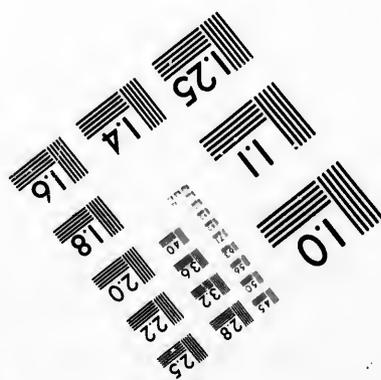
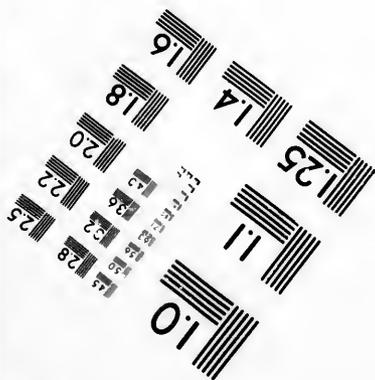
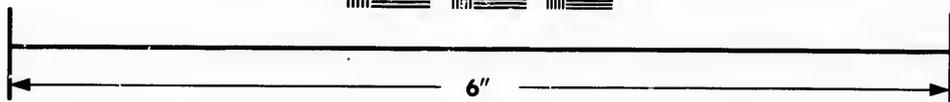
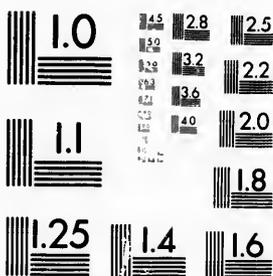


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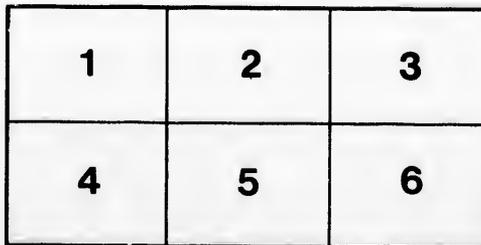
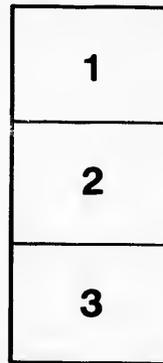
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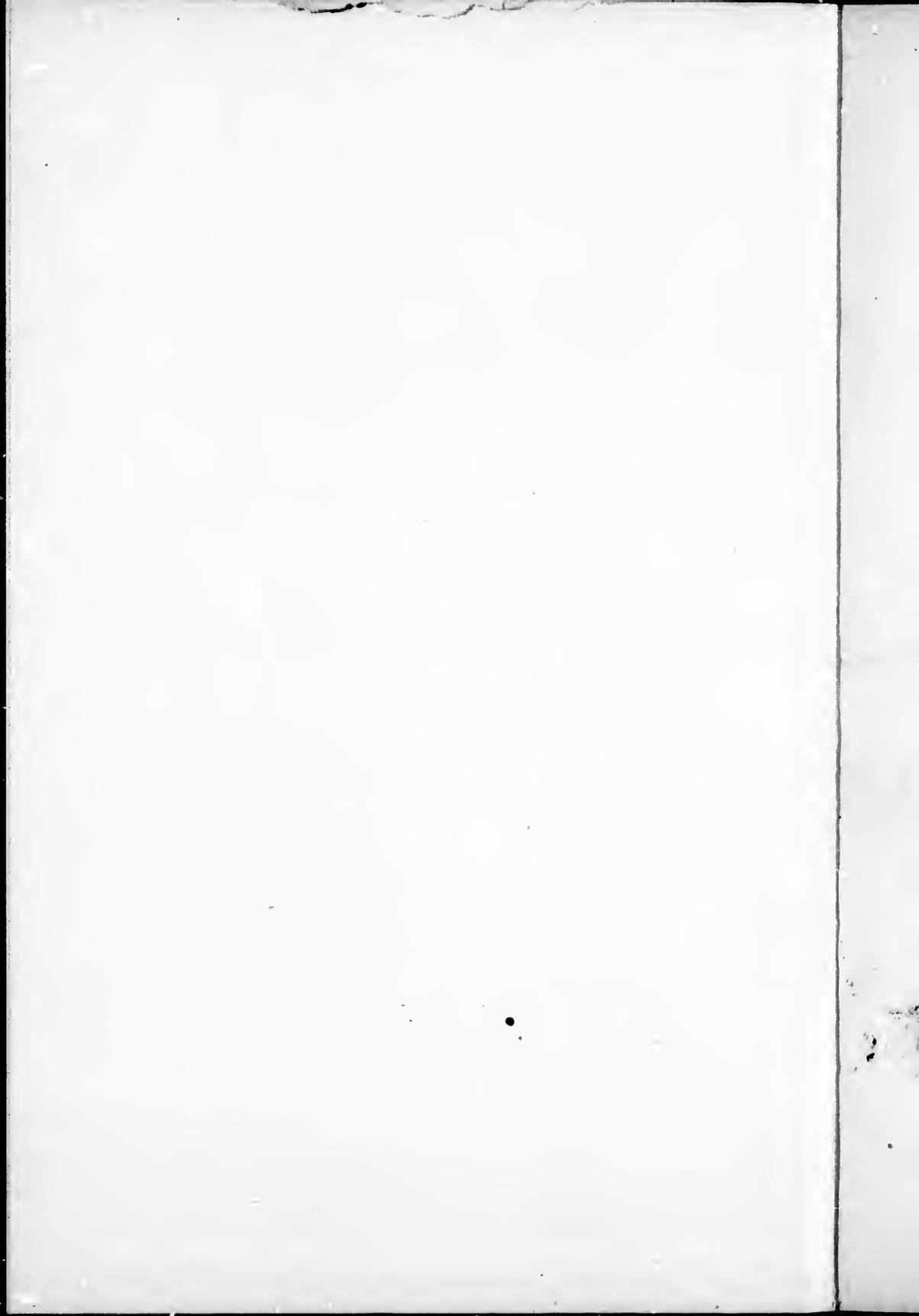
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[From Dr. Kingsford's History of Canada, Volume X.]

