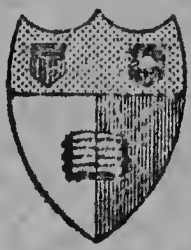

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MEXICO.

DIPLOMATIC AND CONSULAR REPORTS.

MEXICAN ISTHMUS (TEHUANTEPEC) RAILWAY.

FOREIGN OFFICE,
April, 1907.

[Cd. 3284—2.] *Price Three Halfpence.*

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REPORT ON THE

MEXICAN ISTHMUS (TEHUANTEPEC) RAILWAY.

Presented to both Houses of Parliament by Command of His Majesty,
APRIL, 1907.

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Report on the Mexican Isthmus (Tehuantepec) Railway by Mr. W. Max Müller, Secretary to His Majesty's Legation at Mexico.

In the first month of the present year a new factor entered into the handling of trans-continental traffic between the Atlantic and Pacific Oceans. The Tehuantepec National Railway, or the Mexican Isthmus Railway as it is officially called, and the terminal harbours of Coatzacoalcos and Salina Cruz were thrown open to commerce and the first real test of this ocean to ocean highway was begun. Should this test be successful, and there can be no reason for doubting its success, this route may well become the most favoured of all trans-continental lines.

I had left Mexico before the public inauguration, but shortly before I had the advantage of accompanying Mr. Body, the Managing Director in the country of the firm of Messrs. Pearson and Son, on one of his periodical inspection trips of the railway and of the terminal ports of Salina Cruz and Coatzacoalcos. To my mind this railway connecting the two oceans is the most important British enterprise in Mexico, and is likely not only to prove of great benefit to the country itself but also to influence the highways of the commerce of the entire world.

Under these circumstances a short report on the subject of the Tehuantepec Railway and the two terminal ports may perhaps prove of interest.

The Isthmus of Tehuantepec proper lies between the parallels of latitude 16° and 18° north, and the meridians of longitude 94° and 96° west. The Coatzacoalcos River, which rises at the foothills of the Sierra Madre, empties into the Gulf of Mexico, and at its mouth a natural harbour is formed, which is obstructed by a bar. On the Pacific coast at Salina Cruz there is no natural shelter, nothing but an open ocean roadstead. The Tehuantepec Railway joins these two points. As the bird flies it is about 125 miles across the isthmus from ocean to ocean, but by the route which the railway is compelled to follow the distance is 190 miles. With the exception of the Panama Railroad, it is the shortest trans-continental route.

From the very earliest times the advantages of the isthmus as a line of communication between the two oceans would appear to have appealed to the minds of travellers and explorers. Hernan Cortes, who ascended the River Coatzacoalcos in the hopes of finding

a waterway to the East Indies, declared in a report that the isthmus must in time become the great highway of the world's trans-continental commerce. Humboldt designated the Isthmus of Tehuantepec as the " bridge of the world's commerce."

The actual project of constructing some line of communication across the isthmus dates back nearly half a century. Long before Captain James Eads planned his ship-railway across the isthmus, attempts were made both at building ordinary railroads and at digging a canal. From 1857 until 1882 various concessions were granted, generally to American citizens or corporations, and were invariably forfeited owing to the inability of the concessionnaires to fulfil their obligations. In 1882 the Mexican Government determined to build the railway themselves, and entered into a contract with Mr. Delfin Sanchez for the construction of the road. This arrangement also proved unsatisfactory and in 1888 it was rescinded, but on advantageous terms for Mr. Sanchez, who received 562,910 dol. for material and work done and 170,224 dol. as indemnity for the profits that he would have made. About 67 miles of railway were now completed.

In 1888 a loan of 2,700,000*l.*, carrying 5 per cent. interest and guaranteed by a mortgage on the railway property, was issued in London, Berlin and Amsterdam. The syndicated bankers bought the loan at about 70 per cent. The proceeds of the loan were to be devoted to the construction of the Tehuantepec Railway. As a consequence of this loan a contract was made in 1888 with Colonel McMurdo, who will be remembered as the concessionnaire of the Lorenzo Marquez Railway, for the re-construction of the 67 miles of the line, which previous concessionnaires had built in a hurried and unsatisfactory manner, as well as the completion of the line, some 142 miles more. The contractor, who had at his disposal the entire proceeds of the above loan, undertook to finish the work in 30 months, but in 1890 he died, and the Government rescinded the contract, in agreement with Mrs. McMurdo, the Colonel's widow.

The contract was then let to J. H. Hampson, Chandos S. Stanhope and E. L. Corthell, who, under date of February, 1892, undertook to commence construction not later than one month from that date, and to complete the line in 15 months counted from the inception of the work. The funds provided for the purpose from the loan of the 2,700,000*l.* proved insufficient however, and the contract was cancelled by mutual agreement.

In December, 1893, a fresh contract was entered into with Chandos S. Stanhope for the construction of the 37 miles then remaining to be completed, Mr. Stanhope undertaking to complete his work by September 6, 1894, receiving as contract price the sum of 1,113,035 dol.

