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THE ANAMA CANAL

A HISTORY AND DESCRIPTION
OF THE ENTERPRISE

BY
J. SAXON MILLS, M.A.
BARRISTER-AT-LAW

WITH MAPS AND ILLUSTRATIONS

THOMAS NELSON AND SONS
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PREFACE.

THE literature on the subject of the Panama Canal is rather dispersed. A full and entertaining history of the project will be found in Mr. W. F. Johnson's "Four Centuries of the Panama Canal" (Cassell and Co., 1907), a work to which I am greatly indebted. Dr. Vaughan Cornish has given the results of much research and several visits to the canal in "The Panama Canal and its Makers" (T. Fisher Unwin, 1909), and in several lectures, especially one before the Royal Colonial Institute, June 11, 1912. An inexhaustible mine of information will be found in Mr. Emory R. Johnson's Official Report on Panama Canal Traffic and Tolls (Washington, 1912). The Report on the Trade and Commerce of the Republic of Panama for the year 1911, by Mr. H. O. Chalkley, Acting British Consul at Colon, contains useful information. A valuable

series of articles on the Panama Canal appeared in *The Times* of 1912. The *National Geographic Magazine* of February 1911 contains an authoritative article by Colonel G. W. Goethals, Chief Engineer of the Canal, and the number for February 1912 an interesting appreciation by Mr. W. J. Showalter. In *Scribner's Magazine* for February 1913, Mr. J. B. Bishop, Secretary of the Isthmian Canal Commission, writes a very useful paper on the Sanitation of the Isthmus. In his recent work on South America Mr. Bryce devotes one of his delightful chapters to the Isthmus of Panama. A chapter on the Panama Canal will be found in Mr. A. E. Aspinall's "The British West Indies," and many references in Mr. C. G. Murray's "A United West Indies." I must thank Mr. G. E. Lewin, the Librarian of the Royal Colonial Institute, for his unfailing help and courtesy.

BUSHEY, 1913.

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THE PANAMA CANAL.

CHAPTER I.

THE SECRET OF THE STRAIT.

It was either very careless or very astute of Nature to leave the entire length of the American continent without a central passage from ocean to ocean, or, having provided such a passage at Nicaragua, to allow it to be obstructed again by volcanic action. This imperviousness of the long American barrier had, as we shall see, important economic and political results, and the eventual opening of a waterway will have results scarcely less important. The Panama Canal will achieve, after more than four centuries, the object with which Columbus spread his sails westwards from the port of Palos—the provision of a sea-route westwards to China and the Indies,

The capture of Constantinople in 1453 by the Turks interrupted the ancient trade routes between East and West. Brigands held up the caravans which plodded across the desert sands from the Euphrates and the Indus, and pirates swarmed in the Mediterranean and Red Sea, intercepting the precious cargoes of silks and jewels and spices consigned to the merchants of Italy. The eyes of all Europe were turned to the Atlantic, and an ocean route westwards to India and the Orient, the existence of which had been fabled from the days of Aristotle, became an economic necessity.

Columbus, as every one knows, died in the belief that he had discovered this route, and that the lands he had visited were fringes and islands of the Eastern Asiatic continent. The geographers of those days greatly exaggerated the eastern extension of Asia, with the result that the distance from Europe to China and India was underestimated by at least one-half. This was a fortunate mistake, for it is improbable that if Columbus had known that Cathay and Cipangu (Japan) were a good 12,000 miles westwards from the coast of Spain he would have ventured upon

a continuous voyage of that length in the vessels of his time.

It was in his fourth voyage (1502) that Columbus first reached and explored the coastline of the isthmus and Central America. He was apparently not the first to land on the isthmus. That distinction belongs either to Alfonso Ojeda, who is said to have reached "Terra Firma" earlier in 1502, or to Rodrigo de Bastidas, who, we are told, set sail from Cadiz with *La Cosa* in 1500, and reached the isthmus somewhere near Porto Bello. About the doings of Columbus on the mainland we get some detailed information from the Portuguese historian and explorer of the sixteenth century, Galvano. It is interesting to read that the great navigator visited the exact spot where the newly-constructed canal starts from the Caribbean coast. From the Rio Grande, we read, Columbus "went to the River of Crocodiles which is now called Rio de Chagres, which hath its springs near the South Sea, within four leagues of Panama, and runneth into the North Sea." It was this same river, as we shall see, that became the feeder of the canal when the high-level scheme was adopted. So

far out of his reckoning was Columbus that at Panama he imagined himself to be ten days' journey from the mouth of the Ganges! One of his objects, as we know from his own journal, was to convert the Great Khan of Tartary to the Christian faith, and this entanglement in what he called "the islands of the Indian Sea" was a sore hindrance to that and all his other purposes. He began that search for the strait which engaged the attention and tried the temper of Spanish, Portuguese, and English navigators for the next thirty years. He had heard from the natives of the coast of "a narrow place between two seas." They probably meant a narrow strip of land as at Panama. But Columbus understood them to mean a narrow waterway, and rumours of such a passage no doubt existed then, as they still do among the isthmian tribes. He must also have heard accounts of the great ocean only thirty miles away, and it is rather surprising he should not have made a dash across and anticipated Balboa and Drake. In May 1503, however, he quitted the "Terra Firma" without solving the great secret, and he never returned to the mainland.

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He died in 1506, still in complete ignorance of the nature of his discovery. He knew nothing of the continent of America or of that seventy million square miles of ocean beyond, to which Magellan gave the name of "Pacific."

The Holy Grail itself was not pursued with more persistence and devotion than this mythical, elusive strait by the navigators of the early years of the sixteenth century. The isthmian governor sent out from Spain went with urgent instructions to solve the "secret of the strait." In 1513 Balboa set himself to the great enterprise. If he could not discover a waterway he would at least see what lay beyond the narrow land barrier. From Coibo on the Gulf of Darien he struck inland on September 6 with a hundred Indian guides and bearers. It is eloquent of the difficulties of the country which he had to traverse that it was not until September 26 that he won, first of European men, his distant view of the nameless and mysterious ocean.* It was

* The eminence known as "Balboa Hill" in the American canal zone is certainly not that from which Balboa first sighted the Pacific, though very likely a tradition to that effect will now gradually be established.

he, and not Cortez, who "with eagle eyes, stared at the Pacific."

"And all his men

Looked at each other with a wild surmise,

Silent upon a peak in Darien."

Cortez was himself a persistent searcher for the mythical strait. He wrote home to the King of Spain saying, "If the strait is found, I shall hold it to be the greatest service I have yet rendered. It would make the King of Spain master of so many lands that he might call himself the lord of the whole world."

These vain attempts had very important results. They led incidentally to the exploration of the whole coastline of the American continent. For example, Jacques Cartier, who was sent out by the King of France about this time to find "the shorter route to Cathay," searched the coast northwards as far as Labrador and thus prepared the way for the planting of a French colony in Canada. At last, in 1520, a sea-passage from the Atlantic to the Pacific was actually discovered by the first great circumnavigator, Magellan, but it was far away from the narrow lands between North and South America.

Through the perilous straits that have ever since borne his name at the southern extremity of the continent, Magellan pushed his venturous way into the great ocean beyond. But even Magellan had no idea that a few miles south of his strait the land ended and Atlantic and Pacific mingled their waters in one great flood. That truth was accidentally discovered by the English Drake more than fifty years afterwards (1579). Drake had been driven southward by stormy weather when he made the discovery which almost eclipsed in its importance even Magellan's exploit. In his exultation, we are told, he landed on the farthest island, and walking alone with his instruments to its extremity threw himself down, and with his arms embraced the southernmost point of the known world. From that point Drake sailed up the western coast of South America, engaged mainly in his favourite pursuit of "singeing the King of Spain's beard"—capturing, that is, the treasure-ships bound to Panama. But he did not forget the more scientific duty of searching for the strait. Far northward he held his course, past the future California, till he must have

been off the coastline of what is now British Columbia, ever hoping to find the Pacific outlet of the famous North-West Passage. But always the coast trended to the north-west, and Drake, giving up the quest, turned his prow westward and continued his voyage of circumnavigation.

But we are over-running our dates and must return to events at the isthmus. It was about the year 1530 that the non-existence of a natural waterway became recognized. And no sooner was this fact accepted than projects for an artificial canal began to be put forward. It was clear to the geographers and traders of those days that an isthmian route westward offered great advantages to the routes *via* the Cape of Good Hope, Magellan Straits, or the problematical North-West Passage.

CHAPTER II.

CANAL PROJECTS.

It appears that the honour of first conceiving and proposing the project of an artificial waterway through the isthmus belongs to Alvaro de Saavedra Ceron, a cousin of Cortez, who had been with Balboa at Panama. Ceron had been for twelve years engaged in the search for the strait, and had finally begun to doubt its existence. His thoughts turned to the isthmus at Panama, where the narrowness and low elevation of the land seemed to offer the likeliest chance of an artificial canal. We learn from the old historian Galvano that Ceron prepared plans for the construction of a waterway there—almost precisely along the route chosen for the American canal nearly four hundred years later. Ceron's death, however, put an end to this early project.

It is interesting to find the Portuguese historian

Galvano, who flourished in the middle of the sixteenth century, mentioning four possible routes for the canal—namely, Darien, Panama, Nicaragua, and Tehuantepec. The choice, however, quickly confined itself to the Panama and Nicaraguan lines. The reader may feel some surprise that at such an early date as this an engineering project should be seriously considered which was only accomplished in the end by the wealth and mechanical resources of one of the greatest of modern Powers. The explanation is that the tiny vessels of the early sixteenth century could have taken advantage of the natural rivers and lakes in the isthmus, especially those on the Nicaraguan route, and that far less artificial construction would have been necessary than in these days of the mammoth liner and warship.

Charles V., King of Spain, seems to have been quite alive to the importance of these canal projects. In 1534 he directed the Governor of Costa Firme, the old name for the Panama district, to survey the valley of the Chagres, the river which supplies the water for the upper reaches of the American canal. This gentleman,

however, seems scarcely to have shared the royal enthusiasm. He may be supposed to have known the isthmus at these points very well, and his scepticism about the prospect of canal construction there in those days was not wholly groundless. The Spanish historian Gomara, who wrote a history of the Indies in 1551 and dedicated it to Charles V., declared a canal to be quite feasible along any of the four routes mentioned by Galvano. It is true he recognized obstacles. "There are mountains," he wrote, "but there are also hands. If determination is not lacking, means will not fail; the Indies, to which the way is to be made, will furnish them. To a king of Spain, seeking the wealth of Indian commerce, that which is possible is also easy."

But Charles V. died without making any practical advance in this enterprise, and a rather remarkable reaction took place under his successor, Philip II. It should be noted that by this time a permanent roadway had been established across the isthmus from Panama to Porto Bello, along which the Spanish treasure-convoys passed from sea to sea without much interruption. The

rapidly growing power of the English at sea made Philip fear that, if a canal were built, he would be unable to control it, and would probably lose his existing monopoly of isthmian transit. So he issued a veto against all projects of canal construction. He even persuaded himself that it would be contrary to the Divine purpose to link together two great oceans which God had set asunder, and that any such attempt would be visited by a terrible nemesis.* So his Majesty not only forbade all such schemes but declared the penalty of death against any one who should attempt to make a better route across Central America than the land-route between Panama and Porto Bello.

In course of time the king's beard was so horribly singed by English navigators and adventurers in the Caribbean Sea that the Atlantic end of the overland trail became almost

* Herodotus tells a story how the people of Knidos were forbidden by the Delphic oracle to make a canal through the isthmus, along which their Persian enemies could advance by land to attack them. The oracle said that if Zeus had wished the place to be an island he would have made it one. There is a curious resemblance between this story and that related in the text.

useless, and the Spanish argosies were compelled to sail homewards round the far Magellan Straits. But in 1579, as we have seen, Sir Francis Drake ("El Draque" as he was called by the terrified Spaniards) had suddenly attacked, captured, and scattered the Spanish ships off the Pacific coast of South America. So the isthmian land-route was once more resumed, and it took the Spaniard all his time to hold that open.

For many years no progress was made with the idea of an isthmian canal. War between England and Spain was the natural order of things in these Central American regions. In 1655 the English seized Jamaica, and soon afterwards established themselves on the coast of Honduras and Nicaragua. The old city of Panama, of which only a picturesque church-tower remains to-day, had been founded by a Spanish governor named Pedrarias in 1519. In 1671 the city was destroyed by that wicked Welsh buccaneer, Sir Henry Morgan. The town was rebuilt two years later by Alonzo Mercado de Villacorta, five miles west of the old site.

The project of a canal across the isthmus was never allowed entirely to disappear. In

1694 a very determined attempt was made to plant a British colony on the isthmus at Darien, a little east of the Panama route. The pioneer was William Paterson, a Scotsman, who founded "the Company of Scotland Trading to Africa and the Indies." Sir Walter Scott, in his "Tales of a Grandfather," thus describes the project:—

The produce of China, Japan, the Spice Islands, and Eastern India, brought to the Bay of Panama, were to be transferred across the isthmus to the new settlement, and exchanged for the commodities of Europe. In Paterson's enthusiastic words, "This door of the seas and key of the universe will enable its possessors to become the legislators of both worlds and the arbitrators of commerce. The settlers at Darien will acquire a nobler empire than Alexander or Cæsar, without fatigue, expense, or danger, as well as without incurring the guilt and bloodshed of conquerors."

So 1,200 settlers set sail from Leith in July 1698, no doubt with a high hope and courage. In November the expedition arrived and estab-

lished itself at a point of the coast still called Puerto Escoces, or Scotch Port, in Caledonian Bay, also named from the same event. "New Edinburgh" and "New St. Andrews" were founded, but the settlers soon got into difficulties. The climate was intolerable, and the project was opposed from the outset by the English and Dutch East India Companies, who were alarmed on the score of their own exclusive rights, while Spaniards and Indians were a perpetual menace. Broken down by these adversities the original settlers left the place, but were succeeded at once by another company which, after some successful fighting with the Spaniards, were compelled by the superior forces of the enemy to evacuate the settlements in the year 1700. It is possible that if this attempt at colonization had been made after and not before the Union of Scotland and Ireland it would have met with much less opposition in England, perhaps would have received government sympathy and support. In that case the isthmus would have been added to the British dominions, and a waterway might have been constructed under the British flag. It should be added that Paterson,

who had personally surveyed the isthmus, positively declared that the construction of a canal was a feasible undertaking.

During the eighteenth century, though surveying was carried out in many parts of the isthmus by European engineers, the project of a canal was never seriously taken up. It may be remembered that in 1780 our own Nelson was at Nicaragua, annexing the lake and getting control of the interoceanic route in this region, but doing little more than injuring his own health. With the nineteenth century, however, events began to move at the isthmus. The great scientist, Alexander von Humboldt, spent the first few years of the new century in Mexico and Central America. In his "Political Essay on New Spain" he described the impervious isthmus, "the barrier against the waves of the Atlantic," as for ages "the bulwark of the independence of China and Japan."

The absence of any water communication at the isthmus between the two oceans has indeed had highly important political and economic results. It kept East and West far asunder. It removed the west coast of North America from

the colonizing rivalries of the Old World. England and the United States seemed for long ages only semiconscious of their territories on the Pacific which were awaiting colonization. Even in recent times very few emigrants from Europe, who went out with the intention of going far west, penetrated much further than Chicago or Manitoba. Population and industrial enterprise were concentrated in the east of Canada and the United States, and have only begun within modern times to move effectually westwards. England was indeed so indifferent about her territories along a far coast, which could be reached only round the Horn or by an almost impossible land-transit, that in the settlement of the Oregon boundary in the middle of last century she accepted a Canadian frontier-line much further north than would otherwise have contented her. She had at least as good a right to California and the territories to the northwards as the descendants of her revolted colonists. The absence of a waterway at the narrow lands secured to the United States and to England their expansion westwards, but imposed on the westward movement a very slow

and gradual pace. One result of the new canal will be a very rapid development of these Pacific slopes, especially those of British Columbia.

The effect on South America of this complete severance of East and West has also been very important. The republics on the Pacific have been sheltered as much as possible from European influences. Immigration has been naturally restricted, the population, especially that of Chile, kept free from negro admixture, and the development of the countries effectually checked. The opening of the canal will, of course, have a contrary effect all along these lines.

But, to return from this digression, Humboldt described six routes in Central America where a canal would be practicable, including that which was afterwards adopted at Panama. He investigated and discussed many physiographical questions in connection with the subject. There had arisen a general belief that the level of the Pacific was much higher than that of the Atlantic, and that a sea-level canal would therefore be impossible. Humboldt declared against this theory. But it is curious to find him favouring the idea that the construction of a tide-level

canal might have the effect of diverting the Gulf Stream from our shores, and thus making the climate of our British islands much more rigorous and inhospitable.

The researches of Humboldt in the West Indies and Central America much interested the scientist's great fellow-countryman, Goethe. A passage from Goethe's "Conversations with Eckermann" is worth quoting as an example of prophecy wonderfully fulfilled :—

Humboldt [said Goethe] has with great practical knowledge mentioned other points where, by utilizing some of the rivers which flow into the Gulf of Mexico, the end could perhaps be more advantageously attained than at Panama. Well, all this is reserved for the future, and for a great spirit of enterprise. But so much is certain : if a project of the kind succeeded in making it possible for ships of whatever lading or size to go through such a canal from the Gulf of Mexico to the Pacific Ocean, quite incalculable results would ensue for the whole of civilized and uncivilized humanity.

I should be surprised, however, if the United States were to let the opportunity escape them of getting such an achievement into their own hands. We may expect this youthful Power, with its decided tendency westwards, in thirty or forty years to have also occupied and peopled the extensive tracts of land beyond the Rocky Mountains. We may further expect that along the whole Pacific coast, where Nature has already formed the largest and safest harbours, commercial cities of the utmost importance will gradually arise, to be the medium of trade between China, together with the East Indies, and the United States. Were this to happen, it would be not alone desirable but even almost necessary that merchantmen as well as men-of-war should maintain a more rapid connection between the west and east coasts of North America than has previously been possible by the wearisome, disagreeable, and costly voyage round Cape Horn. I repeat, then: it is absolutely indispensable for the United States to effect a way through from the

Gulf of Mexico to the Pacific Ocean, and I am certain they will compass it. This I should like to live to see, but I shall not. Secondly, I should like to live to see a connection established between the Danube and the Rhine. But this, too, is an undertaking so gigantic that I doubt its being accomplished, especially when I consider our German means. Thirdly and lastly, I should like to see the English in possession of a Suez Canal. These three great things I should like to live to see, and it would almost be worth while for their sakes to hold out for some fifty years.

Many projects for canal construction, chiefly by the Nicaraguan route, were started and failed during the first half of the nineteenth century. The second decade of that century witnessed the revolt one by one of all the Spanish provinces in Central and South America. The Colombian Confederation, comprising Venezuela, Ecuador, and New Granada, achieved their independence in 1821. Panama quickly followed, and allied itself with New Granada (now Col-

ombia). In 1825 the Central American envoy to the United States urged the American government to co-operate in the canal enterprise with the states he represented. The result was that Henry Clay, the American Secretary of State, ordered an official survey at Nicaragua, and scheme followed scheme in quick succession. In 1829 the King of Holland was granted a canal concession by the Nicaraguan government. This enterprise was frustrated by the outbreak of the revolution in the Netherlands and Belgium. It would be tedious to enumerate the many projects started during the following years. But it is worth recalling that Louis Napoleon Bonaparte, who was then a prisoner in the fortress of Ham, became interested in the subject, and while still a captive obtained a concession and franchise for a canal company from the Nicaraguan government. He published a pamphlet on the Isthmian Canal question which aroused a good deal of attention, though its author's interest was soon diverted to political events nearer home. A passage from his little book is interesting for its strong advocacy of the Nicaraguan route by the San Juan River and the lakes:—

The geographical position of Constantinople rendered her the queen of the ancient world. Occupying, as she does, the central point between Europe, Asia, and Africa, she could become the entrepot of the commerce of all these countries, and obtain over them immense preponderance; for in politics, as in strategy, a central position always commands the circumference. This is what the proud city of Constantine could be, but it is what she is not, because, as Montesquieu says, "God permitted that the Turks should exist on earth, as a people most fit to possess uselessly a great empire." There exists in the New World a state as admirably situated as Constantinople, and we must say, up to this time, as uselessly occupied. We allude to the State of Nicaragua. As Constantinople is the centre of the Ancient World, so is the town of Leon the centre of the New, and if the tongue of land which separates its two lakes from the Pacific Ocean were cut through, she would command by virtue of her central position the entire coast of North and South America. The State of Nicaragua

can become, better than Constantinople, the necessary route of the great commerce of the world, and is destined to attain an extraordinary degree of prosperity and grandeur. France, England, and Holland have a great commercial interest in the establishment of a communication between the two oceans, but England has more than the other Powers—a political interest in the execution of this project. England will see with pleasure Central America becoming a powerful and flourishing state, which will establish a balance of power by creating in Spanish America a new centre of active enterprise, powerful enough to give rise to a feeling of nationality, and to prevent, by backing Mexico, any further encroachments from the north.

The idea of a trans-isthmian canal seemed likely in the 'fifties of last century to prove a cause of discord, if not of war, between England and the United States. Under the rather "pushful" foreign policy of Lord Palmerston, England rapidly increased her influence and possessions

in Central America. In 1835 "British Honduras" was practically constituted a British colony, and British influence was subsequently extended into Nicaragua and Mosquitia, thus covering the favourite route for an isthmian waterway. The United States were establishing themselves on the Pacific through their encroachments on Mexico. In 1846 they acquired the states of California, Nevada, Arizona, and New Mexico, and naturally began to attach more importance to the canal project and to feel more sensitive as regards rival ambitions in Central America. Soon after they had acquired these Pacific territories, began the great rush for gold to California, and some shorter way from east to west became necessary than the sea-trail round the Horn or the weary wagon-trek over the broad North American continent. Already in 1846, before the Mexican War and the discovery of gold in California, the United States had made a treaty with New Granada, by which the former secured rights of transit over the isthmus "upon any modes of communication that now exist or may hereafter be constructed," and by which they guaranteed the sovereignty

of New Granada over all the territories at the isthmus.

It was under this treaty that the Panama Railway was constructed which brought the town of Colon (formerly Aspinwall) into existence, and was subsequently taken over by the United States government. This railroad made the isthmus for the first time a highway of world-traffic. It had a monopoly of isthmian transportation, and was able to make any charges it pleased. Steamship services to the southern and northern coasts of America from Panama were developed, and the railway succeeded so well that it paid down to 1895 an average dividend of 15 per cent. It was bought by the first French Panama Company for the outrageously high sum of £5,100,000. The existence of the railway really determined De Lesseps' choice of the Panama route, and the immense amount of excavation done by the French had a great deal to do in turn with the American choice of the same route, so that the construction of the Panama Railway was a highly important event at the isthmus. The United States took over the railroad from the French with the

unfinished canal, together with a steamship service from Colon to New York, owned by the railroad.

The rivalry between England and the United States along the Nicaraguan route became so acute and dangerous that a very important treaty was concluded between the two countries in 1850, when we may say that the Panama Canal question entered the domain of modern politics. The Clayton-Bulwer Treaty, so-called from Mr. John M. Clayton, the American Secretary of State, and Sir Henry Bulwer, British Minister at Washington, who negotiated it, held the field for fifty years, and became the subject of endless discussion between England and the United States.

CHAPTER III.

THE CLAYTON-BULWER TREATY AND THE SUEZ CANAL.

THE treaty of 1850 was concerned primarily with a canal along the Nicaraguan route—that is, as the preamble expresses it, a canal “between the Atlantic and Pacific Oceans by way of the river San Juan de Nicaragua and either or both of the lakes of Nicaragua or Managua to any port or place on the Pacific Ocean.” But as Article VIII. says, it established “a general principle” relating to any waterway across the isthmus between North and South America. The two contracting parties undertook in the treaty that neither should “obtain or maintain for itself any exclusive control over the said canal,” or “maintain any fortifications commanding the same, or in the vicinity thereof,” or “occupy, or fortify, or colonize, or assume,

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or exercise any dominion over Nicaragua, Costa Rica, the Mosquito Coast, or any part of Central America.' This agreement, as I said, subsisted for fifty years, but it was scarcely concluded when it was found inconsistent with the growing importance and ambition of the United States, where a demand quickly arose for an American-owned canal.

Again there followed a series of schemes for canal construction at various points of the isthmus. For example, Dr. Edgar Cullen created some excitement in England in the early Victorian days by giving a very favourable account of the Caledonian route across the isthmus at Darien, in a lecture to the Royal Geographical Society. The doctor was received by the young queen and the Prince Consort, a corporation was formed, and an engineer sent out to make surveys from Caledonian Bay. A British and a French man-of-war were dispatched to the isthmus to make investigations. But the surveyor was driven from Caledonian Bay by local tribes, and so went on to Panama, giving a favourable report of that route on his return to England. But nothing came of these incidents,

and the American Civil War in the early 'sixties diverted the attention of the United States from isthmian affairs. At the end of the war American interest revived, and public opinion set more and more against the idea of sharing a canal with any other Power. In 1869 President Grant gave the first public expression to the demand for an American canal under American control. "I regard it," he said, "as of vast political importance to this country that no European government should hold such a work." Later, in an article in the *North American Review*, he said, "I commend an American canal, on American soil, to the American people."

Just before the President's declaration of policy the United States had concluded an important treaty, known as the "Dickinson-Ayon Treaty," with Nicaragua, securing a right of way for a canal over the Nicaraguan route; and, just afterwards, President Grant appointed an Interoceanic Canal Commission which investigated four routes for a canal, and finally, in 1875, reported unanimously in favour of the Nicaraguan route from Greytown to the San Juan River, to Lake Nicaragua, through the Rio del

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Medio and Rio Grande valleys, to Brito on the Pacific coast.

In 1869 an event occurred which was to have a very decisive effect on isthmian affairs—the opening for traffic of the Suez Canal. These two isthmuses in the eastern and western hemispheres have some obvious features in common. They both link two vast continents and form a barrier between two oceans or oceanic systems. They are fairly equal in breadth—Suez, sixty miles, and Panama about fifty-four. The shortest line across each runs almost exactly north and south. And they were both until recent times uninhabited country. But there are many dissimilarities. The isthmus at Suez is a flat and sterile desert; that at Panama is hilly and covered with an almost impenetrable jungle of tropical vegetation. Again, Suez is a healthy district, whereas Panama was, until recent years, a pest-house as deadly as Sierra Leone or the Guinea coast.

Mr. Bryce in his charming book on “South America” compares these two inter-continental causeways from a more historical point of view. He writes :—

A still more remarkable contrast, between these two necks of land, lies in the part they have respectively played in human affairs. The isthmus of Panama in far-off prehistoric days has been the highway along which those wandering tribes whose forefathers had passed in their canoes from North-eastern Asia along the Aleutian Isles into Alaska found their way, after many centuries, into the vast spaces of South America. But its place in the annals of mankind, during the four centuries that have elapsed since Balboa gazed from a mountain top rising out of the forest upon the far-off waters of the South Sea, has been small indeed compared to that which the isthmus of Suez has held from the beginning of history. It echoed to the tread of the armies of Thothmes and Rameses marching forth on their invasions of Western Asia. Along the edge of it Israel fled forth before the hosts of Pharaoh. First the Assyrian and afterwards the Persian hosts poured across it to conquer Egypt; and over its sands Bonaparte led his regiments to Palestine

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in that bold adventure which was stopped at St. Jean d'Acre. It has been one of the great highways for armies for forty centuries, as the canal cut through it is now one of the great highways for commerce.

The turn of the isthmus of Panama is now come, and, curiously enough, it is the isthmus of Suez that brought that turn, for it was the digging of a ship canal from the Mediterranean to the Red Sea, and the vast expansion of Eastern trade which followed, that led to the revival of the old designs, mooted as far back as Philip II. of Spain, of piercing the American isthmus. Thus the comparison of the two isthmuses becomes now more interesting than ever, for our generation will watch to see whether the commerce and politics of the Western World will be affected by this new route which is now being opened, as those of the Old World have been affected by the achievement of Ferdinand de Lesseps.

It will be seen from this quotation how the completion of the Suez Canal affected the Panama

project. Lesseps, fresh from his success at Suez and not contented with his great achievement there, was easily attracted by the schemes which were afoot for constructing a ship canal at another land-barrier which, like the isthmus at Suez, had obstructed the quickest lines of communication between East and West. In 1876 a corporation was established, called "La Société Civile Internationale du Canal Interocéanique," for the purpose of promoting canal schemes on the lower isthmus. Its head was Lieutenant Lucien Napoleon Bonaparte Wyse, who easily obtained a canal concession at Bogotá from the Colombian government. In 1879 an International Engineering Congress was assembled at Paris by Lesseps, whose partisans compelled a decision in favour of the Panama route.

But the United States, determined by this time to construct a canal for themselves without any joint control or international guarantee of neutrality, opposed the French scheme from the outset. No amount of bluff from the French promoters affected this opposition. The American people had indeed some right to complain. The Colombian concession to the French was quite

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inconsistent with the treaty of 1846 between this South American republic and the United States. This treaty Lesseps tried to induce Colombia to abrogate, and every effort, fair and foul, was employed to overcome the American objection to the scheme. In 1880 Lesseps was fêted at a public banquet at New York, but even the personal presence of the great man failed to have the desired effect. President Hayes addressed a strong message to the Senate on the subject, a few passages of which are interesting as showing the very decided views now held by the American government and people :—

An interoceanic canal across the American isthmus will essentially change the geographical relations between the Atlantic and Pacific coasts of the United States, and between the United States and the rest of the world. It will be the great ocean thoroughfare between our Atlantic and our Pacific shores, and virtually a part of the coastline of the United States. Our mere commercial interest in it is larger than that of all other countries, while its relation to

our power and prosperity as a nation, to our means of defence, our unity, peace, and safety, are matters of paramount concern to the people of the United States. No other great Power would, under similar circumstances, fail to assert a rightful control over a work so closely and vitally affecting its interests and welfare.

Without urging further the grounds of my opinion, I repeat, in conclusion, that it is the right and the duty of the United States to assert and maintain such supervision and authority over any interoceanic canal across the isthmus that connects North and South America as will protect our national interests. This, I am quite sure, will be found not only compatible with, but promotive of, the widest and most permanent advantage to commerce and civilization.

The reader will see that all this is inconsistent with the Clayton-Bulwer Treaty, under which the United States had actually undertaken to claim no such exclusive control as was now desired. Lengthy negotiations were now set

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on foot with England for the abrogation of a treaty which forbade the United States to build a canal of their own and prevented them from effectually opposing the French scheme. Lord Granville, however, saw no reason why England should abandon the treaty solely in the interests of the United States, and the negotiations were fruitless.

Meantime the French persisted in their undertaking. Their canal was to be tide-level, twenty-eight feet deep, costing £26,400,000. A corporation entitled the *Compagnie Universelle du Canal Interocéanique de Panama* was formed in 1881, and in the same year the work of construction was begun. So it looked as though the Americans were to lose all chance of constructing an isthmian canal under their own control. Events, however, were to decide otherwise.

CHAPTER IV.

THE FRENCH FAILURE.

THE French company began work on the isthmus in February, and such a rake's progress set in as the world has seldom seen. The name of Ferdinand de Lesseps inspired such confidence that plenty of money was forthcoming from the French people. A great deal of it was subscribed by small investors who could ill afford to lose their savings, and no fewer than 16,000 women took shares in their own names. The beginning of the excavations was celebrated with a "gala" performance in the little theatre at Panama, among the artistes being Sarah Bernhardt. Then began a drama or a melodrama of extravagance and profligacy lasting seven years. Money was poured out like the torrential flood-waters down the river Chagres. I have mentioned the exorbitant sum

which the company paid for the Panama Railway. All the expenditure was on the same scale. Princely salaries were paid to the managers and directors, and elegant mansions erected for their accommodation. Building operations—warehouses, hospitals, hotels, etc.—were carried on “regardless.” Mr. W. F. Johnson tells of a man who owned thirty acres of land useful mainly as a breeding-place for mosquitoes, but lying right across the route of the canal. It was worth perhaps 300 dollars. The man demanded just a thousand times that sum; the Colombian courts awarded it, and the French paid it. For one great mistake the French made was that they failed to secure a canal zone in which they would have exercised full powers of administration. They began to build their canal on Colombian territory, under Colombian control, and the consequence was that they were fleeced on every side. Probably this mistake was inevitable, as the United States would have vetoed any territorial concession by Colombia to France as a transgression of the Monroe doctrine.

The isthmus rapidly degenerated into a moral as well as a climatic pest-house. Froude described

the condition of things at Panama in one terrible sentence: "In all the world there is perhaps not now concentrated in any single spot so much swindling and villainy, so much foul disease, such a hideous dung-heap of moral and physical abomination." In fairness, however, it must be said that Lesseps himself cannot be held directly responsible for this state of affairs. He lived in Paris, and had probably little notion of what was happening at Panama. He furnished an example of the proverbial effects of too much success and prosperity. He seems to have become a superstitious believer in his own star, and to have thought that nothing could fail with which he was associated. Still less can the French nation be blamed for the wild doings of their representatives at the isthmus. And there is at least one redeeming feature in the conduct of this enterprise. In the midst of the moral and physical abominations that infested the isthmus during the French occupation, the engineering work went on steadily and conscientiously. Much of the French work was available for the Americans when they took over the task, and the engineers of the United

States have always testified generously to the excellence of the French excavation and construction along the Canal route.

