europe to the Orient is via the Suez Canal; the short course from the Atlantic seaboard of the United States to Japan and most of China will be by way of Panama. A ten-knot freight-steamer will be able to make the run from New York to Yokohama via Panama in fifteen days less time than it now takes by way of Suez. Hong-Kong and Manila, however, will be equally distant from New York via Suez and Panama. They will be in the enviable position of being served both by the

vessels that take the Suez route and by those that are operated by way of Panama.

The Panama Canal is being constructed to shorten the distance and time of ocean voyages; but it should be remembered that distance is only one of several factors that may determine the routes taken by vessels. It often happens that the longer of two alternative routes is more profitable, because of lower costs for fuel, and of greater opportunities for trading at intermediate ports. Fortunately, the expenses for coal and fuel oil will be less via Panama than by most of the alternative routes; indeed, the low fuel costs via the Panama route and at the canal, where the United States will sell coal and oil at reasonable prices, will greatly assist the canal in competing for traffic free to move by some alternative route.

Another vital fact that should not be overlooked is that transportation costs do not alone determine which country shall succeed in commercial competition. At the present time the commercial and financial relations of Pacific countries are mainly with Europe, not with the United States. It has been only a few years since American capital began to be invested in foreign countries. The industries of western South America, of Australia, and the Orient have been developed mainly by European capital. Under these conditions, European manufacturers have a distinct advantage over American producers in competing for the trade of most Pacific countries.

Similarly, the merchants of Great Britain, Germany, and other European countries have long-established trade relations with the Pacific. Their mercantile houses have outposts in South America, Australia, and the Orient. It will not be easy quickly to shift the merchandising business from European to American houses.

The transfer of trade from Great Britain, Germany, and other European countries to the United States will also be hampered by the fact that the banking connections of countries on both sides of the Pacific are mainly with Europe. Time will be required, and probably our laws will have to be changed, to enable New York and other banking centres of the United States to be of large service to American merchants in extending their trade with Pacific countries. Naturally, European merchants, trading with Pacific countries, will continue to make use of the banking facilities of London, Paris, and Berlin. One of the problems to be worked out in the development of the trade of the United States with Pacific countries is that of substituting American for European banking arrangements.

The Panama Canal will assist in transferring a growing and increasing share of the trade of western South America and of trans-Pacific countries from Europe to the United States; but the shifting of commercial connections will be gradual. There will be no sudden revolution in the trade relations of Pacific countries. In estimating the influence of the Panama Canal upon the development of the trans-Pacific trade of the United States the fact must not be ignored that the traders of Europe, who have long used the Suez Canal, will have the advantage of a prior occupation of the field. Europe's hold upon the trade of the Far East is so firm that the United States cannot hope suddenly to wrest the rich prize from the merchants and manufacturers of Europe.

Since the Spanish-American War, which occurred only fifteen years ago, the United States has been drawn more and more into world politics. Every event and every agency that increases intercourse between the United States and other countries, that broadens and multiplies American trade relations, enhances not only the opportunity but also the responsibility of the United States as one of the leaders among the nations of the world. Our country cannot, and doubtless does not desire to, avoid taking upon itself larger international obligations.

The Panama Canal will, of a certainty, bring the United States into closer touch with the Latin countries of North America and western South America; indeed, Mexico and Central America will be brought within the circuit of the active route by which the coastwise trade between the two seaboards of the United States will be carried on. Commerce and travel between the United States and the Pacific shores of South America will, in a few decades, increase manyfold.

More frequent intercourse and the larger

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I.—THE GREAT GATES TO THE LOCK CHAMBERS.

—"Panama Canal in Construction,"

From an autochrome photograph by Earle Harrison. Copyright, 1913.

II.—Where the canal crosses the Cordilleras.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

III.—Culebra Cut, looking north from Contractor's Hill.

From an autochrome photograph by Earle Harrison.