#### THE WELLAND CANAL.

This, the most important of the Canadian canals, connects lakes Erie and Ontario, and has within the last few years been finally deepened to a navigation of 14 feet, the locks being in length 270 ft. x 45 ft. in width. The enlarged canal is  $26\frac{3}{4}$  miles in length, with a guard lock at lake Erie (where the supply is obtained) and 25 locks of 12 to 14 ft. lift, the mean difference of elevation between the two lakes being 326 ft. 3 in. There are two distinct lines at the northern end, with two distinct entrances, which discharge at Port Dalhousie into lake Ontario. From Allanburg to Port Colborne, 15 miles, the old and enlarged line is followed to lake Erie.

In connection with the canal, there is a descending lock to the river Welland, over which the main line is carried by aqueducts. There is also a branch of 21 miles to the Grand river, the waters of that stream having been the source of supply before the lake Erie level was established, the feeder having been made navigable. A branch also of  $1\frac{3}{4}$  miles from the feeder gives an opening to lake Erie at Port Maitland. The Grand Trunk Railway passes by a tunnel under the canal, so there is no impediment to traffic on either side, and the accidents incident to railways crossing navigable channels are here made impossible.

Nearly three-quarters of a century have passed since its inception until this canal obtained its remarkable and perfect extension.

As early as 1816 a bill was introduced in the legislature for a grant for a survey. It was referred to a committee, but no report was made. In 1819 provision was made for the survey of the Saint Lawrence. In 1821 a commission was appointed to examine into the best means of improving the navigation which, in 1823, reported that the canal should be adapted to admit vessels navigating the lakes. In 1824 an act of incorporation was obtained, of which one of the most active promoters was Mr. William Hamilton Merritt. The canal designed was to admit boats of 40 tons. The capital was \$150,000, in shares of \$50 each. The work was commenced on the 30th of November, 1824: as has since been proved, on means so insufficient as to make it a matter of wonder it was ever completed. Indeed, without the constant intervention of the province, the project must have ended in failure.