It must be carefully noted that the French canal was to be sea-level like the Suez, Corinth, and Kiel Canals. The construction of such a waterway differed in many important ways from that of the high-level lock canal which the United States have completed. To understand this we must consider briefly the character of the country which lies between Panama and Colon. The dominant and decisive features of the isthmus at this point are the Chagres River and the Culebra Mountains. The Chagres enters the Caribbean a little west of Colon. Its valley runs right across the isthmus south-south-eastwardly towards Panama for about twenty-six miles, then, at a place called Bas Opisbo, suddenly swerves away to the north-east into the trackless and jungle-clad hill country. This valley is the only transverse trench which the isthmus affords at this stretch, and it has always fixed the attention of surveyors looking out for a canal site. If the isthmus had been a rainless desert like that of Suez, a canal could have been

constructed by a further preparation of this river valley and some heavy excavations along the nine-mile reach from Obispo to the Pacific. The sea would then have been admitted, the ebb and flow of the Pacific (the Atlantic shore is almost tideless) being regulated by a tidal lock. But the problem is not nearly so simple. The isthmus is one of the rainiest places in the world, enjoying on the Atlantic side 140 inches of rain a year. At Panama the rate is much smaller, not more than 60 inches. In the central hills the rainfall averages 90 to 95 inches. The average number of rainy days in the year is 246 at Bohio (inland on the Atlantic side), 196 at Colon, and 141 at Panama. The reader must not imagine a perpetual downpour or drizzle. The rain comes down in thundering tropical cataracts, leaving spaces of fine weather between the storms. Still, the isthmus is undoubtedly rainy and damp, and it is this humidity which makes the climate so trying, though the variations of the thermometer are by no means extreme and the average air temperature not particularly high. For example, the average temperature at Panama ranges

from 81·6 Fahrenheit in November to 86·1 in March—that is, during the hottest time of the day, from two to four o'clock p.m. The coolest time is from six to seven a.m., when the average temperature ranges between 74·0 in January to 76·6 in June. The yearly average daily temperature is 79·6. The thermometer seems never to have recorded 100 degrees Fahrenheit at Panama, whereas 104 has been touched even at Washington.

But to return to the Chagres River. The tropical rains convert this stream very quickly into a raging torrent. The Chagres is capable of rising over forty feet in twenty-four hours. If the Chagres valley was to be the site of the canal, as was obviously necessary, how did the French propose to “care for” this tremendous and capricious flow of water? Mr. Johnson remarks that “those who have seen the antics of the Chagres under the stress of a characteristic isthmian rain must be pardoned if they regard the harnessing of the Chagres to the canal as something much like the harnessing of a mad elephant to a family carriage.” The only course open to the French with their sea-level project

was to divert the Chagres with its twenty-six tributaries, chief of which are the Gatun and the Trinidad, from its old valley into another channel, along which it could rage as it pleased on its short journey to the Caribbean. This would have been a tremendous, though probably not an impossible, task. The New Panama Company, which took the French work from the Lesseps Company in 1893, dropped the tide-level in favour of a lock or high-level canal, and adopted the plan of a dam across the river valley at Bohio, creating a lake above this point and discharging the flood waters to the level below by means of a spillway in the adjacent hills. We shall see later how the Americans adopted the same principle but modified it in practice.

So much at present for the Chagres problem. The other main feature of the isthmus is met with about the point where the river suddenly changes its direction—that is at Bas Obispo, or Gamboa, about nine miles from the Pacific outlet. Here are the hills, the backbone or “continental divide,” averaging over 300 feet high but rising to much higher points, which connects the Cordilleras of South with the Sierras of North America.

For eight or nine miles the canal must run through this central barrier on its way to the Pacific. The earliest French notion was for a ship tunnel—a project perhaps never seriously contemplated. The only other course was to cut right down through this hilly country. That was a tremendous undertaking, which required, even for its inception, a good deal of the faith which is said to be able to “remove mountains.” We shall look more closely at the famous “Culebra Cut” when we come to the American canal. Most of the work of the French companies consisted of the dredging of the sea-level channels at the Atlantic and Pacific ends. But they drove a pretty deep furrow as well through the Culebra Mountains, excavating in all about 22,600,000 cubic yards.

With their sea-level scheme the French had, of course, a bigger proposition before them at the hills than their American successors. They would have had to cut right down below sea-level, whereas the bottom of the cut in the American lock-canal is forty feet above that level. Considering the difficulty the United States engineers have had with “slides” and “breaks” along the sides of their cutting, one suspects

that the much deeper and narrower channel of the French would have proved impracticable. The French scheme gave a width to the channel at this point of only 74 feet, while the bottom width of the American canal is 300 feet. The French work at the "Cut" was all utilizable by the Americans, who, though with different machinery, adopted the same general method of excavation.

In 1888 the French company suspended payments and went into bankruptcy. The canal was completed to the extent of about two-fifths, and had already cost nearly £80,000,000. It was said at the time that about one-third of this sum was spent on the canal, one-third wasted, and one-third stolen. The original capital with the eight subscription lists between 1882 and 1888 produced nominally £78,701,020, but actually only £40,309,348, the loss in discounts, etc., amounting to £38,391,672. The collapse of the company was followed by investigations and trials in France. Ten senators and deputies, together with the directors, were brought to trial. Ferdinand and his son Charles de Lesseps were, among others, condemned to fines and

imprisonment, but the sentences upon the Lesseps were never carried out. Neither the son nor the father was probably responsible for the iniquities which had marked the history of the company. The genius who had created the Suez Canal was indeed completely broken down by the tragical conclusion of his second venture, and died in 1894 in a condition of mental and physical collapse.

But financial profligacy was not the only cause of the French failure. Disease and death fought against the enterprise from the first. Yellow fever and malaria caused as much mortality among the French employees as would suffice for a great military campaign. Sir Ronald Ross, the great expert in tropical diseases, was told in 1904, when at the isthmus, that the French attempt cost at least 50,000 lives. This may have been an overestimate, but there is no doubt that the mortality was terrible, and would probably have brought the French operations to an end even if greater economy and honesty had prevailed in the administration. It must not be supposed that the French made no provision for the victims of these endemic diseases. Ex-

cellent hospitals were built at Ancon, near Panama, at a cost of over a million of money; while those at Colon cost more than a quarter of a million—in both cases about three times a fair and honest price. At the time of the French occupation of the isthmus nothing was known of the real nature and cause of yellow fever and malaria, of the manner in which they are transmitted, and the only effective means of prevention. All the recent and marvellous advance in scientific knowledge of these diseases was available when the Americans began their work, and was applied with the greatest efficiency and success. Medical science, quite as much as engineering skill, made a Panama canal possible, and we shall have a good deal more to say on this subject when we come to describe the American operations.

Let us not forget, then, that despite their failure the French did a great deal of good work, which they passed on many years afterwards to their American successors. A quantity of the French machinery, tools, and hardware was also available. It is true that among this was included a large consignment of snow-shovels

(for use at sea-level less than 10 degrees from the Equator !), and a quantity of petroleum torches for the festivities which were one day to celebrate the completion of the canal. But a great deal of the plant was in good condition. The extravagance and corruption which prevailed at the isthmus during the first French company were almost incredible. But it may be doubted whether any other nation could have succeeded in the 'eighties of last century where the French failed.

CHAPTER V.

THE HAY-PAUNCEFOTE TREATY.

IN 1893 a new corporation, known as the New Panama Canal Company, took over all the assets of the De Lesseps Company, including the railway, and the work of construction was continued, or at least not wholly interrupted. Meanwhile the people of the United States were not greatly displeased at the collapse of the great French enterprise. They became more and more determined to construct an American canal under American control. The Nicaraguan route was still favoured by many as compared with that at Panama. In 1887 a surveying party was sent to Nicaragua, and the next year the Maritime Canal Company was established to promote the building of a canal there. It is important to notice this particular scheme, for under it work was actually begun. Wharves, warehouses, and

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a breakwater were constructed at Greytown, a railway was built, and some progress made with the canal itself. Outside the Panama route this was the only actual work of canal construction performed in Isthmian and Central America. The project failed owing to the great depression of trade which occurred in 1893 and the impossibility of getting more capital. It should be noticed that these projects of constructing an American canal at Nicaragua quite independently of Great Britain were right in the teeth of the Clayton-Bulwer Treaty of 1850, which still remained in force. Most sensible persons saw that the first preliminary to an American canal was to get this treaty abrogated or modified. But this purpose and canal schemes in general were delayed by the outbreak in 1898 of the Spanish-American War.

This was a naval war, and the United States were to feel the inconvenience and danger of having no sea communication between their eastern and western coasts except *via* the far southern extremity of the continent. United fleet action over the whole theatre of the war was rendered impossible. An event soon occurred

which finally completed the conviction of the American people that, in the words of President Grant, "an American canal on American soil" was a national necessity. At the beginning of the war the battleship *Oregon*, one of the finest ships in the United States navy, lay off San Francisco. She was not wanted there, but she was very badly wanted at the West Indies, the main scene of the naval struggle. To get there the *Oregon* had to sail 13,400 miles round Cape Horn instead of 4,600 miles *via* a Panama canal, if there had been one. Everybody in the United States knew that the precious warship was making that perilous journey exposed all the way to the attack of the enemy. If she had been lost, the course of the war might have been very different, and even the delay of this long passage was a serious consideration at so critical a time. However, the vessel arrived safely and in a record time off Florida, and the suspense and anxiety of the American people were changed into jubilation. But "never again" was the moral they drew from this painful and exciting experience.

At the end of the war a fresh canal campaign broke out in Congress, the claims of Nicaragua

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and Panama being urged by their respective champions. The outcome of this rivalry was the appointment of a commission, the third of the kind, to go to the isthmus and investigate both Nicaragua and Panama. We shall have something to say about the report of this commission, which was issued in December 1900. But already, before that appeared, negotiations had been set on foot between the United States and Great Britain with regard to the Clayton-Bulwer Treaty. Allusions to the subject by Mr. M'Kinley in his second message to Congress had brought the question prominently before the people of both countries. The president had spoken thus :—

That the construction of such a maritime highway is now more than ever indispensable to that intimate and ready communication between our eastern and western seabords demanded by the annexation of the Hawaiian Islands and the prospective expansion of our influence and commerce in the Pacific, and that our national policy now more imperatively than ever calls for its control by this

government, are propositions which I doubt not the Congress will duly appreciate and wisely act upon.

It is obvious that the annexation by the United States of Hawaii and the Philippines, the beginnings of an American oversea empire, had greatly strengthened the case for a canal owned and controlled by the United States, and bringing the eastern coasts, the governmental centre of the States, into far more direct communication with these new acquisitions in the west.

Mr. McKinley's pronouncement was soon followed by conversations between Mr. John Hay, the American Secretary of State, and Lord Pauncefote, British Ambassador at Washington. The result was a treaty which was laid before the Senate in February 1900. This first attempt, however, was unsuccessful. The American people were annoyed to find that it did not abrogate the Clayton-Bulwer Treaty, but left the United States with something very short of that independent control which they desired. Amendments were introduced, and, so altered, the treaty was ratified by the Senate on December 20,

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1900. But in this new shape it proved unacceptable to the British government, and it was permitted to lapse; Lord Lansdowne, however, suggesting that another attempt at agreement should be made.

It may be asked why Great Britain, who had hitherto taken the view that it had nothing to gain, and perhaps much to lose, from the reconsideration of the Clayton-Bulwer Treaty, should now have been so willing to bring it under review. There was a variety of reasons. The government of the United States had protested for nearly fifty years against the agreement, and this pertinacity, together with the changed conditions since the Spanish-American War, may have weighed with the British government. Then the Alaskan boundary question was at that time still under discussion between the two countries, and a settlement was proving difficult. An obstinate resistance to the United States over the canal question might have continued that deadlock indefinitely. At this time, too, England was at the beginning of the Boer War, and finding that business a good deal more intricate than she had expected. The sentiment

of Anglo-American friendship had also grown much warmer since the days when Lord Granville had repulsed the advances of Mr. Blaine.

In November 1901 a new treaty made its appearance. This was ratified by the Senate without amendment, and was ultimately concluded between the two Powers, being known as the Hay-Pauncefote Treaty.*

It is very important to note the provisions of this treaty, because it establishes what is known as the political "status" of the new canal. The Hay-Pauncefote expressly supersedes the Clayton-Bulwer Treaty and provides for the construction of a canal (mentioning no particular route) "under the auspices of the government of the United States," which country is "to have and enjoy all the rights incident to such construction, as well as the exclusive right of providing for the regulation and management of the canal." It adopts the principles of "neutralization" which were embodied in the Treaty of Constantinople of 1888 in connection with the Suez Canal. Both treaties provide for :—

* Appendix i.

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1. Freedom of transit in time of peace or war for the vessels of all nations.

2. Freedom of the canal and its terminals from blockade.

3. A code of procedure for war-vessels entering or leaving the canal.

No special reference is made to the question of fortification, but the United States are to be at liberty to maintain such military police along the canal as may be necessary to protect it against lawlessness and disorder. A treaty, however, subsequently concluded between the United States and the Republic of Panama (known as the Hay-Bunau-Varilla Treaty) contains the following provision :—

If it should become necessary at any time to employ armed forces for the safety and protection of the canal, or of the ships that make use of the same, or the railways and auxiliary works, the United States shall have the right, at all times and in its discretion, to use its police and its land and naval forces or to establish fortifications for these purposes.

But the most important provision of all related to the question of the charges and other conditions of traffic through the canal. The meaning of the section seems plain enough, though it became a subject of rather acute controversy :—

The canal shall be free and open to the vessels of commerce and war of all nations observing these rules, on terms of entire equality; so that there shall be no discrimination against any such nation, or its citizens or subjects, in respect of the conditions and charges of traffic, or otherwise. Such conditions and charges of traffic shall be just and equitable.

This provision is reaffirmed in Article XVIII. of the Hay-Bunau-Varilla Treaty. There is no doubt that the British government regarded this promise of equal treatment as some compensation for the surrender of those rights of joint construction and control which Great Britain enjoyed under the Clayton-Bulwer Treaty. In fact, Mr. Hay, in a memorandum he sent to the Senate Committee on Foreign Relations, described

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the treaty as a sort of contract between Great Britain and the United States by which the former gave up those rights just mentioned in return for the "rules and principles" included in the new treaty, the chief among these being, of course, the provision about equality of treatment for all nations.

It was, therefore, a surprise when the United States government decided that the expression "all nations" did not include the United States themselves, and that it was quite open to them to give preferential treatment to their "coastwise" traffic. Under the term "coastwise" the United States include the sea-traffic not only between ports along a continuous coast, but between such points as San Francisco or Washington and the Philippine Islands. As a matter of fact, an amendment proposed by Mr. Burd in the Senate, reserving to the United States the right of favouring its "coastwise" traffic, had been defeated, when the new treaty was under discussion.

But, leaving these controversial questions, the most important thing for us to notice is that the Panama Canal has what is known as

an "international status." It is not quite the sole and absolute property of the United States in the sense in which the Kiel Canal belongs to Germany, the Corinth Canal to Greece, and the Amsterdam or North Sea Canal to the Netherlands. Its status is governed by treaties which impose certain obligations and restrictions upon the United States and lay down certain rules of administration. It was intended at first to make the status of the Panama and the Suez Canal identical. But there are considerable differences. The "neutrality" of the Suez Canal is guaranteed by all the Powers of Europe, that of the Panama Canal by two only, England and the United States, and it is safeguarded and maintained by the United States alone. Then the Suez Canal is and must remain unfortified, while the Panama Canal will be strongly fortified by the United States.

The reader may wonder what precisely is meant by the word "neutral" as applied to the new waterway. The position will be as nearly as possible that indicated by Dr. Vaughan Cornish in the following passage :—

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If there be a war in which the United States is not a party, the canal will be used by belligerents in exactly the same way as was the Suez Canal—for example, in the Russo-Japanese War—and the government of the United States has pledged itself to see that such neutrality is preserved. But if there be a war in which the United States is a party, the circumstances of fortification and operation by the United States in fact render it impossible for the other belligerent to use the canal, and are intended to have that effect. This being so, the United States is preparing to defend the canal from attack. Thus it is important to the proper understanding of the undertaking on which the United States government has embarked that we should clearly realize that the canal is only neutral in a restricted sense.*

As a matter of fact the status of the Panama Canal lies somewhere between neutralization and American control. The Hay-Pauncefote Treaty also lays down the rules which are to be observed

* "The Panama Canal and its Makers," pp. 42, 43.

by the ships of war of a belligerent using the canal and the waters adjacent to the canal—that is, within three marine miles of either end. They are similar to those in force at Suez, and need not be repeated here.

CHAPTER VI.

THE UNITED STATES AND COLOMBIA.

THOSE citizens of the United States who thought that with the disappearance of the Clayton-Bulwer Treaty all the difficulties in the way of obtaining a canal of their own had also disappeared were doomed to a severe disappointment. They had not reckoned with a South American republic on the verge of bankruptcy and suddenly presented with a glorious opportunity to fill its empty treasury. Two preliminaries were necessary before the United States could settle down at the isthmus of Panama to the work of canal construction. They had to purchase the concession, the unfinished works and the other assets of the New Panama Company, at as reasonable a price as they could obtain; and, secondly, it was necessary to conclude a treaty with Colombia, securing to the United

States on satisfactory terms the perpetual control of a strip of territory on the isthmus from sea to sea within which the canal could be constructed.

The first of these undertakings presented, as it turned out, no great difficulty. The New Panama Company had begun to despair of its own ability to get a canal finished across the isthmus, and to realize that their best course was to transfer the whole business to the United States. This disposition had been greatly strengthened by the Report of the Third Canal Commission, issued in December 1900. Probably the members of the commission were convinced of the advantages of the Panama route and the desirability of continuing the work of the French engineers. But they were shrewd people. They dwelt in their report on the improbability that the New Panama Company would sell its property to the United States, and on the difficulty of getting the Colombian concession transferred. They decided, therefore, that "the most practicable and feasible route for an isthmian canal to be under the control, management, and ownership of the United States is that known as the Nicaraguan route."

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The commission probably foresaw the effect such a decision was likely to have on the directors and shareholders of the New Panama Company. If an American canal were constructed at Nicaragua, all the property and work of the company at Panama would be thrown on the scrap-heap. The company estimated the value of its property at \$109,141,500, a price which the commission, representing the American government, declined to look at. The commission thought \$40,000,000 quite enough for the property, and so completely were the Americans master of the situation that that price was agreed upon in January 1902. The commission thereupon issued a supplementary report, which reversed the former decision and recommended the Panama route and the purchase of the French property.

Then arose in the Congress of the United States a tremendous conflict between the Nicaraguans and the Panamanians, the champions of the two routes which had so long been in rivalry. The former party insisted that Panama was farther from the United States than Nicaragua, and therefore the journey from the eastern to the

western seaboard of the States would be longer. They argued that Panama was unfavourable to sailing vessels on account of the prevailing calms on that coast; that it would be easier to deal with Costa Rica and Nicaragua than with Colombia; and that Nicaragua was "the traditional American route" as compared with the Frenchified Panama. The claims of the old Darien route were also advanced. This was probably done by American railway people who were against any canal, for the Darien route would have involved a rock tunnel five miles long and three hundred feet broad, the attempt to achieve which would probably have ended all canal adventures at the isthmus.

From these discussions emerged the celebrated "Spooner Bill," under which the Panama Canal has been constructed. It empowered the American government to secure the rights and property of the Panama Company for not more than \$40,000,000; to obtain from Colombia the perpetual control of a strip of land, not less than six miles wide, in which the canal should run; and then to proceed with the work. But if it should prove impossible to come to terms with

Colombia and the New Panama Company, then the Nicaraguan project was to be revived. We shall see how, in the sequel, this latter proviso came very near fulfilment. But, as a matter of fact, the Spooner Bill marks the end of the great battle of the routes which had lasted for four centuries.

The purchase price of the New Panama Company's property was happily settled, but the purchase was of course conditional on the conclusion of a satisfactory agreement between the United States and Colombia. It was no use for the United States to acquire unfinished canal-works if they were to be prevented from continuing and completing them. The situation was interesting. The Republic of Colombia was extremely "hard up." Its currency was debased, its treasury empty, its debt rapidly increasing through a large annual deficit. The government, if one may so express it, of the Colombian Republic was therefore not likely to overlook the chance of "making a bit" out of the necessities of the bigger and richer republic farther north. The United States wished to get their concession as cheaply as possible; Colombia wished to sell as

dearly as possible. This is not infrequently the case with buyers and sellers ; but Colombia pushed her haggling a little too far, and in the end very badly overreached herself.

The United States began by proposing terms on which they might obtain the desired strip of territory. The conditions were carefully laid down. The territory was to remain under Colombian sovereignty, but to be administered by the United States. Sanitary and police services were to be maintained by both governments jointly. Colombia was to police the zone, with the help of the United States if necessary. But the business terms were chiefly interesting to Colombia. The United States were to pay Colombia a bonus of \$7,000,000 in cash, and after fourteen years an annuity of \$250,000. These terms, which were not ungenerous, the Colombian minister at Washington declined to accept.

A brilliant idea had, indeed, struck the statesmen of the Colombian Republic. They had remembered that the concession to the Panama Company lapsed in October 1904, and that all its property that could not be carried away would revert to the Colombian government. Only defer

any agreement with the United States till then, and the \$40,000,000 to be paid to the New Panama Canal Company by the United States would drop like a golden nest-egg into the empty exchequer of the Colombian Republic. It was a brilliant idea, but the Colombian method of pursuing it was rather too crude and obvious.

In order to meet the Colombian government the United States improved their offer, considerably increasing the bonus and making other changes. An agreement, known as the Hay-Herran Treaty, was actually arranged between the United States and Colombia, the latter represented by her minister at Washington, Dr. Tomas Herran. This treaty, before it became operative, had to be ratified by the Congress of Colombia, and the president of that state took care that a congress should be elected which would do no such thing. Meantime all kinds of influences, secret and open, were at work. The German "colonial party" had become interested in the question, and had conceived the possibility of Germany, rather than the United States, succeeding to the French concession. It is quite certain that the United States would have re-

sisted any such proceeding, if necessary by actual war. There is little doubt, also, that the party in the United States which had supported the Nicaraguan scheme were throwing every obstruction in the way of a satisfactory agreement between the big and the little republic.

The reader may guess what was the anxiety of the New Panama Canal Company during all this diplomacy and intrigue. They knew that the completion of the sale of its property to the United States depended on an agreement being concluded between that country and Colombia; and they also knew that unless they sold before October 1904, they would have practically nothing to sell, because the franchise and possessions of the company would be forfeited to the Colombian government at that date. It would be better to sell on the best terms they could obtain to Germany or anybody else before the fatal day arrived. Meantime the United States brought every force of argument and menace to bear on the Colombian government. Secretary Hay sent urgent dispatches to the American minister at Bogotá. He reminded Colombia that the decision to adopt the Panama route was not

irrevocable. The Spooner law authorized the American president to await only "a reasonable time" for an agreement with Colombia. Having waited so long, he was able and indeed bound to resume the Nicaraguan project.

When the Colombian Congress duly rejected the Hay-Herran Treaty in August 1903, the New Panama Company became very seriously alarmed. Other offers of purchase were renewed, and the situation became critical for the United States. The American counsel for the company, Mr. William Nelson Cromwell, who had done his utmost to promote the agreement, had the utmost difficulty in keeping his clients to their compact with the United States. He made a hurried trip to Paris, where he said something which had the desired effect. There is no reason to believe that Mr. Cromwell took any part in the surprising events which were soon to alter the entire situation. But he had heard the proverbial "little bird," and the tidings he passed on brought the New Panama directors to the desired mood of patience and expectancy.

Colombia meanwhile kept on marking time. She suggested that a new treaty should be nego-

tiated between the United States and Colombia, to be ratified by the Colombian Senate some time in 1904. That would have put the clock forward splendidly, but the device was duly understood at Washington. In October a committee of the Colombian Senate reported to the Senate a recommendation that no agreement should be concluded with the United States until the French concession had lapsed. This recommendation was not acted upon by the Colombian Senate, nor yet were any steps taken towards the negotiation of a new treaty. The American government gave a generous interpretation to the "reasonable time" specified in the Spooner Bill, and kept on waiting in the hope that the Colombian Congress would still change its mind and ratify the Hay-Herran Treaty, whose terms, as we have seen, were liberal to the Colombian Republic. But when the congressional session at Bogotá came to an end on October 31, 1903, without any further action over the Hay-Herran Treaty, the Americans concluded that the whole business was over so far as negotiations with Colombia on the Panama question were concerned. Obviously the only course was to turn

to the Nicaraguan alternative. And the Colombian government no doubt thought it had won the day by sheer force of astute statesmanship.

Then came a coincidence more astonishing than any since the day when Mr. Weller, senior, upset the Eatanswill outvoters (purely by accident) into another canal. The Panama revolution broke out, and the United States suddenly and without further difficulty obtained all they wanted of the isthmus. And Colombia? She lost every stick and stone of the canal which was to have been hers in October 1904, never made a farthing on a Panama deal, got no thanks from Germany or anybody else, and lost a whole province into the bargain. Such were the results of very astute statesmanship at Bogotá.

CHAPTER VII.

A MINIATURE REVOLUTION.

It was not to be expected that Panama, one of the constituent provinces of the United States of Colombia, would be very enthusiastic about all this haggling and intriguing at Bogotá. Panama asked for nothing better than that a rich and powerful country like the United States should continue the French enterprise and carry it through. The canal would run right through the province, and would bring it into the main stream of the world's traffic and commerce. No doubt the central government at Bogotá would skim off as much as possible of this new wealth and prosperity at the isthmus; but even so, Panama would reap a great advantage from the running of this new and much-frequented highway of communication between east and west through its territory. The dealings of the

central government with the United States had roused a growing disgust and resentment at the isthmus.

The relations between the province of Panama with New Granada and its successor Colombia had been very chequered ever since the revolt of the Spanish colonies in Central and South America in the early years of last century. Panama declared her independence in 1821, and allied herself at once with New Granada. But troubles began forthwith. Again and again the isthmian province seceded from New Granada or Colombia, and was induced to return by promises of more favourable terms of union, these always remaining unfulfilled. In his annual message to Congress in 1903, President Roosevelt enumerated some fifty-three "revolutions, rebellions, insurrections, riots, and other outbreaks" that had occurred at the isthmus in fifty-seven years. Not long before these difficulties between the United States and Colombia, Panama had received a new constitution which was far from satisfactory to the people of the province. There was in truth little to be gained by a continued allegiance to the government at Bogotá. Some

idea of the depths to which Colombia had sunk through a long course of bad administration and corruption may be gathered from a passage in the official address of Dr. Marroquin on his becoming vice-president of Colombia in 1898. He said :—

Hatred, envy, and ambition are elements of discord ; in the political arena the battle rages fiercely, not so much with the idea of securing the triumph of principles as with that of humbling and elevating persons and parties ; public tranquillity, indispensable to every citizen for the free enjoyment of what he possesses either by luck or as the fruit of his labour, is gradually getting unknown ; we live in a sickly atmosphere ; crisis is our normal state ; commerce and all other industries are in urgent need of perfect calmness for their development and progress ; poverty invades every home. The notion of mother country is mistaken or obliterated, owing to our political disturbances. The conception of mother country is so intimately associated with that of

political disorders, and with the afflictions and distrust which they engender, that it is not unusual to hear from one of our countrymen what could not be heard from a native of any other country : “ I wish I had been born somewhere else.” Could many be found among us who would feel proud when exclaiming, “ I am a Colombian,” in the same way as a Frenchman does when exclaiming, “ I am a Frenchman ” ?

This was a cheerful pronouncement for a people to hear from the lips of a man who was just assuming high office in their midst. It suggests some further reasons why the Panamanians should have so readily asserted their independence once more when the negotiations between Colombia and the United States fell through.

Long before that happened, before the Colombian Congress which was to deal with the Hay-Herran Treaty had assembled, a much-respected citizen of Panama, Dr. Manuel Amador (Guerro), had written to the Colombian president warning him that serious consequences would

follow at Panama if that treaty were not ratified. For answer the central government foisted on Panama a candidate for Congress who was well known as an enemy of the United States and of the isthmian canal scheme. Representations to the government at Bogotá were useless, and Panama saw the prospect of a canal being constructed through her territory fading into distance.

Then it was that an eminent Panamanian, José Agustin Arango, a senator at the Colombian Congress of 1903, who had vainly urged the ratification of the Hay-Herran Treaty, conceived the idea that Panama might declare her independence and then make her own treaty with the United States regarding a trans-isthmian canal. It soon turned out that the same idea had struck many others, and a junta of zealous conspirators was quickly formed. Señor Arango chanced to meet Dr. Amador one day at the offices of the Panama Railroad, and unfolded his revolutionary design to that gentleman. The doctor proved highly sympathetic. There was indeed no difficulty in finding adherents. Señor Arango, Dr. Amador, and C. C. Arosemena undertook the

conduct of the movement, and among the other leaders were Señor Arango's sons and sons-in-law, Nicanor A. de Obarrio, Federico Boyd, Tomas and Ricardo Arias, and Manuel Espinosa. A very important person, General Esteban Huertas, commander of the troops in Panama, was easily enrolled, as were also alcaldes, chiefs of police, and other important officials.

The first thing to do was to sound official opinion in Washington as to what treatment the revolted province might expect from the American government. Moreover, revolutions cost money, and supplies must be obtained from somewhere. So Dr. Amador and Ricardo Arias were deputed to go to the United States. There they called on Mr. Cromwell, the counsel of the New Panama Company, who gave them very little encouragement. Moreover, they were carefully "shadowed" by Colombian agents, so that they were able to cable to their expectant friends at the isthmus only the single depressing word, "desanimado" (disappointed).

Then Dr. Amador called at the office of a Panamanian friend and sympathizer, Joshua Lindo, and asked for counsel in his difficulties. Mr.

Lindo at once suggested that the likeliest person to help was Mr. Bunau-Varilla, who had been chief engineer under the French Canal Company. It is interesting to know that this gentleman had been a fellow-student of Alfred Dreyfus, and had given effective help in the campaign which ended in that officer's liberation from the island prison not so very far from the isthmus of Panama. Unfortunately, said Mr. Lindo, Mr. Bunau-Varilla was in Paris; but even as the friends deplored his absence the telephone rang, Mr. Lindo answered the call, and lo! Mr. Bunau-Varilla announced his return to New York. Such a coincidence might well seem providential, for Mr. Varilla proved a friend in need and in deed. He promised the necessary funds as well as other practical help, and asked for only one return—that he might be appointed minister of the reconstituted Panama to the United States for just so long a time as was necessary for the arrangement of the new treaty between the two countries for the construction of the isthmian canal.

It is not surprising, therefore, that the next telegram sent home by the revolutionary agents

was more cheerful. It consisted of the single word "esperanzas" (hopes). Dr. Amador now made some efforts to ascertain the sentiment and intentions of the United States government. He called on Mr. Hay, the Secretary of State, at the state department. Now it is obvious that when a gentleman calls at a foreign office and announces himself as a conspirator against a government with which that office has friendly relations, the visitor cannot expect much practical help and sympathy. But the authorities at Washington, whose nerves were raw from the prolonged struggle with Colombia, would scarcely have been human if they had not felt a secret joy at a movement which promised such an ample retribution on Colombia and so easy a settlement of the Panama problem. Dr. Amador was politely informed that he must pay no more calls at the department. But he had seen and heard enough to assure him that the United States would at least remain neutral, and, if the revolution succeeded, would conclude a canal treaty with the new republic. He felt that there were two very important conditions to be fulfilled. Firstly, the revolution must be effected without

bloodshed, for public sympathy in the United States would be alienated by any fighting or violent disturbance. The conspirators were also not without a certain natural solicitude for their own skins. Secondly, there must be a brand-new government ready to take the place of the Colombian administration so soon as this was abolished.

The scene now changes to the isthmus. The conspirators were inclined at first to be sceptical about Dr. Amador's report of the probable attitude of the United States, but on November 2, 1903, the arrival of the American gunboat *Nashville* at Colon reassured them. The *Nashville* had come, as American men-of-war had frequently come in the past to Colon or Panama, not to take sides with any party in a scrimmage, but calmly and impartially to maintain order and keep transit open at the isthmus, in accordance with treaty obligations. The orders to the *Nashville*, as subsequently to the *Boston* and the *Dirie*, were these :—

Maintain free and uninterrupted transit.
If interruption threatened by armed force,
occupy line of railroad. Prevent landing

of any armed force with hostile intent, either government or insurgent, either at Colon, Porto Bello, or other point.*

A similar order was sent to Rear-Admiral Glass at Acapulco, who was to proceed to Panama with the same object.

But the coming *coup d'état* was known at Bogotá as well as at Washington. The date fixed for the outbreak was November 4. General Huertas was to be ready with his troops, and the signal to be given by the blowing of bugles by the firemen. But the Colombian government at last decided to act, and on November 3 the steamer *Carthagena* arrived at Colón, having on board General Tovar with a force of about four hundred and fifty men. The commander with three other resplendent warriors, Generals Castro, Alban, and Amaya, at once took train for Panama; while their troops, many of whom had brought their wives, camped out in the streets of Colon. These events were duly telephoned to Panama. The news

* See "Four Centuries of the Panama Canal," p. 188 (W. F. Johnson).

reached Dr. Amador and his friends at ten o'clock, just an hour before the arrival of the Colombian officers. It was "a crowded hour of glorious life" for the conspirators, some of whom found the excitement too much for their nerves, disappeared from the scene, and gave up the conspiracy business altogether. But the leaders were of better mettle, and while the trans-isthmian train was rapidly bringing the representatives of the established government to Panama a good many plans were discussed. The desperate nature of the occasion may be gathered from the fact that one of the proposals was to drug the Colombian officers, and when thus disabled convey them to durance vile. In great perplexity Dr. Amador sought General Huertas; but he had put on his dress uniform and gone to the station to meet his superiors. So matters were to be allowed to take their own course.

At eleven o'clock a gush of glittering uniforms, fifteen in all, counting the generals and the staffs, descended upon the Panama platform. One might almost have expected them to advance to the footlights and announce their arrival and

intentions in a four-part chorus. Here obviously were the properties, the stage scenery, and the artistes, principals and chorus, of a first-rate comic opera. In the harbour lay three Colombian gunboats whose political views were not fully ascertained, though it was thought the commanders had been won over to the revolutionary cause. The new arrivals were welcomed by General Huertas and conducted to headquarters, while the conspirators, no doubt with quickened pulses, awaited subsequent events from a distance.