The railroad was actually completed from ocean to ocean in 1894, but no sooner was that done than defects in construction, as well as want of suitable harbour facilities on both the Gulf and Pacific coasts, made it necessary to begin work over again.

Much remained to be done in order to adapt the line to heavy traffic, and, recognising that in its then condition the railway was to all intents and purposes a valueless property, the Mexican Government began to devise means for rendering the line of some practical utility as a route for trans-continental traffic. With this object in view they entered into negotiations with the firm of S. Pearson and Son, Limited, whose head, Sir Weetman Pearson, had already gained a great name in Mexico through the successful construction of the drainage canal of the Valley of Mexico and of the port works at Vera Cruz.

The outcome of these negotiations was a series of contracts between the Mexican Government and the firm of S. Pearson and Son. The first contracts were concluded in 1898 and 1899, and dealt with the improvement and administration of the railway and the construction of the two terminal ports. These contracts were modified and extended in 1902, when the Mexican Government entered into a partnership agreement with the British firm for the joint exploitation of the railway. This final contract was concluded in May, 1902, and approved by Presidential decree of June 4 of the same year, with modifications arranged on May 20, 1904, and approved by decree of May 31, 1904.

Under these various contracts the firm of S. Pearson and Son enjoyed, so to speak, a dual character, *vis-à-vis* the Mexican Government, viz., of contractors for the construction of the two harbours, and of partners in the exploitation of the railway and the ports when completed. This is, I believe, the first instance on record where a national government have taken a private firm into partnership, and speaks volumes for the high reputation for efficiency and integrity which Sir Weetman Pearson had acquired in his earlier dealings with the Mexican Government.

The first contract for the construction of the ports and the administration of the railway had been entered into in April, 1898, but work had not actually been begun until December, 16, 1899. The cost of the improvement of the railway, which finally involved its practical reconstruction, has been borne entirely by the Mexican Government, the actual work being carried out by the Pearson firm, not as contractors, but as agents, *i.e.*, at cost price. The Government made a first appropriation of 800,000*l.* and in 1901, a further appropriation of 500,000*l.*, and up to date have certainly spent not less than 1,500,000*l.* in bringing the railroad to its present efficient state.

The original agreement with Messrs. S. Pearson and Son also gave them the contract for the construction of the ports at Salina Cruz and Coatzacoalcos, and the specifications contained therein have been in general adhered to with such slight alterations as have proved necessary with the progress of the works, *e.g.*, the construction of a second breakwater at Salina Cruz. No general contract price was fixed for the whole works, only a schedule of prices of units of work was adopted. The Mexican Government continued

to advance sums from the reserve fund of the Treasury as the work of construction progressed. In fact, it was not till June of last year that the Government fixed a limit to the expenditure that they were prepared to incur on the two ports, *i.e.*, 6,500,000*l.* This last, however, can hardly be called a contract price, as Sir Weetman Pearson refused on his side to enter into any agreement to finish the works according to the accepted plans for that amount.

On December 10, 1906, Señor Limantour requested Congress to authorise a further appropriation of 20,000,000 dol. for the works at the two ports, and on that occasion he made the following remarks in regard to the capital outlay on their construction :—

"The contracts, which are being executed in the ports of Salina Cruz and Coatzacoalcos, were signed five years ago and involve the expenditure of more than 65,000,000 dol. Of the 65,000,000 dol. of works which are included in existing contracts there have already been finished works to the value of nearly 40,000,000 dol. ; so that of the authorisations which have been solicited from this Chamber at different times all the available money has been employed in prosecuting the work at these ports in order that the large lines of steamers might have absolutely perfect service.

"There remains to be expended 25,000,000 dol., more or less, and of this sum we ask of you 20,000,000 dol. out of the Treasury Reserve."

As the works have progressed certain additional constructions have proved necessary ; at present, for instance, the jetties at Coatzacoalcos are being lengthened, so that before the work of construction at both ports is entirely concluded the estimate of 6,500,000*l.* is sure to be exceeded.

Under the terms of the contracts of May 16, 1902, and May 20, 1904, Messrs. S. Pearson and Son, Limited, entered into a contract of partnership with the Mexican Government for the purpose of exploiting the Tehuantepec Railway and the ports of Coatzacoalcos and Salina Cruz, such partnership to be called the Tehuantepec National Railway Company. The agreement holds good for a period of 51 years, commencing July 1, 1902. The corporate working capital was 7,000,000 dol., to be furnished in equal shares by the two partners, whereof each of the partners has paid in 1,000,000 dol. ; the balance, until the sum of 7,000,000 dol. shall have been completed, is to be paid up as and when required. This capital cannot be used for the improvement of the railway, but merely for running and operating expenses.

Messrs. S. Pearson and Son were, under the terms of the contract, to be the administrators or managers of the corporate property : "To administrate all the business connected with the partnership ; to make use of the corporate signature and to represent the railway company in all matters and business of whatsoever nature they may be ; together with all the rights conferred by this contract and the obligations which it imposes."