We are told "as a proof of how little the subject had attracted public enterprise at the time, not half a dozen gentlemen of capital or influence in the district attended the ceremony." There had been little stock subscribed in Upper Canada. In 1836, twelve years later, the total amount was only \$14,850. It, however, had found some favour in Lower Canada and the United States. In 1825 the charter was amended to raise the stock to \$800,000, upon which the president of the company proceeded to New York, and obtained subscriptions to the amount of \$300,000.

The first theory of the route was to make a connection with the Welland river, then regarded as the virtual connection with lake Erie. It was admitted that the current of the river Niagara was strong, nevertheless that vessels could sail up against it. There are stretches, however, in the neighbourhood of the

1898

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village of Fort Erie, where extreme rapidity of current has to be encountered, and it was consequently determined to have recourse to the Grand river, which, while it would furnish the water supply, would also assure a satisfactory and quiet navigation. The locks were to be 100 ft. x 22 ft. width, 7 ft. 6 in. on the sills and 40 in number.

The work was undertaken with the design of making an immediate connection with the Welland river, the Grand river navigation feeder hereafter to be completed. The connection with lake Ontario was to be effected by the navigable Twelve mile creek, which would be followed from the lake to the foot of the higher ground, overcome by the lockage.

In 1826 the company appealed to the house of assembly for assistance, with the understanding that the connection with lake Ontario would be attained in 1827. It was stated that \$100,000 had been subscribed in Canada, an assertion that subsequent facts disclosed to be entirely untrue, and that \$300,000 had been contributed in New York. It was likewise advanced that the directors were desirous that at least a majority of the stockholders should be British subjects, consequently that a limit had been placed on the stock offered in the United States. \$400,000 had been left for the English market. A loan of \$600,000, the first in a long series of such applications, was made; 21 members voted for, 12 opposed the bill. About this period, lord Bathurst, on the part of the British government, agreed to pay one-ninth of the estimated cost, \$65,400, the equivalent being a free toll on the government stores forever. On the ground that the stock had not been sold in the London market, an appeal was again made to the legislature in 1827. No loan was asked, but the government was petitioned to take \$200,000 worth of the stock. Although sustained by the influence of the government, the bill had a very narrow escape of failure, and only passed by a majority of two, the vote being 20 to 18. On the prorogation of parliament sir Peregrine Maitland made special allusion to the work. He felt, he said, the responsibility of giving the aid that had been granted and cheerfully shared it. The conduct of the Upper Canada legislature had its effect on the Lower Canadian house, which took stock to the extent of \$100,000.

In 1828 the company continued to be in great difficulties. The estimate was that \$450,000 was required to finish the work, while the exchequer of the company had merely to rely on prospective payments coming due in shares amounting to \$84,000, and it was doubtful how much of this sum would be paid. It was evident that further application to the Upper Canadian legislature would be without effect. The imperial government was therefore appealed to; the consequence of which was that £50,000 sterling was generously advanced, on security of the tolls and property of the company. No loan was applied for in 1829. The work was, however, carried on with such spirit and energy that on the 30th of November, the anniversary of the commencement of the canal five years previously, two vessels passed between lakes Ontario and Erie, drawing 7½ feet of water, with 21½ feet of beam. The length of the canal was 16½ miles, with 34 ascending locks.

The route of that day from the Niagara river lay through a canal of 9½ miles in length, commencing a quarter of a mile west of the entrance of the Welland

river and ascending by two locks to the level of what was called the "deep cut." The level of the canal was higher than that of lake Erie, as the water supply was obtained from the Grand river, carried by a wooden aqueduct over the Welland river.

In 1830 an application was made to the legislature that the stock should be increased to \$300,000, and a loan of \$100,000 granted. The opposition in the legislature was very great. On one occasion it was moved that the second reading of the bill should be that day three months. The votes were even, 24 for and against. The speaker, afterwards judge McLean, voted in the negative. The bill was carried. Although the connection with lake Erie had been gained by the opening of the route by the Welland river, the communication was regarded as "tardy and circuitous," and it was determined to effect a direct communication with lake Erie. With this view application was again made to both houses of the legislature. On the 14th of March, 1831, the act was passed authorising the receiver-general to issue \$200,000 of the debentures as a further loan. It was much opposed, 25 voting for, 21 against. In 1832 no aid was asked. In 1833 \$30,000 was voted to subscribe for the unsold stock. In 1834 fresh legislation was called for. Representations were made that the means of the company were exhausted, that the canal was \$100,000 in debt, and that \$100,000 was required to put the canal into a complete state for use. During the next session, so unpopular was the proposition of further assistance that the committee to whom the petition was referred made no direct recommendation, but confined themselves to the hope that something might be done to place the canal in a situation beneficial to the public interest. Nevertheless, owing to the energy of the members interested, stock to the amount of \$200,000 was taken, the money necessary for its payment being obtained by debentures; and the stock was raised by enactment to a million of dollars.