The Colombian officers wished to be conducted forthwith to the fortifications and the sea-wall. Now this was precisely what General Huertas, whose heart beat loyally under his official gold braid to the cause of freedom and independence, wished to avoid, and for two reasons: firstly, it would have been easy for the federal generals to signal to the gunboats in the harbour and thus get command of the entire situation; secondly, on that same sea-wall there were some modern quick-firing guns, behind which even fifteen men might quickly get the whole city at their mercy. So General Huertas determined that on the whole

he would conduct his guests anywhere but to the sea-wall. He suggested that there were better ways of spending the hot hours of the day than in going round fortifications in stiff and sweltering uniforms. After luncheon, followed by a little siesta behind sun-shutters, would be a better time for the business of inspection. The generals were probably both hot and hungry, and they allowed themselves to be persuaded.

But even as they lunched their suspicions seemed to have awakened. Some one, it is said, warned them of the trap into which they had walked. And moreover, why did the Bogotá troops not arrive from Colon? What exactly happened is not recorded, but it is a fact that the generals suddenly insisted on the Panama troops being paraded and themselves being conducted to the fortifications.

General Huertas made some excuse for leaving the luncheon room, and outside the door found Dr. Amador, the respectable physician of Panama, now an arch-conspirator, though without the black mantle and stiletto. "The contrast between these two men," writes Mr. Johnson, "was most striking. The one was advanced in

years, venerable and stately in aspect, and yet impetuous as youth. The other was only a boy in stature and scarcely more than a boy in years, yet at the time deliberate and dilatory. The latter, however, quickly responded to the zealous initiative of the former. 'Do it,' exhorted Dr. Amador in an impassioned whisper, 'do it now.' "

The business was soon over. Huertas ordered out his soldiers, who knew well enough what was going to happen. Then, as the military swells from Bogotá came on the ground, the little general gave the order, the rifles were levelled on the Colombians, and they were walked off to police headquarters and safely locked up. Then Governor Obaldia was also arrested and taken to prison, but this was only a formality. He was an ardent conspirator, but as he represented the central government, it was thought desirable to perform the symbolical act of arresting and deposing him. He was at once released.

There was now no going back. The next step was to announce the fact of the revolution to the gunboats in the harbour, which were still a

doubtful factor. Two of them, the *Padilla* and the *Chucuito*, remained silent; but the third, the *Bogotá*, sent word that if the generals were not released by ten o'clock it would turn its guns on to the city. The generals were, of course, not released, so at ten o'clock the *Bogotá* launched three shells into the city. One of these killed an unfortunate and innocent Chinese coolie near the barracks, and that was the only casualty that occurred during the whole course of the great Panama revolution. Then the *Bogotá*, that deed of slaughter accomplished, steamed out of the harbour.

The next morning the gunboat *Padilla*, which had been considering the situation during the night, suddenly made up its mind, steamed in to a snug anchorage under the fortified sea-wall, and hoisted the flag of free and independent Panama. The *Padilla* might have been called upon to make good its new allegiance, for a report was spread that the terrible *Bogotá* was returning to bombard, this time to good purpose. So a letter was drawn up by the consuls of the United States, Great Britain, France, Germany, Italy, Spain, Holland, Ecuador, Guatemala, Salvador,

Denmark, Belgium, Cuba, Mexico, Brazil, Honduras, and Peru, protesting against the bombardment of a defenceless city without due notice to the consular corps as contrary to the rights and practices of civilized nations. What answer the justly enraged commander of the *Bogotá* would have returned to this rather representative address cannot be known, for the *Bogotá*, no doubt unnerved by the sensation of casting three live shells into a live town, never returned to witness the devastation it had wrought.

What in the meantime was occurring at Colon? Why had the 450 Colombian soldiers not flown to the rescue and vengeance of their captured officers? The explanation is simple, though perhaps unexpected—they could not pay their railway fares! After the departure of the generals for Panama on November 3, Colonel Torres, who had been left in charge of the government troops, demanded a “special” to take them across the isthmus. The superintendent of the line intimated that specials were procurable, but that fares must be paid. And the fares of 450 persons ran into money, in fact nearly \$2,000 in gold, or quite a little wheelbarrowful of

the depreciated Colombian silver. Anywhere but in Panama or Ruretania the plea of state necessity, which in presence of the 450 needed no demonstration, would have procured some concession from the railway authorities. But the railway rules provided for no such emergencies. No fare, no journey — that was the immutable railway law, and Colonel Torres had to lead his men back to their street encampments. It is one of the many remarkable coincidences at this juncture that the telegraphic and telephonic system also broke down, the wires refusing to transmit any messages from Colon to the officers at Panama.

At last, on November 4, Colon received the news of the revolution and the impounding of the Colombian officers. Some little impatience then appeared among the Colombian troops. They actually threatened to seize the railway and go across in spite of regulations. Also it was rumoured that Colonel Torres, losing for a moment his self-command, threatened to kill every American citizen in Colon unless his fellow-officers were at once liberated. At any rate, that rumour was duly reported to the commander

of the *Nashville*, who, on the strength of it, at once landed fifty bluejackets to preserve the peace of the town. The commander also wrote to the alcalde of Colon and the chief of the police, giving the gist of an official order he had received from Washington. The order pointed out that to allow the passage of Colombian troops from Colon to Panama would excite a conflict between the forces of the two parties, and would thus interrupt the free and open transit of the isthmus which the United States was bound to maintain. The commander had therefore instructed the superintendent of the railways to afford carriage to the troops of neither party. Never was officer so outrageously impeded in the performance of his obvious duty as Colonel Torres. And right in the middle of the situation thus created the *Carthagena*, which had brought the Colombian troops to Colon, sailed demurely home.

In a few days there assembled some nine or ten vessels of the United States navy at Colon or Panama. On November 4 it was announced that the United States would permit the landing of no forces hostile to Panama within fifty miles of the city of Panama or anywhere at all on the

Caribbean coast. Was not the United States government compelled by treaty obligations to preserve peace, the paying of fares, and "free and uninterrupted transit" at the isthmus? How unreasonable to suggest that the great and grown-up republic was protecting and taking the side of the little baby republic which had just been born at Panama!

But the 450 soldiers encamped with their wives in the streets of Colon were becoming an inconvenience, and it was highly desirable to remove this substantial lump of grit from the machinery of revolution. The commander of these troops himself helped to effect that object. He, in fact, offered to take his little army away in return for a satisfactory honorarium. The Panama treasury fortunately contained at that time a sum of \$140,000 in debased Colombian coinage, worth about \$56,000 in gold. A little of this might well be expended on clearing the country of the Colombian troops. The commander accepted \$8,000 in gold, and quickly bundled the loyal troops and their spouses on board the Royal Mail steamship *Orinoco* for passage homewards. He himself did not propose

to return home and report himself. His scheme was to go to Jamaica and spend his suddenly acquired wealth in "that loveliest of the Antilles." Then a cruel thing happened. The 450 got wind of the bargain their commander had made with the Panama government, and by a swift logical process concluded that the \$8,000 which had been paid for their departure belonged to themselves as well as to their commander. So they laid hands on the hapless officer and took all the money from him. We may imagine the annoyance of the gentleman who had betrayed his country, dishonoured his name, and then lost the "tip" which had made it all worth while. His subsequent proceedings are nowhere recorded.

Just after the Colombian troops had set sail homewards a special train arrived at Colon bringing the captive generals, who had promised to go home without further fuss. They left Colon on November 12, so that they had plenty of time to contemplate the beginnings of the new régime in Panama. All kinds of reports began to arrive about the intentions of the government at Bogotá. A naval expedition was said to be on the way from Buenaventura, but the United

States navy had instructions to take care of any experiments of that sort. Then the news came that a land expedition was approaching along the isthmus. That would have implied a real triumph of original exploration. It would have meant clearing a road for troops through impenetrable jungle, through which it is hard to cut the narrowest track by means of the machete or the long Spanish cutlass. The untamed San Blas Indians, who permit no white man to spend a single night in their territory, would have mobilized against the invasion, and so would the wild cats and anacondas and monkeys, who share with the Indians the sovereignty of that tangled wilderness.

The revolution was an accomplished fact, and Colombia could do nothing but accept the inevitable and reflect on the disappointment of her golden dreams. The revolutionists had been ready with their constitutional arrangements. The municipal council of Panama had met immediately after the *coup d'état*. It was unanimously voted that Panama should be a free and independent republic, and a provisional ministry was at once appointed. These proceedings were

ratified the same afternoon at a mass meeting of the people of Panama held in the cathedral square. A formal manifesto was also issued, constituting a declaration of independence and a justification of the revolt. It opens magniloquently: "The transcendental act that by a spontaneous movement the inhabitants of the isthmus of Panama have just executed is the inevitable consequence of a situation which has become graver daily." It goes on to set forth the grievances of Panama under the Colombian connection and the events which had led to the revolution. It ends in an almost pathetic note:—

At separating from our brothers of Colombia we do it without hatred and without any joy. Just as a son withdraws from his paternal roof, the isthmian people in adopting the lot it has chosen have done it with grief, but in compliance with the supreme and inevitable duty it owes to itself—that of its own preservation and of working for its own welfare. We therefore begin to form a part among the free nations of the world, considering Colombia as a sister nation,

with which we shall be whenever circumstances may require it, and for whose prosperity we have the most fervent and sincere wishes.*

By November 7 the new government had settled down so steadily to its work, and so obviously commanded the adherence of the whole people, that it received formal recognition from the United States in these words :—

As it appears that the people of Panama have, by unanimous movement, dissolved their political connection with the Republic of Colombia and resumed their independence, and as there is no opposition to the provisional government in the state of Panama, I have to inform you that the provisional government will be held responsible for the protection of the persons and property of citizens of the United States, as well as to keep the isthmian transit free, in accordance with the obligations of existing treaties relative to the isthmian territory.

* For full text of declaration see Appendix ii.

We need not dwell upon the desperate efforts made by the Colombian government to retrieve the situation. A respected Colombian, General Reyes, was sent to Washington to offer to revive the old Hay-Herran Treaty, with modifications greatly in the American interest, if the United States would help to restore Colombian sovereignty at the isthmus. But all was in vain. Colombia must lie on the bed she had made, and before the end of the year the new republic had been recognized by all the leading Powers of the world. The new government was true to the undertaking on the strength of which Mr. Bunau-Varilla had given his help and support to the movement. On November 7 he was appointed minister of Panama to the United States, and on November 18 the Hay-Bunau-Varilla Treaty* was signed at Washington, which finally placed the United States in a position to begin the work of canal construction at the isthmus.

* Appendix iii.

CHAPTER VIII.

THE BATTLE OF THE LEVELS.

By the Hay-Bunau-Varilla Treaty the United States guaranteed and undertook to maintain the independence of the Republic of Panama. The new republic granted to the United States in perpetuity the use, occupation, and control of a strip ten miles wide and extending three nautical miles into the sea at either terminal, with all lands lying outside of the zone necessary for the construction of the canal, and with the islands in the Bay of Panama. The cities of Panama and Colon were not embraced in the canal zone, but the United States assumed their sanitation and, in case of need, the maintenance of order therein. All railway and canal property rights belonging to Panama and needed for the canal passed to the United States, including any property of the railway and canal

companies in the cities of Panama and Colon. The works, property, and personnel of the canal and railways were exempted from taxation in the cities of Colon and Panama as well as in the actual canal zone. Free immigration of the workers and free importation of supplies for the construction and operation of the canal were granted. Provision was made for the use of military force and the building of fortifications by the United States for the protection of the transit. The United States were to pay \$10,000,000 down on exchange of ratifications and an annuity of \$250,000, beginning nine years from the same date. It will be noticed that the United States enjoyed in the canal zone all the rights, though not the name and title, of sovereignty.

The treaty was finally ratified on February 26, 1904, and four days later the first Isthmian Canal Commission, consisting of seven members, was appointed by President Roosevelt to arrange for the conduct of the great enterprise. Careful instructions were given to the commission. The Isthmian Canal Commission were authorized and directed :—

First.—To make all needful rules and regulations for the government of the zone, and for the correct administration of the military, civil, and judicial affairs of its possessions until the close of the fifty-eighth session of Congress. Second.—To establish a civil service for the government of the strip and construction of the canal, appointments to which shall be secured as nearly as practicable by merit system. Third.—To make, or cause to be made, all needful surveys, borings, designs, plans, and specifications of the engineering, hydraulic, and sanitary works required, and to supervise the execution of the same. Fourth.—To make, and cause to be executed after due advertisement, all necessary contracts for any and all kinds of engineering and construction works. Fifth.—To acquire by purchase or through proper and uniform expropriation proceedings, to be prescribed by the commission, any private lands or other real property whose ownership by the United States is essential to the excavation and completion of the canal. Sixth.—

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To make all needful rules and regulations respecting an economical and correct disbursement and an accounting for all funds that may be appropriated by Congress for the construction of the canal, its auxiliary works, and the government of the canal zone ; and to establish a proper and comprehensive system of bookkeeping showing the state of the work, the expenditures by classes, and the amounts still available. Seventh.—To make requisition on the Secretary of War for funds needed from time to time in the proper prosecution of the work, and to designate the disbursing officers authorized to receipt for the same.

The work of this commission was not wholly satisfactory, and in April 1905 another was appointed, which was ordered to meet at Panama quarterly, the first commission having conducted its operations from Washington.

The first two and a half years of the American occupation were spent mainly in preparing for the great task. One very important question had now to be finally decided. The battle of

the routes was over, and now began the battle of the levels. We have seen that the French began with the idea of a tide-level canal. The New Panama Canal Company had changed to the lock or high-level plan, but the French had not advanced in their work to the point when the one or the other scheme must be definitively adopted. The excavation they had carried out was all available for either type of canal. But the Americans had now to come to a decision.

A few more words about the main physical features of the isthmus are necessary for the reader to understand the nature of the problem. The two most important factors in the problem, as we have seen, are, firstly, the river Chagres with its tributaries, the Trinidad, Gatun, and twenty others; and, secondly, the range of low hills on the Pacific side through which any canal from Colon to Panama must pass. The river Chagres is a great mountain torrent which enters the Caribbean Sea a little west of Colon. The canal follows its course inland for about 26 miles, when the river valley turns sharply north-east and the canal continues

straight on to the Pacific. The Chagres is not a river to be despised. The rainfall on the isthmus is very heavy, especially on the Atlantic side, where 140 inches per annum have been recorded. The isthmian rivers are all liable to quickly-swelling floods, the Chagres at Gamboa having been known to rise $35\frac{1}{2}$ feet in twenty-four hours. The two different types of canal involve equally different methods of dealing with this formidable stream. It must either be harnessed to the work or firmly and finally shut off from any interference with the canal. De Lesseps, who had chosen the tide-level scheme, proposed to turn the Chagres and other rivers into diversion channels, so that they could get safely to the sea without crossing the line of the canal or having any connection with it. This would have involved a work of excavation and construction scarcely less gigantic than the building of the canal itself.

On the other plan, the Chagres and its tributaries would be made the feeders of the upper reaches of the canal. So far from being politely shown off the premises, the question rather was whether they would be able to supply sufficient

water all the year round for the needs of the canal. Then this harnessing of the Chagres meant the taming of its waters in a huge artificial lake, in which the impetuous current would be quenched and through which the dredged channel of the waterway would run. The New Panama Company had recommended the construction of a huge dam for this purpose at Bohio towards the Atlantic end of the canal, and this plan had been adopted by the first American Isthmian Commission, which issued its report in 1901. I may add that the Spooner Act, which authorized the construction of a canal, also contemplated a lock or high-level waterway. As we shall see, Bohio was not in the end adopted as the site of the big dam, but Gatun, where it is now constructed, with its concrete spillway carrying away the overflow waters of the lake down the old Chagres channel to the near Atlantic. I need not say that these were two very different ways of "caring for" the Chagres and its affluents. The tide-level canal would also, of course, be supplied with sea-water, while the high-level will be a fresh-water canal. Colonel Goethals, the chief engineer of the canal, anticipates rather a curious

result from this latter circumstance. He thinks the bed of the upper reaches of the canal will in course of time be quite paved with the barnacles washed by the fresh-water from the bottoms of the great ocean-going vessels passing through the canal.

The second physical feature is the hill country or the "Continental Divide" which the canal enters near the point where the Chagres River crosses its course. Here runs the famous Culebra Cut, the nine-mile-long artificial canyon, the biggest excavation in the world. Now the highest elevation of these hills along the centre line of the canal was 312 feet above sea-level. The bottom of the canal at the cutting is 40 feet, so that the vertical depth of the cut on the centre line is 272 feet. The engineers of the tide-level scheme would have had not only to excavate 85 feet deeper—that is, to 45 feet below sea-level—but to make the cutting immensely wider in order to avoid the danger of disastrous landslides. This would have meant an enormous amount of additional work, as well as expense. Nevertheless, the controversy between the two principles was very warmly and

equally sustained. It may be mentioned that Mr. Bunau-Varilla was an especially ardent advocate of the tide-level scheme. In fact, he was not for calling the waterway a canal at all; he would have christened it "the Straits of Panama."

However, a decision was necessary, and in 1905 a board of consulting or advisory engineers was appointed, mainly to consider whether the canal should be constructed at high-level or sea-level. Five members were appointed by European governments, and the president was Major-General George W. Davis, formerly of the United States army. The instructions given to this board by President Roosevelt will afford a very clear idea of the problem it had to solve :—

There are two or three considerations which I trust you will steadily keep before your minds in coming to a conclusion as to the proper type of canal. I hope that ultimately it will prove possible to build a sea-level canal. Such a canal would undoubtedly be best in the end, if feasible; and I feel that one of the chief advantages of the

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Panama route is that ultimately a sea-level canal will be a possibility. But while paying due heed to the ideal perfectibility of the scheme from an engineer's standpoint, remember the need of having a plan which shall provide for the immediate building of a canal on the safest terms and in the shortest possible time. If to build a sea-level canal will but slightly increase the risk, then, of course, it is preferable. But if to adopt the plan of a sea-level canal means to incur a hazard, and to insure indefinite delay, then it is not preferable. If the advantages and disadvantages are closely balanced, I expect you to say so. I desire also to know whether, if you recommend a high-level multi-lock canal, it will be possible, after it is completed, to turn it into or substitute for it, in time, a sea-level canal without interrupting the traffic upon it. Two of the prime considerations to be kept steadily in mind are :

First.—The utmost practicable speed of construction. Second.—Practical certainty that the plan proposed will be feasible ; that

it can be carried out with the minimum risk.

The quantity of work and the amount of work should be minimized as far as possible.

There may be good reason why the delay incident to the adoption of a plan for an ideal canal should be incurred ; but if there is not, then I hope to see the canal constructed on a system which will bring to the nearest possible date in the future the time when it is practicable to take the first ship across the isthmus—that is, which will in the shortest time possible secure a Panama waterway between the oceans of such a character as to guarantee permanent and ample communication for the greatest ships of our navy and for the larger steamers on either the Atlantic or the Pacific. The delay in transit of the vessels owing to additional locks would be of small consequence when compared with shortening the time for the construction of the canal or diminishing the risks in its construction.

In short, I desire your best judgment on all the various questions to be con-

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sidered in choosing among the various plans for a comparatively high-level multi-lock canal; for a lower level, with fewer locks; and for a sea-level canal. Finally, I urge upon you the necessity of as great expedition in coming to a decision as is compatible with thoroughness in considering the conditions.

The board went to the isthmus and investigated the subject with great care. In January 1906 they issued three reports. A majority of eight to five pronounced in favour of the sea-level scheme "as the only one giving reasonable assurance of safe and uninterrupted navigation." "Such a canal," it said, "can be constructed in twelve or thirteen years' time; the cost will be less than \$250,000,000; it will endure for all time."

The minority were just as confidently in favour of a high-level canal. They concluded:—

In view of the unquestioned fact that the lock canal herein advocated will cost about \$100,000,000 less than the proposed sea-level canal; believing that it can be built in much less time; that it will afford a

better navigation ; that it will be adequate for all its uses for a longer time, and can be enlarged, if need should arise, with greater facility and less cost, we recommend the lock canal at elevation 85 for adoption by the United States.

The third report was made by the chief engineer, Mr. Stevens, who, quite apart from all considerations of expense, was strongly in favour of the high-level plan.

The three reports were considered by the canal commissioners, a majority of whom ultimately agreed with the minority of the advisory board. They admitted that a sea-level canal was ideally the best, but considered that the cost of making such a canal sufficiently wide would be prohibitive. They declared therefore for a lock canal at an elevation of 85 feet above sea-level. They gave their decision thus :—

It appears that the canal proposed by the minority of the board of consulting engineers can be built in half the time and at a little more than half the cost of the canal proposed by the majority of the board, and that when

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completed it will be a better canal, for the following reasons :

1. It provides greater safety for ships and less danger of interruption to traffic by reason of its wider and deeper channels.

2. It provides quicker passage across the isthmus for large ships or a large traffic.

3. It is in much less danger of damage to itself or of delays to ships from the flood - waters of the Chagres and other streams.

4. Its cost of operation and maintenance, including fixed charges, will be less by some \$2,000,000 or more per annum.

5. It can be enlarged hereafter much more easily and cheaply than can a sea-level canal.

6. Its military defence can be effected with as little or perhaps less difficulty than the sea-level canal.

7. It is our opinion that the plan proposed by the minority of the board of consulting engineers is a most satisfactory solution of an isthmian canal, and therefore we recommend that the plan of the minority be adopted.

In February 1906 the president referred the question for final decision to Congress. In his message on the subject he spoke thus :—

It must be borne in mind that there is no question of building what has been picturesquely termed “the Straits of Panama” —that is, a waterway through which the largest vessels could go with safety at uninterrupted high speed. Both the sea-level canal and the proposed lock canal would be too narrow and shallow to be called with any truthfulness a strait, or to have any of the properties of a wide, deep water strip. Both of them would be canals, pure and simple. Each type has certain disadvantages and certain advantages. But, in my judgment, the disadvantages are fewer and the advantages very much greater in the case of a lock canal substantially as proposed in the papers forwarded herewith; and a careful study of the reports seems to establish a strong probability that the following are the facts: The sea-level canal would be slightly less exposed to damage in the event

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of war ; the running expenses, apart from the heavy cost of interest on the amount employed to build it, would be less ; and for small ships the time of transit would probably be less. On the other hand, the lock canal, at a level of 80 feet or thereabouts, would not cost much more than half as much to build, and could be built in about half the time, while there would be very much less risk connected with building it, and for large ships the transit would be quicker ; while, taking into account the interest on the amount saved in building, the actual cost of maintenance would be less. After being built, it would be easier to enlarge the lock canal than the sea-level canal.

The law now on our statute books seems to contemplate a lock canal. In my judgment a lock canal as herein recommended is advisable. If the Congress directs that a sea-level canal be constructed, its direction will, of course, be carried out. Otherwise, the canal will be built on substantially the plan for a lock canal outlined in the accompanying papers, such changes being

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made, of course, as may be found actually necessary.

In June 1906 Congress finally decided for a high-level canal, and the controversy was officially closed. But the friends of the sea-level scheme were by no means silenced. Whenever any serious difficulty occurred in the construction of the canal on the lock principle their voices were heard again. In fact, the conflict cannot be said to have ended until 1909, and even then it is not certain that the sea-levellers modified their convictions.

CHAPTER IX.

MAN AND THE GNAT.

ALMOST at the beginning of their great task the Americans were faced with a problem which involved the success or failure of the whole enterprise. I have said something about the climate and health conditions at the isthmus. It is fairly certain that yellow fever and malaria would have wrecked the French undertaking even if there had been no other obstacles to its success. It is not less probable that if the Americans had been in no better a position to wage war with these plagues, their work at the isthmus would also have been in vain. The French had built excellent hospitals and provided efficiently for the comfort and recovery of those who were stricken with these diseases. But being totally ignorant of the sources and method of transmission of malaria and yellow fever, they could

do nothing effectual in the way of prevention and eradication. They could only take the individual victim when they found him and do their best to cure him. They still believed that malaria was produced by climatic conditions, by marshy emanations, mists, and so forth. The fleecy clouds which gather round the isthmian hills in the rainy season were given the very undeserved title of "the white death" by the French workers at the isthmus. Yellow fever, again, was just as mistakenly attributed to the climate, and especially to filthy ways of living. It is not surprising that, with these misconceptions, medical skill should have been almost useless during the French occupation, and that the employees at the isthmus should have died in their thousands.

But since the days of the Lesseps company, science had thrown a flood of light on the nature of these tropical scourges and the secret of their transmission. As these medical and scientific pioneers made a Panama Canal possible, though their names are not directly linked with its construction, we may look back for a few moments at their triumphs of discovery. The credit for

first discovering that malaria is not due to poisonous emanations or contagion but is carried from people infected with the disease by the *anopheles* mosquito belongs to Major (now Sir) Ronald Ross, formerly of the Indian Medical Service, who devoted himself to this subject during the last years of the 19th century. By a series of experiments he proved that malaria is due to the presence in the human blood of an organism which is conveyed from person to person by this mosquito, and that the mosquito is harmless unless it has become infected with the germ by biting a person who has caught malaria. The value of this discovery was soon shown by practical applications. Major Ross was engaged by the Suez Canal Company to deal with the malaria which had become firmly established at Ismailia, a little town of 10,000 inhabitants on that canal. No fewer than 2,500 cases had been supplied in one year by this small population. The new methods founded on the new discovery proved so effectual that in three years the disease was stamped out, and there has been no relapse ever since. The same results were achieved at Port Said.

Now, if malaria is thus caused by mosquito bite, there was some *à priori* reason for thinking that yellow fever might be transmitted in the same way. At any rate the insect was again laid under a very grave suspicion. The opportunity for studying this further question was afforded during the Spanish-American war, when a serious outbreak occurred among the troops occupying Havana, in Cuba. The doctors were quite unable to deal with this most terrible of all diseases. Knowing nothing whatever of its cause, their treatment of it could be only experimental and casual. So a board of inquiry was formed consisting of four army surgeons serving in Cuba—Walter Reed, James Carroll, Jesse W. Lazear, and Aristides Agramonte. The experiments were begun in June 1900, and continued into the next year. Of these four, Dr. Agramonte was not liable to the disease, and Dr. Reed was called away on duty to Washington. The other two determined to experiment on their own persons rather than risk the lives of other people.

Dr. Carroll first allowed himself to be bitten by the mosquitoes, not the *anopheles* but another variety known as the *stegomyia*. He fell ill

with a bad attack of yellow fever, which very nearly cost him his life. Later, in the yellow fever hospital, Dr. Lazear deliberately allowed a mosquito to feed on his hand. In four days he was down with the disease in so acute a form that he died of it—a true martyr, if ever there was, to the cause of science and the welfare of mankind. These and other experiments proved conclusively that yellow fever, like malaria, is transmitted by mosquito bites, but it was still uncertain how soon after biting an infected person the mosquito becomes itself harmful and how soon a person stricken with malaria is able to infect a healthy mosquito. So further experiments were necessary, and volunteers were invited to offer themselves for this service. Everybody in the army knew what had happened to Doctors Carroll and Lazear, but in spite of this plenty of willing martyrs appeared. “The first to present themselves were two young soldiers from Ohio, John R. Kissinger and John J. Moran. Dr. Reed talked the matter over with them, explaining fully the danger and suffering involved, and stating the money consideration offered by General Wood. Both young men

declared that they were prepared to undergo the experiment, but only on condition that they should receive no pecuniary reward. When he heard this declaration, Dr. Reed touched his hat with profound respect, saying, "Gentlemen, I salute you!"* Kissinger took the disease from the mosquito bites, and recovered. A room was prepared for Moran, a sort of mosquito den into which fifteen gnats, all suffering from yellow fever, had been admitted. Major Reed describes what happened :—

At noon on the same day, five minutes after the mosquitoes had been placed therein, a plucky Ohio boy, Moran by name, clad only in his night-shirt and fresh from a bath, entered the room containing the mosquitoes, where he lay down for a period of thirty minutes. Within two minutes of Moran's entrance he was being bitten about the face and hands by the insects, that had promptly settled down upon him. Seven, in all, bit him at this visit. At 4.30

* "Sanitation of the Isthmus." Mr. J. B. Bishop in *Scribner's Monthly*, February 1913.

p.m. the same day, he again entered and remained twenty minutes, during which time five others bit him. The following day, at 4.30 p.m., he again entered and remained fifteen minutes, during which time three insects bit him ; making the number fifteen that had fed at these three visits. On Christmas morning, at 11 a.m., this brave lad was stricken with yellow fever, and had a sharp attack, which he bore without a murmur.

But still the demonstration was not complete. It was necessary to prove by equally undeniable evidence that yellow fever is not conveyed by contagion with the clothes and persons of infected people. These experiments were even more trying and heroic than those which preceded. A small wooden hut, 14 by 20 feet, was prepared, and into this was stored a large amount of bedding and clothes which had been used and worn by persons suffering from the fever. The building was carefully guarded against the intrusion of mosquitoes, and a temperature of seventy-six degrees, with a sufficient moisture,

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maintained. "For twenty consecutive days Dr. Clarke and his men went into this room, handled, wore, and slept in the contaminated clothing, although the stench was so offensive as to be almost appalling. They emerged from the ordeal in perfect health, proving beyond possibility of dispute that the disease was not contagious, and that the mosquito was the sole method of transmission.

When distributing the credit for the new channel of world-traffic through the isthmus of Panama, let us not forget Dr. Lazear who sacrificed his life and the many others who cheerfully risked their lives to establish truths and facts without which the construction and continued operation of the canal would almost certainly have been impossible.

One mosquito may look very much like another, but the *stegomyia* and the *anopheles* differ in many important respects. The latter finds its most favourable breeding-places in stagnant pools of fresh water, such as are left by the heavy rains of the isthmus. It is essentially a gnat of the country-side. The *stegomyia*, on the other hand, inclines to a more frivolous town life.

Cisterns and tanks and other receptacles for storing water are his favourite haunts. In length of life and power of flight the species also differ, though these details are not yet fully ascertained. The *stegomyia* is said to live three months. Dr. Cornish states that it becomes dangerous only by attacking man during the first three days of yellow fever, and that, even then, twelve days elapse before its bite is infectious. Six days after a man has been bitten by an infected *stegomyia* he falls ill with yellow fever, and for the next three days he is capable of transmitting it to the healthy mosquito. Mr. Bishop informs us that if there is no fresh case of yellow fever within a period of sixty days after the latest one in an epidemic, it is a safe conclusion that the disease has been stamped out, because there is no mosquito alive to carry the parasite. After a period of ninety days all doubt on the subject is removed.* If a community, therefore, which has thus got rid of its last case of yellow fever could be completely isolated, yellow fever could never possibly return. It could only be reintroduced from outside. It

* *Scribner's Monthly*, February 1913, p. 248.

should be possible, with a proper system of sanitation and quarantine, to free any district entirely from this awful scourge.

The case of the *anopheles* and his little contribution to human suffering is very different. Whereas the victim of yellow fever either dies or gets better and quickly ceases to be a source of infection to the mosquito, the victim of malaria seldom dies of the disease, but he remains infectious to the *anopheles* for three years. The disease does not simply attack new-comers or white people. Natives of the isthmus and the West Indies are subject to it, and, indeed, seem to be in a chronically malarious condition. It is said that 50 per cent. of the population of the isthmus were found in 1904-5 to have the parasite of malaria in their systems. It is difficult to estimate or imagine the part played by this widespread malady on conditions of life and civilization within the tropics.

Sir Ronald Ross, the greatest living authority on the subject, made some interesting remarks in an address at the Royal Colonial Institute in January of this year. He said :—

Nothing has been more carefully studied of recent years than the existence of malaria amongst indigenous populations. It often affects every one of the children, probably kills a large proportion of the new-born infants, and renders the survivors ill for years ; only a partial immunity in adult life relieves them of the incessant sickness. Here in Europe nearly all our children suffer from certain diseases—measles, scarlatina, and so on. But these maladies are short and slight compared with the enduring infection of malaria. When I was studying malaria in Greece in 1906, I was struck with the impossibility of conceiving that the people who are now intensely afflicted with malaria could be like the ancient Greeks who did so much for the world ; and I therefore suggested the hypothesis that malaria could only have entered Greece at about the time of the great Persian wars. One can scarcely imagine that the physically fine race and the magnificent athletes figured in Greek sculpture could ever have spent a malarious and splenomegalous childhood. And, con-

versely, it is difficult to imagine that many of the malarious natives in the tropics will ever rise to any great height of civilization while that disease endures amongst them. I am aware that Africa has produced some magnificent races, such as those of the Zulus and Masai, but I have heard that the countries inhabited by them are not nearly so disease-ridden as many of the larger tracts. At all events, whatever may be the effect of a malarious childhood upon the physique of adult life, its effects on the mental development must certainly be very bad, while the disease always paralyzes the material prosperity of the country where it exists in an intense form.

The isthmus of Panama was beautifully adapted to the breeding of the *anopheles* and the widest dissemination of malaria. In fact, the canal zone taken over by the Americans was perhaps the most malarial strip of territory in the world. The heavy rains leave the country covered with those marshes and pools from which these little ghostly insects are always rising in swarms, ready to

carry the germs of disease from the sick to the healthy and thus perpetuate and extend the domain of this distressing malady. The reader will notice that, as the yellow fever victim is only infectious to the mosquito for three days, while the malarial person can convey the poison for three years, it is a much more practical problem to eradicate yellow fever than to stamp out malaria. It is true the causes of malaria are now fully known and the only effective methods of propagation ascertained. If one could isolate all malarial patients, including all who are capable of transmitting the disease, in buildings screened with fine copper-gauze to keep out the mosquitoes and thus gradually diminish the area of infection to vanishing point, it would not be necessary to deal with the breeding-places of the mosquitoes, and man and the gnat might live together in perfect amity. But with fifty and even seventy per cent. of the people malarially infected, such a heroic course is obviously impossible, and one can hope only to diminish to a considerable degree the prevalence of the disease.