The Mexican Government merely retained the right of

inspecting the material and technical part of the railway and ports, as well as all matters relating to the administration and book-keeping. Plans of new works and periodical statements of accounts were to be submitted for the approval of the Ministry of Communications. The railway company bound itself to maintain the railway and ports in good condition, effecting ordinary repairs and replacing works, materials and machinery destroyed by use, and to return them to the Mexican Government in good condition at the expiration of the contract.

The annual earnings were to be apportioned as follows :—

(1) Payment of the operating expenses, maintenance of track, &c., and formation of a reserve fund for repairs.

(2) Payment of interest on loans.

(3) Payment to the two partners of an interest of 5 per cent. on the capital furnished by them.

(4) Refundment of losses in previous years which had been charged to capital.

(5) Payment of interest of 5 per cent. per annum after seven years on the capital devoted to the Coatzacoalcos port works for the special purpose of securing an additional depth of 1 metre over the 9 metres originally projected, making 33 feet in all.

(6) The surplus to be divisible between the Government and the contractors as follows :—During the first 36 years 65 per cent. to the Government and 35 per cent. to the contractors ; during the next five years 68½ per cent. to the Government and the balance to the contractors ; during the next five years 72½ per cent. to the Government and the balance to the contractors ; and in the last five years 76½ per cent. to the Government and the balance to the contractors.

In May, 1904, the railway company, duly authorised by the Mexican Government, issued a loan of 1,250,000*l.* at 5 per cent., guaranteed on the proceeds of the road and ports. This loan was taken by the Dresdener Bank and, together with a later issue of 175,000*l.*, was used to re-imburse the Government and Messrs. Pearson and Son the advances they had made for the construction of the road. The railway company is authorised to increase the amount of its loans to 2,000,000*l.* if necessary.

It is calculated that since the first work was done on the Tehuantepec route about 10,000,000*l.* have been expended, and before the harbour works are perfected about 1,000,000*l.* will probably have to be expended in addition to the 2,000,000*l.* just appropriated by Congress, making a total capital expenditure on the railway and ports of about 13,000,000*l.*

The work both on the railway and at the ports seems, so far as an amateur can judge, to have been carried out with the thoroughness that characterises the enterprises of Messrs. S. Pearson and Son. The works at the ports were, at the time of my visit, not yet completed though they were sufficiently advanced to permit of the commencement of the inter-oceanic traffic. The railway, however, was prac-

tically completed, with the exception of a few deviations, and it certainly was a delightful sensation to be rushing through the tropical forest at a rate which sometimes exceeded 56 miles per hour, and so smoothly that even during meals one was not incommoded by the speed. I wish travellers could experience such a sensation on the other lines of Mexico.

Many difficulties were encountered by the contractors in the initial periods of the reconstruction of the railway, arising chiefly from the heavy rainfall during the rainy season, the exuberant vegetation and other tropical conditions, and also on account of the difficulty in obtaining labour, caused principally by the fears of yellow fever. These difficulties have now been triumphantly overcome, and the railroad is in excellent structural condition, with a good roadbed of rock ballast and new steel bridges, and the management appears to be thoroughly capable and efficient. In the reconstruction of the road many of the heaviest gradients have been reduced and the curves eliminated, and this work was still proceeding when I was on the isthmus.

The engineering conditions for the railway construction require a gradual ascent from the mouth of the Coatzacoalcos River, crossing many affluents of that river till the Cordillera of the Sierra Madre is reached. There is a depression at the Jaltepec River, 79 miles from Coatzacoalcos. This river is spanned by a steel bridge of six spans, 560 feet in length. Between this point and the Atlantic the gradients are about 60 feet to the mile. The real gradient, however, may be said to begin at the point known as Santa Lucrecia, where the Jaltepec River is crossed. The Malatengo Cañyon is entered about 38 miles beyond Santa Lucrecia. Here the route is through rock cuts and chasms, which are bridged, gradually climbing upward to Rincon Antonio, where the railway company has established its yard and shops. A short distance beyond Rincon Antonio the Chivela Pass is entered and crossed at a height of 735 feet above sea-level. At Chivela the construction of two horseshoe curves and one tunnel was necessary. From this, the highest point, the descent to the Pacific is abrupt and the steepest gradients are encountered. Through the Chivela Pass the gradients reach 116 feet to the mile. On the Pacific slope the route follows for some distance the course of the Tehuantepec River, but leaves it before the terminus of Salina Cruz is reached.

The main line, which, as I have said, is 190 miles long, is supplemented by a branch about 18 miles long connecting Juile and San Juan Evangelista.

At Santa Lucrecia connection is made with the Vera Cruz and Pacific Railroad, over which trains run to Vera Cruz and Cordoba on the Mexican Railway, thus giving uninterrupted access to Mexico City and all parts of the Republic, and also to the United States. At San Geronimo is the junction with the new Pan-American line, which will give, in the future, direct railway access to the Republics of Central America.

The equipment of the Tehuantepec road is of the most modern description. The gauge is of the standard one of 4 feet 8½ inches; the numerous bridges are of steel, with solid masonry abutments; culverts of adequate capacity have been put in wherever required in solid masonry; nearly the entire road is now laid with 80-lb. rails, and is ballasted with crushed rock or gravel; the ties are of creosoted pine, native hardwood and California redwood, and are provided with heavy steel tie-plates.