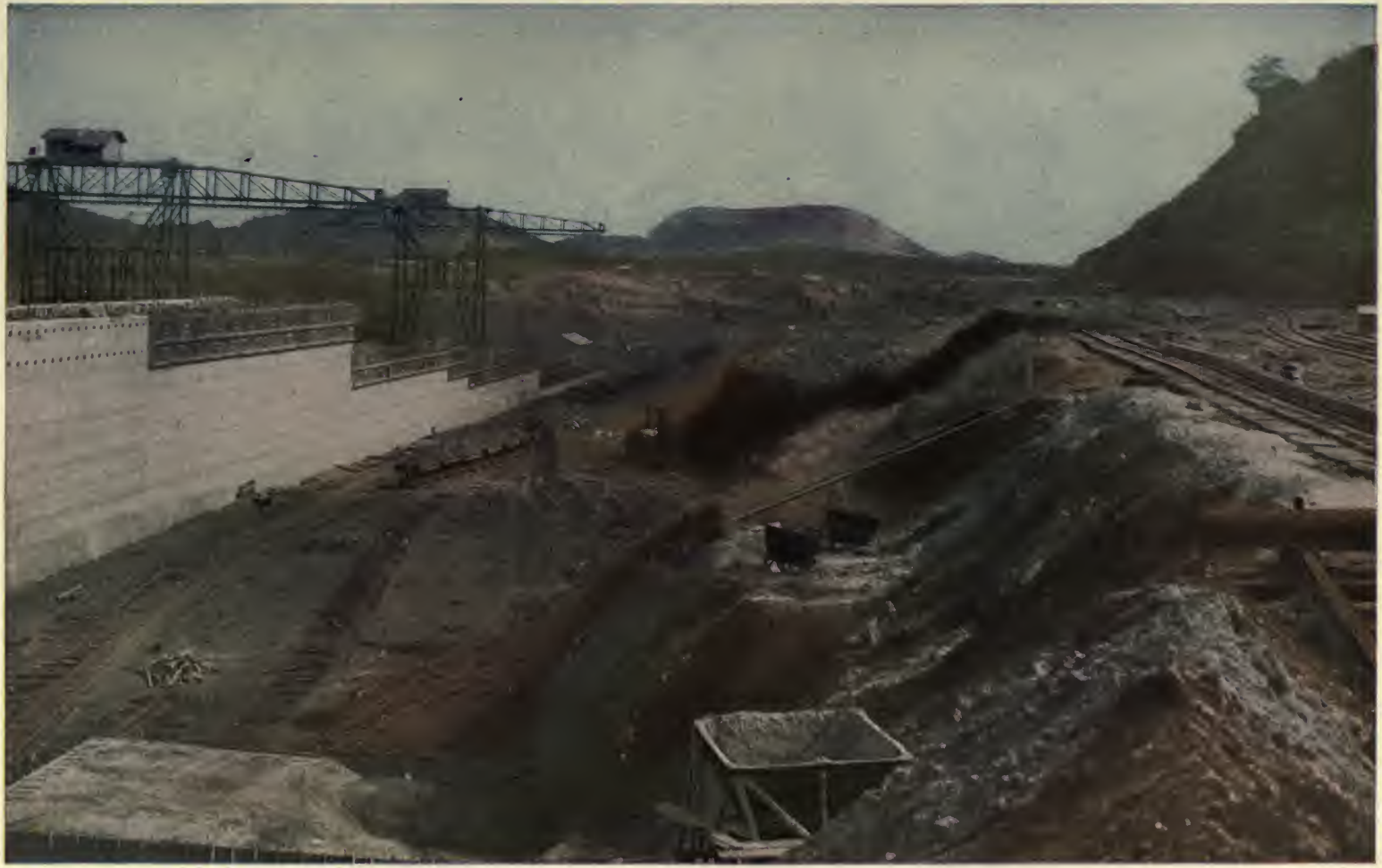
IV.—The Culebra Cut before the Cucaracha slide of January, 1913.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

V.—At work in Culebra Cut.