The first two and a half years of the American occupation of the isthmus was spent in looking

round and preparing for the great work. It soon became evident that the most pressing and immediate task was one of cleaning up and sanitation. In July 1904, Colonel W. C. Gorgas, whose name will always be associated with the triumphs won over disease at the isthmus, became the head of the department of sanitation under the Canal Commission. He quickly recognized that everything depended on the efficiency and success of his own department. "The experience of our predecessors," he wrote, "was ample to convince us that unless we could protect our force against yellow fever and malaria we would be unable to accomplish the work."* When the Americans took over, yellow fever, though present, was quiescent, but the figures began almost at once to mount up. In December 1904 there were six cases on the isthmus and one death. In January 1905 there were nineteen cases and eight deaths, seven and one respectively among the canal employees. In May there were thirty-three cases, twenty-two on the canal, with seven deaths in all, including three employees. In June there was an alarming advance. Sixty-two cases

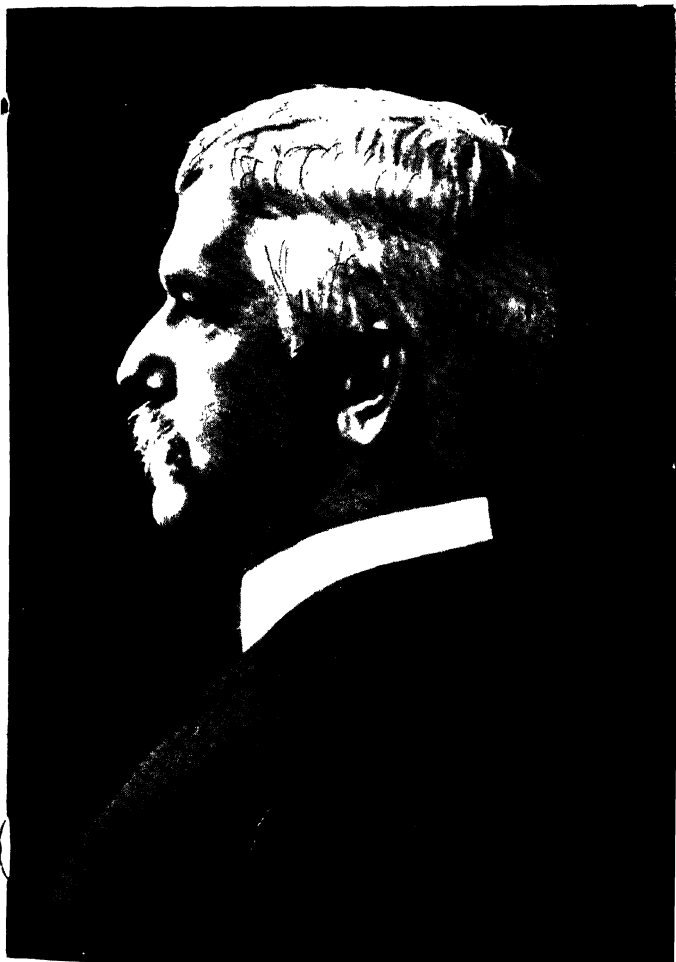
* *Journal American Medical Association*, July 6, 1907.

occurred on the isthmus, thirty-four of them among the employees. There were nineteen deaths, six on the canal. Something like a panic then set in among the Americans engaged on the canal works. Many threw up their positions, and the homeward-bound steamers were filled with employees fleeing from this real "yellow peril." In the annual report of the Commission for 1905 we read :—

A feeling of alarm, almost amounting to panic, spread among the Americans on the isthmus. Many resigned their positions to return to the United States, while those who remained became possessed with a feeling of lethargy or fatalism, resulting from a conviction that no remedy existed for the peril. There was a disposition to partly ignore or openly condemn all preventive measures. The gravity of the crisis was apparent to all.

This loss of moral tone was the most dangerous symptom of all. A feeling of "let us eat and drink, for to-morrow we die" gained possession

of the canal workers, and in the indifference of despair many tore down the nettings over the windows of the canal building and began to neglect all the sanitary precautions enjoined on them by the department. Evidently a calamity was in prospect which would have brought to an end, perhaps for ever, American canal ambitions at the isthmus. The restoration of public confidence and sense of responsibility seems to have been due largely to Mr. Charles E. Magoon, governor of the canal zone. He set himself to rebuke and remove the morbid bravado then prevailing. "He began by frankly and publicly declaring that he, personally, was afraid of the fever, and that in his opinion all non-immunes who professed not to be afraid were 'talking rot!' Then he ordered all the window-screens to be repaired and kept in place, and announced that if any man was caught leaving them open or tearing holes in them, something uncommonly unpleasant would happen to him. Now when a man of Judge Magoon's mental and physical stature admits that he is afraid, any lesser man is a fool to say he isn't; and when a man of Judge Magoon's resolution gives an order



[Clinician—Washington, D.C.]

COL. WILLIAM C. GORGAS,
Medical Dept., U.S. Army, Head of the Department of Sanitation, Ancon.

and prescribes a penalty for its violation, that order is very likely to be obeyed.”*

Governor Magoon arrived at the isthmus in May 1905, just as the yellow fever epidemic was reaching its climax. From that moment he and Colonel Gorgas, to whom he gave the most complete support, set themselves to fight the fever. The first thing to do was to get all the patients within screened buildings, whether the hospital or their own homes, so that no *stegomyia* mosquitoes could saunter in and take the poison. Then the towns of Colon and Panama were handed over to a campaign of spring-cleaning such as the world has never witnessed. Then the canal building was thoroughly fumigated with pyrethrum powder or sulphur, and not simply the official building but every single house in the city of Panama was similarly disinfected. Dust and refuse were everywhere burnt. A very efficient system of inspection was adopted, and a rigid quarantine enforced against all foreign places whence the yellow plague could be imported into the zone.

But more important than the immediate

* “Four Centuries of the Panama Canal.”

expedients were the more permanent sanitary improvements carried out in Colon and Panama. These towns were repaired with brick or cement, and provided with what they had never yet enjoyed, a proper system of drainage. Waterworks were also constructed outside the towns, and a supply of pure water made available for every household. Hitherto water had had to be stored during the dry season in tanks and cisterns, in which the *stegomyia* mosquito revelled exceedingly. These were now no longer necessary, and stagnant water, wherever it collected in the town, was drained away. In order to expedite these splendid reforms, Governor Magoon withdrew the workers from the canal and concentrated all efforts on the sewers and waterworks. So speedily was the work carried forward that the water was turned on for public use from the main in the Cathedral Plaza on July 4.

The results of this drastic campaign were soon apparent in the dwindling of the yellow fever returns. In July there were still forty-two cases, and thirteen deaths on the isthmus, with twenty-seven cases and ten deaths among the employees. August showed a great improvement, with

twenty-seven cases and nine deaths on the isthmus, and twelve cases and only one death on the canal. The improvement continued through September, October, November, and in December only one case was reported on the isthmus and one on the canal. Three months having elapsed since the last case, and, therefore, every *stegomyia* which could possibly be infected with malaria having departed this life, the epidemic was entirely past and over. As I have pointed out, there cannot possibly be any return of it under these conditions unless the infection is brought from without. And if any new cases are at once isolated and screened from afternoon calls of the mosquito, the outbreak may be easily and infallibly suppressed. We may say, therefore, that the yellow spectre at the isthmus has been shorn of all its terrors.

Malaria is, however, a very different proposition. A corresponding crusade has been carried on for six years against the little *anopheles* gnat, the little criminal who carries the malarial poison. His happy breeding-grounds are in open country marshes and pools, and there is no lack of these in the canal zone. It was impossible to deal with

the entire three-quarters of a million acres of that territory, but wherever the canal workers were settled determined war was waged against the mosquitoes. It should be remembered that the *anopheles* can fly only about a hundred or two hundred yards. The jungle was therefore cleared away for a few hundred yards round each village and settlement, marshes and pools in this area were drained off, and into all the ditches where stagnant water had collected oil was poured, which so effectually turns the mosquito's stomach that it never recovers. Some 1,200 acres of the zone were thus treated, and of course the regulations as to house-screening applied to malaria no less than to yellow fever. The employees were also supplied freely and generously with quinine.

The result has been not the eradication of malaria, but the reduction of the cases to about one-third the number at which they stood in 1906. Yet even so, among the 40,000 employees on the canal during the year ending June 30, 1912, there were 7,000 malaria cases in the hospitals, with 32 deaths, 22 of these being white people. The heavy rainfalls at the isthmus will probably

prevent the complete sanitation of the country in this respect, for the simple reason that the destruction of the *anopheles* mosquito or the eradication of the malarial germ can never be complete. There will always be people going about with the malarial organism in their blood, and always *anopheles* mosquitoes ready to become infected with it and to carry the infection about. But, as we have seen, much can be done by the means described to reduce the ravages of the disease. In 1906, out of a working force of 26,000, there were 21,739 cases of malaria. We have seen how this figure had been brought down in 1912. In 1906 it was almost certain that any white person coming to reside at the isthmus would catch malaria. Now it is quite possible to live there in perfect health, quite free from any malarial infection.

It may be useful to mention that the entire death-roll among the employees on the Panama Canal and railway from the American occupation down to June 30, 1912—that is, about eight years—was 5,141, of whom 284 were Americans. Of this total, 4,119 died of disease and 1,022 from violence or accident. During the same period

49 American women and 87 American children died.* Sir Ronald Ross, as I have said, was told by the British Consul at Panama in 1904 that the French lost in the nine years of their occupancy some 50,000 lives, principally from malaria and yellow fever. This may be an over-estimate, but there is no doubt that the American figure shows an enormous improvement on the French.

It is easy to conclude that what has been done in sanitation at the isthmus of Panama may be done anywhere else in the tropics, where malaria and yellow fever prevail. That may be true, but we must also remember that the work of Panama had behind it all the wealth and resources of a mighty republic of 90,000,000 citizens. The expenditure on these hygienic purposes at the isthmus has been enormous, though not a penny has been wasted. Down to the end of December, 1912, the total outlay of the Department of Sanitation was \$15,500,000. Waterworks, sewers, etc., accounted for another \$2,500,000, so that we get a grand total expenditure on sanitation of \$18,000,000. This will certainly rise to \$20,000,000 before the canal is finished, so that

* See *Scribner's Magazine*, February 1913, p. 251.

for the ten and a half years of its construction there will have been an annual expenditure for all health purposes of \$1,900,000. It is not likely that there will be many tropical areas of this kind with so large a sum available for the luxury of scientific sanitation. Again, it must be noticed that the administration had special advantages at the isthmus. It exercised something like military authority. It had absolute powers of deportation, and could enforce its regulations as it pleased. And in considering the statistics it must also be borne in mind that not only the physical but the moral and mental health of the work-people at the isthmus was promoted in every way. We shall look into the life of the Panama construction camps in the next chapter. The social interest and amusement provided for the employee must have counted for something beside the sewerage and screening and mosquito-hunting. All the same, the success achieved at Panama is full of hope and promise for tropical life in the future. Colonel Gorgas writes encouragingly :—

I think the sanitarian can now show that

any population coming into the tropics can protect itself against these two diseases (malaria and yellow fever) by measures that are both simple and inexpensive ; that with these two diseases eliminated life in the tropics for the Anglo-Saxon will be more healthful than in the temperate zones ; that gradually, within the next two or three centuries, tropical countries, which offer a much greater return for man's labour than do the temperate zones, will be settled up by the white races, and that again the centres of wealth, civilization, and population will be in the tropics, as they were in the dawn of man's history, rather than in the temperate zone, as at present.

Apart from the question of disease, it is far from certain that the white man can ever remain as "fit," as capable of bodily labour, in equatorial regions as in his native temperate conditions, or that his descendants will also maintain the same standard of health and strength. Ordinary non-professional opinion would perhaps discount Colonel Gorgas's forecast as a little too optimistic.

CHAPTER X.

LIFE AT THE ISTHMUS.

BEFORE we go on to describe the canal and its method of construction, we must look at the sort of social life and civil administration which has prevailed since the Americans arrived. Construction camps in tropical climes are not usually distinguished for order and good morals. The Americans determined to make an exception at Panama. They had a perfectly free hand and the enjoyment of all sovereign rights at the isthmus, and were able to construct a brand-new little state on the most approved and ideal principles. We have seen what instructions were given by President Roosevelt to the first commission. An entire administrative system had to be established within this little plot 10 miles wide and 50 long. Laws had to be framed and civil government established, with all the needful

accessories of judicial courts, police force, fire-brigades, customs and revenue service, post-offices, public works and financial department. The administration carried what is known as "paternalism" to all lengths. That is, it did all the catering and providing itself, and left little or nothing to private companies. Of course, everything had to be imported, for the little territory itself produced nothing. Whole villages and settlements with all the accessories of social life had to be built along the line of works. Over 2,000 structures, including offices, hospitals, hotels, messes, kitchens, shops, storehouses, and living quarters, were constructed, and more than 1,500 buildings taken over from the French, which were made available by necessary repairs.

Colonel Goethals gives us a brief insight into the work of the Commissary Department of the Panama Railroad :—

The Commissary Department of the Panama Railroad Company was enlarged until it is now [1911] a great department store, supplying to the employees whatever may be necessary for their comfort and conven-

ience. Manufacturing, cold-storage, and laundry plants were established, and turn out each day about 90 tons of ice, 14,000 loaves of bread, 2,400 rolls, 250 gallons of ice-cream, 1,000 pounds of roasted coffee, and 7,500 pieces of laundry. Four or five refrigerator cars, loaded with meats, vegetables, and such fruits as can be obtained, are sent out on the night freight to distant points, and every morning a supply train of about 16 cars, of which number six to eight are refrigerator cars, leaves Cristobal at 4.30 to distribute food-stuffs and laundry to the local commissaries along the line, where the employees make their purchases, and where the hotels, messes, and kitchens secure their supplies for the day.

A graphic and representative picture of one of the construction settlements along the canal was given by the correspondent of *The Times* at Panama.* He chose "Emperador," or "Empire," as the typical village. This is the headquarters of the central division of the

* *The Times*, September 26, 1912.

construction work, and is situated about half-way along the great Culebra Cut. The correspondent writes :—

According to the census just completed, it contains 7,152 inhabitants, of whom 1,757 are whites, 3,701 negroes, 1,569 mestizos, 101 Chinese, and 24 East Indians. North of the main street is a section called the “ native town,” apparently because it is inhabited by natives of other countries than Panama, but really because here was situated the native hamlet alongside which the French built their construction camp in 1881. It is occupied by the part of the population not employed by the government, and here are the American saloons, the Spanish *cantinas* and restaurants, Chinese shops, East Indian fancy-work shops, and negro tailoring and shoemaking places. On the south side of the American settlement are the labour “camps,” consisting of barracks and eating-places. All the buildings are of wood, constructed to last not over ten years ; and none are large, excepting the

administration buildings and the club-house. On three sides of the village are the huts of the labourers who prefer the half-jungle life with its freedom ; and here, with discomfort and squalor and liberty, is the only picturesque part of the settlement ; all else is orderly, of one pattern, almost smug. On the fourth side the village is limited by the canal itself.

In the centre of the village is the commissariat, where the canal and railroad workers buy their food and clothing. Here congregate every morning the housewives of the village to do their shopping, and at night, after work, the men, to complete the family purchases. There is a similar store in each canal village—eighteen in all. The commissariat does away with the middleman's profit and buys in such large quantities, and for cash, that it obtains the lowest prices, while the many ways in which the materials purchased can be used prevent waste. If there is cause for complaint on the part of any class in the canal workers, that class is the bachelors, for they are discriminated against in the matter of quarters. But good

provision is made for their meals, at the so-called "hotels" for the white employees, and the messes and kitchens for Spanish and negro labourers.

Another remarkable evidence of how the canal administration stands *in loco parentis* to all its work-people is that it has provided twenty-six churches and maintains fifteen ministers of religion. This is interesting because it shows how the state, when conducted on common-sense principles, may provide for religious instruction without causing any offence or inflicting any injustice. The administration treated all denominations with perfect impartiality. Of the fifteen ministers it supported, four were Episcopalian, four Baptist, three Roman Catholic, one Wesleyan, and one Presbyterian. But this was not the entire provision of churches and chapels on the isthmus. There were fourteen other churches not under direct government control, but assisted by the government in many ways. Of the forty in all, thirteen were Episcopal, seven Baptist, seven Roman Catholic, two Wesleyan, and eight undenominational.

As I have pointed out, the moral sanitation of the isthmus was cared for as well as the physical. For example, in September 1905, a man living in the canal zone was charged with running a roulette table. He pleaded that he owned a concession from the Republic of Panama. That excuse was not allowed, and he was sentenced to fine and imprisonment for transgressing one of the canal zone laws. Gambling, which had always been one of the Panamanian vices, was quite forbidden within the zone. Remembering the descriptions given of the state of morals at the isthmus during the French occupation, one cannot help being struck with the contrast afforded by the American regime. Criticisms of the canal scheme, of climatic and social conditions in the zone, appeared in the early days from time to time. Mr. Johnson quotes an example which is so amusing as to bear repetition :—

A land as feverish to the imagination as to the body is Panama. It is a land making a fitting environment to the deeds of conspiracy, piracy, loot, cruelty, and blood that have principally made its history for cen-

tures. This gloomy, God-forsaken isthmus is a nightmare region. One descriptive writer has truly said of it that it is a land where the flowers have no odour, the birds no song ; where the men are without honour and the women without virtue. He is not far wrong. The birds, brilliant as is their plumage, have no musical notes. The dense forests teem with bright-hued parrots, paroquets, and other birds, which squeak and scream but do not sing. There are beautiful orchids to be found in the swamps and jungles—fair to look upon, but they have no odour. The oranges have green skins instead of golden, the plantains must be fried to make them fit to eat, the reptiles and insects are often venomous, and myriads of parasites are ever ready to invade the human body and bring disease and death. In the atmosphere itself is something suggestive of the days of the old pirates and their fiendish cruelties and orgies. There is no life in the air ; it is depressing, damp, miasmatic, and intensely hot. For a great part of the year thunder-showers succeed each other all day

long and half the night, with sheet lightning all around the horizon after dark. There is practically no twilight, day passing almost instantly into night. It is no wonder that this uncanny land has made its residents degenerate into plotters, revolutionists, murderers, and thieves. Its aspect is one of darkness, treachery, and curse.

President Roosevelt had something to say on these recurring criticisms in a message to Congress in January 1906. He wrote :—

From time to time various publications have been made, and from time to time in the future various similar publications, doubtless, will be made, purporting to give an account of jobbing or immorality or inefficiency or misery as obtaining on the isthmus. I have carefully examined into each of these accusations which seemed worthy of attention. In every instance the accusations have proved to be without foundation in any shape or form. They spring from several sources. Sometimes they take the shape of statements by irresponsible

investigators of a sensational habit of mind, incapable of observing or repeating with accuracy what they see, and desirous of obtaining notoriety by widespread slander. More often they originate with or are given currency by individuals with a personal grievance. The sensation mongers, both those who stay at home and those who visit the isthmus, may ground their accusations on false statements by some engineer who, having applied for service on the commission and been refused such service, now endeavours to discredit his successful competitors, or by some lessee or owner of real estate who has sought action or inaction by the commission to increase the value of his lots, and is bitter because the commission cannot be used for such purposes, or on the tales of disappointed bidders for contracts, or of office-holders who have proved incompetent, or who have been suspected of corruption and dismissed, or who have been overcome by panic and have fled from the isthmus. Every specific charge relating to jobbery, to immorality, or to inefficiency,

from whatever source it has come, has been immediately investigated, and in no single instance have the statements of these sensation mongers and the interested complainants behind them proved true. The only discredit adhering to these false accusations is to those who originate and give them currency, and who, to the extent of their abilities, thereby hamper and obstruct the completion of the great work in which both the honour and the interest of America are so deeply involved. It matters not whether those guilty of these false accusations utter them in mere wanton recklessness and folly, or in a spirit of sinister malice to gratify some personal or political grudge.

The soundness and purity of the canal zone administration has long ago been established beyond all question and cavil. The Americans have given an example to the world how a great work of this kind, involving the gathering together of a large multitude of workers from many races and nations, may be carried on without those moral and physical evils which have marked

too many enterprises of the kind. In fact, the way in which the Americans have arranged and controlled the life of the canal zone stands quite as much to their credit as the skill and determination they have shown in the actual construction of the canal.

But we have said nothing yet about the workers themselves on the canal. The Americans, on taking over the work from the French, found about 700 West Indian negroes engaged in excavating the Culebra Cut. From this contingent as a nucleus a much larger army of workers was built up. The numbers rapidly grew. In December 1905 there were 5,000 employees; in 1906, 24,000; in 1908, 31,000; the highest figure being reached in 1910, when there were 50,000 workers available for duty. Of the employees, speaking roughly, one-seventh have been white Americans, all, of course, skilled workers, one-seventh European labourers, and five-sevenths West Indian negroes. The British West Indies, especially Barbados, have continued to be the main source of labour supply. But the West Indian at the outset left a great deal to be desired in his work and efficiency. In 1905 complaints

were made on the subject by the chairman of the canal commission to the President of the United States. In 1906 the chief engineer reported :—

The criticisms of the character of the common labour which were made in last year's report still hold good. Our labour consists almost entirely of West Indian negroes, and their efficiency is very low, although we have a few of this class who are fairly steady workers—by this it is meant that they average to work all the time, but the great body of them do not. The majority work just long enough to get money to supply their actual bodily necessities, with the result that, while we are quartering and caring for twenty odd thousand of these people, our daily effective force is many thousands less. Preliminary steps have been taken toward securing a large number of Spanish labourers direct from the north-west provinces of Spain, also for the securing of a trial shipment of Cantonese Chinese, as it is believed that the introduction of labourers of different nationalities will be beneficial.

The Chinese project was frustrated through the influence of trade unions in the United States, backed up by representations from the Pacific coast states. The West Indian labourer quickly began to earn a better report. It was found that his inefficiency was largely due to insufficient and improper food. He speedily improved when turned on to the generous and nourishing diet provided in the zone. In order to be certain that he had the full advantage of the provided meals, the price of them was very wisely deducted from his wages. Moreover, the American foremen soon began to learn that the men from Barbados, Trinidad, and elsewhere were British subjects and could not be treated as though they were southern state "coons." With a better understanding and more sympathetic treatment of the black employees, much more work was got out of them, and a good deal of the credit for the building of the Panama Canal is due to the 30,000 workers* who have been recruited mainly from the British islands in the West Indies.

But the southern European contingent has

* This is the figure of official recruiting. Very many more came to the isthmus of their own accord.

been found to be excellent material. It was thought that the work-people of Spain, Italy, and Greece would take more easily to navvying work in the tropics than people from more northerly regions of the temperate zone. The results were, on the whole, satisfactory. The Greeks were, it is true, not equal to the Italians or the Spaniards, and very few of them were recruited for canal work. The Italians, also, though several thousands of them were engaged, proved rather hard to handle. They were bitten with collectivist ideas, and inclined to act on trade union lines. The Spaniard was, in every way, the most satisfactory workman introduced from Europe. He was taken in an unsophisticated state directly from his village in Galicia or Castile. He was tractable and orderly, and quick and ready to learn. Hard labour under the tropical sun and in the hot damp of the isthmus seemed to have no exhausting or enervating influence whatever upon him. The Spaniard shows no sign of settling down on the isthmus. He either goes home with his savings or on to railway work in Brazil. Some 9,000 have been directly recruited, but this number does not include all the Spanish

labourers whose muscle has helped to the completion of this great work.

A word or two should be said about the wages earned on the canal. The West Indian recruit was offered 6½d. an hour for common labour and an eight-hour day, in addition to free quarters, medical care, and repatriation. Meals were supplied to him at the rate of 1s. 2½d. per day. Later the pay of all not under contract was reduced to 5d. per hour, and the price of the three meals to 1s. 1½d. Negro artisans, such as carpenters, masons, blacksmiths and others, of whom there were some 5,000 employed in connection with the canal works, received pay varying from 8d. to 22d. per hour. There were in 1912 4,400 negro artisans receiving 8d. an hour or more, while 400 received 1s. an hour, and the work was constant.

The European labourer, in addition to free quarters, received \$1·60 per eight-hour day, and more for overtime work. He was charged 40 cents a day for his three meals, which left him a minimum net wage per day of \$1·20, or a little less than thirty shillings a week. Many, however, received more, and a good number of Spanish

work-people must have gone home with a nice little nest-egg in their pockets.

The skilled labour was done almost entirely by United States employees, though the "gold roll," as it was called, included at first some Europeans. The pay was excellent, the social life, with its gymnasia, billiard-rooms, concerts and so forth, attractive, and the commissariat, with its three good meals at a fixed charge, quite up to the standard of a good hotel. The billets on the isthmus were therefore popular, and about 7,000 Americans on an average have been in employment there.

As I have pointed out, the responsibility for the construction of the canal was vested in the President of the United States, who acted through an executive commission resident in the canal zone. The work was organized in a large number of departments, each responsible for a big task. These were excavation and dredging; locks and dams; machinery and buildings (also responsible for paving and other improvements in Colon and Panama); labour, subsistence, and quarters; material and supplies; sanitation (responsible also for hygiene in Panama and Colon, which

towns are technically outside the zone); civil administration; the Panama railroad. There were also some smaller divisions, such as accounts and an office of a purchasing officer in Washington, nearly all the supplies for the canal being obtained in the United States. It should be added that the Republic of Panama is responsible for the policing of the two big towns, but the department of civil administration of the Panama Canal Commission employed 200 police, 88 of which were native West Indians.

This busy hive of labour will soon present a very different aspect. With the approach of the canal to completion the numbers of the workmen will gradually be reduced. A drastic process of sifting and selection will be carried out among the Americans employed on the works. Only about 2,500 men will be necessary to operate the canal when it is in full working order. These will be established at the locks and other important points. In fact, the canal authorities recommend a complete depopulation of the isthmus except, of course, the terminal cities and the operating stations on the canal. Otherwise, they think, a large expense for sani-

tation will be necessary which might thus be avoided. But the question of defence must not be forgotten. It will certainly be found advisable to maintain a pretty large American garrison at the isthmus, and to the population we have mentioned perhaps even 8,000 American troops must be added. The busy scenes still prevailing in the canal zone will now soon have disappeared like a dream, and the future traveller who looks from the ship-rail over the shining waters of Gatun Lake or beyond to the vast and silent tropical forest will have difficulty in reconstructing the spectacle which the narrow lands presented during the ten strenuous years of construction.

CHAPTER XI.

THE PROBLEM OF CONSTRUCTION.

WE may now begin to consider the canal itself, the problems which its designers had to solve, the methods of construction, and the features of the completed work. As we have seen, the first two and a half years were a time mainly of preparation for the titanic enterprise of excavation and construction. In fact, it might have been better if the work during that period had been entirely restricted to scavenging, sewer-ing, and so forth. The labourers were hurried a little too fast to the isthmus, before the isthmus was properly cleaned up to receive them. Hence the yellow fever panic and difficulties which might have been avoided. The people of the United States were responsible for this over-haste at the start. The great thing, they cried, is to "make the dirt fly." They wanted evidence

that the steam-navvies were actually at work in the bed of the canal and that the task was well in hand. In fact, the public at home took an interest in the canal operations which was sometimes embarrassing. Some newspaper man at the isthmus would report an accident or unforeseen difficulty, probably with a good deal of exaggeration, an anxious excitement sprang up among the people, and special commissions had to go to the isthmus in order to investigate the true state of affairs and if possible restore confidence at home.

As the reader knows, the Americans had no clean slate on which to write at Panama. They succeeded two French companies which had been at work for twenty years. True, the New Panama Canal Company which succeeded the Lesseps Company had not greatly perspired over the undertaking. It had kept a certain amount of work going, chiefly in order to maintain its concession. All the same, the French had ploughed a pretty deep furrow between Colon and Panama, and much of the work they had done was fortunately available whichever type of canal should be adopted, high-level or tide-level. They had

carried out a good deal of dredging for the channel through the tidal flats at either end of the canal, and they had made a very visible impression on the "continental divide" at what is known as the Culebra Cut. Altogether the French companies excavated 81,548,000 cubic yards. The Americans inherited from their predecessors a large amount of machinery and tools, in addition to a great deal of work well done. Much of the machinery, even of the Lesseps Company, was found to be in serviceable condition, and operations could be continued with it, though the extent and efficiency of the plant was, of course, as time went on, greatly increased.

The main problem which the American engineers had to solve was how to deal with the Chagres River. On the tide-level scheme, that violent and capricious stream, which in the rainy season was navigable for half its length of 100 miles, would have had to be diverted into another channel or ponded back in its upper waters by a high dam at Gamboa, some of the overflow of which might perhaps have been permitted to pass into the canal. But, as we have seen, the Chagres would have to be utilized and at the same

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time controlled if the high-level plan was adopted. A river which is capable of rising $35\frac{1}{2}$ feet in twenty-four hours needed a great deal of regulation and discipline before it could be used as the feeder of the upper reaches of a lock canal. The only way to do this was to diffuse its waters over a vast artificial lake which it would keep full, but in which its floods and current would be effectually tamed. This could only be done by a huge dam intercepting the course of the river in its lower reaches, at some point before it entered the Caribbean Sea. When the New Panama Canal Company changed its plans and decided for an elevated waterway, it was intended to construct such a barrier at Bohio, a point much higher up stream than Gatun, the site ultimately chosen by the American engineers. The Isthmian Canal Commission which reported in 1901, also arranged for a dam at Bohio to control the Chagres River. On this plan the river would have been intercepted much higher up, and the artificial lake would have been much smaller. But when the Americans finally decided on the high-level type in 1906, the site of the proposed dam was shifted from Bohio to

Gatun, nearer the river's mouth, which involved the inundation of a much vaster area of country. This position for the dam was first suggested by a French engineer, Godin de Lépinay, who, in a paper read before the congress of engineers in Paris in 1879, advocated a lock canal with a dam controlling the Chagres River at Gatun. This, then, was the biggest problem peculiar to the high-level scheme, for the cutting through the "continental divide," though an even more titanic labour, would have had to be accomplished whatever type of canal had been adopted.

No feature of the construction has been subject to so much criticism and anxious solicitude as this Gatun dyke. On it depends the maintenance of Gatun Lake and the supply of water for the canal. If the dam fails, everything fails. The real cause of the difficulty was the foundation upon which this big artificial hill had to be laid. The great dam at Assouan in Egypt is based upon the eternal granite, upon which masonry of natural stone is built. It is, therefore, part and parcel of the solid framework of our planet, and will probably last as long. The Gatun dam is, however, founded upon the alluvial deposits of the

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Chagres River. This alluvium consists of gravel firmly cemented with mud and clay, and is unquestionably water-tight. These deposits go down in places to a depth of 280 feet before the solid rock is reached. The dam had, therefore, to be laid down on the top of them.

Now this foundation, though water-tight, is soft. It would have been impossible to place upon it a massive structure of rock or concrete. The deposits would have given way under its weight. The only plan was to dump down in the valley an earthen dam, making it very broad so as to distribute the weight over as large a space as possible of the alluvium underneath. A steep slope would have been impossible, for the weight of the central portion would have pushed the clay and gravel outwards, and the whole mass would have subsided. The earth-dam was to block the valley through which the Chagres had hitherto flowed uninterruptedly to the sea. This valley is a mile and a half wide, and this is, therefore, the length of the dam. Its base is 2,100 feet wide. It is 398 feet through at the surface of the water, 100 feet wide at the top, and was to be 115 feet above sea-level. The last figure has, it

seems, been brought down to 104 feet, which will be an advantage, as the weight upon the foundations will be proportionately less.

In the middle of the dam the level of the lake is controlled by a channel called the "spillway," with walls and floor of concrete, by which the surplus waters will be sluiced off into the old bed of the Chagres River and so passed on to the sea. The entrance to this channel is closed with falling gates or doors. This safety-valve will no doubt be capable of dealing with the biggest and quickest rise of the lake-level that is ever likely to take place. It can pass off 137,000 cubic feet of water a second, the water issuing at a speed of 35 feet a second. But, to complete the security, the big culverts of the mighty Gatun locks close by can be turned open, and 170,000 cubic feet a second carried off there. Indeed, as regards the Gatun Lake the anxiety, if there be any, is that the water-supply will be insufficient rather than dangerously excessive.

The level of the lake is to be kept at 85 feet above mean sea-level—that is, the dam, or a considerable length of it, will be exposed to what is called a "head" of water of 85 feet. The

lake itself will be 164 square miles in extent. There have been many rational anxieties on the sufficiency of the dam. A certain American senator, however, who visited the works during the construction, worried himself rather unnecessarily on this last figure. Colonel Goethals was showing a congressional delegation round the works, and in the course of the survey they came to the dam with the broad expanse of water behind it. "Colonel," he said, "how is it that so small a body of earth as the Gatun dam can hold in check such a tremendous body of water as the Gatun Lake?" The chief engineer explained that the pressure of a body of water is determined by its height and not by its volume. The inquirer seems not to have been satisfied with the statement of this hydrostatic law. Senator Knox, afterwards Secretary of State, then came to his aid. "Senator," he said, "if your theory were true, how could the dykes of Holland hold in check the Atlantic Ocean?" This was a clincher, and the sceptic joined in the laugh at his own expense.