One of the many problems which had to be solved was presented by the luxuriant vegetation, which, if left to itself, would soon overgrow the track and stop the trains. Manual labour is constantly employed to remove the rapid growth and figures for a considerable sum in the annual maintenance of the road, but in addition the company has to make use of an ingenious device for sprinkling the roadbed with crude oil, heated to 210° Fahr., from their oilfields on the Coachapa River, a tributary of the Coatzacoalcos, which destroys even the roots of the plants, and has the additional advantage of laying the dust, thus adding to the comfort of travelling in a hot climate.

The Tehuantepec route will at first be worked with a single track, and it is calculated that 10 freight trains, carrying 300 tons net, can be despatched in each direction every 24 hours. It is claimed that freight can be transferred across the isthmus within 30 hours after a vessel enters the harbour at the other terminus, and the company promise a freight train service of 12 hours from ocean to ocean. If, however, the movement of freight proves to be as great as is expected, the line will doubtless shortly have to be double-tracked.

The rolling-stock is of the most substantial and modern description, and is more numerous in proportion to the mileage of the line than that of any other railway in the Republic, but, nevertheless, provision has been made for further increase in the equipment, if the needs of the traffic require it.

The following is a statement of the rolling-stock at present in use, or ready for use, and an increase of 20 per cent. is actually on order :—

	Number.
Engines	40
Passenger coaches	35
Private cars	5
Baggage cars	10
Box cars	1,250
Flat cars	120
Stock cars	60
Tank cars	15
Guards' vans	21

All the locomotives burn oil fuel, which is at present imported from Texas in tank-steamers, and unloaded into three large storage

tanks at Coatzacoalcos, each with a capacity of 6,000 tons. Very shortly, however, Messrs. S. Pearson and Son's oilfields at San Cristobal on the Coachapa will be in a position to supply oil. A pipe line is already laid from the oilfields to the refinery now building at Minatitlan, a distance of 20 miles, and a track-line is being laid direct from Minatitlan to a point on the main railroad, 18 miles from Coatzacoalcos. This will enable the oil to be delivered to the engines cheaply and expeditiously; but the consumption of oil fuel in the locomotives, besides the advantage for the company, has a great advantage for the persons travelling by the line in the freedom from smoke and coal dust, as anyone who has travelled behind an oil-burning engine will know.

The box cars have a very ingenious arrangement for expediting the loading and unloading of freight at the wharves. The roofs are so constructed that about one-half can be pulled back and the loads can be lifted by the cranes direct from the hold of the ship and dropped into the interior of the car, and *vice-versâ*.

The general offices and shops, company's hospital, &c., are established at Rincon Antonio, a healthy spot at an elevation of 900 feet, and at a distance of 125 miles from Coatzacoalcos. The climate there is pleasant and salubrious, and the heat is tempered by the winds that are constantly blowing across the isthmus. The general offices are quite a model in their way, and are especially adapted for the heat of the tropics. The shops are equipped with the most modern machinery and appliances for every possible repair to the rolling-stock and engines in use on the line. Here, as at Salina Cruz and Coatzacoalcos, every bit of machinery is direct-driven by electricity, generated by a steam plant, crude oil being used for fuel. Here, as at all other places where Messrs. S. Pearson and Son have large works, every care has been taken to make life as agreeable and homelike as possible to the officers and employés. Comfortable modern houses have been erected for the general manager and superior officials, whilst the subordinate officials are lodged in excellent staff-houses. A commodious club house has been built and quarters provided for a Catholic Chapel and a masonic lodge. Special attention has been given to the question of a pure and abundant water supply.

As I before said, the two terminal ports are still far from being completed, though the works at both ends are sufficiently advanced to admit of the entrance of large ships and of the speedy handling of freight.

At Coatzacoalcos little remains to be done beyond deeper dredging of the channel on the bar, and the building of further wharves and warehouses, but at Salina Cruz there is still much to be done in dredging out more space in the inner harbour, building wharves and warehouses, and finishing the dry dock. The last bit of work on the harbours will probably not be done before 1909.

At its mouth the Coatzacoalcos River is 2,000 feet wide,

and forms a natural harbour of almost unlimited capacity, with an average depth of 50 feet. The problem, therefore, which the engineers in charge of the port works had to solve was merely the removal of the bar in order to prevent it from forming anew. This has been met by following the plan adopted at the mouth of the Mississippi and at Tampico. Two converging jetties have been built, extending from the mouth of the river into the sea, so as to confine the current within as narrow limits as possible and compel it to scour the channel across the bar. These jetties are each over 4,000 feet long, and built of rock and rubble; both are practically completed with the exception of the protecting blocks at the extremities. The normal bar is 14 feet on the crest, and the channel is to be 33 feet deep and 656 feet wide. The current having proved rather slower in scouring out the channel than was anticipated, and it being necessary to attain a proper depth before the transcontinental traffic could be successfully inaugurated, the work of the current has lately been supplemented by two dredgers.