An act was also passed that the affairs of the company should be under the control of four directors, three of whom should be named by the assembly. In 1835 there was no demand for money, but the lieutenant-governor, sir John Colborne, laid before the house a despatch from Mr. Spring Rice, the colonial minister, that he could not recommend to the imperial government to cancel the loan of £50,000 sterling, in accordance with the vote of the assembly, which had asked this concession. Messrs. Thorburn, Duncombe, and Mackenzie were the directors appointed.

We are indebted to their labours that the history of the construction of the work has been preserved. There was a feeling of general dissatisfaction regarding the undertaking. On all sides, its completion was regarded as indispensable to the well-being of the province. On the other hand, there was a want of confidence in the management. There had been a continual call for assistance from the public chest. The canal had been constantly represented to be on the eve of completion, but it had never been finished. The committee reported in 1836 that the amount of subscriptions proved that the work had been commenced literally with an empty exchequer. The following concise statement of the property in the canal, as it was held by individuals and the public, was appended to the report :

	£	s.	d.
Loan by Great Britain (provincial currency)..	55,555	11	2
Loan by Upper Canada.....	100,000	0	0
Stock taken by provincial legislature .....	107,500	0	0
Stock taken by Lower Canada.....	25,000	0	0
Stock in England by private individuals....	30,137	10	0
Stock in United States by " "	69,625	0	0
Stock in Lower Canada by " "	13,825	0	0
Stock in Upper Canada by " "	3,712	10	0
Stock in New Brunswick by " "	500	0	0
	<hr/>		
	£405,855	11	2
Advanced this year (1836) by parliament.....	2,000	0	0
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Total.....	£407,855	11	2

The cost of the work was set forth at £425,213 3s. 5d., less £100, the balance in hand 30th December, 1835.

In 1836 a select committee, appointed on the petition of the company, recommended that the canal should be made a public work, and the receiver-general should issue debentures for the stock owned. A second report set forth that the amount required to make the canal strictly a public work was £814,319 6s. 2½d. [*sic.*] Of this amount £200,000 was estimated as necessary to the completion of the canal, the wooden locks to be replaced by stone structures. On the 11th of January, 1837, resolutions on the subject were carried by large majorities. They affirmed the great importance of the canal, the necessity of its completion in a substantial manner, and the substitution of stone locks; £200,000 was voted for this purpose: £117,800 to purchase the stock held by individuals, £25,000 to enable the company to pay its liabilities, and £20,000 to purchase the hydraulic works held by private individuals.

Although it was seen that the canal must eventually be transferred to the province, the legislature at this date did not accept the full responsibility of this policy. The government was, however, authorised to subscribe for \$980,000 additional stock, and the total amount of stock was determined at £597,300 (\$2,389,200).

The troubles of 1837 and 1838 intervened to prevent further legislation, but in 1839 it was voted that the private stock should be purchased, and the canal become the property, and be under the management of the public. The amount of stock held in Canada was £31,712 10s. od. (\$126,850), while the total amount was \$471,200, so that the vote was as just and honest as it was politic. The act did not receive the royal assent until the first session of the union parliament, 5th of July, 1841. The total amount of expenditure prior to the union is given in the annual report of 1867 as \$1,851,427.77.\*

After the union of 1841, the first enlargement of the canal was effected. The proposition was to construct locks in accord with the navigation of the Saint

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\* [Annual Report of the Commissioner of Public Works, 1867, p. 482.]