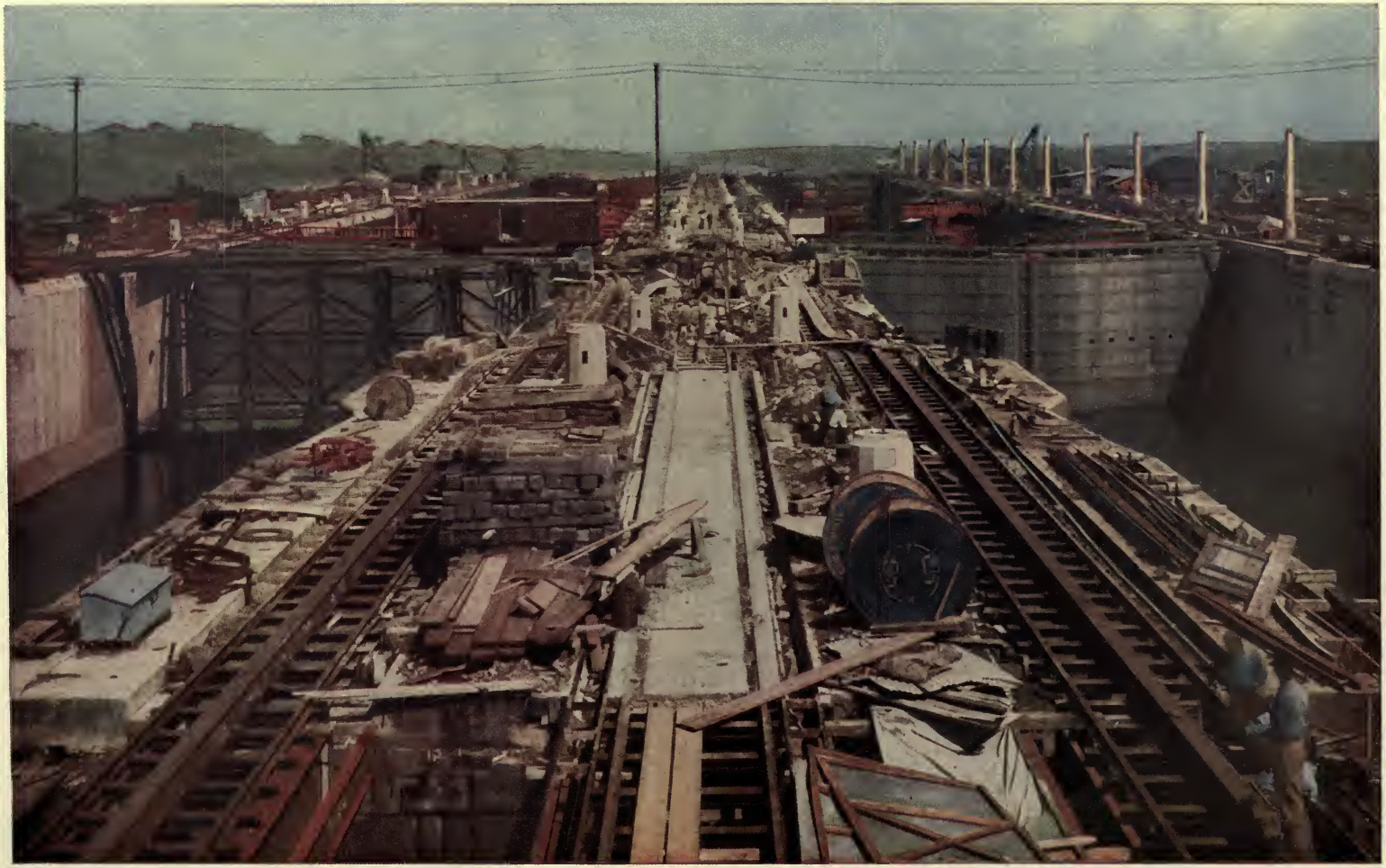
From an autochrome photograph by Earle Harrison. Copyright, 1913.

VI.—One of the large one-hundred-and-five-ton, five-cubic-yard dipper steam-shovels used in Culebra Cut.



From an autochrome photograph by Earle Harrison. Copyright, 1913.

VII.—The great sea-level ditch from Miraflores Lock to Balboa, the Pacific entrance.