The harbour at Coatzacoalcos, as well as that at Salina Cruz, will have a depth of 33 feet at low water.

At Coatzacoalcos, as at Salina Cruz, elaborate preparations have been made for the expeditious handling of freight. The total frontage of the wharfage will extend 1 kilom. ($\frac{5}{8}$ mile). There will be eight steel wharves, 136 yards long, and eight iron warehouses, 136 yards long by 36 yards wide, each with a holding capacity of 6,000 tons; four of these are already completed and two are under construction. There is also a timber wharf 216 yards long. Each ship loading or unloading will occupy a separate wharf. All the quays are provided with travelling electric cranes of great power, four to each wharf, with a reach from vessels to warehouses or cars of 86 feet, and with numerous capstans. An electric plant of 1,500 kilowatts furnishes the necessary energy for the crane and capstans and for other purposes. Warehouses and cars are equipped with removable roofs to permit the handling of freight in a single operation, working the cranes directly between the vessels and the cars or warehouses.

At Salina Cruz, on the Pacific, the engineering problem was much more serious than on the Gulf. The "Northers" which sweep across the isthmus beat the surf out to sea, and, since there is no natural shelter, it was necessary to construct both an outer, or refuge harbour, and an inner harbour with wharves and dry dock. Enormous breakwaters have been built far out into the sea, ending in a depth of 70 feet, with the convex side turned seaward, and form the outer harbour. The entrance to this harbour is 656 feet across. The east breakwater is 1 kilom. ($\frac{5}{8}$ mile) long. It extends out for 1,200 feet in a straight line from the shore, then bends for 825 feet in a curve with a radius of about 1,900 feet, and then continues in a straight line for about 1,235 feet. The west breakwater is about 1,900 feet long, extending in a straight line for 850 feet, and then curving for about 370 feet on a radius of 325 feet, and

continuing in a straight line for 680 feet. The method of construction adopted for the breakwaters is as follows :—A rubble foundation is laid up to 33 feet below low water, 87 yards wide at the base and gradually narrowing to 54 yards at the top. On this foundation huge blocks of concrete or rocks weighing up to 40 tons are dropped at random from steam cranes. Then a smooth surface is made, and on it are placed two rows of concrete blocks of 50 tons weight; they are carefully fitted together and have a joint width of 33 by 6½ feet high. On the surface thus formed, which is about 18 feet above low water, a stone parapet will be built 19½ feet wide by 6½ feet high. The outer harbour thus formed covers an area of something like 150 acres.

Across the rear of the protected area a line of wharfage extends opening into the interior basin. On this line of wharfage there will be six steel warehouses similar in all respects to those at Coatzacoalcos, equipped with similar electric cranes and capstans, and driven from a generating plant of 1,500 kilowatts. Four of the warehouses are already completed.

The inner harbour is the result of dredging, and will eventually be 3,280 feet long by 925 feet wide, with a depth of water alongside the wharves of 33 feet. More than half of this inner harbour is now dug out, and for the next two years dredgers will be removing the remaining portion of the basin. The entrance from the outer to the inner harbour will be 100 feet wide, and will be spanned by two swing bridges.

The outer wall of the inner harbour, which is to form the wharves, is a most ingenious bit of engineering. As there was no solid foundation to build on, the following device was adopted. Enormous concrete monoliths, with three large holes, are built on the sand. Through these holes, which are large enough to contain several men, the sand and mud is gradually dug up, partly by suction and partly by manual labour. When the concrete monolith is sunk sufficiently deep another similar section is made *in situ* upon it, and a similar process is gone through. Before the wharf can be built a foundation of these monoliths will be laid to a depth of 65 feet, and the holes and interstices filled up with concrete after the monoliths have been sunk to their final destination. The whole will be backed up with masonry and form a wharf 76 yards wide.

At both Coatzacoalcos and Salina Cruz, in addition to the berths at the quays, provision has been made for additional slips, and at Salina Cruz one of the finest dry docks in the world, and to-day the largest on the Pacific coast, is being built. This will be 610 by 89 feet, with a depth on sill at low water of 28 feet.

The trackage at both Coatzacoalcos and Salina Cruz includes many miles of lines, 26 miles at the former and 22 miles at the latter port, and the arrangement is such that there can be but little difficulty in handling freight and shunting cars.

At Coatzacoalcos an old town already existed, but this is being modernised, with every attention to hygiene. Large offices have been

built on the river bank, and houses have been built on the hill for the staff and employés. The pestilential fever-breeding swamps, which rendered Coatzacoalcos a hotbed of yellow fever and other diseases, have been almost entirely filled in.

At Salina Cruz there was nothing but a small Indian village on the site now occupied by the railroad works. A new town has been laid out on higher and more healthy ground, in accordance with modern ideas and sanitary principles, and adequate provision has been made here, as at Rincon Antonio, and at Coatzacoalcos, for the comfort and welfare of officers and workmen.

It will be seen that preparations have been made for handling this Mexican isthmus route as an essentially trans-continental freight proposition, though the local business, both passenger and freight, is no negligible quantity. When I was on the isthmus the company was handling a large volume of local freight, and the two passenger trains it was working seemed to be well filled.