All the same, the Gatun dam has two extremely

responsible and heavy duties to perform. It has to withstand the horizontal thrust of a head of 85 feet of water so as not to be carried bodily down the Chagres bed into the Atlantic. And it has to block up the valley so effectually that the water of the lake shall not percolate through at any point. There is every reason to believe that, in spite of all alarums and excursions during its construction, it will fulfil both these requirements. Its composition and construction may be briefly described. Two bulwarks of big rocky fragments were built up on either outer line or "toe" of the structure. This rough material was obtained from the lock site, or Mindi, or the Culebra Cut twenty-six miles away. The area between these piles is filled with silt, and water pumped into it by hydraulic dredges from the Chagres valley. The surplus water is carried off through pipes. The sodden silt remains and is packed down and consolidated by atmospheric pressure. Such a "hydraulic fill" is impervious to water, the thrust or "head" which is very quickly lost in the minute interstices or pores of the material. It will be seen how such a structure differs from a dam of concrete

or stone masonry. It is porous, while at the same time impervious to water.

• The future traveller through the Panama Canal will probably never guess the immensity of the labour that has gone to the building of the Gatun dam. Already, indeed, it looks so much like a part of the natural landscape that it might well escape special observation altogether. Yet nothing less than 21,145,931 cubic yards of material were laid down—enough to make a wall of earth three feet high and three feet thick reaching nearly half-way round the world. The spillway itself contains 225,485 cubic yards of concrete.

It will be noticed that in the dam proper there is no core of masonry or puddled chalk or clay whatever. It was at one time intended that there should be. I have alluded to the alarmist rumours that were raised again and again at Panama and created much uneasiness in the United States. These were especially concerned with the great dam, and that word must have frequently been on the lips of the engineers in more than one significance. Every possible test was applied to determine the exact character of the underlying materials, to ascertain whether

there was any connection between the swamp areas to the north and south through the deposits in the gorges which the earthwork was to bridge, to prove the ability of the material below to support the structure, and to find out whether suitable material for the dam could be found in its neighbourhood. "As the result of all these investigations," wrote Colonel Goethals,* "it may be briefly stated that the underlying material is impervious to water; that it possesses ample strength to uphold the structure that will be placed upon it, and, the subsoil being impervious, that there is no connection between the swamps above and the sea below."

In order to make assurance doubly sure, Colonel Goethals planned the dam so as to include triple interlocking steel sheet-piling across the valley, driven down to bed-rock, and decided to carry the dam to a height of 135 feet. Even so, the news of a collapse was wired home, and this so impressed President Roosevelt that he sent a commission of engineers to the isthmus accompanied by President-elect Taft. The investigations had a different result from what had been expected.

* *The National Geographic Magazine*, February 1911.

Instead of being dissatisfied with the size and strength of the dam, the engineers declared that it was being built too high and that the steel piling was unnecessary. It must be admitted, therefore, that the efficiency of the Gatun dam has been subjected to the most rigorous tests, and that no further anxiety on the subject need be felt.

With the blocking of the Chagres outlet at Gatun, the waters of the lake have gradually accumulated until they cover an area of 164 square miles. Not only the Chagres itself but its tributaries, the Trinidad and others, are thus ponded back. The reservoir extends up a number of long and winding arms, and is thus very irregular in shape. The bed of the channel itself was cleared of brushwood and trees, but the rest of the valley was thickly overgrown. As the waters rose, therefore, and gradually submerged this primeval forest, a rather dismal spectacle was presented of decay and destruction. The lake has, indeed, completely altered the aspect of the country. Villages and even small towns, whose names had come down from the days of the old navigators, lie buried for ever beneath the waters

of Lake Gatun. Even now the great expanse of water with its wooded islands looks like a natural feature of the landscape rather than yesterday's creation of engineering enterprise. The vessels in transit will, of course, keep to the dredged and buoyed channel, but the channel will itself be invisible, and the traveller, after tossing on the restless Caribbean Sea, will enjoy the full sensation of a cruise over a landlocked fjord or lake. Lake Gatun is indeed twice the size of Lago Maggiore and four-fifths the size of Lake Geneva. The journey from Gatun to Bas Obispo, where the water-way again assumes the appearance of a canal and enters the Culebra gorge, is 22 miles, but the same 85-foot level is maintained right to the locks at Pedro Miguel, where the waters of Lake Gatun are again retained by a dam connecting the walls of the lock with a hill to the west. The rest of the lake is held in by the natural configuration of the country, the only outlets being at the Gatun spillway and, of course, through the locks.

But we must not overlook the main purpose of the lake, which is to supply the water for the canal and the lockages. For this purpose every-

thing, of course, depends on the rainfall at the isthmus, and the question arises whether this may be relied upon to replenish the canal with the needful water-supply. Colonel Goethals estimates that in an average dry season 58 "lockages," or transits of the canal, per day would be possible, which is a greater number than the twenty-four hours of the day would permit, allowing vessels to follow each other at intervals of one hour. Happily, a resource is still left if the supply of water should show signs of proving insufficient. At Alhajuela, on the Chagres River, some nine or ten miles above Obispo, there is an excellent site for a dam, forming a reservoir where some of the surplus water of the rainy season could be stored and supplied to the canal as required in the dry months. Details of the construction of such a dam were prepared in connection with a former canal-scheme, and would be available in case of need.

CHAPTER XII.

THE CULEBRA CUT.

THE most famous section of work on the canal has been that at the vertebra or "continental divide," which runs along the isthmus on the Pacific side and had to be pierced through by any canal running from Colon to Panama. This tremendous work, known as the "Culebra Cut," from the name of one of the hills, extends for nine miles from Bas Obispo to Pedro Miguel. Mr. Bryce has truly said, referring to this section, that "never before on our planet have so much labour, so much scientific knowledge, and so much executive skill been concentrated on a work designed to bring the nations nearer to one another and serve the interests of all mankind."* The bottom of the canal in the cut, as in the channel through Lake Gatun,

* "South America," p. 26.

is 40 feet above sea-level. The highest elevation of the original surface of the ground above the centre line of the canal was 312 feet above sea-level, so that the total excavation along this saddle was 312 minus 40, or 272 feet. This was, however, not actually the highest point of excavation. Gold Hill, close to the canal line, is 534 feet above sea-level, and from the top of this hill a new and steeper slope had to be made. The surface of the water is 85 feet above sea-level, and so is 227 feet below the original saddle at its highest elevation. We have already noticed that a tide-level canal would have involved an excavation 85 feet deeper, and the width of the cutting would have had to be immensely wider. The slides and breaks which have rendered the American excavation so much more difficult lead one to suppose that the tide-level cutting might have proved impracticable.

All the work at Culebra performed by the French was available for their successors. The French companies accounted for 18,646,000 cubic yards of material on this section. They had already cut down 152 feet below the original surface at its highest elevation, and the cliff

they had cut in the face of Gold Hill was 374 feet in vertical height. It is well to mention such figures, as some people imagine that the French wasted all their time and resources at Panama. It may be added that the bottom width of the channel adopted by the French engineers was 74 feet, whereas that of the American canal will be 300 feet.

Many descriptions have been given by visitors of the spectacle presented in this long and deep gash through the mountains during the progress of the excavations. From these and the numerous photographs taken at that stage the traveller will be able to reconstruct the scene—the two hundred miles of railroad construction track, laid down tier above tier at different levels ; the thousands of men busily at work ; the roar and smoke of the dynamite tearing the rock into fragments; the mighty steam-shovels like great dragons burying their iron teeth in the surface of the bank, engulfing a huge mouthful, then swinging round and belching it all into the dirt trucks, to be carried off to the dumping-ground at Gatun near the Atlantic or Balboa at the Pacific end of the canal. At Culebra, Colonel Goethals made the

“dirt fly” to the full satisfaction of public opinion in the United States. All sorts of devices and machinery were employed to hasten and economize the process. For example, there was the Ledgerwood Unloader. Railway trucks provided with flaps were used, these flaps making a single platform of the whole train. At the rear of the train was a plough which could be drawn by a wire rope attached to a drum carried on a special car in the fore part of the train. When the train arrived at the dumping-ground the drum was started, and the plough, advancing from the rear, swept the 320 cubic yards and rock from the sixteen cars in seven minutes. Then there was a “track-shifter,” invented by an employee on the isthmus, which lifted and relaid the railway lines as the spoil-tracks had to be shifted. This powerful engine raised the track and ties clear of the ground and deposited them from three to nine feet sideways.

The “spoil trains” were treated with all the respect which is accorded to the fastest mail trains of the day on an English main line. They followed one another from the cutting at intervals of three minutes, and any delay, of course,

balked the mammoth steam-shovel of its glutinous meal on the stones and rubble of the mountain-side. Any cause of delay was at once, reported by telephone to the superintendent of transportation at Empire, and the obstruction was immediately dealt with. By this persistent concentration on the main object the dirt has been made to fly not only more speedily but more cheaply.

One of the most serious causes of anxiety and difficulty along the canal line were the "slides" and "breaks" which kept occurring in the Culebra Cut. To use a condensed Americanism, the sides would not "stay put." Large masses of material would slide or move from the banks into the excavated area, closing off the drainage, upsetting the steam-shovels, and tearing up the tracks. A very unpleasant phenomenon was the lifting of the shovels in the bottom of the canal due to the bulgings of the earth there. It is not necessary to enter into the distinction between "slides" and "breaks," or into the learned disquisitions that have been written about them. It is sufficient for us to note that they added immensely to the amount of material which had to be got out of the Culebra gorge. Colonel

Goethals tells us that of the 14,325,876 cubic yards removed during the year 1909, 884,530 cubic yards, or 6 per cent., were due to slides; that in 1910 of 14,921,750 cubic yards removed, 2,649,000, or 18 per cent., came from slides or breaks that had previously existed or that had developed during the year.

It might have been imagined that these discouraging additions to the work would have seriously delayed progress on the canal and put forward the date of its completion. But able and economic organization triumphed over all these lets and hindrances. At the beginning of the American excavations the engineers estimated that 103 million cubic yards of "dirt" had still to be removed, and that this work would take nine years to accomplish. But that estimate of material proved to be greatly below the mark. Enlargements of the canal and the unforeseen collapses in the Culebra Cut brought up the total to 195 million cubic yards. It is a remarkable evidence of the efficiency and economy of the American organization that this immense task will have been completed in about six years of actual full-swing work.

Some idea of the way in which Colonel Goethals made the dirt fly may be gathered from the fact that in the first five years of his directorship, down to April 1912, he removed 160 million cubic yards of material. "If all this material," writes Mr. Showalter, "could be placed in a solid shaft of the shape of the Washington Monument, with a base as large as an average city block, it would tower more than six miles skyward, overtopping the earth's loftiest mountain peak by more than a mile. Again, if it were to be loaded on to the big Lidgerwood dirt cars used on the canal, it would make a string of them reaching over two and a half times around the earth, and requiring a string of engines reaching from New York to San Francisco to move them." It is indeed a remarkable achievement that, while the amount of material to be removed was increased by about 90 per cent., the time of removal was cut down by 30 per cent. Nor has the increase of the work added to the estimate of cost. The total cost of the completed canal was fixed in 1908 at 375 million dollars. Yet, in spite of the increased excavations, enough of this sum, it is calculated, will be left over to build a new break-

water, and perhaps a big storage reservoir at Alhajuela on the upper reaches of the Chagres River. In the Culebra Cut, despite the landslides, the cost of excavation has actually been reduced by more than one-third.

The pessimists have of course been busy with these landslides in the "Cut." They predicted that the canal along this section would always be exposed to danger from that source. But here, too, every precaution has been taken. The engineers have given a much lower slope to the sides of the canal, which is therefore wider at the top than had been originally planned. The slopes will also be sown with creeping grasses and other plants, which will bind down the surface soil. When the forty-five feet of water are in the canal, the bottom will be held down by the weight, and the bulgings no longer take place. Moreover, any earth that, in spite of all precautions, still manages to slide into the canal should be easily dealt with by the big 20-inch suction dredges, which can be brought up through the locks and set to work. So we need not trouble much about the stability of things along this nine-mile section through the Culebra Mountains.

Here as elsewhere it is possible to give only a very general idea of the difficulties which were encountered and overcome in the course of construction. The drainage of the "Cut" during the work was in itself a heavy and important task. It was necessary to keep out the water of the surrounding country and to rid the excavated area of water collecting in it. A system of diversion channels, carrying off the Obispo River and its tributaries, effected the first object, and the second problem was solved by gravity drains and pumps. On the whole, this mighty trench through the isthmian hills is not only the biggest thing to the credit of a nation which delights in bigness, but the greatest achievement of its kind the world has ever seen.

CHAPTER XIII.

THE LOCKS.

THE Panama Canal belongs to the “age of concrete.” All other vast works of construction, such as the Pyramids of antiquity and the Assouan Dam of to-day, have been built of live natural rock. At Panama everything—locks, wharves, piers, breakwaters—has been constructed of concrete. The Americans have not only built these incomparable piles of masonry; they have manufactured the material out of which they are built. This circumstance makes the rapid completion of the canal all the more wonderful. Not less than four and a half million cubic yards of artificial stone have been produced for the built portions of the canal and its accessories. This amount of concrete, we are informed, would make an ordinary sidewalk nine feet wide

by six inches thick reaching more than twice round the earth.

The broken stone which is one of the ingredients of concrete was quarried and transported from Porto Bello—a name famous in the annals of West Indian romance—20 miles to the east of Colon; while the sand came mostly from Nombre de Dios, also a celebrated place 20 miles further to the east, the Atlantic terminal of the old paved trans-isthmian road along which the Spanish mule convoys brought the silver of the Incas from Panama. Millions of yards of stone came from Porto Bello. Hundreds of bargeloads of sand came from Nombre de Dios and from islands in the Atlantic and Pacific. Myriads of barrels of cement were shipped from the United States to Cristobal, an outskirt of Colon, thence carried by barges to Gatun or by railway to the Pedro Miguel and Miraflores lock sites. Dozens of mighty “mixers” were ready to receive these diverse materials. Each of these could accommodate ten tons of sand, cement, crushed stones, and water. This indigestible mixture the machine would toss and churn round for a minute or so in its interior and then belch

it all out in the shape of unhardened artificial stone.

• The belief in concrete among the builders of the Panama Canal has been almost a superstition. They invented a sort of cement gun to shoot sand and water against the sides of the Culebra Cut, so as to form a coating of solid artificial rock, but the experiment rather deserved than achieved success. Of course all such structures as lighthouses were built wholly of concrete, and it is reported that even barges were constructed of this adaptable material. As regards concrete and its nature and behaviour nothing was taken for granted. Every means was taken of testing such important matters as the effect of sea-water on this material, the time it takes for these huge masses of artificial stone to settle, and many other questions on the answer to which the permanence and stability of the locks and the entire waterway would depend. The Panama Canal, writes Mr. Showalter, is "the greatest effort man ever has made, and perhaps ever will make, to simulate the processes of geologic ages, and do in days what Nature required unreckoned years to accomplish."

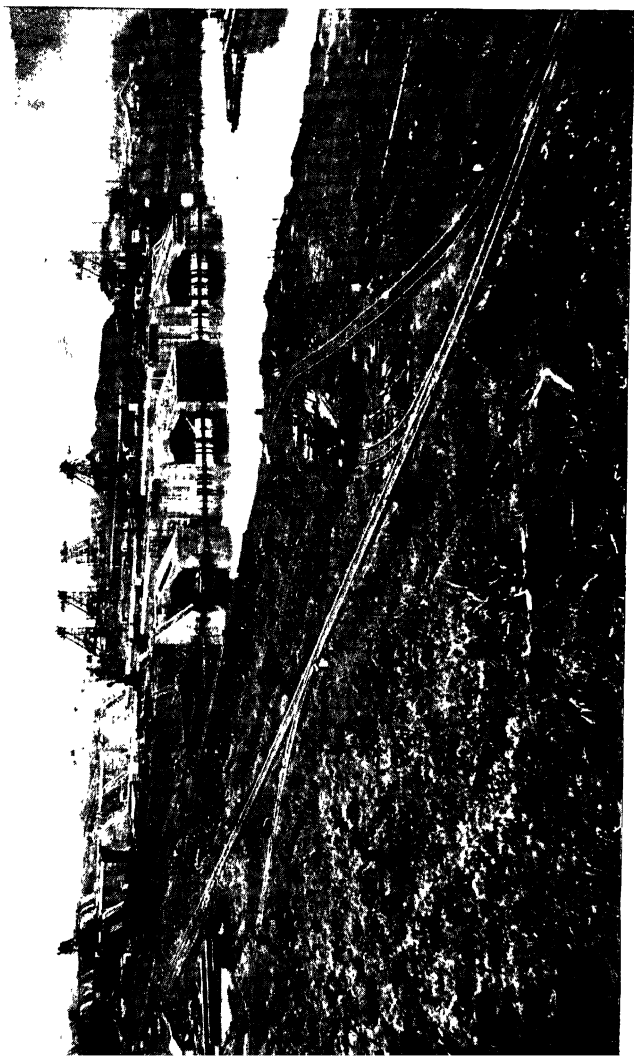
These remarks about concrete naturally lead

us to the subject of the Panama locks, the magnificent stairway at Gatun, the single-step locks at Pedro Miguel (or, as the worker quickly Anglicized it, Peter Magill), and the double-step flight at Miraflores. The most impressive of these is the colossal duplicated three-step flight at Gatun, up which the vessel in transit is lifted from the end of the sea-level seven-mile-long entrance channel through Limon Bay to Gatun up to the surface of Gatun Lake, 85 feet above the level of the sea. This giant staircase has been constructed in a cutting through the hill which retains at this end the waters of the artificial lake. A tremendous amount of excavation, upwards of 5,000,000 cubic yards, was necessary, and the locks, which are constructed entirely of concrete, contain about 2,046,100 cubic yards of that material. The chambers of all the locks in the canal will have a usable length of 1,000 feet and a width of 110 feet. These dimensions should prove large enough for the largest ships not only existing but likely to be constructed for many years to come. They satisfy the requirement of the Spooner Act that the canal shall be "of sufficient capacity and

depth to afford convenient passage for vessels of the largest tonnage and greatest draft now in use, and such as may reasonably be expected.” More than 95 per cent. of the ships now afloat are less than 600 feet in length, so that a good margin is allowed. We may be certain that the American government has given the closest attention to the question of the length and breadth of the lock-chambers, for the canal, we must remember, is primarily a military passage for the purpose of transferring, if need be, the entire American fleet from the Atlantic to the Pacific seaboard. The locks of the Kiel Canal, it may be added for purposes of comparison, have an available length of 492 feet and a width of 82 feet.

The vessel, then, in order to gain the level of Gatun Lake from the Atlantic entrance, has to pass through a flight of three successive locks. The maximum lift is 32 feet, or about four feet higher than at any other locks now in use. All the locks along the Panama Canal are duplicated—that is, there are two parallel sets with a common centre-wall—so that two ships could be simultaneously put through both flights in the same or

in opposite directions. This "double-tracking" is in itself one of the many precautions taken against accidents at the locks. There are no locks in the world where these precautions are so minute and numerous. It is all of course in the interests of the owners to inspire the maximum of confidence in maritime circles. Complete efficiency in the operation of the canal, absolute safety for the vessels and cargoes entrusted for ten or twelve hours to its keeping, are the elementary conditions of success. Each lock through which the vessel passes is equipped with two pairs of mitre gates—that is, double swinging doors—the biggest lock-gates in the world; but in all cases the uppermost locks have a second pair of gates, so that if some unruly vessel were to ram open one set of gates there would still be another set ready to receive it. But even this is not all. Heavy chains are stretched across the channel with the ends attached to hydraulic paying-out machinery. These chains and their attachments are capable of bringing to a dead stop a vessel of 10,000 tons moving at the rate of five miles an hour. And still the precautionary devices are not exhausted. Let us suppose that all these



Gatun Locks, looking South-West, showing North End of the Locks.

barriers were broken down, though such a disaster is almost beyond the bounds of things possible. At the head of each flight of locks there are provided great cantilever swing-bridges which can be thrown across the channel in case of accident. From these bridges a series of nickel-steel wicket girders could be let down. The lower ends of these girders would drop into a sort of sill at the bottom of the rushing waters. The girders would then act as small perpendicular runways, down which large steel sheets on rollers would be let down, gradually damming back the escaping waters.

And lastly, in order to avoid all recourse to these emergency contrivances, it is ordained that no vessel shall enter any chamber of any locks under its own steam. Nearly all the accidents that happen in locks are due to the vessels being worked independently of the lock authorities when passing through. Captains may be as anxious as possible to avoid mistakes, but there is many a slip possible between an order and its fulfilment. So the lock operators are not going to be responsible for the safety of a vessel which is not entirely under their own control. None

will be allowed to negotiate the locks under its own motive-power. A series of electric towing-stations will be set up on the side walls of the locks. When a vessel approaches it will be brought to a standstill outside the locks. Then four of these towing engines will be fastened to it by means of hawsers—two at the stem, in order to draw the vessel into the locks, and two at the stern, to check its speed and bring it to a standstill when necessary. And this control will of course be exercised all through its passage to the upper or lower levels. We should certainly not hear of any accidents in the lock-chambers of the Panama Canal.

It is expected that a vessel will be passed through the three locks at Gatun in about fifty minutes, though some delay may be caused in the approach. On the Atlantic side the water of the canal will be smooth, and the ship will be in some degree sheltered from the winds, so that there should be no difficulty in the approach from that direction. Coming from Lake Gatun to the locks the vessel may experience a little rough water, though there is seldom a great force of wind there, and the lake will be free from currents.

As regards the Pacific side, the ocean there fully corresponds with its name. It is always calm, and not the slightest difficulty may be anticipated from either winds or waves or currents.

Over thirty miles away at the southern extremity of the Culebra Cut the vessel in transit will be lowered from the high-level lake 30 feet down to the surface of another artificial lake much smaller in content, held at a surface-height of 55 feet above sea-level. These are the single-step duplicate locks known as the Pedro Miguel or "Peter Magill." The construction of these locks required 770,000 cubic yards of cement. On the west side of these locks is the other dam which, with the mighty Gatun dam at the other end, holds up the waters of Lake Gatun. This smaller dam is also of earth, and is about 1,400 feet long and 40 feet wide at the top. It is subjected to a maximum "head" of water of 40 feet, but the average is from 25 to 30 feet. The length of the lake, which is known by the pretty name of "Miraflores," between the Peter Magill and the next set of locks, is about 2,000 yards, and the lake itself covers about 1,200 acres. Its waters are held up at 55 feet

above sea-level by two dams at the Miraflores locks.

These are the third and last set of locks for a ship proceeding from the Atlantic to the Pacific. They are in two steps, or, to use the more technical expression, "two in flight," and they drop the vessel from the Miraflores Lake at 55 feet elevation down to sea-level. It must be noticed, however, that the fluctuations in the tide of the Pacific end are about 20 feet, and that the height of the lake is given for mean tide. In other words low water during "spring" tides is 10 feet below the average sea-level. The maximum lift for these locks therefore will be 65 feet. There are two dams holding up the waters of the Miraflores Lake, one to the west of earth, and one to the east of concrete. The former is 2,300 feet long and 40 feet wide at the top. The average "head" to which it is subjected is 30 feet, the maximum 40. Its construction is similar to that at Gatun. The concrete dam is about 500 feet long, and is provided with regulating works similar to and of the same dimensions as those at Gatun, the crest in this instance being 39 feet above mean tide-level, with seven openings,

allowing a discharge of 7,500 cubic feet per second. The locks themselves will require 1,312,000 cubic feet of concrete. I should add that these dams at Pedro Miguel and Miraflores are, unlike their big brother at Gatun, founded upon the solid bed-rock. There has, therefore, been no question as to their permanence and stability. Moreover, as will have been noticed, the pressure of water is only about a half of that at Gatun.

The relaying of most of the old Panama railroad was proceeding *pari passu* with the construction of the canal. Two sections of the old line, one from Colon to Mindi at the Atlantic end, the other from Corozal to Panama at the Pacific end, could be used for the new. All the rest had to be built. The greater portion of the old track was, indeed, submerged beneath the waters of Lake Gatun. The line is also being doubled throughout almost its entire length. It was originally intended to carry the line through the Culebra Cut along a berm 10 feet above the water surface, to be left for this purpose during the excavations of the channel; but the "slides" interfered with this project, and a new line to the east of the Cut was selected. The heavy embankments along the

railway were among the most useful and convenient "dumps" for the material taken out of the Culebra cutting. As a great part of the railroad passes through the lake, culverts of reinforced concrete are provided to equalize the water on both sides of the embankments. South of Miraflores the new railway passes through a tunnel 800 feet long, and a striking feature of the canal is a steel bridge across the Chagres River near Gamboa, almost a quarter of a mile long. We need not dwell on the excavations of the tidal stretches of the canal on the Atlantic and Pacific ends or through Lake Gatun. A good deal of the French work was available at the tidal levels, but a vast amount of excavation had still to be done by steam-shovels as well as dredges, rocky elevations being found in both channels. Below the Miraflores locks a million and a half cubic yards of rock had to be removed. There will be some tidal current at the Pacific end, but as the sea-level section here will be 500 feet wide, the current will never run faster than about one foot per second. The sea is practically tideless at the Atlantic terminal, the variation being only 2·5 as a maximum, whereas at the Pacific it is 21·1.

CHAPTER XIV.

THE COMPLETED CANAL.

WE may now begin to consider the canal as a whole and in its completed state. From deep water in Limon Bay, 41-foot depth at mean tide, to deep water outside Panama, 45-foot depth at mean tide, is just about 50 miles. The greater part of the canal is at high elevation, only 15 miles of it being at sea-level. We shall note the varying depths and widths of the channel when we take our imaginary journey along it. Here it is enough to say that the minimum width will be 300 feet, the minimum depth 41 feet, the breadth and depth being, however, for the greater portion of its course, greater than these dimensions. Its highest point above sea-level, as the reader already knows, is 85 feet—that is, 85 feet at the surface of the water, and 40 feet at the canal bottom. The depth along this

stretch is therefore 45 feet. The Panama Canal, though not so long as the Kiel and Suez Canals, is very much broader and deeper. Suez is 108 feet wide and 31 feet deep as *minima*; Kiel, 72 feet and $29\frac{1}{2}$ feet. The Manchester Ship Canal is 120 feet by 26 feet. In length Panama, with its 50 miles, comes third, Suez being 90, Kiel 61, and Manchester $35\frac{1}{2}$ miles long.

During the building of the canal the department of construction and engineering was arranged in three divisions—the Atlantic, embracing the engineering construction from deep water in the Caribbean Sea to include the Gatun locks and dam; the central division, extending from Gatun to Pedro Miguel; and the Pacific division, from Pedro Miguel to deep water in the Pacific Ocean. For the ordinary student, however, the channel divides naturally into four sections, the Atlantic level, the lake, the cutting, and the Pacific section (in two levels separated by locks).

The invisible channel of the waterway begins at the mouth of Limon Bay, about eight miles from Gatun locks. Limon, also known as Colon or Navy Bay, is about three miles wide and three and a half miles long from north to south. It



Gatun Tinner Lock, looking North from Lighthouse.

is shallow, from three to seven fathoms deep, and seems to be steadily growing shallower. This is not surprising, as it is fully exposed to the "northers," which blow with terrific force from the Caribbean, and no doubt carry into the bay a good deal of detritus from the bottom of the sea. The heavy rains of the isthmus must also scour the land perpetually down into the bay. On the east side of the bay is the flat Manzanillo Island, a mile long by three-quarters broad, on which stands the city of Colon. This town, which was once known as Aspinwall, owes its existence to the Panama Railway, of which it is the northern or Caribbean terminus. Its position on the railway gave it an advantage over the old town of Chagres, a little distance along the coast to the west, which, though once a flourishing port, has now fallen on evil days. Near Colon is Cristobal, the new Atlantic terminal of the canal.

Without some protection the entrance to the canal would have been exposed to the extremely violent storms which occur in the Caribbean during the winter months. During these storms vessels cannot lie safely in Colon harbour, and could not

safely enter or issue from the canal. So a break-water two miles long has been run out from Toro point in an easterly direction, covering the extremity of the canal. A glance at the map will suggest a thought that this barrier will not provide sufficient protection, and that another breakwater will have to be run out from the eastern shore. Such a further protection will be provided if the need should arise.

At this point then, west of Colon and at the mouth of Limon Bay, our vessel enters the buoyed submarine channel of the canal and speeds onwards along the first section of the waterway, 500 feet in bottom-width and 41 feet deep, towards the locks at Gatun. But the locks are not yet visible. It is not until the fifth mile—that is, at Mindi—that a bend of the canal opens that gigantic structure to view, and by that time the vessel has left the broad waters and is enclosed within banks. The experience which awaits the traveller who has looked forward with some excitement to see the world's greatest wonder of to-day has been vividly imagined by Mr. Bryce. Our late American Ambassador writes :—

The voyager of the future, in the ten or twelve hours of his passage from ocean to ocean, will have much variety. The level light of the fiery tropic dawn will fall on the houses of Colon as he approaches it in the morning, when vessels usually arrive. When his ship has mounted the majestic staircase of the three Gatun locks from the Atlantic level, he will glide slowly and softly along the waters of a broad lake which gradually narrows toward its head—a lake enclosed by rich forests of that velvety softness one sees in the tropics, with vistas of forest-girt islets stretching far off to right and left among the hills; a welcome change from the restless Caribbean Sea which he has left. Then the mountains will close in upon him, steep slopes of grass or brushwood rising two hundred feet above him as he passes through the great Cut. From the level of the Miguel lock he will look southward down the broad vale that opens on the ocean flooded with the light of the declining sun, and see the rocky islets rising, between which in the twilight his course will

lie out into the vast Pacific. At Suez the passage from sea to sea is through a dreary and monotonous waste of shifting sand and barren clay. Here one is for a few hours in the centre of a verdant continent, floating on smooth waters, shut off from sight of the ocean behind and the ocean before—a short sweet present of tranquillity between a stormy past and a stormy future.

The Gatun locks, each chamber of which is a sort of “canyon of cement,” will almost oppress the imagination with the sense of immensity. At the foot of the locks the vessel will surrender its own volition and entrust itself wholly to the canal operators. It will be attached to the electric apparatus ashore and gently towed into the lock-chambers. In less than an hour it should have climbed the three gigantic steps and be afloat on the surface of the lake, 85 feet above sea-level. The traveller might fail even to notice of himself the great dam which abuts on the locks to the west. He may be surprised to hear that the whole being of the canal depends upon that earthwork, and that with the Culebra

Cut it absorbed the greater part of the labour and skill and solicitude of the canal-builders. The Gatun dam has indeed been so adopted and transfigured by Nature that it appears only a part, and not a very conspicuous part, of the landscape. Nor would our traveller, without previous information, guess the history of the great expanse of water which stretches to right and left up many a distant arm or loch and round many a picturesque island, and over which his vessel, once more resuming its own power and control, begins to advance. The buoys alone indicate that the channel, the true and well-wrought link between the two oceans, still holds its course through the bed of the lake. Mr. Bryce has pointed out what a pleasant interlude in a long ocean journey will be afforded by this placid glide of 22 miles over the inland lake from Gatun to Gamboa. The bottom widths through the lake are 1,000 feet for 16 miles, 800 feet for 4 miles, and 500 feet for about 3 miles.

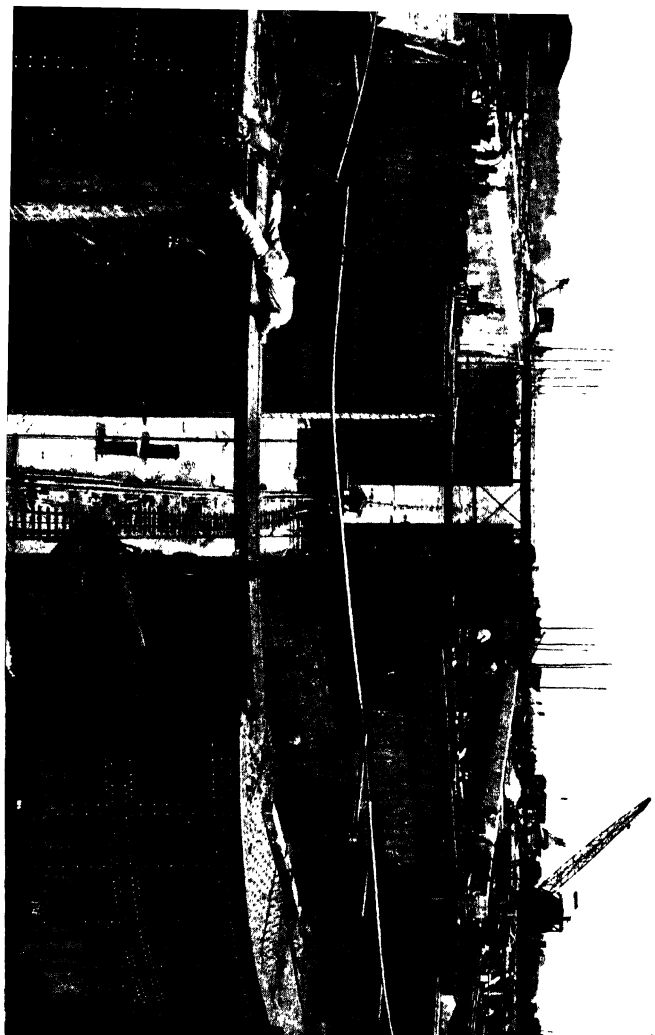
At Gamboa the vessel enters the eight-mile section of the Culebra Cut. Here again, though the traveller in future days will need no reminding

of the enterprise represented by this tremendous trench driven through the backbone of the isthmus, he will have to imagine the busy scene during the days of construction which will then have disappeared. He must try to reproduce what was little less than a manufacturing town at Gorgona, just near the entrance to the Cut, where stood the machine shops, boiler shops, smith shops, car shops, pattern shops, where repairs of all kinds were made and machines of all sorts and sizes constructed. He should think of that model residential town to the west of the Cut where the chief engineer and his assistants lived, surrounded by the quarters of the men, each dwelling protected with its fine wire netting to exclude the mosquitoes, the whole settlement scrupulously clean and bright with well-kept lawns and flower-beds. All this will have passed away with the crowds of workers who interrupted for a dozen years the stillness of the primeval forest. Nature and silence will in a large degree have resumed their sway, but the world will not forget the debt it owes to that conquering industrial army which divided the land here in order to unite the nations.