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VIII.—Gatun Locks, looking from the top of the centre wall toward the Atlantic entrance to the canal.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

IX.—A lock chamber on the Panama Canal at Pedro Miguel.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

X.—The great gates to Pedro Miguel locks, now virtually completed.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

XI.—The great concrete walls of the locks at Pedro Miguel.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

XII.—Gatun spillway.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

XIII.—The Atlantic entrance to the canal.

From an autochrome photog. aph by Earle Harrison. Copyright, 1913.

XIV.—The Chagres River in the dry season.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

XV.—Gatun Lake.

From an autochrome photograph by Earle Harrison. Copyright, 1913.

XVI.—"The Old Sea Wall" with new Panama in the distance.

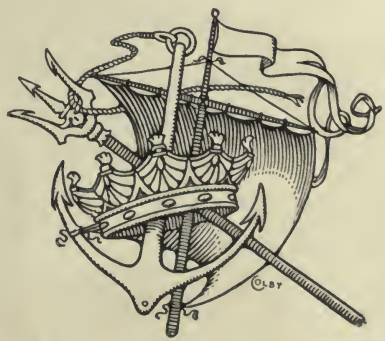
commerce between the United States and Latin-American countries should prove to be mutually advantageous, politically as well as economically. In its relations with all countries south of the Rio Grande the United States is, and has every reason for continuing to be, politically disinterested. The autonomous political and economic development of Latin-American countries is the desire of the United States. Whatever assistance the United States may be able to render its neighbors will be given in a cordial spirit, untainted by any selfish desire to acquire dominion or to exercise political control over any country.

Nor will the people of the United States be unaware of the fact that closer political relations with other American countries will be helpful to the United States. This country possesses a monopoly neither of political wisdom nor of the elements of civilization. Co-operation between Latin and Saxon countries will be mutually beneficial. The Panama Canal promises to promote Pan-Americanism, to bring American countries nearer together in thought and feeling, and to promote trade in culture as well as commodities.

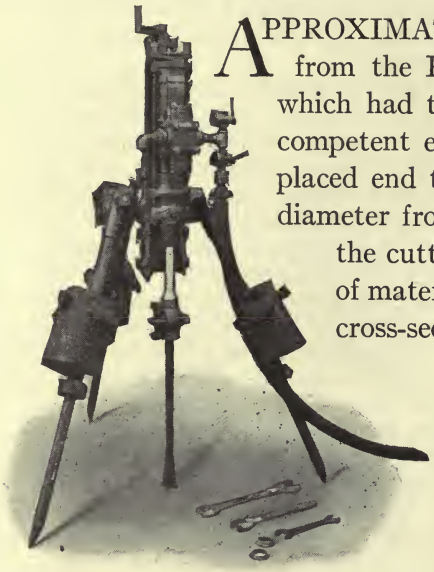
This is true in spite of the necessary admission that the connection of the United States with the canal has temporarily estranged one Latin-American country. This is to be regretted. The people of the United States, it is certain, have not desired to wrong Colombia, and it is to be hoped that both countries will place before each other and the world the full record of their action. If either party has done wrong, it must be large enough to admit its wrong-doing. In that way alone can mutual understanding and confidence be restored.

It is possible that the chief accomplishment of the Panama Canal may be one of which the people of the United States will scarcely be aware. The main obstacle to the successful development of our federal government has been sectional strife. A country of continental area, comparable in size to Europe, and having within its borders great diversities of climate, of industrial activities, and of population elements, is governed by the will of the whole people. In times past the clash of sections has been so severe as nearly to disrupt the government.

Fortunately, sectional strife, though not at an end, is no longer violent. The railroad, the telegraph, and the telephone have made political unity possible and certain; but every agency that more closely unites the different parts of the country makes possible better and more effective government. The Panama Canal, by increasing the economic interdependence of the East and the West, and of the West and the South, will promote the political unity as well as the economic solidarity of the country.



The Drills that



APPROXIMATELY one half of the material excavated from the Panama Canal was solid rock, every yard of which had to be drilled and blasted before removal. A competent engineer estimates that all these drill holes, if placed end to end, would equal the length of the earth's diameter from pole to pole, with 1,500 miles added; that the cuttings from these holes would equal the amount of material taken from a shaft 3¼ miles deep with the cross-section of the Simplon Tunnel; and that these cuttings piled in a pyramid would overtop one of the larger pyramids of Ghizeh.