However, the principal object of the line is to serve as a connecting link between ships on the Atlantic and ships on the Pacific, and it is to be anticipated that the principal trans-Atlantic and trans-Pacific steamship companies will avail themselves of the facilities offered for this purpose.

Already one contract has been entered into with the American-Hawaiian Steamship Company for the carrying of sugar from Hawaii to New York.

From the commencement of the present year this company abandoned the route to the Far East viâ the Straits of Magellan, and began a regular service between New York, Hawaii and the Far East, viâ the Mexican isthmus route. At first, it is stated, there will be a monthly service between Salina Cruz and the Far East, a 10-day service between Salina Cruz and Hawaii, calling at San Francisco on the way out, and a weekly service between Coatzacoalcos, New Orleans, Philadelphia and New York. If the needs of the traffic require it these services will be proportionately increased.

As at present arranged six 12,000-ton ships will be used on the Far East and Honolulu lines, and four 8,000-ton ships on the Atlantic line, while smaller vessels of 6,000 tons will be used for a coast service between Salina Cruz, San Diego, San Francisco, Seattle and Vancouver.

The above arrangements are provisional, and I only give the information for what it is worth, and would beg that persons desiring to make practical use of this line would not place too much reliance on them, but would make inquiries at headquarters.

At the present time the joint service established by the Leyland and Harrison Lines makes three calls a month at Coatzacoalcos. The Cuban Steamship Company (Cayo Line) calls every three weeks, and the Canadian Steamship Line once or twice a month. The Mexican Navigation Company already touches there, and it is probable that the Royal Mail Steamship Navigation Company and the

German and French lines, which have a service between European and Mexican ports, may also find it profitable to call at Coatzacoalcos. Besides this, no doubt, tramp steamers will touch there in increased numbers.

At Salina Cruz, besides the ships of the American-Hawaiian Company, the following lines will have a regular service :—The Pacific Steam Navigation Company, twice a month; the new Canadian Line from Vancouver, once a month; the German Kosmos Line, once a month. It is also understood that there will be a more regular service between Australian ports and Salina Cruz by the vessels which bring coal. The Pacific Mail Company is reported to have the intention of making regular callings at Salina Cruz in its San Francisco to Panama service, but as this line is controlled by the interests governing the trans-continental service of the Southern Pacific Railroad, there is at present some doubt as to whether their ships will really make Salina Cruz a port of call.

It is believed that other steamship companies now running vessels viâ the Cape Horn, Panama and the Suez Canal routes will divert some of their ships to the Mexican isthmus route if the facilities for handling freight prove as efficient and expeditious as anticipated. How much of Asiatic commerce and how much of European shipments to Asia will go by this route still remains to be seen, but there is little doubt of the capacity of the Tehuantepec Railway to command a sufficient share, at least, of what the other routes have been enjoying.

At the beginning of my report I stated that the opening of the Tehuantepec National Railway to trans-continental traffic would be likely to influence the highways of the world's commerce, and I will now add a few words in explanation of this statement.

The geographical effects of the line upon commerce are easily measurable. It will compete under advantageous conditions for traffic between European and American ports on the Atlantic on the one hand, and ports in the Far East and Australasia and on the Pacific coast of the American Continent on the other. This traffic is now moving by vessels round Cape Horn, or through the Straits of Magellan, or by the Suez Canal, or by land over the trans-continental lines of North America.

The officials of the company informed me that they were already assured of 600,000 tons of freight for the year 1907, and had over 1,000,000 tons in sight for 1908. In fact, the prospects of freight were so large that they were afraid to properly advertise their route for fear of not being able to comply with the demands of the traffic.

Mr. John F. Wallace, former chief engineer of the Panama Canal, in giving evidence before the United States Senate Committee on Inter-oceanic Canals, made the following statements as to the advantages of the Tehuantepec route over the Panama route:—

"I do not think that you can over-appreciate the importance of protecting our future trade by heading off the possible development of the route by way of Tehuantepec. It goes without saying

that it is much easier to hold a line of traffic than to get it away from somebody else after they get it once. I do not think that there are very many people that appreciate what the Tehuantepec route means if they get it established once.

"The Tehuantepec route to all Pacific ports of the United States, the Orient and Australasia is much shorter than the Panama route. The distance from New York to Hong-Kong, for instance, by way of the Tehuantepec Railway is 1,351 miles nearer than by way of Panama. Freights are worth on an average of 1 dol. per ton for 1,000 miles. That means that the Tehuantepec route would be 1 dol. 35 c. plus the rate over the railroad, which, say, might be 2 or 3 dol. a ton—granting it is about 3 dol. now—which would make it 4 dol. 35 c. a ton. Any less sum than that could be charged by the Tehuantepec Railroad, and make money out of it, and also save five days in time.