Through the cutting the bottom width of the canal is 300 feet. Having accomplished the eight or nine mile passage through the deep gorge, the vessel reaches the end of the high-level section at the Pedro Miguel locks. Here she is gently lowered 30 feet down to the bosom of little Miraflores Lake, held at 55 feet above sea-level. The length of this subsection is about a mile and a half, and it ends at the Miraflores locks, where the ship is lowered by two steps to the level of the Pacific. Then follows the last stage of this eventful transit—the eight-mile tidal section along which the vessel glides between low swamps to her own element of deep sea-water beyond the new port of Balboa, west of Panama, whose wharves are being constructed from the waste material of the inland excavations. The new breakwater which runs out from Balboa to Naos Island suggests wind and storm. But eternal calm reigns along these shores, and the object of the breakwater is to protect the line of the canal, not from heavy seas, but from the silt-bearing currents from the east which set at right angles to the channel. Constant dredging was necessary to prevent the bed of the canal becoming filled

with this sediment. The dyke has proved very effectual for this purpose.

Such is the Panama Canal which has for so many centuries been the desire of the nations, and which is now one of the permanent geographical features of the globe. It is so well and truly constructed that nothing short of an earthquake could ever seriously damage it. The question naturally arises whether this ultimate danger needs to be seriously considered. Panama is rather suspiciously close to a region where geological conditions are not remarkable for stability. The earthquake at Kingston a few years ago was as destructive a calamity as those of Messina and San Francisco. Costa Rica, too, almost an isthmian country, enjoys a very bad reputation for this kind of friskiness. Panama, however, seems happily to lie outside the zone of such disturbances. Slight earthquake shocks have been felt, probably only the reflections of severer shocks elsewhere. But there is no record or tradition of a really serious convulsion. There is, indeed, one visible and reassuring evidence of the self-possession of the earth's surface in this region. To the east of the modern city of



Panama is the site of old Panama, of which the lofty tower of the old cathedral—a pathetic and picturesque object—is still standing. This shows that there has been no serious earthquake here for the greater part of four centuries. Still, the danger—great or small—does exist, and it threatens a high-level canal, with its elaborate lock-machinery and masonry, far more than it would have affected a canal at sea-level. No very severe convulsion might be necessary to throw one of these locks out of gear, and the entire canal, therefore, out of operation for a considerable time. But against such perils there is no guarding, and every precaution having been taken against foreseeable and preventable dangers, all else must be left to the disposal of that Providence “which by his strength setteth fast the mountains,” “who laid the foundations of the earth, that it should not be removed for ever.”

It seems incredible that the canal should ever be in danger of injury or destruction from the attack of any civilized Power, because all nations are apparently interested in its preservation. What, then, is the meaning of these slopes which are being prepared for forts and batteries at

either end of the canal? "With the two great forts at the two ends of the canal," writes Mr. Showalter, "fitted with four 14-inch guns, six 6-inch guns, and twelve 12-inch mortars, with twelve companies of coast artillery, one battery of field artillery, four regiments of infantry, and one squad of cavalry, there is not likely to arise a time when these fortifications, backed up by the American navy, will fail to command a proper and wholesome respect from other nations." Yet if the object were simply to maintain the neutrality of the canal, the best course would seem to have been to leave the canal entirely unfortified, as is the case at Suez, and trust to the moral influence of the great Powers and their common interest in keeping the canal free and open to the world's traffic. Obviously the idea of making the canal zone a big military camp and arsenal is not so much to "police" the passage as a great international waterway, but to defend it and the zone as a position of immense strategic importance to the United States. President Hayes, in a message to the Senate in 1880, spoke of the canal as "the great ocean thoroughfare between our Atlantic and Pacific ports, and

virtually a part of the coastline of the United States." The words I have italicized seem to show that the United States regard the new passage rather as wholly proprietary, like those of Kiel and Corinth, than as international in status, like the Suez Canal.

In the Hay-Pauncefote Treaty there is no specific reference to fortification. The only allusion to the defence of the canal occurs in the second subsection of the third clause: "The United States shall be at liberty to maintain such military police along the canal as may be necessary to protect it against lawlessness and disorder." The Hay-Bunau-Varilla Treaty is rather more specific in its provisions on this subject, though even that instrument seems scarcely to have contemplated an armament and garrison on the large and permanent scale intended at the isthmus.*

England has, however, acquiesced in the proposed fortification. The decision is not likely to be challenged in any other quarter. The United States have built the canal with their own money and enterprise. They are more

* See *ante*, page 71.

closely and immediately interested in the passage than any other Power, and so long as they fulfil their undertaking to afford equal treatment in tolls and other respects to the commerce of all nations, nobody is likely to protest against the presence of American men and guns at the isthmus.

Indeed, there is some force in the plea that the complete neutralization of the canal would be inconsistent with American control and operation. In time of war the Americans would have had either to refrain from using the canal for their warships (an unthinkable proposition) or to permit their enemy or enemies to use it on equal terms. This would have meant a rather painful experience for the American engineers, managers, workmen, and others on the isthmus. They would have been obliged to put the enemy's vessels through the canal, and thus commit a sort of legalized treason against their own government by giving "aid and comfort" to the enemy. So it comes to this—that the canal will be neutral at all times except when the United States are themselves a belligerent. Then it will become part and parcel of the sovereign dominions of the great American Republic.

But the United States will have to stand all the ulterior possibilities of this position. If they were at war the canal would be at once liable to attack. In fact it would invite attack as a very vulnerable point in their armour. It has been truly said that the canal zone will have all the disadvantages, without any of the advantages, of an island. It will be entirely dependent on imported supplies and isolated from the centre of American power. If the American fleet lost the command of the sea even for a short time, the enemy could land troops at any part of the isthmus, march them against any point of the extended canal line and inflict on the United States a wound in a very sensitive, if not a vital region. So that instead of simply doubling the efficiency of the existing American fleet, by enabling it to be transferred swiftly and bodily from the western to the eastern coast, it may rather add to the naval responsibilities of the States and compel a considerable increase in their sea-power. To Englishmen, however, this development of the power and resources of the United States ought to bring no feelings but those of pleasure and satisfaction. In view of the

great secular struggle between East and West for supremacy in the Pacific, which some people think will fill the pages of future world history, anything that strengthens the position and prestige of Anglo-Saxondom as the main guardian of Western ideas and principles should be welcome to all the members of that race.

It is estimated that the fortification of the canal will cost about \$12,000,000. This added to the \$375,000,000, the estimated cost of construction, will bring the entire bill up to the round and goodly sum of \$400,000,000 or £80,000,000. This puts all other expenditure on artificial water-channels into the shade, as the Suez Canal cost only £19,000,000, the Manchester Ship Canal £15,000,000, and the Kiel Canal £8,000,000. As regards this expense and the possibilities of revenue returns, Colonel Goethals has written an interesting passage :—

Much has been said and predicted as to the commercial value of the canal to the United States. In this connection it must be remembered that the commercial shipping of this country never required the canal.

The trip of the *Oregon* in 1898 settled the question of the advisability of constructing an isthmian canal, and had the canal been built at that time, thereby saving that trip around the Horn, there is no question that it would have been agreed generally that the canal, even at an expenditure of \$375,000,000, was worth while.

In whatever light the Panama Canal is viewed, it will have paid for itself if in time of war or threatened war a concentration of the fleet is effected without that long, tedious, uncertain route followed by the *Oregon*.

It will practically double the efficiency of that fleet, and, notwithstanding the fact that we are a peaceful nation, our outlying possessions make the Panama Canal a military necessity, and it must be so recognized. From this point of view the debt should be charged to the account which necessitated its construction, and whatever revenues are derived from other sources are so much to the good. The traffic that will utilize the canal depends upon the tolls

that will be charged, and the President has asked the Congress for legislation which will enable the establishment of rates.

There is another policy which, if adopted, will have a material bearing on the revenues of the enterprise. Through the Panama railroad a large expenditure of money has been made for providing the present working forces with supplies of all kinds. Though the railroad has been reimbursed for this plant through fixed charges on sales, it should not be abandoned, but utilized for furnishing shipping with its needed supplies. Suitable coaling plants should be erected for the sale of coal to vessels touching at or passing through the canal. In addition, since oil is now used on a number of ships plying in the Pacific, such fuel should also be on hand for sale by the canal authorities.

The extensive machine shops now located at Gorgona must be moved before the completion of the canal, and they should be established in connection with a dry dock that will be needed for commercial purposes, and utilized as a revenue producer for the



Dodge Mill and Tackle from Mill on East D. 1

canal. This policy also needs Congressional action.

With properly regulated tolls, and with facilities for fully equipping, supplying, and repairing ships, the Panama route would offer many advantages and bring to it a sufficiently remunerative return to pay, not only the operating expenses, but to gradually absorb the debt which the United States has incurred by its construction.

We shall return to the question of tolls in a later chapter.

CHAPTER XV.

PANAMA AND THE ISTHMUS.

It may be convenient to deal here with a few detached questions before inquiring into the commercial and maritime changes likely to be produced by the canal. The reader understands the position of the United States at the isthmus. They control a zone of territory ten miles wide running across from Panama to Colon. These two towns are, however, not included politically, though they are geographically, within the zone. This narrow strip of territory with its precious canal runs right through a foreign country in which the social and political conditions existing must be a matter of importance to the canal-owners. One cannot help wondering how long this state of things is likely to continue. Panama, the youngest of the South and Central American

republics, is no better than the rest in its governmental principles. Indeed, the republic had scarcely got into being when it was threatened with a military revolution. A pompous and polysyllabic self-importance, coupled with a levantine standard of business and financial ethics, scarcely promises a long continuance of the present political relations with a great republic which is not likely to see its achievement at the isthmus in the smallest degree prejudiced or endangered.

Some interesting little details of Panamanian manners have been reported. For example, Chinese immigration is forbidden by law, yet, strange to say, most of the retail trade of the isthmus is in Celestial hands. This is because the law against immigration gave the opportunity for the formation of a syndicate with the collusion of the authorities, by which Chinese were introduced at a rate of \$200 entrance fee. The judicial standards which prevail in this little Bumbledom may be gathered from another story. The mate of a British ship was recently sentenced to twelve years' hard labour for manslaughter, because he was held responsible on no evidence whatever

for the loss of a ship and the lives of several relatives of *those serving on the jury*.

It is scarcely to be expected that a people for whom ideals and standards of this kind are good enough will take much trouble to develop their country. An efficient and responsible administration might make a good deal of these narrow lands between the two oceans, a territory of 33,000 square miles, larger, that is, than Scotland or Ireland. It is perhaps as well that the construction of the canal has not made many Panamanian fortunes or produced any great boom in trade. Otherwise the withdrawal of the industrial army from the zone might have had the effect produced when the French canal works were shut down. A grievous famine desolated the whole country. This is not likely to happen again. The zone has been largely an independent and detached enclave, such as never existed during the French occupation, when the Panamanians became dependent for work and wage on the industrial invaders. The American canal employees have done very little shopping in Panama and Colon, because they could buy every necessity and luxury duty-free in the United States

government stores. Some trade may be lost owing to the departure of the workers, but it is hoped that this will be more than replaced by the growing stream of tourists who will come to visit the "big ditch," and increased business brought by the shipping which will pass through the canal.

With a little thrift and enterprise the Panamanians might have profited much more from the long period of construction. They might have supplied the zone with a good many more articles. As it was, the only contribution the country made to the zone or to the towns was about 28,000 head of cattle killed annually. The country is almost entirely dependent on imported supplies, only a small fraction of which it pays for by exports. Here is a little instructive table of the Panamanian commerce :—

	Imports.	Exports.
1908 .	£1,561,362	£365,410
1909 .	£1,751,261	£300,495
1910 .	£2,008,679	£353,866
1911 .	£1,980,488	£179,941*

* Six months.

The excess of imports over exports looks rather alarming, but it is adequately explained by the British Consul at Colon as “ a measure of the commercial value to Panama of its transit trade and of the trade with canal employees and tourists.” The great bulk of the imports is consumed in the two towns of Panama and Colon, for, as in most of the South American republics, the interior is undeveloped and therefore self-supporting, being still in the “ pack-mule ” stage of civilization.

In 1911 the imports into Panama from the United States amounted to £1,024,589, from the United Kingdom to £454,541, and from Germany to £223,845. France, Italy, and Spain exported to Panama smaller quantities. The exports from Panama to the United States amounted in 1910 to £301,684 (1911, first six months, £150,990); to the United Kingdom, to £33,055 (1911, first six months, £15,921), with smaller values to Germany and France. The reader will be interested to learn what sort of things Panama exports. Here, then, is a list of the principal exports for 1910, the last full year available :—

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Bananas . . .	Bunches	3,643,900	184,257
Cacao . . .	Kilos	18,021	940
Cocoanuts . . .	„	6,305,238	31,534
Cocobolo . . .	„	1,203,522	7,132
Gold	„	2,748	26,995
Hides	„	567,454	16,973
Horns	„	6,893	1,410
Ivory Nuts . . .	„	2,102,743	26,527
Mother-of-pearl shell	„	625,008	10,183
Rubber	„	6,305,238	31,534
Sarsaparilla . . .	„	32,553	2,099
Skins	„	257,740	4,750
Tortoise shell . .	„	3,829	3,334

The United Fruit Company has now, in the province of Bocas del Toro, 32,000 acres of bananas under cultivation and 1,000 acres planted in cacao, with about 165,000 trees; the bananas being exported to the United States, and the chocolate to the United States and Europe. There should be a considerable increase in rubber production during the next few years, as 150,000 rubber trees have been recently planted in this

province, and these will soon be ready for tapping. Nearly all the rubber exported at present is taken from the wild trees growing in the virgin forests of this province. A curious article of exportation is the ivory nut, or *tagua*, which in value now comes next after bananas. These nuts are collected by Indians on the Caribbean coast, brought to Colon, and there bought by merchants and shipped to New York and Hamburg. They are used to make the big buttons which are now so fashionable, and probably a good many English girls who are wearing coats "made in Germany," are carrying about a number of these ivory nuts which not long ago were lying on the tropical shores of the Caribbean. The timber exports from Panama would grow rapidly with proper exploitation. Exports of mahogany, cedar, and cocobolo have already begun.

The gold exports come mainly from the mines of the Darien Company, a French company which has been working for years. The whole isthmus is strongly under suspicion of gold. All the streams show evidence of it, and prospectors are always searching the Darien country and the provinces of Los Santos and Veraguas for the

saint-seducing metal. No other minerals are worked in the isthmus. There are "coal-deposits" of a sort in the canal zone, but the coal is of no commercial value.

The only railway at present existing in the republic is that between Colon and Panama, the entire stock of which is owned by the United States government, and is worked as a company under the laws of the state of New York. This line, which has had to be largely reconstructed owing to the course of the new canal, was opened in 1855. It is rather surprising that it should not have been more extensively employed for traffic between the Atlantic and Pacific coasts of America. As a matter of fact, it was the main highway of transcontinental traffic until 1869, when the Missouri River was first linked up with the Pacific coast by the Union and Central Pacific Railroads, and the first continuous line across the States came into existence. After that date the traffic fell off very rapidly. The causes of this decline are various. To begin with, the great trunk-lines across the States competed ruthlessly with the old isthmian route, getting control of the Pacific Mail Steamship Company, which was

for long the only regular line between the west coasts of the United States and Panama. Then the French and American construction work has seriously interfered with the route by limiting the amount of commercial freight that could be handled across the isthmus.

Another cause of depression has been the opening of the Tehuantepec route in South Mexico. In 1906 the American-Hawaiian Steamship Company made an agreement with the Tehuantepec National Railway, which runs across the isthmus, and withdrew its vessels from the old Magellan route, establishing regular services between New York and Puerto Mexico on the Atlantic side, and on the Pacific between Salina Cruz, the Pacific terminal of the canal, and the west coast ports of the United States and Hawaii. The route so organized was opened in 1907, and has proved very successful, chiefly owing to the enormous increase in the sugar exports from Hawaii. The intercoastal traffic by Tehuantepec from New York to Pacific ports advanced from 114,900 tons in 1906 to 295,800 tons in 1911, and from Pacific ports to New York from 32,000 tons in 1906 to 162,500 in 1911.

All this competition hit the Panama route very badly. The Atlantic to Pacific traffic by that railroad rose from 25,914 tons in 1906 to 46,394 tons in 1910, and the Pacific to Atlantic from 24,937 tons to 32,482 tons between the same years. But in 1911 there came a sudden expansion to 96,420 tons (Atlantic to Pacific), and to 115,508 tons (Pacific to Atlantic), owing largely to the development of shipping services on both isthman terminals. In fact, the commercial freight has had to be seriously held up and restricted in the interests of canal construction and the shipment of canal material.

The reader will perhaps ask whether the Tehuantepec route is likely to compete seriously in the future with the Panama Canal. The distance from New York to San Francisco is 1,016 nautical miles less *via* Tehuantepec than *via* Panama, and from New Orleans 1,573 miles less. The difference to Honolulu in favour of the Tehuantepec transit is almost exactly the same. But the difference in time will be a good deal less than these figures indicate. The cargo has to be transferred from shipboard to railroad on one side of the isthmus of Tehuantepec and retrans-

ferred on the other. This means on the average about four days' delay. At Panama, a vessel can pass through the canal in half a day, or, reckoning other causes of detention, coaling, etc., the total isthmian transit should not take more than one day. Then there is the question of expense. The cost of transferring freight at Tehuantepec could not be less than \$2.50 per cargo ton. A Panama toll of \$1.20 per vessel ton, net register, would be equivalent to about \$0.60 per cargo ton, giving Panama an advantage of \$2 over Tehuantepec. And the inconvenience and damage resulting from transshipment, from which a through service through the canal is free, will also be a considerable point in favour of the waterway. It is not likely, however, that Tehuantepec will be ruined by the opening of the canal. Considerable short-distance coasting trade is sure to continue along that route, and it will share in the general benefit of the developments which await Isthmian and Central America.

Has Panama any danger to fear from its old rival the Nicaraguan canal project? The United States seems to have forestalled this possible challenge of Panama's monopoly of water transit

over the isthmus. Just as I write comes the news of a new treaty between the United States and Nicaragua, securing to the former, for the payment of \$3,000,000, the exclusive rights to construct a canal through Nicaraguan territory. The United States are reported also to have obtained under the treaty possession of Fonseca Bay, one of the few places on the west coast of Central America affording ample deep water facilities.

Moreover, the Colombian Chargé d'Affaires in London recently made the following communication to the press :—

I have received from my government the following information respecting certain propositions made to Colombia by the government of the United States, which the government of Colombia has not accepted. The American propositions were as follows :

1. That Colombia should grant the United States an option for the construction of an inter-oceanic canal, starting from the Gulf of Uraba on the Atlantic to the Pacific Ocean, through the region of the Atrato River.

2. That Colombia should give to the American government the right to establish coaling stations in the islands of San Andres and Providencia, which are located in the Caribbean Sea.

3. In consideration of the above, the United States to pay to Colombia \$10,000,000 and to use their good influence for the settlement of pending differences between Colombia and Panama. Also to grant Colombia preferential rights for the use of the canal and the settlement by arbitration of the claims of Colombia against the Panama Railroad Company.

The government of Colombia declined to accept the above proposals, insisting, at the same time, that all questions pending between Colombia and the United States should be settled by arbitration.

It is evident that the United States are not going to permit any competitive canal scheme in Central America if they can help it.

What will be the effect of the opening of the canal on Panamanian prosperity? The local

merchants fear that the system of state-supply, which has prevailed in the zone during the constructional period, will be continued after completion and extended to the shipping which will pass through the canal, and that coal and ship-chandlery will become American government monopolies. Much depends on whether the Panamanian merchant will be allowed to import freely through Colon and compete in the supplying of the ships in transit.

No serious development can be expected in Panama until the country is better provided with railways. The only other line in contemplation is one from Empire, on the Culebra Cut, to David, a town close to the Pacific near the far western frontier, in the province of Chiriqui. This line would be 289 miles in length, and branches from it are proposed to Anton, 5 miles, and to Los Santos, about 67 miles.

It is pretty safe to prophesy that the blue streak through the isthmus of Panama will have a gradual but sure effect on the politics of Central America. The need to protect the canal, and to surround it with orderly conditions, social and political, will compel a good many states to

put themselves to amendment or force the big republic responsible for the canal to provide them with good government whether they like it or not. If the United States had to intervene in Cuba in order to put down anarchy or misrule, they may be persuaded by an even stronger necessity to intervene in the affairs of Central America in the defence of the Panama Canal. It would be no surprise, especially after recent events in Mexico, if the south-western frontier of the States gradually advanced down the broad and narrow isthmus until it reached and passed the line of the canal. This would be quite in accordance with the law which makes it almost inevitable that a great and well-governed Power should absorb weaker states along its borders, especially when these are unable to keep their houses in order.

There is always the danger that foreign Powers will intervene in the affairs of these republics in the interests of their bondholders, and this would compel in turn the intervention of the United States in order to make good the Monroe doctrine, which is directed against any such foreign interference in American affairs. In order to avoid

these complications Mr. Taft actually proposed not long ago to refund the debts of Honduras and Nicaragua, placing the custom-houses under the control of American officials. The object was partly to secure loans advanced by American bankers, but partly also to satisfy European bondholders and to make the politics of these republics more stable. Nothing came of this significant project. But I should not care to ensure, except at a very high premium, the permanence of the political arrangements now existing in these regions when the Panama Canal is in working order and becomes more and more essential to the safety and prosperity of the great republic. The canal may in the long run be not "virtually" but actually "a part of the coastline of the United States."

CHAPTER XVI.

THE NEW OCEAN HIGHWAYS.

I HAVE already mentioned that England and Europe gained much more from the opening of the Suez Canal than the United States. Before the Suez Canal was opened, the voyage both from Liverpool and from New York to Asia and Australia was made *via* the Cape of Good Hope. Liverpool had then an advantage over New York of 480 miles in the journey to all Asiatic and Australian as well as East African ports. When the Suez Canal was opened the route to Asia was *via* the Mediterranean and Red Seas for both Liverpool and New York. But New York is 3,207 miles from Gibraltar, while Liverpool is only 1,283, so that Liverpool has had an advantage of 1,924 miles instead of 480, as formerly, on the voyage to Asiatic ports. In other words,

Liverpool gained a competitive benefit of 1,444 miles from the opening of the Suez Canal.

♦ Now let us take the voyage to Australia from New York and Liverpool. From New York the journey is still made *via* the Cape of Good Hope, but from Liverpool chiefly *via* Suez. Liverpool is 1,622 miles nearer than New York to Australia *via* Suez, but only 480 miles nearer round the Cape. Liverpool therefore has owed a competitive "pull" of 1,142 miles over New York to the Suez Canal.

Let us remember, therefore, that the Suez Canal has largely diminished the advantage which the western route sought by Columbus and his successors would once have conferred upon England and Europe in the voyage to the Far East. The opening of the Panama Canal will readjust the balance which was tilted against the United States when the Suez Canal was opened in 1869. The United States will gain far more than the western ports of Europe from the new highway through the American isthmus. Speaking broadly, Suez was a British, Panama is an American proposition.

There are so many facts and figures in con-

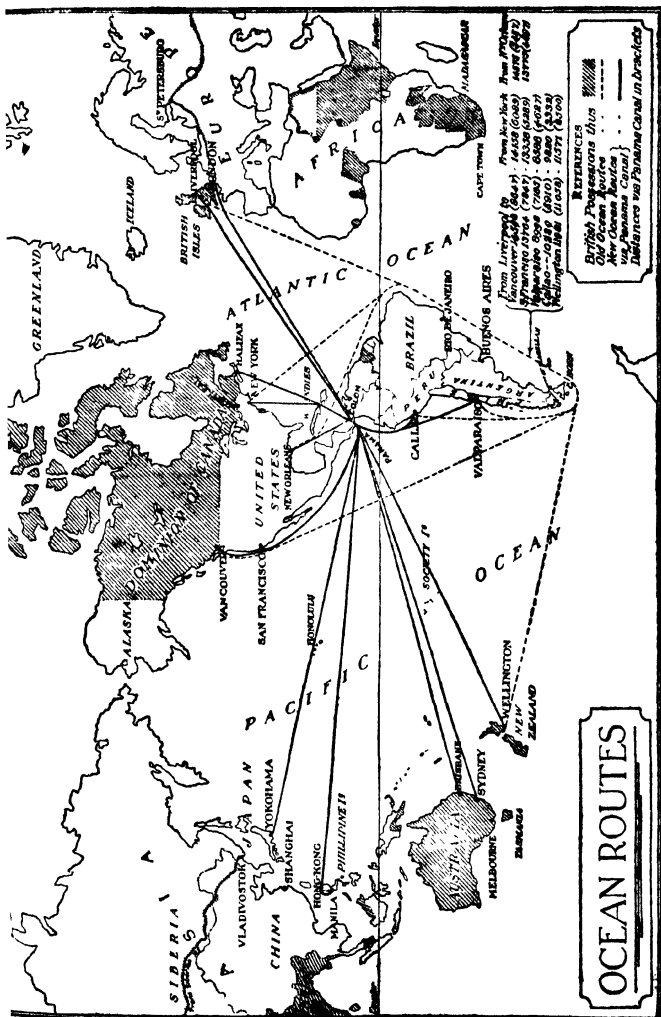
nection with the changes in distances and sea-routes as the result of the construction of the Panama Canal that it may save the reader's attention to lay down a few more obvious effects in succession. We can then go on to look at the subject in closer detail.

1. The canal reduces the distance between New York on the eastern and all ports on the western seaboard of America *north of Panama* by 8,415 geographical miles. The saving from New Orleans is much greater.

2. Liverpool is brought 6,046 miles nearer to all ports on the western seaboard of America (of course including Canada) north of Panama.

3. The saving between New York and the Pacific ports of America *south of Panama* depends how far south those ports are. But on the average the shortening of distance is 4,709 miles. The saving varies from 8,415 miles at Panama to about 1,004 miles at Punta Arenas, the strange little town on the Straits of Magellan. New Orleans and the Gulf ports benefit still more.

4. Liverpool is brought on an average about 2,600 miles nearer to Pacific ports of America *south of Panama*. The shortening of distance varies



OCEAN ROUTES

from 6,046 miles at Panama itself down to zero at a point between Punta Arenas and Coronel (the most southerly commercial port of Chile).

5. All the Pacific ports of the Americas are, *via* Panama, 2,759 miles nearer to New York than to Liverpool.

6. The Panama Canal will not bring any port in Australia or the East Indies, nor any ice-free port in Asia or Asiatic islands, nearer to any European port. Of all ports on the western Pacific coasts, only those of New Zealand and a few very chilly ones in Siberia will be brought nearer to Liverpool.

7. All of Asia and all of Australia, with the exception of New Zealand, will be nearer Europe by way of the Suez Canal than by way of the Panama route.

8. Nearly all Japan, Shanghai, Hong-kong, the Philippines, New Guinea, all Australia (save a far western strip), and all New Zealand are brought nearer the Atlantic and Gulf ports of the United States and the Atlantic ports of Canada.

9. The relative distances from New York and Liverpool to the Atlantic coast of South America

(nearly all way down), to Africa, and to Asiatic ports south of Hong-kong are unchanged.

10. It is New York and not Liverpool which is now nearer to Yokohama, Sydney, and Melbourne. Wellington, in New Zealand, formerly equidistant between the two great ports, is now 2,739 miles nearer to New York than to Liverpool. Sydney, which was formerly over 1,500 miles nearer Liverpool (*via* Suez) than New York (*via* Cape of Good Hope), now becomes 2,424 miles nearer New York (*via* Panama) than Liverpool (*via* Suez).

11. Nearly the whole of the Atlantic seaboard in the Old World and the New is brought nearer to the Pacific ports of the United States and Canada.

12. The Panama Canal cannot invade the main traffic field of the Suez route—the countries of Southern Asia, East Africa, the Red Sea, and the Persian Gulf. The competitive region of the two canals lies east of Singapore.

The reader will gather from the last proposition that the scene of the new battle of the routes will lie in the Western Pacific, and this probably will also be the scene of the main industrial and commercial competitions of the future. It is in these regions,

[illegible]

0 30 60 90 120

Scale of Miles

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Australasia and the countries along the Pacific Asiatic coasts, that the traffic zones of the Suez and Panama Canals touch or overlap. The positive effect on relative distances from American and European ports is of great importance to commercial developments in these regions. Let us look at the geographical results of the Panama Canal a little more closely. On pages 252, 253 are two tables transcribed from the official report of 1912 on Panama Canal Traffic and Tolls, by Mr. Emory R. Johnson.

The following tables are given by Dr. Vaughan Cornish :—

		Reduction, miles (geog.).
New York to—		
Yokohama . . .	{ by Suez 13,564 by Panama 9,835 }	3,729
Shanghai . . .	{ by Suez 12,514 by Panama 10,885 }	1,629
Sydney	{ by Cape of Good Hope . . . 13,658 by Panama (via Tahiti) . . . 9,852 }	3,806
Melbourne . . .	{ by Cape of Good Hope . . . 13,083 by Panama (via Tahiti) . . . 10,427 }	2,656
Wellington, N.Z.	{ by Straits of Magellan . . . 11,414 by Panama 8,872 }	2,542
Hong-kong . . .	{ by Suez 11,655 by Panama 11,744 }	
Manila (Philippines)	{ by Suez 11,601 by Panama via San Francisco and Yokohama . . . 11,585 by Panama, Honolulu, and Guam 11,729 }	16

Comparative distances (in nautical miles) from New York and Liverpool to New Zealand, Australia, Philippines, China, and Japan, *via* Suez and Panama Canals.

To	New York <i>via</i> Panama Canal.		Liverpool <i>via</i> Suez Canal.		Difference in favour of Suez -, Panama +.
	Ports of Call.	Distance.	Ports of Call.	Distance.	
Wellington .	Panama and Tahiti . .	8,851	Aden, Colombo, King George Sound, and Melbourne	12,989	+4,138
Sydney . .	"	9,811	Aden, Colombo, King George Sound, Adelaide, and Melbourne	12,235	+2,424
Adelaide . .	Panama, Tahiti, Sydney, and Melbourne	10,904	Aden, Colombo, and King George Sound	11,142	+238
Manila . .	Panama, San Francisco, and Yokohama	11,548	Aden, Colombo, and Singapore	9,701	-1,847
Hong-kong .	"	11,383	"	9,785	-1,598
Shanghai . .	"	10,839	Aden, Colombo, Singapore, and Hong-kong	10,637	-202
Tientsin . .	"	11,248	Aden, Colombo, Singapore, Hong-kong, and Shanghai	11,377	+129
Yokohama .	Panama and San Francisco	9,798	"	11,678	+1,880

Distances (in nautical miles) from Liverpool *via* the Panama and Suez routes to Australia, New Zealand, the Philippine Islands, China, and Japan.

To	Suez Route.	Distance.	Panama Route.	Distance.	In favour of Suez -, Panama +.
Adelaide . .	Aden, Colombo, and King George Sound	11,142	Panama, Tahiti, Sydney, and Melbourne	13,478	- 2,336
Melbourne . .	Aden, Colombo, King George Sound, and Ade- laide	11,654	Panama, Tahiti, and Syd- ney	12,966	- 1,312
Sydney . .	Aden, Colombo, King George Sound, Adelaide, and Melbourne	12,235	Panama and Tahiti . .	12,385	- 150
Wellington . .	Aden, Colombo, King George Sound, and Melbourne	12,989	"	11,425	+ 1,564
Manila . .	Aden, Colombo, and Sin- gapore	9,701 9,785	Panama, San Francisco, and Yokohama	14,122 13,957 13,822	- 4,421 - 4,172 - 2,445
Hong-kong Tientsin . .	Aden, Colombo, Singa- pore, Hong-kong, and Shanghai	11,377 11,678	"		
Yokohama . .	"		Panama and San Fran- cisco	12,372	- 694

As figures are rather confusing and difficult to retain in the memory, let us find a more graphic way of indicating this zone in the Western Pacific where the chief conflict of canal and commerce is likely to take place in the future. Let us mark out a block of sea and land between the lines of latitude 40° north and 40° south and the lines of longitude 120° east and 160° east of Greenwich. This zone includes Japan and Korea, Shanghai and the Philippines, New Guinea, and all Australia except the farthest western coastline. New Zealand lies outside it. Now along its western margin, the Suez and Panama routes to New York are equal in length. Along its eastern margin, which lies outside Japan and Australia (*not* New Zealand), and only traverses the scattered islets of the Pacific, the Suez and Panama routes to Liverpool are equal in length. Now look down an imaginary line near the centre of the zone but running rather west of north and east of south. Along this line all places are the same distance from New York and Liverpool, by Panama and Suez respectively.

Can we, then, roughly forecast the changes in ocean trade-routes which will result from this

new channel of communication between East and West? For this purpose we may divide the world traffic into three parts—firstly, that part of it which the canal is almost certain to secure; secondly, that for which it will have to fight with competitive routes; thirdly, that which it will have no chance of securing.

As regards the first, Panama will almost certainly attract most, if not all, the traffic which flows from the eastern American and Gulf ports to Hawaii and the west coast of North and South America, and of the traffic from the United Kingdom and the west of Europe to the whole western seaboard of America. We have already seen the regions where the Panama Canal will have to compete with the existing routes. Roughly, they comprise Pacific Asia, a part of the East Indies, and Australasia. These regions represent an enormous volume of traffic from which Panama will have to try to detach as large a share as possible. The third part is the main traffic-field of Suez—that is, Southern Asia, East Africa, the Red Sea, and the Persian Gulf. No efforts on the part of Panama, no reductions of canal tolls, could possibly lure any of this traffic from its

determination to Suez; the competitive region of the two canals lies all east of Singapore, and the greater part of the commerce of that region with Western Europe will still continue to move *via* Suez.

