

dimensions of which were fixed at 515 x 80, with sixteen feet on the sills at mean water.

In 1870, the Milwaukee Board of Trade suggested that the locks on the St. Lawrence route should be made 300 x 45 feet with a depth of 15 feet, and somewhat similar dimensions were advocated by the Board of Trade of Chicago. The lake harbors were well known to be easily susceptible of being deepened to 16 feet, as has been done since; and even then there was a 14-foot channel through the mud flats of Lake St. Clair. But the commission decided that to exceed the dimensions fixed by them would be to entail an unjustifiable expenditure upon the limited resources of the Dominion.

One of the chief reasons why the Welland Canal cost so much money was owing to the lift of the locks being restricted generally to from 12 to 14 feet. The summit level of the canal from Lake Erie to Thorold is about 18 miles long, and then there is a rapid descent into Lake Ontario. The total fall between the lakes is 326½ feet at mean stages. This is overcome by 25 locks of about 13 feet average lift each. Had this been arranged for 13 locks of 25 feet lift, a much more direct line could have been selected, and both the first cost and subsequent maintenance of the canal greatly reduced. The lift at the Liverpool docks is about 24 feet at low tide. On the Severn it is much greater. As before stated, the "Soo" lock was designed for a single lift by the late General Poe, one of the foremost of United States Army Engineers. Had primeval practice been abandoned, and concrete substituted for cut stone in the greatly diminished number of locks, the saving which would have followed in the item of masonry alone would doubtless have enabled the Welland Canal to be made of much larger dimensions for the same amount of money, and thus confer a vast and lasting benefit on the St. Lawrence route. The total expenditure on this canal up to the 30th of June, 1895, is \$23,764,070; before Confederation, \$7,638,239 83; since Confederation, \$16,125,831.

In the lower canals the dimensions of the Welland locks were adhered to, so that in the enlargement works now in progress on the St. Lawrence, they are the same size, viz., 270 x 45 feet with 14 feet on the mitre sills. On the St. Lawrence canals there has been expended up to the 30th June, 1895, the sum of \$23,109,203; before Confederation, \$7,471,208; since Confederation, \$15,637,990.

The construction of the "Soo" canal was not, however, begun until 1888-9. The progress of events prevented the mistake of adopting small dimensions for the lock there. The result has been a greatly increased size of structure. The first design was for a chamber 600 x 85 feet with a depth of 16½ feet. This was subsequently altered to 650 x 100 feet, depth 19 feet; and finally, in 1892, the dimensions were fixed at a length of chamber of 900 feet, with a uniform width throughout of 60 feet and a depth on the mitre sills of 20 feet 3 inches at the lowest known stage of the St. Mary's river. The cost of this canal, up to the 30th June, 1895, was \$3,256,510. It was opened for traffic last fall. It has aided considerably in passing United States vessels, and in relieving the congested traffic at their lock. It is a noticeable fact that the Canadian trade at this point is only about 4 per cent. of the whole. The Canadian lock is a magnificent structure, and its operation by the electrical method an unqualified success. The result of the improvements at the "Soo" is to make all the four upper lakes practically one for

commercial purposes. The "Soo" lock and canal will cost about \$4,000,000 when completed.

But this reference is aside from the main object of my remarks, as we have really to consider what the prospects are for an increased trade through the St. Lawrence to our own port of Montreal when the canals (still incomplete) shall have been finished throughout to a draught of 14 feet.

The unparalleled reduction in freight rates on the upper lakes bears directly upon this point, and has been brought about by the great increase in the size and speed of the steam fleet there. To form an idea of this, it may be stated that the total tonnage of the lakes on 30th June, 1895, was 1,241,459. Of this, two-thirds were steamers, and the number of these of one thousand tons and over on the 30th June, 1894, was 359, with an aggregate gross tonnage of 634,467. In the lake ship yards this winter (1895-96), there will be built 65 vessels of all kinds, at a cost of about \$8,500,000. Thirty out of the sixty-five are steel freight vessels, twenty of them being steamers. These thirty vessels will average 400 feet in length, and the cargo capacity will average nearly 4,000 tons on a draught of 14½ feet. One of them is 432 x 48 feet. They will cost about \$200,000 each. The total carrying capacity of the 42 freight vessels is, on 14½ feet, 136,600 tons gross. Allowing the average number of trips during the coming season, this addition to the fleet will carry about two and a-half millions of tons of iron ore or coarse freight.

As a consequence of all this, grain is now carried from Chicago to Buffalo (870 miles) at about half the cost of 1886. In 1886, the season's average on wheat between these points was 3.6 cents; in 1894, it was 1.2 cents; in 1895 the average was 1.9 cents; but in July last it was carried for 1 cent. It must also not be forgotten that between Duluth, Chicago and Buffalo, works are now in progress which will in the near future secure a channel 20 feet in depth between these points, and this will surely eventuate in a still further and large reduction in lake freights.

A remarkable change has taken place in last year's grain business between Buffalo and New York. In 1894 the Erie Canal carried 42,608,700 bushels; but in 1895 this had fallen to 14,612,700. The highest canal rate paid on wheat, Buffalo to New York, was 3 cents, the lowest 1½ cents, and the average 2½ cents. And yet, in the face of these prices, the railways carried double the amount of grain between the same points in 1895 that they did in 1894. It may be said, however, that \$9,000,000 have been recently voted for the improvement of the Erie Canal, and that the electric trolley system has recently proved a success in towing a small fleet of steel barges. With 9 feet in the canal, and the "emancipation of the mule," it may be able again to hold its own. At all events, its long competition with the railways has done much in the past to keep at reasonable rates the cost of grain transportation from the great West to the Atlantic seaboard, and has thereby added substantially to the prosperity of the State of New York.

Taking the probable average lake rate in the near future on wheat at 1½ cents, Buffalo charges reduced to ¾ cent, and the Erie improved at 2 cents, it is quite clear that 4 cents at the outside will soon carry 60 pounds of grain from Chicago to New York, a distance of 1,368 miles—and pay a fair profit at that.

It is this competitive rate we must face, when upon the completion of the canals to fourteen feet, we shall