"The distance from New York to San Francisco by that line is about 1,200 miles shorter than by way of Panama. There you have 1 dol. 20 c., plus the toll across the isthmus of 3 dol., or whatever it will be, and the saving in time of about four or five days. That holds good all through here—I mean in varying proportions—but they have the advantage. That is partly, of course, compensated by the fact that they have 175 miles to haul the stuff, and it will cost them the same to handle their stuff on the wharves that it does at Panama and Colon, and it will cost them about three times as much to handle it over the railroad, providing of course the Panama road is rebuilt and re-equipped. And there is a reverse advantage to us in that fact, which we can overcome by a low flat charge at Panama now, if we fix it up, and we can keep the business for a less cost than we can ever get it back again."

Mr. Wallace attached such importance to the competition of the Tehuantepec Railroad and the probable diversion of traffic from the Panama route that he even urged the operation of the Panama Railway at a loss, during the period of the construction of the Canal.

The following table of comparative distances of the various routes from the principal ports of Europe and the United States to ports on the Pacific shows that in every case the advantage in point of distance lies with the Tehuantepec route :—

Route from—	Total Distance.	Excess over Tehuantepec Route.
	Miles.	Miles.
New York to Hong-Kong, viâ—		
Cape Horn	20,379	8,777
Cape of Good Hope	16,945	5,343
Suez Canal	13,596	1,994
Panama Railroad	12,953	1,351
Isthmus of Tehuantepec	11,602	....
New York to Yokohama, viâ—		
Cape Horn	19,802	9,796
Cape of Good Hope	18,085	8,079
Suez Canal	15,527	5,531
Panama Railroad	11,256	1,250
Isthmus of Tehuantepec	10,006	....
New York to Auckland, New Zealand, viâ—		
Suez Canal	16,871	7,447
Cape of Good Hope	16,719	7,295
Cape Horn	13,890	4,466
Panama Railroad	10,305	881
Isthmus of Tehuantepec	9,424	....
New York to Melbourne, viâ—		
Cape Horn	15,215	4,150
Suez Canal	15,171	4,106
Cape of Good Hope	15,019	3,954
Isthmus of Tehuantepec	11,065	....
New York to Honolulu, viâ—		
Cape Horn	15,826	9,163
Panama Railroad	7,939	1,276
Isthmus of Tehuantepec	6,663	....
New York to San Francisco, viâ—		
Cape Horn	15,687	10,797
Panama Railroad	6,063	1,173
Isthmus of Tehuantepec	4,890	....
Liverpool to Hong-Kong, viâ—		
Cape Horn	20,606	5,353
Panama Railroad	16,471	1,218
Cape of Good Hope	15,722	469
Isthmus of Tehuantepec	15,253	....
Liverpool to Yokohama, viâ—		
Cape Horn	19,400	5,945
Cape of Good Hope	17,653	4,198
Panama Railroad	14,540	1,085
Isthmus of Tehuantepec	13,455	....
Liverpool to Auckland, New Zealand, viâ—		
Cape of Good Hope	16,221	3,412
Suez Canal	14,645	1,836
Cape Horn	13,897	1,088
Panama Railroad	13,312	503
Isthmus of Tehuantepec	12,809	....
Liverpool to San Francisco, viâ—		
Cape Horn	16,552	8,276
Panama Railroad	8,885	609
Isthmus of Tehuantepec	8,276	....
New Orleans to Hong-Kong, viâ—		
Cape Horn	20,804	10,531
Cape of Good Hope	17,845	7,572
Suez Canal	15,108	4,835
Panama Railroad	12,308	2,035
Isthmus of Tehuantepec	10,273	....
New Orleans to Yokohama, viâ—		
Cape Horn	20,227	11,590
Cape of Good Hope	18,625	9,988

Route from—	Total Distance.	Excess over Tehuantepec Route.
	Miles.	Miles.
New Orleans to Yokohama, viâ—continued—		
Suez Canal	17,039	8,402
Panama Railroad	10,611	1,974
Isthmus of Tehuantepec	8,637	....
New Orleans to Auckland, New Zealand, viâ—		
Suez Canal	18,381	10,286
Cape of Good Hope	17,259	9,164
Cape Horn	14,314	6,219
Panama Railroad	9,659	1,564
Isthmus of Tehuantepec	8,095	....
New Orleans to Melbourne, viâ—		
Suez Canal	16,683	6,947
Cape Horn	15,640	5,904
Cape of Good Hope	15,560	5,824
Panama Railroad	11,181	1,445
Isthmus of Tehuantepec	9,736	....
New Orleans to Honolulu, viâ—		
Cape Horn	16,251	10,917
Panama Railroad	7,294	1,960
Isthmus of Tehuantepec	5,334	....
New Orleans to San Francisco, viâ—		
Cape Horn	16,112	12,551
Panama Railroad	5,418	1,857
Isthmus of Tehuantepec	3,561	....

The average saving in distance by the Tehuantepec route over Panama to all places on the Atlantic coast of the United States and Europe is, say, about 1,250 miles. The ordinary freight steamer makes about 10 miles an hour, or, say, 250 miles a day, requiring five days longer viâ Panama, assuming the time of crossing the two isthmuses to be the same. It will take a steamer about one day to pass through the Panama Canal and the freight about two days to pass over Tehuantepec from ship to ship, leaving still four days to the advantage of Tehuantepec. The extra cost of the four days to a steamer, say 2,000 dol. plus the Canal tolls, would make a 5,000-ton cargo about 10,000 dol. viâ Panama. No doubt the cost viâ Tehuantepec would be no greater, as a matter of fact it would certainly be less, and there would be the saving in time of four days, which, to quick freight, is of great importance in this age of rapid transportation.