By far the larger percentage of this drilling was done with the more than six hundred Ingersoll-Rand Rock Drills used on the Canal. Three hundred of these were brought over from the old French régime. And when increasing activities demanded more drills, it was natural that the largest orders should go to the builders of the splendid old drills of the French days, until more Ingersoll-Rand Drills were in use on the Canal than of all others combined. And the modern drills surpassed their older prototypes in their capabilities.

INGERSOLL—

11 Broadway New York

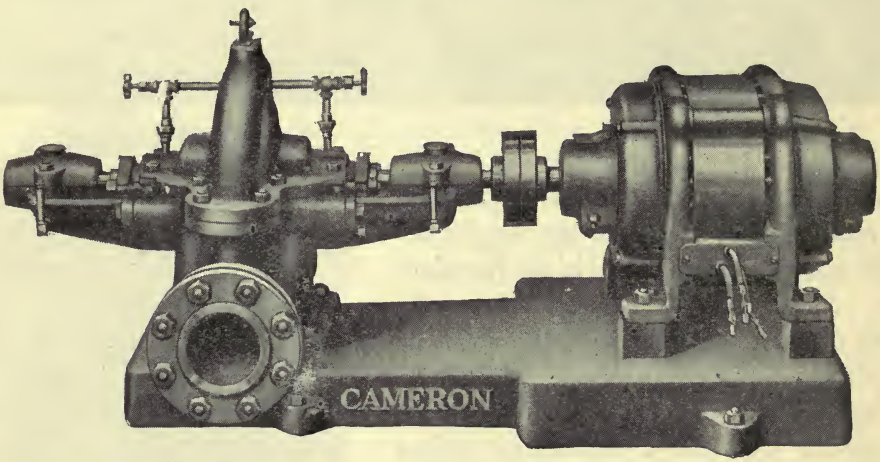
Dug the Canal

THE FACT IS that Ingersoll-Rand Rock Drills made the Panama Canal possible; for the methods that excavated the rock for the pyramids could not be tolerated in the twentieth century. And among the names of those who made the Canal an accomplished fact must be placed those of Simon Ingersoll, Addison C. Rand and Henry C. Sergeant—the three men who made the rock drill a commercial success and whose work culminated in the modern Ingersoll-Rand Drills—the drills which pierced the mountain range at Culebra and pushed the Canal through solid rock at Bas Obispo.

RAND COMPANY

Offices in All Principal Cities of the World

CAMERON PUMPS
AND
THE PANAMA CANAL



Probably very few among those who know Cameron Pumps (and what engineer or contractor does not) know also that there was what might be called a military period in its history. Away back in 1863, when the business was only three years old, A. S. Cameron had as a partner William Sewell, a U. S. Army engineer. Together they perfected and produced the Sewell and Cameron Crank-and-Flywheel Pump which had a large use in the U. S. Navy and merchant marine of that day. Therefore it is peculiarly fitting that the Army Engineers who have carried the Panama Canal to practical completion should give to Cameron Pumps such recognition as to use them on some of the most important work of the canal. During construction, the simple, rugged, ever-dependable Cameron Steam Pump bore its share of the burden of handling water, and in the permanent machinery equipment for the great Canal Locks, sixty splendid Cameron Centrifugal Pumps appear. Nine of these will take care of drainage and overflow water which may accumulate in sumps placed for the purpose. Three will be ready to empty the big culverts when it is necessary to inspect or repair them. Forty-eight will operate the chain fenders which will prevent an unruly ocean liner in the locks from poking an inquisitive nose through the great lock gates—meaning a shut-down of traffic while damages are repaired. When one considers that the safety of the locks is the key to the Canal operation, one realizes the responsibility placed upon these Cameron Pumps. In the world's greatest engineering triumph, these pumps are worthy memorials to the Scotch inventor and the American army engineer who established the Cameron standard of quality.

A. S. Cameron Steam Pump Works,
11 BROADWAY, NEW YORK.