The question of tolls at Panama is, of course, very important in its bearing upon the future popularity of the canal. It would certainly not have done to make the Panama charges higher than those at Suez. These latter have been reduced as from January 1, 1912. They are now 6·25 francs (\$1·206) per net ton for loaded vessels. The passenger tolls are 10 francs a passenger above twelve years of age, and 5 francs for each child from three to twelve years old. If these figures had been exceeded at Panama the traffic there would have suffered. On the other hand, the attempt to attract traffic by a great reduction on tolls would have involved a loss on the assured traffic between the eastern and western coasts of America which would have more than counter-balanced the probable gain.

Mr. Taft's proclamation fixing the Panama tolls will be found at the end of the book. It will be seen that the charge of \$1·20 is almost identical

of the new route. Travellers tell us that the biggest ocean rollers in the world are found on the Pacific coast of America just a little north of the southern straits. For these reasons insurance rates *via* Panama are likely to be lower than those round the far south of the American continent.

There is good reason to believe that the Panama Canal will pay its way without imposing any new burden on the taxpayers of the United States. It will probably not produce the dividends of the Suez Canal. It will have cost four times as much, and is unlikely for many years to command quite as large a volume of traffic. The increase in the traffic at Suez has been enormous during the last fifteen years, owing largely to the development of the resources of the Far East with the help of western capital. The net tonnage of vessels passing through the canal in 1911 was 18,324,794, and the total passengers were 275,651. All forecasts of the traffic *via* Panama must, of course, be speculative, but it may be mentioned that the net register tonnage of vessels that might have advantageously used a Panama Canal in 1910 is officially estimated at 8,328,029.

Before discussing the more economic and commercial results likely to follow from the opening of the canal, there are one or two subsidiary questions we may consider. Is the Panama Canal likely to be used by sailing vessels? The prevailing idea is that it will be no more practicable a route for such craft than the Suez Canal. Winds, tides, and currents have much more to say to the sailing vessel than to the steamer, and the terminals of the canal, especially on the Pacific end, are not always easy of approach to wind-driven ships. One effect of the opening of the Panama Canal will be to hasten the decline of these old-fashioned and more beautiful craft. It must not be imagined that the "windjammer" or "limejuicer," in the sea-going vernacular, has already nearly disappeared from the seven seas. A great deal of the world's commerce is still carried on in such vessels. They still battle their way round the Horn laden with the timber of Oregon or British Columbia and the nitrates of Chile. But the unsuitability of the Panama transit for sailing vessels will unquestionably lead to their quicker decline. It is interesting to see how steam has

gradually ousted sail in the world's shipping. In 1873-4 the sea-going sail tonnage of the world was 14,185,836 tons. This declined to 11,636,289 in 1888-9; to 8,693,769 in 1898-9; and to 6,412,211 in 1910-11; while steam tonnage increased from 4,328,193 in 1873-4 to 41,061,077 in 1910-11. For many reasons, climatic and economic, we may safely assume that the Panama Canal will be confined exclusively to "steam circles." Steamers will be substituted for the "limejuicers" in every canal-using line, and the snowy canvas will be banished to other regions. Hitherto, such freights as coal, lumber, grain, nitrate of soda, and sugar have been considered specially suited for sail transportation, because they are shipped as full vessel cargoes and do not require rapid transportation or delivery. But even such cargoes are certain to be largely transferred to the steamship when it is realized that the Panama Canal is "no road" for sailing vessels.

Another interesting question is the probable effect of the canal on the American mercantile marine. The ocean-going merchantmen of the United States engaged in the foreign trade are

practically non-existent, though the "coasting" trade, which includes the trade of Hawaii and the Philippines with the United States, is strictly reserved to American vessels, ships flying foreign flags being entirely excluded. But these latter, which are in the main British, carry on all the foreign trade of the United States with South America, New Zealand, Australia, Northern China and Japan. It is almost unbelievable that in 1908 there was not a single steamship flying the flag of the United States between the United States ports and those of Brazil, the Argentine, Chile, or Peru. The mails from New York and the other Atlantic ports of the American republic go, or went until quite recently, *via* Europe, though New York is 370 miles nearer Brazil, etc., than the Old World coasts.* The reasons for this want of a foreign-trade mercantile marine

* Many persons may have expected these countries to be much nearer New York. They do not realize that *nearly all South America lies east of North America*. Washington is on the same meridian as Callao on the coast of Peru. Antofagasta and Iquique, the chief nitrate ports of Chile, have the longitude of Boston. The eastern point of Brazil lies 2,600 miles east of New York, and is *equidistant from New York Bay and the English Channel*.

are chiefly the greater cost of shipbuilding in the United States and the requisitions with regard to wages and food of the American trade-unions. The result of the high standards of comfort thus imposed has been that the cost in wages and food to run American ships under American conditions across the Pacific is double that in European or Japanese steamers. It is scarcely to be wondered at, therefore, that some people in the United States regard the Panama Canal as a very disinterested gift from the United States to humanity at large, especially perhaps to Great Britain and Japan—as an example of altruism run mad. But while the United States may not be ready to reap the full advantage of the canal at the start, it is highly probable that its opening will lead to a rapid growth in the United States merchant service. A larger coasting fleet will be required with larger vessels, and this will lead to a general development of the larger classes of shipbuilding.

At present no vessels are permitted to fly the American flag unless American-built. A large number of American-owned vessels are therefore registered under the flags of some foreign nation.

As the United States begins to compete in cheapness and efficiency of shipbuilding with other countries, the chief motive for this foreign registration will be removed. Great Britain cannot expect to be the chief carrier of United States trade for ever. This is indeed one of many directions in which the opening of the Panama Canal may tend rather to the disadvantage than to the benefit of the United Kingdom. There is no reason why the United States should not build up a mercantile marine as swiftly as Germany and Japan have done. England will have to consider seriously this and many other probable effects of the canal closely touching her most important interests.

I will conclude this chapter with an interesting little fact which may already have occurred to the reader. From the moment the Panama Canal is opened it will be possible for the first time to sail all round the world from England wholly in the northern hemisphere and without crossing the Equator. Who will be the first circumnavigator along the all-northern trail ?

CHAPTER XVII.

THE CANAL AND THE AMERICAS.

THE likely effects of the Panama Canal on international commerce and the development of the world's resources is so big a subject that one can do little more than indicate the larger probabilities. The influence of the canal on the British Empire must be left to another chapter. Here we shall have to consider mainly the case of the United States, the country which stands to gain far more than any other from this new link between East and West.

The most obvious result of the new event, as it was the main object of the canal's construction, must be the immensely quickened all-sea communication between the eastern and western coasts of North America. The motive for the building of the canal was military rather than commercial. It was rendered necessary by painful

experience during the Spanish-American War of the effects of the 14,000-mile sea journey between the two seaboard of the republic. But the commercial results will not be the less important because they were not foremost in the object and motive of the canal-builders. It is pretty clear that what we may call the main developmental effect of the canal will be felt along that Pacific coast of the Americas which has been so long shut out from the great centres of industrial enterprise in the New World and the Old.

We are so accustomed to regard the United States as a fully developed and fully equipped country that we forget how slowly her population and industries advanced westward from the Atlantic coasts. Even now it cannot be said that the railroad communications between the east and the Pacific states beyond the great mountain-divide of the Rockies are fully equal to the carriage of the produce which is or should be exchanged between east and west. The transcontinental lines have scarcely yet furnished a cheap and satisfactory connection between the Pacific coast states and their largest and most

natural markets. Hitherto the railways have had to compete with only three alternative routes : (1) the all-sea route round Cape Horn for sailers, and through Magellan Straits for steamers ; (2) the route *via* Panama, with railroad transit over the isthmus ; (3) the route *via* Tehuantepec, with railroad transit over that isthmus from Puerto Mexico on the Gulf to Salina Cruz on the Pacific. The new canal will be a much more formidable competitor. It is highly important that the industries of the United States should have the benefit of this healthy tug-of-war between railroad and canal, and the government is perfectly justified in keeping that competition open, even to the length of forbidding the use of the canal to ships owned, controlled, or operated by railway companies.

There is no fear that the Panama Canal, even if it prospers exceedingly, will ruin the trans-continental railroads. The report of the Isthmian Canal Commission in 1901 made some interesting remarks on this subject, and they are as pertinent to-day :—

The competition of the canal will affect,

first, the volume and rates of the through business of the Pacific railroads, and secondly, the amount of their local traffic. At the beginning of their existence these railways depended almost entirely upon their through traffic; but their chief aim throughout their history has been to increase the local business, which is always more profitable than the through traffic; and although the great stretch of country crossed by them is still in the infancy of its industrial development, the local traffic of some, if not all, of the Pacific roads has already become of chief importance. A vice-president of one of the railway systems states that since 1893 "the increase in business of the trans-continental lines has not come from the sea-ports, but from the development of the intermediate country." The canal can certainly in no wise check the growth of this local traffic, and the evidence strongly supports the belief entertained by many persons that the canal will assist largely in the industrial expansion of the territory served by the Pacific railways.

If this be true, the proximate effect of the isthmian canal in compelling a reduction and readjustment of the rates on the share of the transcontinental railway business that will be subject to the competition of the new water route, will be more than offset by the ultimate and not distant expansion of the through and local traffic, that must necessarily be handled by rail. It seems probable that the increase in the population of the country, and the growth in our home and foreign trade, will early demonstrate the need of the transportation service of both the canal and the railways.

The reduction of freight through the use of the canal is sure to give a big stimulus to many leading industries of the Pacific states. One of the most important is the lumber industry. California and Oregon are very rich in forests of pine, spruce, cedar, and redwood, the last being much in demand in Atlantic countries. A good deal of this timber is exported to Europe and the eastern states, and it has all to be carried in sailing ships round Cape Horn. It is calculated that the

opening of the Panama Canal will reduce the freight by 50 per cent., which means that all this Pacific coast timber will be correspondingly increased in value. The exports eastwards are sure to advance rapidly with the new means of transport. Grain, wine, and fruit will benefit, and the manufactured goods from the industrial states of the east will flow through the same channel to the western states in an ever-increasing volume.

Every staple industry of the United States will feel the new stimulus, and England and Europe generally are certain to feel the pressure of this new competitive power of the American republic. In cotton and iron goods especially the exports from the eastern and southern states are bound to forge ahead. Manufactured cotton goods exported from the southern states have had to be carried by rail to the western ports, and thence by steamer to China and Japan, or else eastward by the Suez Canal, sometimes even *via* England or Germany. We may imagine what a boon the Panama Canal will be to this trade, and how conveniently it will lie for the Gulf ports and all their raw and manufactured exports.

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American iron and steel will also be immensely strengthened for competition with those of England and Europe in the markets of China, Japan, British Australasia, and along the coast of South America. We need not describe in detail effects which are likely to be felt over the entire range of American industry.

The United States appears, indeed, to be on the verge of tremendous developments. In a paper read before the Royal Colonial Institute,* that well-known physical geographer and economist, Dr. F. B. Vrooman, gave us a hint of further American enterprises in civil engineering, after the Panama Canal is opened :—

The isthmian canal is but a part of the greater American waterways project. As soon as this is finished it is possible that the United States will start in a large way with the project of the artificial canalization of the Mississippi with its 16,000 miles of already navigable waters and a drainage basis of 1,280,000 square miles. The cutting-through of an ocean-ship canal to the Great Lakes

* March 19, 1912.

will make seaport towns of the Canadian cities on the Lakes Ontario, Erie, and Superior. The Saskatchewan and the Red River can be canalized for 1,000 miles, and a short haul from Winnipeg will open the whole Saskatchewan valley from near the foot-hills of the Rocky Mountains—downstream, but for this short portage—all the way to the Gulf of Mexico, and thence to Panama and the Pacific ports. Every trans-continental freight-rate in Canada and the United States will be reduced, and perhaps some in the middle interior. As this great southern movement starts up the industries of the southern states will receive a new impulse. The Gulf of Mexico and the Caribbean Sea will spring into a new life, together with the West Indies and Central America and the vast and fertile interior drained by the Orinoco and the Amazon.

CENTRAL AND SOUTHERN AMERICA.

But there are no countries which will hear the call of the canal so nearly and clearly as those of Central and Southern America. It is astonishing

how that forty-mile wide land barrier between the two oceans has isolated all the western shore of the continent. The Panama Canal Railroad has done very little to modify the situation. The Pacific coast of America has looked westwards over its waste of waters, and has scarcely been reached by the industrial and economic forces at work behind it in the Old and New Worlds. Its trade has been carried on mostly with Europe, and especially England, in sailing vessels that have plodded round the distant Horn. An interesting example of this geographical and commercial detachment of the west coast of Central and South America is furnished by the port of Mazatlan in Western Mexico. From this place there are considerable exports of logwood and mahogany. But thirty times as much of this lumber has gone to Europe as to the east of the American continent. On the opposite or eastern side of Mexico is Tampico, where the returns of trade are just the reverse, the United States being the largest customer for its exports. Despite the old Spanish paved roads across the isthmus at Panama, by which the silver and pearls of Peru and the Pacific were conveyed to

Nombre de Dios and Porto Bello, for shipment to Spain, despite the sixty years of the little Panama Railway, the American continent even in its narrowest parts has been something like an impenetrable screen between east and west. Four centuries of continued agitation and effort to get the water through show how seriously this physical divorce has been felt, and give an earnest of the large results which are sure to follow the completion of the task.

There have been other reasons for the backward development of western South America. To begin with, the Spanish, not a progressive and pioneering race, laid their hands on these countries four hundred years ago, and have held them politically or racially ever since. This would not in itself have kept out the Anglo-Saxon or the German. But these countries have not yet been greatly needed as an outlet of the surplus populations of Europe. Even the United States is very far from being filled up, and Canada is likely to be giving away farms for many years to come. The Teutonic race, to which above all others the trusteeship of Western civilization is committed, has left these Spanish Americas,

with their revolutions coming almost as frequently and regularly as the seasons, comparatively unvisited. As yet the North European emigration to the southern continent has been mainly confined to Argentina and Southern Brazil.

In one respect the isthmian breakwater has been profitable to these states of the Pacific coast. It has sheltered them largely from the negro element which has spread so widely over the West Indies and the southern United States. But Japan and China are already there, and the yellow will be laid on more and more thickly unless these countries are brought quickly within the zone of Western ideas and enterprise. And that process is likely to begin with the opening of the canal.

The backwardness of these regions is indeed almost unbelievable. Most people think of them as producing mainly nitrates and revolutions. But their possible resources and products are illimitable, and are only awaiting the organized capital of the West to be made available for human service. As yet these Latin republics are in their middle ages of development. There are few railways, only one continuous trans-

continental line having been completed between Valparaiso, through Mendoza, to Buenos Aires. Their internal communications are carried on mainly by the pack mule, as they have been since the days of Pizarro and Valdivia. Each country, of course, has a foreign trade, but the people of the interior, the Indians or mixed breeds, live in isolated communities which are self-sufficing, raise their own food and make their own simple manufactures, knowing little or nothing of the products of foreign countries.

The whole coast and its hinterland is engaged almost solely in what are known as "extractive" industries—that is, in mining or agriculture. The exports consist mainly of foodstuffs and raw materials, nitrate, ores of copper, silver, and gold, grain, sugar, cotton, cocoa, coffee, wool, hides, rubber, and woods. With these the people pay for their manufactured goods, and these come mainly from Europe, and chiefly also from the United Kingdom. The mineral wealth of the northern parts, especially the Andean plateau, is still enormous, though vast quantities have been extracted. For centuries the Andes furnished the civilized world with

most of the bullion used for its current coinage. Between 1630 and 1803 Peru alone sent out £250,000,000 worth of silver. Bolivia has contributed £800,000,000 worth; the famous mines of Potosi alone accounted for £600,000,000 worth of this metal. The nitrate works of Chile are in the hands of Englishmen and Germans, and American and other foreigners hold the sugar plantations of Peru. But, as I have said, the range of production is enormous and only awaits the stimulus of imported capital. To give one example of the variety of products, it is said that the Aconcagua valley in Chile would alone furnish annually from its vineyards 1,000,000 gallons of claret, if the grapes were not used to produce a local drink named "chica." There is no sign of the exhaustion of any of the natural products of these regions. Even the nitrate of soda, that most valuable of fertilizers, though it is being shovelled out at a great rate, covers about 220,000 acres, or about 400 miles from north to south, and is sufficient to last for a very long time to come.

Nitrate, minerals, wheat, barley, wool, hides—these are the main exports of the Pacific west, the returning imports being cotton goods, ma-

chinery, steel rails, woollens, coal, and all sorts of miscellaneous manufactures and supplies. But, as I said, the trade has been almost wholly with Europe, England enjoying a very predominant position. The United States have competed with Europe at great disadvantages. The trade has been mostly carried on in sailing vessels. Now such craft, to get from New York to South America, have been obliged to sail eastwards almost as far as the Canaries in order to catch the trade winds and weather Cape St. Roque on the coast of Brazil. The sailing vessel from Europe, on the other hand, sails right past the Canaries, and can give the American ship ten days' start in the journey to any part of South America south or west of the most easterly point of Brazil. If the reader will turn back to the chapter on the new distances he will see how the little streak of blue water at Panama will alter all this. Take one little fact to illustrate the change. Callao, on the coast of Peru, is, before the opening of the canal, farther by steam from New York than is the South Pole, but the Panama Canal will bring the city 1,000 miles nearer to New York by steam than San Francisco will then be. The canal

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will reduce the distance from New York to the Chilean nitrate port of Iquique by 5,139 miles (nautical), to Valparaiso by 3,747, to Coronel (farther south) by 3,296, to Valdivia (about 1,000 miles north of Magellan's Straits, nearly at the farthest southern limit of the commercially important part of western South America) by 2,900. Take Iquique, an important North Chilean nitrate port. By Panama this place is 4,004 miles from New York, but 6,578 from Liverpool. Their respective distances *via* Magellan were 9,143 and 9,510.

It looks, therefore, as though the United States, with its new advantages, which begin when the first vessel is passed through the Panama locks, would have a good chance of securing for the future the main share of the South American trade. Its cotton, iron and steel goods, electrical machinery, etc., will be able to compete on very different terms with those of England and Germany. Cotton manufactures have reached Chile and the other countries of Pacific South America by a rather absurdly roundabout route. The raw cotton has been grown in the southern parts of the United States, carried to Europe

for manufacture, and brought back to South America *via* the Straits of Magellan. These goods will, we may be sure, tend in future to go direct from the American factories *via* New York, Charleston, or New Orleans, without trans-shipment, thus saving about 7,000 miles of transportation. A very small part of the American trade with these countries has passed by the Panama railroad. The rates charged by the steamers which have picked up the goods for the west coast at Panama have been kept so high as to be practically prohibitive. It has actually been cheaper to send goods from the United States by way of England or Germany—that is, a journey of 14,000 miles—than by way of Panama, a journey of three or four thousand. One of the surest results, then, of the Panama Canal opening will be a rapid development of the Pacific coasts of America, especially of South America, and a great expansion of trade between these countries and the United States.

The effect of the canal on the Atlantic coasts and hinterland of South America will naturally be less striking. There has never been much interchange of trade between the two coasts

of the southern continent, for the simple reason that their products are not complementary but mostly identical. Most of the trade of the eastern coast states is with the countries of the North Atlantic. But some trade to the more northerly and tropical parts of this coast is certain to flow through the canal. Lumber from the Pacific coasts of North America is used in Atlantic South America, and a part of this trade, which is likely to grow in extent, will be passed through the canal. It should be noticed, however, that the temperate reaches of the eastern coast of South America farther to the south will be nearer the Pacific coasts of the United States and Canada *via* the Horn and the Straits of Magellan owing to the big easterly projection of Brazil.

We must leave the probable effects of the Panama Canal on the British possessions in America to another chapter. It has not been possible to deal with prospective commercial developments in great detail. Only some general idea could be given of the vast changes and developments in progress. On the day on which I am writing the Washington correspondent of *The Times* summarizes the meaning and

effect of the Panama Canal in three rather formidable words. He says it "symbolizes commercial Pan-Americanism." The canal is going to help America to keep its trade more to itself. It represents in commerce and economics what the Monroe doctrine represents in politics. It will immensely assist the United States to become the chief industrial supplier of the great continent, with the other states mainly as agricultural or mining annexes. One incident in the furthering of this ambition was the attempt to conclude a treaty of reciprocity with Canada, the effect of which, as Mr. Taft admitted, would have been to make Canada such an "annexe" of the republic. The Canadian people, however, realizing the ulterior political and commercial effects of such a treaty, refused to ratify it. Canada, in fact, belongs to another political and economic system. She gives valuable trade-preference to the manufactures of the mother-country in the Old World, and there is happily no reason to believe that she will abandon the Imperial ideals for the objects of continental Pan-Americanism. After all, the citizens of Canada and the United States are mostly of the

same stock, speaking the same language and cherishing the same great traditions. The two ,branches of the Anglo-Saxon family ought to be able, while each maintaining its own life and growth, to remain happily side by side, sharing in the new prosperity which the world owes to this latest achievement of the great republic.

CHAPTER XVIII.

THE CANAL AND THE BRITISH EMPIRE.

ONE of the most important results of the Panama Canal, one which is likely to have the largest influence on future political history, seems scarcely to have been noticed by writers on this subject. I have shown how much nearer Australia and New Zealand are brought to New York than to Liverpool, owing to the isthmian passage. They are brought of course proportionately nearer to the eastern provinces, which are also the governmental headquarters of Canada. But the moving away, so to speak, of these great countries from England, and their closer approximation to the great and growing branches of the Anglo-Saxon stock in America, has the effect of locating the centre of gravity of the English-speaking races more firmly and permanently than ever in the New World. When Canada,

Australia, and New Zealand have grown for another quarter of a century, and the United States have reaped for so long the advantage in wealth and power of the new waterway, the little islands of the United Kingdom may begin to appear as a detached and distant fragment, rather than as the "heart and hearth," of the British Empire and the English-speaking world. In the eighteenth century, when the English plantations in America began to develop their manufactures and had increased rapidly in population, the question was discussed in England how long she could continue to control an over-sea empire, likely to be in time more populous and prosperous than the home-country itself, from these far-away islands of the Old World. It was actually suggested at that time that the King of England should carry his crown and throne where the most part of his subjects were congregated. That suggestion is not likely to be repeated. We have found a way of harmonizing local self-government with imperial unity. But the position of England in her empire is sure to be greatly modified as time goes on, and the Panama Canal, by bringing these vast and unde-

veloped continents and isles of the far south-west so much nearer to North America than to the imperial centre, cannot fail to have some influence, in this direction. From a commercial point of view, its effect will be to increase the value and importance of those trade preferences which Australia gives the home country in her markets.

Probably no single country in the world, certainly no portion of the British Empire, stands to gain so tremendously from the opening of the canal as British Columbia. England has not yet realized what enormous resources are locked up in this province of the furthest west, which looks out from a hundred harbours to the Pacific and across to the awakening East. The long haul across the continent, the interminable sea-trail round the Horn, twice crossing the equator, kept British Columbia, until lately, outside the thought and interest, not only of Englishmen, but even of the Canadians of the administrative East. Even with the gradual filling of the empty middle and west, geography would have continued to be against British Columbia. But the Panama Canal makes all the difference. This province will no longer look vaguely and dreamily to the

western sea-spaces and a still half-slumbering Orient. She will suddenly find herself at one end of a sea-route which will shorten her distance from New York by 8,415 miles and from Liverpool by 6,046 miles.

Her timber and other produce will no longer toil wearily in the holds of the "windjammer" down the whole length of Northern, Central, and Southern America. There at Balboa, less than half-way down, is the entrance of the long-desired short-cut to the world-centres of progress and enterprise. The electric thrill of this new circuit will be felt not only along the havens and fjords of the British Columbian coast, but nearly a thousand miles inland. We may say that almost the whole western half of Canada, where the golden wheat frontiers are ever advancing, will face about and henceforth look west instead of east. All the corn and produce of Alberta and Western Saskatchewan will flow, not eastwards as heretofore, but to the Pacific shores, there to be shipped for transit *via* the canal to the southern and eastern United States, to the north and east of South America, and to the Old World over the Atlantic. Even the

eastern and western fronts of the Dominion will feel the grip of a new link, which may serve important naval and defensive interests for Canada.

The new Pacific outlet will have many advantages over the eastern. For one thing, it is always ice-free, whereas the eastern route is ice-bound for five months in the year. Even now, I understand, it is appreciably cheaper in winter to send wheat from Calgary to Liverpool by Vancouver than by St. John's, New Brunswick. The freight-rate between British Columbian and United Kingdom ports should be at least halved when the canal is in operation. Of all cities in any clime or hemisphere, Vancouver seems to stand most surely on the threshold of a new and mighty future. She will have "greatness thrust upon her." Her citizens are preparing for the spacious days that are about to set in. A "Great Vancouver" will probably arise from the nine local municipalities, to provide an area and administration worthy of the dawning era. Dr. F. B. Vrooman eloquently voiced the sentiment of the great port and of British Columbia at a recent luncheon of the Progress Club at Vancouver. He said :—

We are on the verge of nothing less than a revolution of the world's commerce, and industry, and finance, which now, as sure as fate, are destined to be transferred to the lands of the Pacific Ocean. It is not only revolution. It is such a revolution as never has been and never again can be fore-ordained before chaos primeval for this twentieth century of the Christian era, for there are no more hemispheres to cut in two. There are no more oceans, with half the water area on the world and twenty million square miles more than all the land surface of the globe, to be suddenly transferred into the arena of world trade. There are no more continents with the widest reaches, the richest resources, and the densest populations of the world to be awakened and developed after Asia has achieved its resurrection.

Therefore I say to you that there has got to be one port at least in the British Empire big enough to be equal to the greatest opportunity the world ever offered any city since time began. And if that city is

not destined to be Vancouver, it will be for one, and for only one, reason—because the men of Vancouver have been too timid and feeble, too shortsighted and too little to take hold of what the good God has offered them.

I have already alluded to the question of coal in connection with the new canal. All the new routes will have to be cheaply and abundantly “coaled,” or they will be at a great disadvantage in the competition for traffic with Suez. The Isthmian Canal Commission of 1899–1901 pointed out that the coaling stations at San Francisco, Seattle, and Vancouver will in the future bear about the same relation to the route *via* the Panama Canal to the Orient as the coaling stations at or near the Suez Canal bear to the route from Europe *via* Suez to the Orient. Among the Pacific Islands, at Colon and Panama, and among the West Indies coal will have to be stored in big quantities for the tramps and liners and warships which will soon be drawn along these seaways by the new canal. British Columbia has coal illimitable, and this interest alone ought

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to be quickly and mightily developed in the coming years. Happily there are men of imagination and public spirit in this great Pacific province of the empire who understand what the canal means to it in future wealth and welfare, and are preparing its people to take advantage of the new opportunities. Let an eloquent British Columbian, Dr. Vrooman again, open for us the broad and bright prospect :—

New markets will be found on the Atlantic for British Columbia lumber and paper. This new large demand will increase the price. But the saving of freight is an enormous item. The present freight-rates from Vancouver to Liverpool are sixteen dollars per 1,000 feet. The canal will give British Columbia a rate of about eight dollars per 1,000 feet. This difference per 1,000 will add to the value of British Columbia timber destined for Europe. But it is for more reasons than this that British Columbia is destined to be a vast Imperial industrial workshop. While her agricultural and horticultural possibilities are far beyond what

is generally supposed, British Columbia is in natural resources and raw materials of industry one of the richest areas on the globe. But above all is she rich in mechanical power—water-power and coal. These are about to be opened up and developed. Their development soon will be beyond computation, for, roughly speaking, there is not an investment in British Columbia to-day which will not be directly increased in value by the new canal; but also much indirectly in the impetus given to development. This one thing—this canal—costing us nothing—will double, quadruple, and quintuple values out there in a few brief years. With easier access will come new trade, and new demands will create new products, and soon the innumerable water-powers of British Columbia will start the wheels of a thousand new industries. The illimitable resources of the province will be opened up, developed, and utilized at home or shipped abroad. The value of every town lot and of every acre of land of the 395,000 square miles of the province will be greatly enhanced;

town sites will be hewed out of the forests, and the forests themselves—every stick of wood of their 182,000,000 acres of forest and woodland—will be increased in value directly, by reason of cheaper shipping alone, to the extent of several dollars per 1,000 feet; and in the items of lumber and wood-pulp alone the Panama Canal will make as a free gift to British Columbia considerably more than the United States is spending on the whole canal.

The mines of British Columbia, which have already produced over £70,000,000, will leap forward with renewed prosperity. Her fisheries, which have produced £21,000,000, will be more extensively developed and, let us hope, be made again a British asset—since they are wholly in the hands of the Japanese, who not only send their earnings home to Japan, but are criminally wasteful in their methods. The coal deposits of the province, which promise to be the most extensive in the world, will, with immense deposits of iron, be opened to the world's markets. It is said that the

coal-fields of one small district in the Kootenay are capable of yielding 10,000,000 tons of coal a year for over seven thousand years, and a new district has been discovered within a twelvemonth which the provincial mineralogist told me on Christmas Eve was the most important economic discovery ever made in British Columbia, where there are known to be 1,000 square miles of the best of anthracite, and which is probably the richest known anthracite district in the New World west of Pennsylvania.*

The references to coal are especially interesting in this passage. It is an evidence of the public alertness in this matter that the British Columbian government has just appointed a special commissioner "to investigate and report upon all circumstances and conditions incident to the production and sale or other disposition of coal in British Columbia."

It may be certain, therefore, that the opening of the canal will be followed by a rapid growth of

* From the already-quoted paper read before the Royal Colonial Institute, March 19, 1912.

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exports from Canadian ports, serving a thousand miles of hinterland, many of the vessels returning laden with the manufactures of the eastern United States and Europe, both streams of traffic flowing through the isthmian canal. But we must not overlook the growth in passenger traffic. The sea-passage round by the canal from Europe to the Pacific states of North America will be much cheaper and to many people more pleasant than the fatiguing transcontinental railway journey. Fresh brain and muscle will enter Canada by its western portals, new needs will arise, new industries spring up, a new æon of progress and enterprise begin on the far Pacific slopes when the first vessel mounts and descends the mighty steps of this wonder-working isthmian highway.

THE WEST INDIES.

But there is another region of the British Empire which will benefit only less, if less at all, than the Pacific province of Canada. The West Indies will feel at once the throb of a new life and interest when the canal is thrown open to the world's traffic. These "pearls of ocean," the oldest of England's oversea possessions, have

lain hitherto in what the Americans call a "dead end." They are thrown across the entrances to a land-girt sea, the Mediterranean of the New World, from which there has hitherto been no exit to the west or the south, but only a return by the same passages to east and north. A glance at a map will show how these islands, the Greater and Lesser Antilles,* cluster round the Atlantic end of the canal and beset all the possible sea-routes from east and north and south-east. Every vessel that makes from the Atlantic for the canal entrance or quits the canal for the Atlantic will have to pass through this star-thick storied archipelago.

The islands naturally fall into two groups, with the names I have just mentioned. The Greater Antilles, lying further to the west and north-west, consist of Jamaica, the Bahamas, and the Turks and Caicos Islands, these last being administered by Jamaica. To this group belongs, geographically and historically, the mainland

* Marco Polo, following Aristotle's nomenclature, had given the name of "Antilla" to an island off the eastern coast of Asia. The name was transferred by Columbus, or Peter Martyr, to the islands of the Caribbean.

colony of British Honduras, a territory rather larger than Wales, whose great value England has scarcely begun to appreciate. The Lesser Antilles, stretched like a jewelled coronet round the eastern entrance to the Caribbean, consist, north to south, of the Virgin Islands, St. Kitt's and Nevis, Antigua, Montserrat, Dominica (these forming the Leeward Islands Confederation), St. Lucia, Barbados, St. Vincent, Grenada, Trinidad, and Tobago (the Windward Islands). With this group goes naturally British Guiana, on the continent east of the Spanish Main, a territory much larger than Great Britain, which should also begin to develop its vast resources more adequately when the canal is opened.

These islands, being largely inhabited by black people, cannot be entrusted with complete self-government like purely white communities. They are under various forms of what is known as crown colony government. For example, Trinidad and the Windward Islands are under the complete control of the British Colonial Office, while Barbados and Jamaica enjoy a large measure of self-rule. But this division into a large number of small governments without any

connection with each other is extremely expensive, and proposals have been made for a federation of the British West Indies either in one great system, including them all, with British Honduras and Guiana thrown in, or in two systems embracing respectively the Greater and the Lesser Antilles.

England, it must be confessed, has treated her splendid West Indian empire very badly. In order that she might have sugar "dirt-cheap" at home she allowed the great staple product of the isles and mainland, cane-sugar, to be brought to the verge of ruin by the competition of European bounty-fed beet-sugar. Happily there was a statesman of strong imperial sympathies in England, Mr. Joseph Chamberlain, who arranged the Brussels Sugar Convention with certain Powers of Europe, all of which agreed to suppress their own bounties and to impose countervailing duties on bounty-fed sugar imported from countries outside the convention. This gave the West Indies a fairer chance of competition, and they quickly felt the benefit. But the convention was always opposed in England by certain industries in which sugar is used and is therefore wanted as cheap as

possible, and notice has recently been given, despite the protests and alarms of the West Indies, that England intends to withdraw from the convention. And this, too, without any sort of compensation for the sugar-islands, which had begun to rely upon the protection against unfair competition afforded by that instrument.

England has withdrawn her garrisons and, what is still more serious, almost her entire navy from the West Indies. When the terrible earthquake occurred at Kingston in Jamaica in 1907, there was no English ship-of-war anywhere near to render help and to maintain order, and this duty had to be performed by vessels of the American fleet. Five days after that disaster the correspondent of *The Times* wrote: "It is difficult to describe the sense of humiliation with which an Englishman surveys Kingston harbour this evening—two American battleships, three German steamers, a Cuban steamer, and one British ship; she leaves to-night, and the white ensign and the red ensign will be as absent from Kingston harbour as from the military basins of Kiel and Cherbourg." And this is what England calls ruling the waves and being mistress

of the seas ! Later in the same year she had another lesson. Rioting broke out in St. Lucia, once, but no longer, an important naval base. It was a whole week before an English cruiser arrived, though a Dutch man-of-war, the *Gelderland*, was anchored in the spacious harbour of Castries, St. Lucia's capital.