The same holds good for distances from New York to places in the Far East and Australia as compared with the route viâ the Suez Canal, but I will not go into this question in further detail, as a glance at the comparative list of distances given above will go further to prove the geographical advantages of the Tehuantepec route than any words of mine.

One immediate commercial effect of the opening of this route will be the diversion of several hundred thousand tons of sugar at present shipped by the Cape Horn route from Hawaii to Atlantic

ports on the ships of the American-Hawaiian Steamship Company. Mr. Body informs me that his company guarantee 6 per cent. interest on the value of these shipments of sugar from Hawaii for every day over 30 days from Hawaii to New York or Philadelphia.

Another effect will be a re-adjustment of ocean and trans-continental freight rates owing to the opening of a shorter and cheaper route. This will especially affect all the railroads in the United States and in Canada which participate in trans-continental traffic.

The opening up of this route will be of special benefit to the middle west of the United States, and will offer advantages over all others for traffic between places in the Mississippi Valley viâ the Gulf ports of New Orleans, Galveston, &c., and the United States, Mexican, Central American and South American ports on the Pacific Ocean.

The traffic to which I have referred will naturally be more or less governed by competitive conditions, but there are other effects independent of such conditions, one of which is the influence which this line to the Pacific will have on the Mexican national development. The opening of the Tehuantepec route, with its ports in full operation, must bring about a large increase in the exchange of products between Mexican and Central American ports on the Atlantic and Pacific Oceans respectively, and also between the interior sections of Mexico and the Pacific States. The cost of transportation will be greatly reduced by the Tehuantepec route, as compared with the long hauls over railway lines at present. To-day traffic between Mexico City and Mexican ports on the Pacific moves viâ the Mexican and United States railways over the frontier of the Rio Grande, and thence by rail to Guaymas. The natural route for this traffic is by way of Salina Cruz and the Tehuantepec Railroad, at all events till the projected lines from Guadalajara to Manzanillo and Tepic are completed.

In connection with the Mexican national development the Tehuantepec Railway should be considered not only as a line across the isthmus, but as the basis for feeding lines from other parts of the Republic. From the Pacific coast port to the railway junction at Santa Lucrecia is 109 miles, and from thence to Cordova 213 miles. The distance from Cordova to Mexico City is 198 miles, so that the capital, where all the railway lines of the Republic centre, is by these routes only 520 miles from Salina Cruz. The Vera Cruz and Pacific Railway, which by means of the junction of two branches at the point known as Tierra Blanca, brings both Mexico City and Vera Cruz into communication with the Pacific coast, is practically owned by the Government. The roadbed, however, is through a tropical country, in which the rains are very destructive to railway property, and at the present time the whole line is in a very poor condition, and is certainly not fit to cope with heavy freight or rapid passenger traffic. Steps, however, have been taken for improving it by substituting new steel bridges for the old ones, which were unable to withstand the floods, by ballasting the roadbed, and by substituting new ties for the old decayed ones. That it is possible to construct

a perfect railway under exactly similar climatic conditions Sir Weetman Pearson has proved on the isthmus, and we may hope that, if the prospects of traffic warrant the expenditure, the line of the Vera Cruz and Pacific Railway may be put into similar good order, in which case there ought to be no difficulty in carrying passengers from Mexico City to Salina Cruz in 24 hours.

It is always dangerous to prophesy, but if pluck and perseverance are to have their reward certainly the Mexican isthmus route should be a success. The object which the Government and the contractors have had before them has been to handle freight at the lowest possible cost by preparing to do it on the largest scale practicable with modern machinery, and to attain this object neither money nor labour have been spared. To those who, like myself, have only seen the almost completed results it is difficult to realise the conditions that existed on the isthmus five years ago, when death and disease played havoc with the lives and constitutions of the men employed, when Nature was continually undoing the work done, and when the financial prospects appeared gloomy. I have little doubt that the optimistic forecasts of the Mexican Government as to the future of the Tehuantepec route will be realised, but in any case the railway will remain as a monument to the enlightened and progressive policy of General Diaz and to the pluck and efficiency of the British firm who have carried through the great work to such a successful conclusion.

As I before said, the formal opening of the Tehuantepec Railway and of the two ports of Salina Cruz and Coatzacoalcos to trans-continental traffic was celebrated towards the end of January in the presence of President Diaz, the members of his Government, the Diplomatic Corps resident in Mexico, and other persons, including Sir Weetman Pearson. Those present on that occasion witnessed the realisation of a dream the origin of which was in the brain of Hernan Cortes, though it is doubtful if the "Conquistador" would recognise in the iron road and the magnificent facilities for handling freight at the ports the fulfilment of his dream of a highway from Spain to the East Indies.

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