Montreal.—At Montreal harbor the St. Lawrence Canal system and all the great Canadian transcontinental lines centralize. The great Canadian railways—the Canadian Pacific, the Grand Trunk, the Grand Trunk Pacific and the Canadian Northern—are all feverishly improving their terminals at Port Arthur and Fort William, at Georgian Bay ports, and at Montreal.

The Canadian government has commenced the construction of the new Welland Ship-Canal between Lakes Ontario and Erie. This canal, with 800-foot locks and with a possible ultimate draught of 30 to 35 feet, will accommodate the large lake carriers so as to continue to Kingston or Prescott without breaking bulk. This will add greatly to the shipping in Montreal, and will, it is confidently expected, hold the greater part of the Canadian trade to the St. Lawrence route.

Montreal, however, under existing conditions of traffic and accommodation, is almost at the limit of its capacity. With double the present traffic assured within the next few years, it will require a great deal more and better harbor accommodation to meet the demands upon it.

Montreal to the Sea.—With the possible exception of the development of Glasgow there is no more romantic episode in the annals of harbor engineering than the making of Montreal an ocean port. Largely by the faith and energy of Scotch Canadians, following the successful improvements on the Clyde, the River St. Lawrence between Montreal and the sea has been deepened from less than 10 feet to its present depth of 30 feet at the low stages of the river level. During the early summer months the depth is greater, and reaches as much as 38 feet. The minimum width is 450 feet.

Although the author is not now connected with the staff of the River St. Lawrence Ship-Channel, he was continuously engaged upon that great work for twentytwo years, commencing as an assistant and being in charge as superintending engineer for ten years up to 1909. For many years this work has been looked upon as being one of the great successful public works of Canada, and under the Hon. J. D. Hazen, Minister of Marine, the work is now in charge of Mr. V. W. Forneret, B A.Sc., superintending engineer, who for many years was the author's chief assistant.

The work is all carried on departmentally. The plant is owned by the government, and for its own special work is probably the most complete dredging plant and excavating machinery for submarine rock which is in existence at the present time.

At the present time, with magnificent range lights for each course, with a splendid system of gas buoys and a telephone signal service, navigation is considered very easy and safe by night as well as by day.

The deepening of the channel from 30 to 35 feet at extreme low water was commenced two years ago, and about one-fifth of the work to tidal water is already completed.

The natural fall in the river level between Montreal and Quebec, a distance of 160 English miles, is 29 feet. The maximum discharge of the river during the season of navigation is about 600,000 cubic feet per second, while at the lowest stages of water the minimum is slightly less than 200,000 cubic feet per second.

With the present average slope and velocity of current and average cross-section, the low-water river level and discharge are balanced, with an average current of about 3 miles per hour. This being theoretically correct, it may be considered assured, that if the water supply of the St. Lawrence remains unchanged and the natural cross-section of the river is not enlarged, the present river levels will be constant.

The permanence of the ship-channel and the St. Lawrence route would therefore appear to be well assured.

From Montreal via the St. Lawrence to the open sea the distance is nearly 1,000 miles, and, besides the attraction to passengers of 3 days' sailing in smooth water with beautiful scenery, the strong commercial consideration for water freights into the interior is the incentive to keep pace with increasing trade on the North Atlantic During the season of seven months the commerce passing through Montreal is nearly 40 per cent. of the total commerce of Canada, and this percentage is increasing.

In 30 years only two ships have been totally lost between Quebec and Montreal, and the occasional groundings, which are well advertised, are not frequent. None of the accidents whatever in recent years has been due in any measure to the ship-channel.

Montreal Harbor.—The First Improvements.—In 1830 the first Harbor Commission was appointed under the authority of the Governor of the Province of Canada, for the purpose of carrying into effect "An Act to provide for the improvement and enlargement of the harbor of Montreal."

In their first annual report the commissioners recorded that they confidently anticipated that the wharves undertaken would be, when completed, superior to any works of the kind in the province, and would enable the City of Montreal to be advantageously contrasted with any other in North America for beauty, solidity, and convenience of approach by water.

This was the first attempt made to improve the harbor of Montreal by a commission. The commissioners had the same faith in the future of the harbor, and courage in undertaking works, which has characterized the administration from 1830 to the present time. The present harbor of Montreal justifies the modest boast of the commissioners of 80 years ago.

Scheme of Harbor Extensions of 1910.—In 1910, the author prepared for the harbor commissioners a comprehensive scheme of improvements, according to which it was proposed to develop the valuable water front and shores of the river, owned exclusively by the Dominion government and held in trust by the harbor commissioners, so as to result in the following revenue-producing features: (a) Sites for industries, by making land and improving connections with inaccessible properties; (b) the extension, enlargement and improvement of railway termini, giving equal facilities to all Canadian lines for connecting with harbor and industrial points; (c) facilities for encouraging and developing industries along the valuable water front.

According to the Board of Consultive Engineers, the items approved were estimated to cost \$17,000,000, and this work is now in progress.

This winter condition is a surprise to those who are accustomed to ports open all the year round, but as the Great Lakes and their navigation, amounting to 75,000,000 tons annually, and their great ports are also all closed at the same time, and by the same cause, Montreal harbor does not suffer unduly. The shipping of the St. Lawrence in the autumn is at once transferred to the excellent Canadian ports of Halifax and St. John, and commerce is carried on all the winter as usual with only the disadvantage of the extra rail haulage.

A very full description is given of the physical features of the River St. Lawrence and Montreal harbor.