Lawrence, 200 x 45 x 9 ft. on the sills. The money was to be obtained by a guarantee given from the mother country. Lord Sydenham, the governor-general, formed the opinion that the expense would be too great. He considered that the locks as they were then designed, 150 ft. x 26.6 x 10 ft., could sufficiently compete with the Erie canal route. In view of the defence of the province, locks of 200 ft. x 45 ft. x 9 ft. were constructed at the entrance lock at Port Dalhousie, lake Ontario, and also lock No. 2, so that Saint Catharines can be reached by the larger class of propellers: and at the guard locks at Port Colborne, and Port Maitland, to admit such vessels, in case of need, finding refuge in the canal.

In lord Sydenham's day the wonderful traffic of the west was never even surmised. To have foretold it a quarter of a century ago would have appeared an exaggeration which might have been compared to the fabulous narratives of the Arabian nights. It has, nevertheless, surpassed all calculation and expectation. The work of the second enlargement of the canal was begun in 1873. A mixed commission had been appointed in 1870, to examine into the policy of affording greater facility by the Saint Lawrence route. The report recommended the adoption of a lock 270 ft. in length, 45 ft. in width, with 12 ft. of water on the sills. It is difficult to explain why this length was determined, for even now modern criticism affirms that it is insufficient. In 1870 the Boards of Trade both of Chicago and Milwaukee had advocated a depth of 15 ft. and a lock of the length of 300 ft. This view, I am afraid it must be said unfortunately, was not accepted, and it is to be feared that it is not to the advantage of Canada that it was not regarded. The new canal, so constructed to the 12 feet navigation, was filled on the 27th of August, 1881. The first vessel that passed through was the United States steamer "Don. M. Dickinson," in tow of the Canadian tug "Harvey Neelon," on the 15th and 16th of September of that year.

In 1886 the representations of the necessity of deepening the canal to 14 feet were accepted as calling for further enlargement. At the close of the navigation of that year, this work was undertaken and carried on through the winter. On the 30th of May, 1887, the propeller "Newburgh," drawing 14 feet, passed through the newly deepened channel from Port Colborne to Port Dalhousie.\*

During the ten years the enlarged canal has been in operation the traffic has chiefly been that of vessels proceeding to Ogdensburg. The propeller engaged in this trade is 240 feet long, 42 feet beam end, drawing 15 ft. 6 in. of water, carrying 2,100 tons. To pass through the Welland canal, the vessel has to be brought to the required draught of 14 feet, and this lightage costs 2 cents per bushel of grain.

The propeller of 270 feet is still a matter of the future. It is conceived that a steel built vessel and consort, aggregate capacity of 4,500 tons = 150,000 bushels, passing with unbroken bulk from lake Superior to Montreal will so reduce the charge of freight as to ruin the trade to the Saint Lawrence. To what extent, is the problem to be determined by experience. Moreover, it is held

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\* Consequently the several enlargements to the canal have been as follows:— first lock, 110' x 22' x 7½'; second, 150' x 26½' x 8½'; third, 270' x 45' x 12'; fourth, 270' x 45' x 14'.

such vessels will have a fair chance of carrying no small share of the up freight, even with the formidable influence of the Canadian Pacific Railway against them. Until the enlargement of the whole line of the Canadian canals is complete, the advantage of the Welland, as constructed, must remain undeveloped. The cost of the whole line, brought to the depth of 14 feet lowest horizon, will then have reached the immense sum, for a community with the resources of Canada, of fifty-five millions. It is anticipated that in three years this through route will be established.

I trust I may be permitted to say that the first proposal for deepening the canal to its present depth, 14 feet on the sills, proceeded from myself in 1865. "The Canadian Canals," published in Toronto at that date, was the first to suggest and advocate this policy. No recognition has ever been made of the fact. As it has remained unacknowledged, so it has been left without reward. What recompense I may now look for is that which posterity will see fit to give to my name. I feel it a duty to my own reputation to make this claim in the distinct language in which I express it.

In the compilation of this note, I must acknowledge my obligations to the address given by Mr. Monro, engineer in charge of the Soulanges canal, on his retirement from the office of president of the society of Canadian engineers, on the 15th of January, 1896.

I know no paper that in so brief a space gives so well digested and able a view of the navigation of the Saint Lawrence, or more accurately advances the modern principles to be observed in the construction of canals, by which cost may be reduced and efficiency obtained.

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