



PERMANENT WAY.

THE CHIGNECTO SHIP RAILWAY.

CHIGNECTO SHIP RAILWAY.

To very many persons, one of the most interesting displays at the great exhibition held last autumn in St. John, N.B., was the model of the Chignecto ship railway, placed there by H. G. C. Ketchum, C.E., the father and moving spirit of that great enterprise. The lifting docks, the railway and all were there in miniature, and under the manipulation of a skilled attendant, or of Mr. Ketchum himself, the model ship was almost constantly being hoisted up, run across the supposed isthmus and lowered down on the other side. An accurate and comprehensive map, showing the provinces of New Brunswick and Nova Scotia, the Isthmus of Chignecto and the adjacent waters was of material benefit in making clear to visitors the stupendous import of this exhibit, which occupied so little space in the great buildings.

There were some who remembered that as far back as 1875, some five years before Captain Eads submitted to the public his scheme for a ship railway across the Isthmus of Tehuantepec, Mr. Ketchum had shown at an exhibition in St. John that year the plans and details of his own scheme, now being practically carried out in the construction of the marine transport railway across the Isthmus of Chignecto. To Mr. Ketchum belongs the highest credit for having developed this scheme and pressed its feasibility and importance with such persistence and energy as first to secure a subsidy from the Dominion Government and then to enlist the co-operation of capitalists for its completion.

Most Canadians are familiar with the commercial importance of this enterprise, should its success realize but a measure of the anticipations of its promoters; but the facts will bear re-stating. Vessels plying between the Gulf of St. Lawrence and Bay of Fundy or United States ports are now compelled to sail around the Peninsula of Nova Scotia. But they may also have to sail around the Island of Cape Breton, as the Strait of Canso, which separ-

ates Nova Scotia from Cape Breton, is usually blocked with ice for three weeks longer than the gulf, and the passage of which, owing to the weather, is not always available to large ships. If, instead of taking either of these courses a vessel could be transported across the Isthmus of Chignecto and make her passage by way of the Bay of Fundy, the distance to St. John from St. Lawrence ports would be lessened 500 miles as compared with the Canso route, and probably 700 miles as compared with the route around Cape Breton. Another important consideration is that vessels from the lakes could easily make St. John via the isthmus, which would not be risked in the rough weather that sometimes sweeps the Atlantic coast of Nova Scotia. If the reader will study a map of the Lower Provinces in connection with these statements the importance of the proposed new route will be apparent. Its value has been recognized for a century past by the people of the Lower Provinces, and a ship canal project has been before the public for much more than half that length of time. But the vast difference in the rise and fall of tides in the Bay of Fundy and Gulf of St. Lawrence, together with other difficulties, was fatal to that scheme, and it remained for Mr. Ketchum to solve the problem. The Isthmus of Chignecto is only seventeen miles wide, the line of the railway is straight across, and the heaviest gradient but a fifth of one per cent. But two large cuttings had to be excavated, and one bog filled up. The road is, practically, a dead level. But one stream had to be crossed (the Tidnish), and a single span sufficed. So that, though in a sense difficult, the physical features to be overcome could hardly be called formidable.

Now, as to the railway itself, and the method of construction. At the head of the Bay of Fundy is a narrower bay of the same name as the isthmus. Into this at its head

empties a tidal stream called La Planche, and at its mouth is the western terminus of the railway. Here, by excavation and construction, is being built a dock 530 feet long, 300 feet wide and 40 feet deep. At the entrance there is a gate 60 feet wide and 30 feet high, which can be closed so as to retain the water in the dock when the tide recedes. This wet dock will accommodate six ships of a thousand tons each. At its inner end will be a lifting dock of solid masonry 230 feet long and 60 feet wide, equipped with 20 hydraulic presses capable of lifting cargo laden vessels a height of 40 feet. At the bottom of this lifting dock will be the ship carriage, or cradle, on wheels. It is provided with keel blocks and bilge guards, which may be gauged to suit whatever sized vessel may be placed on the lift. This cradle is necessarily of the most powerful construction, is provided with heavy springs, and will have under it 240 wheels. When a vessel has been placed over the centre of the lift and the blocks properly adjusted the hydraulic power is put in operation and the cradle and ship rise until the former is on a level with the railway. The rails on which its wheels rest are adjusted to those of the railway, and by means of hydraulic capstans the novel train is hauled upon the main line, to be drawn by powerful locomotives across the isthmus. The weight of ship, cradle, and "gridiron" upon which the cradle rests while in the dock, may weigh as high as 3,500 tons, from which an estimate may be gained of the power of the hydraulic lift. In order to avoid trouble arising from the great rise and fall of tide at this end of the line, varying from 36 to 45 feet, and sometimes more, the gates of the dock will be closed at half ebb and not re-opened till half flood tide is reached again six hours later.

At the Tidnish, or eastern terminus of the line, the machinery is, of course, the same, but no flood gates are needed to keep the vessels in the dock afloat, as the rise and fall of tide on that side of the isthmus is only about six or seven feet. It was necessary, however, in order to construct the lifting dock, to build a cofferdam and pump out the water. It was also necessary, owing to the shoal