This, one must allow, is a slovenly way of conducting a great empire. If these methods are pursued after the Panama Canal is opened, the results will be disastrous. A complete change will have to be made in the attitude of England and the Colonial Office to the British West Indian Islands. For these islands, instead of being tucked away in a sort of cul-de-sac, or inland lake, will henceforth be thrown right across or alongside the main highways of the world's ocean-traffic. Look again at the map and see how the most direct sea-route from New York, the eastern states and Canada to Colon and Cristobal comes down through the Windward Passage, between Cuba and Haiti, and then right past the eastern end of Jamaica, quite close to the magnificent bay on which Kingston stands.

Look again and see how the routes from

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Liverpool, Southampton, and the Old World pass through the Lesser Antilles, either Leeward or Windward, further east. The most direct of these trails passes through the Virgin Islands, the most northerly group, and one of these is said to possess a harbour of which a good deal might be made. But this is not by any means the only line of approach to the entrance of the canal. A more southerly route near Barbados or Trinidad might be chosen, and certainly would be chosen by vessels intending to call at ports along the old Spanish Main.

Trinidad will indeed lie right across the direct route from ports on the Pacific coasts of the United States and Canada, as well as from the Far East, to Brazil and the Atlantic coast of South America—a trade which may well grow to very large proportions, considering the vast undeveloped resources of the Orinoco and Amazon basins. Valuable deposits of petroleum have also been discovered in Trinidad, and this should add greatly to the wealth and importance of that island as oil replaces coal for fuel. Oil-bunkering stations will be wanted at many points in the West Indies.

Trinidad and Kingston seem likely to benefit most from the traffic to and from Cristobal, the new Atlantic terminal of the canal. Both are splendidly equipped by Nature to act as coaling and repairing stations as well as centres for the distribution of goods. Kingston has a superb harbour, and so also has Port of Spain (the capital of Trinidad) in the Gulf of Paria, a natural landlocked harbour in which the fleets of the whole world could lie in safety—and, it is important to add, outside the hurricane zone. Trinidad lies right athwart the mouths of the Orinoco River. The years that are coming will see a tremendous development of the resources of these rich tropical basins, and Port of Spain is a natural port of exit and entry for the trade of regions where Raleigh sought the fabled Manoa or El Dorado.

It is too soon to try to indicate in detail the effects which the Panama Canal is likely to have on the trade and production of the islands themselves. The sugar industry is reviving under the influence of the Treaty of Reciprocity, concluded between a large number of the islands and the Dominion of Canada. Probably the

sugar for the tea-tables and apple-tarts of Vancouver, and a good many places far to the north and east, will be brought from the West Indies to Vancouver. But the islands will benefit more directly and immediately through the immense growth of traffic in the Caribbean Sea, the supply of coal and other necessities to this increased shipping, and in general through the publicity the islands will enjoy, which will mean a growing invasion of "globe-trotters," and consequently a big development of agricultural resources and an influx of new capital.

An almost certain and immediate result of the new route, I may say in passing, will be a large increase of the tourist traffic to England and Europe from the western coasts of North and South America. When the fares are lowered, and the traveller can do the journey wholly by water, without the trouble of changing from railroad to steamer, we may be sure that a rapidly growing tide of passengers will set eastwards as well as westwards through the canal.

But, to return to the West Indies, every nation is preparing to develop or establish in these regions harbours and coaling-stations and other

facilities for its trade. For example, a Danish company proposes to establish connection between Copenhagen and San Francisco through the island of St. Thomas, one of the Virgin group. At St. Thomas, by the way, is shown the castle of Edward Teach, or "Blackbeard," the very beau ideal of a skull and crossbones pirate who, according to "Tom Cringle's Log," wore a beard in three plaits a foot long, and a full-dress purple velvet coat, under which bristled many pistols and two naked daggers over eighteen inches long, and who had generally a lighted match in his cocked hat with which he lit his pipe or fired a cannon, as the occasion demanded. "One of his favourite amusements when he got half-slewed was to adjourn to the hold with his comptators, and, kindling some brimstone matches, to dance and roar as if he had been the devil himself, until his allies were nearly suffocated. At another time he would blow out the candles in the cabin and blaze away with his loaded pistols at random right and left. . . . He was kind to his fourteen wives as long as he was sober, and never murdered above, three of them." This very improper, but picturesque, gentleman was run down at last by

H.M. frigates the *Lime* and the *Pearl* to a creek of North Carolina, where, with thirty men in an eight-gun schooner, he made a desperate fight for life, killing and wounding more than the number of his own crew, and dying where he fell, faint with the loss of blood, overcome by superior numbers alone. Whether "Blackbeard" ever inhabited the castle at St. Thomas may be questioned, but the island ought to benefit from the canal, as it lies right across the main entrance to the Caribbean from the Atlantic.

The German steamship lines are awake to the new opportunities, the Hamburg-Amerika preparing for the new emigrant traffic between Europe and Western America. Germany, it is said, is negotiating for a coaling-station in Hayti, which, with its two negro republics, stands to profit immensely from the new conditions. No one has troubled much about this splendid island of late. It has had a dark and terrible history. Discovered by Columbus, who called it *Hispaniola*, it was occupied by the Spanish adventurers who found alluvial gold there. Then it became the headquarters of the "buccaneers" who succeeded to the gallant and courtly sea-rovers of the

Elizabethan period and became formidable about the year 1630. One of these buccaneers was that Henry Morgan who sacked the old town of Panama in 1671, and then became quite a respectable character, governor of Jamaica, and dubbed knight by Charles II. It was in Hispaniola, or Hayti, that this species of Western viking got their name. The island had been depopulated by the Spaniards, but the cattle and hogs they had introduced became wild and repopulated the land in their own kind. Thus Hispaniola became a splendid provisioning base for the ships of the buccaneers. They hunted the cattle and preserved the meat, smoke-drying it in the Indian fashion. This industry was called *boucanning*, and from it the buccaneers were named.

Hispaniola was the mother colony of the Spanish Empire in the West Indies which has now wholly disappeared, very unfortunately for Spain in view of the enhanced value these islands will now soon acquire. In 1795 it was ceded to France, and soon afterwards the emancipated slaves gained possession of the island, and after a period of anarchy and bloodshed established their

independence. It is divided into two negro and mulatto republics, Hayti and San Domingo, and, as might have been expected, has sunk to the lowest depths of possible human degradation. Fetishism, human sacrifice, and even cannibalism prevail in this sea-girt Paradise, placed right among the possessions of the most civilized Powers of the world and now across the main ocean routes from the West to the United States, Canada, and the Old World. Can anybody believe that beautiful Hispaniola, an island 30,000 square miles in extent, whose economic and strategic value will be increased a hundredfold in the years that are coming, will long remain under this blighting shadow of ignorance and barbarism? Here certainly the Panama Canal will work a beneficent political change.

France, too, is beginning to look up her possessions and opportunities in the Caribbean. Here her two islands, Martinique and Guadeloupe, are placed most conveniently for her ships coming westwards from Havre, Bordeaux, and St. Nazaire, while Tahiti and New Caledonia will pass them on over the Pacific to the Far East. M. Gilquin, writing in *La vie Maritime*, says :—

In Martinique, Guadeloupe, New Caledonia, and Tahiti our commerce—that is to say, exports and imports together—was, in the year 1909, ninety millions of francs ; this rose to one hundred and twenty-two millions in 1910, and it is probable that when we get the figures for 1911 they will be found to be even more favourable. It is certain that with the opening of the Panama Canal a great increase in traffic will take place, and possessing, as we do, ports so advantageously placed on the principal lines of route, we should benefit extensively by that development of traffic between Europe and the western coasts of both North and South America. In order that we may reap the benefit, however, of the situation of our colonial harbours, it is necessary that these be taken in hand at once and rendered fit for the commerce they will be called upon to handle.

And what is England doing to prepare for the new epoch in these regions where she has planted her flag on so many rich and beautiful islands,

strung like pearls of necklace and tiara over these warm tropical seas? We hear of Jamaica providing a new site for coaling and ships' repairs near Kingston, of harbour improvements at Port of Spain (Trinidad) and St. George (Grenada), of oil-bunkering stations at Barbados and St. Lucia. All this is good, but England will have to enter upon a very different policy for the future with regard to her West Indian empire. She must show that she values her priceless inheritance in and round the Caribbean; that she is determined to maintain her position, to promote her commerce, and to further the interests of all her subjects in these regions.

What the West Indies need in order to be able to take the new opportunity by the forelock are organization and combination. Schemes have been proposed for federalizing the constitution of the islands—placing them, that is, under a strong central government for those purposes that are common to them all. There are many difficulties in the way of such proposals. The nearest island of the Greater Antilles is 1,000 miles away from the nearest of the Lesser, so that Nature seems to have pronounced for the

present against any federal scheme embracing all the islands. But space is always shrinking. Wireless telegraphy and aeroplanes may make 1,000 miles an inconsiderable distance for such political purposes. The Leeward Islands have already been organized under a single federal government, and it ought to be possible to extend the system. Moreover, the islands and the colonies on the continent are learning the value of common consultation and action in such matters as quarantine, and they meet together in annual agricultural conferences.

We need not wait for a formal and complete federal constitution. Some central council for consultation on the best means of taking advantage of the new opportunities, some central fund for promoting common objects, such as advertising the wonderful attractions of the islands and preparing for the birds of passage that will soon be coming from every civilized country in the Old and New World—all this is possible now. It is important, too, that the West Indian colonies should have some assembly or council through which they can address the Imperial Power with a single voice. England can give

these colonies invaluable help. She can assist them to develop those steamship and telegraphic communications between the islands which are still so inadequate. She can indicate the best locations for harbours, coaling and repairing stations, and the other facilities which the new traffic will require. In view of the certain growth in wealth and prosperity, the colonies ought to be able by contributions among themselves to provide a substantial fund for objects they can carry out in common for the advantage of each and all.

Some valuable information and very practical suggestion will be found in the report of the West Indian Commission presided over by Lord Balfour of Burleigh which was issued in 1910. Besides recommending a system of reciprocal trade preference between Canada and the West Indies, the commissioners made important proposals with regard to steamship and telegraphic communications. They favoured the public ownership and operation of the West Indian cables and possibly of the whole system northward to Halifax. They wrote:—

The single cables now connecting Halifax with Bermuda and Bermuda with Jamaica ought either to be duplicated or supplemented by wireless. A cable should be laid between Bermuda and Barbados, with a branch to Trinidad, and perhaps another to British Guiana. The cables which run from Jamaica to the eastern islands and British Guiana, sometimes single and sometimes duplicate, are very old. The bed of this part of the Caribbean being trying for cables, we believe it would be found advantageous in most cases not to renew them, but to replace them by wireless installations. If these were well arranged, they might form a satisfactory connection between the eastern islands and Jamaica and an alternative route to Bermuda, and render unnecessary duplication of the suggested Bermuda-Barbados cable. While it is desirable to connect British Honduras with Jamaica, we consider that the probable volume of traffic would not warrant the cost of a cable. We therefore recommend the employment of wireless for this purpose. Small installations should

also be supplied to the outlying Leeward and Bahamas Islands.

England will have to foster the welfare of her possessions in these regions as she has never done before. The Brussels Convention forbade her to give any preference to sugar produced in her own dominions. But she is about to step out of that agreement, and will be at liberty, if she thinks fit, to encourage by preferential favours the one great staple for which these colonies can find no substitute. There may be differences of opinion on the fiscal question, but surely everybody must agree that the naval power and political prestige of the British Empire must be represented in the Caribbean Sea by something rather more impressive than two small and obsolete cruisers. If England is to maintain her position against the severer competition she will now have to face, if she is to get her share of the new commerce now in prospect, she will have to give her traders, and shippers, and merchants all the confidence and encouragement which her flag should inspire. One or two well-equipped naval bases, a squadron

of up-to-date cruisers for police and patrol work in the Caribbean and down the Pacific coasts of America, are indispensable. There must be no more earthquakes and destructions of British cities with never a British vessel to bring the sorely-needed help, no more riots in British islands with only a Dutch warship standing helplessly by.

Both British Columbia and the West Indies have complained with reason of the absenteeism of the British fleet from their shores. The necessity for concentrating all our naval power in the North Sea to meet the German menace has no doubt been the cause of these withdrawals from the outer sea-marches of the empire. But at any cost this wrong will have to be righted in the future. The West Indies and British Columbia are just the two portions of the empire which the Panama Canal may benefit most and most immediately, and they have a right to expect the support and co-operation of the imperial government wherever it can be given. All the Powers of the world will be afloat on the Caribbean and along the Pacific sea-trails to Balboa. Let the white ensign return to these seas and shores

as an earnest to all that the same national spirit that won for England her political and commercial supremacy avails to maintain it now and in the new era which is just dawning.

CHAPTER XIX.

THE NEW PACIFIC.

SOME readers may perhaps think that these forecasts of the results of running a canal through the isthmus of Panama are somewhat exaggerated. It is sufficient to point out to such a critic how different the course of American and world history might have been if Nature had left a practicable channel between the two Americas. The effect of erecting an artificial passage there in these days may be even greater than at present we can imagine. Some of these results will be apparent at once ; others may take decades or even centuries to materialize. Many of the commercial and political results which have followed the construction of the Suez Canal were quite unforeseen in 1869. We may be similarly mistaken in our forecast with regard to the Panama Canal. Mr. Bryce suggests that

if a dozen experts were, in 1914, to write out and place in the libraries of the British Museum and of Congress their respective forecasts bearing on this subject, sealed up and not to be opened till A.D. 2000, they might make curious reading in that year. We may venture to predict that the results of Panama will be much more profound and revolutionary than those of Suez. The Panama Canal, says Mr. Bryce, is "the greatest liberty man has ever taken with Nature." It will involve a far greater shifting of centres of gravity, political and commercial, a more radical readjustment of ideas and points of view than the Suez Canal.

As the past four hundred years have belonged to the Atlantic, the present century and others to come may belong to the Pacific. That area of 70,000,000 square miles may become the main theatre of the rivalries—commercial, political, and racial—of the most powerful nations of East and West. Some believe that the world is advancing to that loud and fateful day when East and West will fight out their long difference in some naval and aerial Armageddon on and above this miscalled Pacific. Without straining our imaginations to this extent, we may well observe

that the canal brings Eastern and Western civilizations into much closer contact and competition than before. Mr. Kipling has informed us that East is East and West is West, and never the twain shall meet; and a still earlier author, desiring to give the penitent sinner the uttermost consolation, declared that the Lord removes his transgressions from him "as far as the east is from the west."

The new canal rather diminishes the force of such similitudes. It is not simply that the east of Canada and the United States, as representing Western civilization, is brought much closer to China and Japan; that the passage from West to East which the early navigators vainly sought is now thrown open. The important thing is that the Pacific is going to be the scene of commercial and political rivalries in which the slowly awakening people of China and the already wideawake people of Japan will take part. All the Pacific Ocean westward to 160 degrees of longitude east of Greenwich is brought nearer to England and the western coasts of Europe. The entire ocean right back to the western extremity of Australia is brought closer to the governmental and industrial centres of the United States and Canada.

English people have been thinking "Atlantically" up to now. The Pacific, held at an unimaginable distance by a broad continent or an abyss of ocean, has been known to them chiefly through stories of adventure among its coral islands familiar to their childhood. Yet England is the greatest Pacific Power in the world. British Columbia alone has a Pacific sea-front longer than the United States, and holds 383,000 square miles, an area as large as France and Spain put together. And yet the population of that vast and fertile province is only 134,000. And what of the lonely continent that bounds this oceanic abyss in the far south-west? Australia, without New Zealand, is about 3,000,000 square miles in extent, and has to-day a white population of about 4,600,000, or about 4,700,000 people all told. The northern part of this mighty island-continent, known as the "Territory," 560 miles wide, 900 miles long, and 523,620 square miles in extent, a region of great potential wealth, has a total European population of 1,274! And to the north and north-west there are a billion (1,000,000,000) brown and yellow people, packed together in crowded islands and

territories, whose mere overspill would quickly fill that delectable island-continent to the south where England has done so little to make good her nominal title to sovereignty by actual and effective settlement.

Such a possession, an empire in itself, held so precariously and offering such a ceaseless temptation to swarming land-hungry hordes, is rather a weakness than a strength to England on the threshold of the new era. And from all this Pacific region and its adjuncts where she has secured all the empty and desirable plots and pegged out so many claims for posterity, she has had to withdraw her fleets, as Rome had to draw in her legions from the outer provinces to defend the central heart of her empire. We may hope that this North Sea danger, so embarrassing and disastrous in its strategic needs to a power like England, whose empire is scattered over every ocean and continent, may disappear through the growth of better relations between the German and Anglo-Saxon branches of the Teutonic race. To that stock more than any other is committed the defence of Western and Christian ideas, and the great issues of the future may compel a

Pan-Teutonic alliance, embracing the British and German Empires and the United States.

England has two responsibilities in the Pacific—the one to herself and her empire, and the other to Christendom and Western civilization. If she is true to the former, she cannot well be false to the latter. She must bring her fleets back to this great ocean and assert an influence in its politics proportionate to her territorial domains and the extent of her commerce in those regions. But there are objects more important than the interests of any single Power. The entire coast of the Pacific from Behring Straits to the Horn, and round south by New Zealand and Australia, must be kept “white”—reserved, that is, for the Occidental and Christian races. Perhaps the United States may one day so far modify the Monroe doctrine as to welcome Germany to a sovereign foothold among the unstable politics of South America, in order to strengthen still more the outposts of Christian civilization in the Western hemisphere.

It is possible to talk great nonsense about what is called the “yellow peril.” No sensible person imagines that the nimble Japanese, the inscrutable

Chinaman, and the subtle Hindoo are suddenly going to rise as one man and throw down the gage of challenge to Christianity and the West. East, like West, has its own political and religious divisions; nevertheless it is impossible to foresee what the results of the Oriental resurgence may mean, and England and the United States, and perhaps Germany, may some day have a joint responsibility in the Pacific compared with which their rivalries among themselves may seem trifling and irrational.

But I do not wish to end this little book with presages of future discord. We must all hope that the Panama Canal will prove a new and powerful influence for peace, that it will bring even East and West together, not in strife and suspicion, but in friendship and a better mutual understanding. There is surely a human interest and sympathy transcending even those racial divisions which may seem most insuperable. The great nation which has given this splendid gift to the world should ask no better or more selfish reward than that it may contribute to the welfare and progress of humanity at large.

APPENDIX I.

THE ISTHMIAN CANAL CONVENTION (COMMONLY CALLED THE HAY-PAUNCEFOTE TREATY), 1901.

*1. The high contracting parties agree that the present treaty shall supersede the aforementioned (Clayton-Bulwer) convention of April 19, 1850.

2. It is agreed that the canal may be constructed under the auspices of the government of the United States either directly at its own cost, or by gift or loan of money to individuals or corporations, or through subscription to or purchase of stock or shares, and that, subject to the provisions of the present treaty, the said government shall have and enjoy all the rights incident to such construction, as well as the exclusive right of providing for the regulation and management of the canal.

3. The United States adopts as the basis of

the neutralization of such ship canal the following rules substantially as embodied in the Convention of Constantinople, signed the 28th October, 1888, for the free navigation of the Suez Canal ; that is to say :

First.—The canal shall be free and open to the vessels of commerce and of war of all nations observing these rules, on terms of entire equality, so that there shall be no discrimination against any such nation or its citizens or subjects in respect of the conditions or charges of traffic, or otherwise. Such conditions and charges of traffic shall be just and equitable.

Second.—The canal shall never be blockaded, nor shall any right of war be exercised nor any act of hostility be committed within it. The United States, however, shall be at liberty to maintain such military police along the canal as may be necessary to protect it against lawlessness and disorder.

Third.—Vessels of war of a belligerent shall not revictual nor take any stores in the canal except so far as may be strictly necessary ; and the transit of such vessels through the canal shall be effected with the least possible delay in

accordance with the regulations in force, and with only such intermission as may result from the necessities of the service. Prizes shall be in all respects subject to the same rules as vessels of war of the belligerents.

Fourth.—No belligerent shall embark or disembark troops, munitions of war or warlike materials in the canal except in case of accidental hindrance of the transit, and in such case the transit shall be resumed with all possible despatch.

Fifth.—The provisions of this article shall apply to waters adjacent to the canal, within three marine miles of either end. Vessels of war of a belligerent shall not remain in such waters longer than twenty-four hours at any one time except in case of distress, and in such case shall depart as soon as possible, but a vessel of war of one belligerent shall not depart within twenty-four hours from the departure of a vessel of war of the other belligerent.

Sixth.—The plant, establishment, buildings and all works necessary to the construction, maintenance and operation of the canal shall be deemed to be parts thereof for the purpose

of this treaty, and in time of war, as in time of peace, shall enjoy complete immunity from attack or injury by belligerents, and from acts calculated to impair their usefulness as part of the canal.

4. It is agreed that no change of territorial sovereignty or of international relations of the country or countries traversed by the before-mentioned canal shall affect the general principle of neutralization or the obligation of the high contracting parties under the present treaty.

5. The present treaty shall be ratified by the President of the United States by and with the advice and consent of the Senate thereof, and by His Britannic Majesty; and the ratifications shall be exchanged at Washington or at London at the earliest possible time within six months from the date thereof.

APPENDIX II.

THE PANAMA DECLARATION OF INDEPENDENCE, 1903.

The transcendental act that by a spontaneous movement the inhabitants of the isthmus of Panama have just executed is the inevitable consequence of a situation which has become graver daily.

Long is the recital of the grievances that the inhabitants of the isthmus have suffered from their Colombian brothers ; but those grievances would have been withstood with resignation for the sake of harmony and national union had its separation been possible and if we could have entertained well-founded hopes of improvement and of effective progress under the system to which we were submitted by that republic. We have to solemnly declare that we have the sincere and profound conviction that all the hopes

were futile and useless, all the sacrifices on our part.

The isthmus of Panama has been governed by the Republic of Colombia with the narrow-mindedness that in past times was applied to their colonies by the European nations—the Isthmian people and territory were a source of fiscal resources and nothing more. The contracts and negotiations regarding the railroad and the Panama Canal and the national taxes collected in the isthmus have netted to Colombia tremendous sums which we will not detail, not wishing to appear in this exposition which will go down to posterity as being moved by a mercenary spirit, which has never been nor is our purpose ; and of these large sums the isthmus has not received the benefit of a bridge for any of its numerous rivers, nor the construction of a single road between its towns, nor of any public building nor of a single college, and has neither seen any interest displayed in advancing her industries, nor has a most infinite part of those sums been applied toward her prosperity.

A very recent example of what we have related above is what has occurred with the negotiations

of the Panama Canal, which, when taken under consideration by Congress, was rejected in a summary manner. There were a few public men who expressed their adverse opinion, on the ground that the isthmus of Panama alone was to be favoured by the opening of the canal by virtue of a treaty with the United States, and that the rest of Colombia would not receive any direct benefits of any sort by that work, as if that way of reasoning, even though it be correct, would justify the irreparable and perpetual damage that would be caused to the isthmus by the rejection of the treaty in the manner in which it was done, which was equivalent to the closing of the doors to future negotiations.

The people of the isthmus, in view of such notorious causes, have decided to recover their sovereignty and begin to form a part of the society of the free and independent nations, in order to work out its own destiny, to insure its future in a stable manner, and discharge the duties which it is called on to do by the situation of its territory and its immense richness.

To that we, the initiators of the movement

effected, aspire and have obtained a unanimous approval.

We aspire to the formation of a true republic, where tolerance will prevail, where the law shall be the invariable guide of those governing and those governed, where effective peace be established, which consists in the frequent and harmonious play of all interests and all activities, and where, finally, civilization and progress will find perpetual stability.

At the commencement of the life of an independent nation we fully appreciate the responsibilities that state means, but we have profound faith in the good sense and patriotism of the Isthmian people, and we possess sufficient energy to open our way by means of labour to a happy future without any worry or any danger.

At separating from our brothers of Colombia we do it without hatred and without any joy. Just as a son withdraws from his paternal roof, the Isthmian people in adopting the lot it has chosen have done it with grief, but in compliance with the supreme and inevitable duty it owes to itself—that of its own preservation and of working for its own welfare.

We therefore begin to form a part among the free nations of the world, considering Colombia as a sister nation, with which we shall be whenever circumstances may require it, and for whose prosperity we have the most fervent and sincere wishes.

JOSÉ AGUSTIN ARANGO,
FEDERICO BOYD,
TOMAS ARIAS.

APPENDIX III.

THE PANAMA CANAL CONVENTION (COMMONLY
CALLED THE 'HAY-BUNAU-VARILLA TREATY'),
1904.

The United States of America and the Republic of Panama being desirous to insure the construction of a ship-canal across the isthmus of Panama to connect the Atlantic and Pacific Oceans, and the Congress of the United States of America having passed an Act approved June 28, 1902, in furtherance of that object, by which the President of the United States is authorized to acquire within a reasonable time the control of the necessary territory of the Republic of Colombia, and the sovereignty of such territory being actually vested in the Republic of Panama, the high contracting parties have resolved for that purpose to conclude a convention and have accordingly appointed as their plenipotentiaries—

The President of the United States of America, John Hay, Secretary of State, and the government of the Republic of Panama, Philippe Bunau-Varilla, Envoy Extraordinary and Minister Plenipotentiary of the Republic of Panama, thereunto specially empowered by said government, who after communicating with each other their respective full powers found to be in good and due form, have agreed upon and concluded the following articles :

Article 1.

The United States guarantees and will maintain the independence of the Republic of Panama.

Article 2.

The Republic of Panama grants to the United States in perpetuity the use, occupation and control of a zone of land and land under water for the construction, maintenance, operation, sanitation and protection of said canal of the width of ten miles extending to the distance of five miles on each side of the centre line of the route of the canal to be constructed ; the said zone beginning in the Caribbean Sea three marine

miles from mean low water mark, and extending to and across the isthmus of Panama into the Pacific Ocean to a distance of three marine miles from mean low water mark, with the proviso that the cities of Panama and Colon and the harbours adjacent to said cities, which are included within the boundaries of the zone above described, shall not be included within this grant. The Republic of Panama further grants to the United States in perpetuity the use, occupation and control of any other lands and waters outside of the zone above described which may be necessary and convenient for the construction, maintenance, operation, sanitation and protection of the said canal or of any auxiliary canal or other works necessary and convenient for the construction, maintenance, operation, sanitation and protection of the said enterprise.

The Republic of Panama further grants in like manner to the United States in perpetuity all islands within the limits of the zone above described and in addition thereto the group of small islands in the Bay of Panama, named Perico, Naos, Culebra, and Flamenco.

Article 3.

The Republic of Panama grants to the United States all the rights, power and authority within the zone mentioned and described in Article 2 of this agreement and within the limits of all auxiliary lands and waters mentioned and described in said Article 2 which the United States would possess and exercise if it were the sovereign of the territory within which said lands and waters are located to the entire exclusion of the exercise by the Republic of Panama of any such sovereign rights, power or authority.

Article 4.

As rights subsidiary to the above grants the Republic of Panama grants in perpetuity to the United States the right to use the rivers, streams, lakes and other bodies of water within its limits for navigation, the supply of water or water-power or other purposes, so far as the use of said rivers, streams, lakes and bodies of water and the waters thereof may be necessary and convenient for the construction, maintenance, operation, sanitation and protection of the said canal.

Article 5.

The Republic of Panama grants to the United States in perpetuity a monopoly for the construction, maintenance and operation of any system of communication by means of canal or railroad across its territory between the Caribbean Sea and the Pacific Ocean.

Article 6.

The grants herein contained shall in no manner invalidate the titles or rights of private landholders or owners of private property in the said zone or in or to any of the lands or waters granted to the United States by the provisions of any Article of this treaty, nor shall they interfere with the rights of way over the public roads passing through the said zone or over any of the said lands or waters unless said rights of way or private rights shall conflict with rights herein granted to the United States, in which case the rights of the United States shall be superior. All damages caused to the owners of private lands or private property of any kind by reason of the grants contained in this treaty or by reason of

the operations of the United States, its agents or employees, or by reason of the construction, maintenance, operation, sanitation and protection of the said canal or of the works of sanitation and protection herein provided for, shall be appraised and settled by a joint commission appointed by the governments of the United States and the Republic of Panama, whose decisions as to such damages shall be final and whose awards as to such damages shall be paid solely by the United States. No part of the work on said canal or the Panama railroad or on any auxiliary works relating thereto and authorized by the terms of this treaty shall be prevented, delayed or impeded by or pending such proceedings to ascertain such damages. The appraisal of the said private lands and private property and the assessment of damages to them shall be based upon their value before the date of this convention.

Article 7.

The Republic of Panama grants to the United States within the limits of the cities of Panama and Colon and their adjacent harbours and within the territory adjacent thereto the right to acquire

by purchase or by the exercise of the right of eminent domain, any lands, buildings, water rights or other properties necessary and convenient for the construction, maintenance, operation and protection of the canal and of any works of sanitation, such as the collection and disposition of sewage and the distribution of water in the said cities of Panama and Colon, which, in the discretion of the United States, may be necessary and convenient for the construction, maintenance, operation, sanitation and protection of the said canal and railroad. All such works of sanitation, collection and disposition of sewage and distribution of water in the cities of Panama and Colon shall be made at the expense of the United States, and the government of the United States, its agents or nominees shall be authorized to impose and collect water rates and sewage rates which shall be sufficient to provide for the payment of interest and the amortization of the principal of the cost of said works within a period of fifty years, and upon the expiration of said term of fifty years the system of sewers and water works shall revert to and become the properties of the cities

of Panama and Colon respectively; and the use of the water shall be free to the inhabitants of Panama and Colon, except to the extent that water rates may be necessary for the operation and maintenance of said system of sewers and water.

The Republic of Panama agrees that the cities of Panama and Colon shall comply in perpetuity with the sanitary ordinances whether of a preventive or curative character prescribed by the United States, and in case the government of Panama is unable or fails in its duty to enforce this compliance by the cities of Panama and Colon with the sanitary ordinances of the United States the Republic of Panama grants to the United States the right and authority to enforce the same.

The same right and authority are granted to the United States for the maintenance of public order in the cities of Panama and Colon and the territories and harbours adjacent thereto in case the Republic of Panama should not be, in the judgment of the United States, able to maintain such order.

Article 8.

The Republic of Panama grants to the United States all rights which it now has or hereafter may acquire to the property of the New Panama Canal Company and the Panama Railroad Company as a result of the transfer of sovereignty from the Republic of Colombia to the Republic of Panama over the isthmus of Panama, and authorizes the New Panama Canal Company to sell and transfer to the United States its rights, privileges, properties and concessions, as well as the Panama Railroad and all the shares or part of the shares of that company; but the public lands situated outside of the zone described in Article 2 of this treaty now included in the concessions to both said enterprises and not required in the construction or operation of the canal shall revert to the Republic of Panama except any property now owned by or in the possession of said companies within Panama or Colon or the ports or terminals thereof.

Article 9.

The United States agrees that the ports at either entrance of the canal and the waters thereof,

and the Republic of Panama agrees that the towns of Panama and Colon shall be free for all time, so that there shall not be imposed or collected custom-house tolls, tonnage, anchorage, light-house, wharf, pilot, or quarantine dues or any other charges or taxes of any kind upon any vessel using or passing through the canal or belonging to or employed by the United States, directly or indirectly, in connection with the construction, maintenance, operation, sanitation and protection of the main canal, or auxiliary works, or upon the cargo, officers, crew, or passengers of any such vessels, except such tolls and charges as may be imposed by the United States for the use of the canal and other works, and except tolls and charges imposed by the Republic of Panama upon merchandise destined to be introduced for the consumption of the rest of the Republic of Panama, and upon vessels touching at the ports of Colon and Panama and which do not cross the canal.

The government of the Republic of Panama shall have the right to establish in such ports and in the towns of Panama and Colon such houses and guards as it may deem necessary to collect duties on importations destined to other portions

of Panama and to prevent contraband trade. The United States shall have the right to make use of the towns and harbours of Panama and Colon as places of anchorage, and for making repairs, for loading, unloading, depositing, or transshipping cargoes either in transit or destined for the service of the canal and for other works pertaining to the canal.

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Article 23.

If it should become necessary at any time to employ armed forces for the safety or protection of the canal, or of the ships that make use of the same, or the railways and auxiliary works, the United States shall have the right, at all times and in its discretion, to use its police and its land and naval forces or to establish fortifications for these purposes.

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APPENDIX IV.

PANAMA CANAL TOLL RATES.

By the President of the United States of America,
Washington, November 14, 1912.

A PROCLAMATION.

I, William Howard Taft, President of the United States of America, by virtue of the power and authority vested in me by the Act of Congress, approved August twenty-fourth, nineteen hundred and twelve, to provide for the opening, maintenance, protection and operation of the Panama Canal and the sanitation and government of the canal zone, do hereby prescribe and proclaim the following rates of toll be paid, by vessels using the Panama Canal.

1. On merchant vessels carrying passengers or cargo one dollar and twenty cents (\$1.20) per net vessel ton—each one hundred (100) cubic feet—of actual earning capacity.

2. On vessels in ballast without passengers or cargo forty (40) per cent. less than the rate of tolls for vessels with passengers or cargo.

3. Upon naval vessels, other than transports, colliers, hospital ships, and supply ships, fifty (50) cents per displacement ton.

4. Upon army and navy transports, colliers, hospital ships and supply ships one dollar and twenty cents (\$1.20) per net ton, the vessels to be measured by the same rules as are employed in determining the net tonnage of merchant vessels.

The Secretary of War will prepare and prescribe such rules for the measurement of vessels and such regulations as may be necessary and proper to carry this proclamation into full force and effect.

THE END.

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