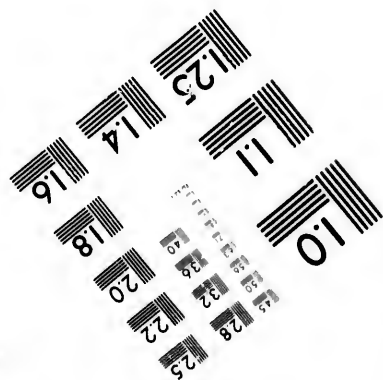
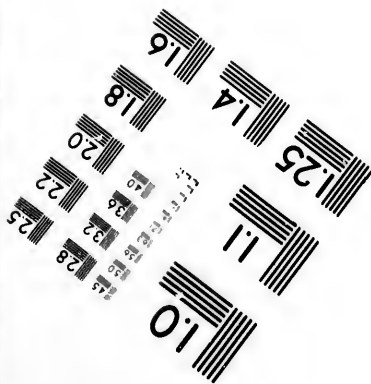
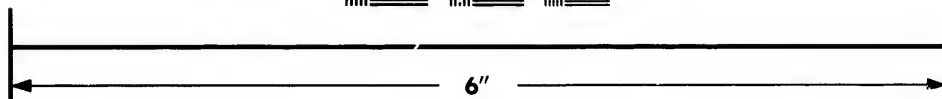
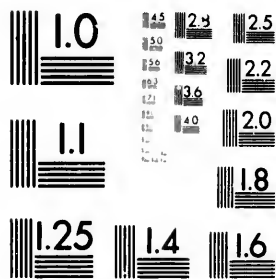


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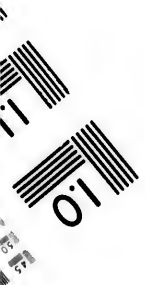
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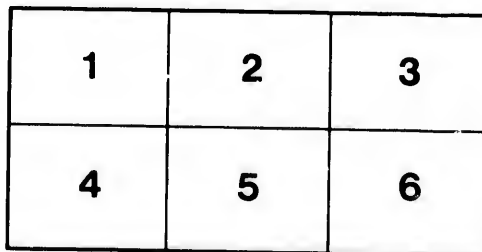
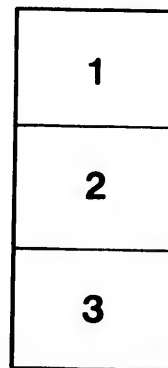
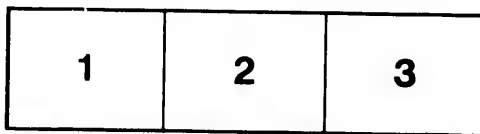
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THE
NORTH AMERICAN CANAL.

AN ADEQUATE OUTLET
FOR A CONTINENTAL COMMERCE.

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THE NORTH AMERICAN CANAL.

AN ADEQUATE OUTLET FOR A CONTINENTAL COMMERCE.

The object of the North American Canal Co. is to make the best, cheapest and quickest possible transportation between the widely separated masses of producers and consumers ; to make a wide, deep channel, with the fewest possible locks, between Lake Erie and the seaboard ; and thus to make one mingled current of the shipping of the Great Lakes, the St. Lawrence, the Hudson, and the Coast.

We propose to enable the Western farmer to load his products on a deep draft steamer at the head of the great lakes and deliver it direct, without rehandling, to the ocean steamer for export ; and similarly to directly supply by steamer the great centres of distribution for the vastly larger domestic trade of the eastern part of the continent.

Neither tariffs nor taxes nor reciprocal treaties can help the producer without the means to take advantage of them. Cheap transportation is his only boon.

An adequate water route between the great lakes and the seaboard, giving the cheapest possible freights, is an imperative necessity.

Existing methods of handling commodities are too costly : hence the Western producer can only realize half or less than half the price for which his produce sells in the Eastern market ; while he pays very high prices for what he buys.

Transportation and rehandling eat up so much of the value of his produce, and so raise the cost of his necessities that the producer has no living margin of profit. One bad season puts him in debt ; and thereafter interest eats up his narrow margin and each year he becomes more involved until his only remedy is bankruptcy and migration. The old home is sacrificed ; and the discouraged farmer seeks on new soil a new stage setting for the rehearsal of the old sad play.

A few examples will show how the western farmer will benefit by better and cheaper methods of handling commodities.

The farmer gets but 40 cents per bushel for wheat which sells at the seaboard for 85 cents ; while anthracite coal, which costs \$1.25 per ton to produce, costs him \$7 to \$9 a ton. The farmer, getting 40 cents per bushel for an average crop of 15 bushels, gets but \$6.00 gross per acre ; if he farms 160 acres his gross earnings are \$960 a year.

We expect to save $2\frac{1}{2}$ cents per bushel freight charge on his grain, and something on return freights, besides two or three re-handlings ; a total saving of at least five cents per bushel ; or 75 cents per acre ; or \$120 on \$160 acres ; or $12\frac{1}{2}$ per cent added profit on his business.

The farmer gets a yet smaller part of the final price of meat. If the cattle are sent live, he has to pay high railroad freights unaffected by water competition. If they are dressed at Chicago he has to pay high freights and the cost of re-icing the meat cars five or more times.

We will enable him to ship live cattle by steamer as quickly as by rail, and far cheaper and better ; while dressed meat will be

taken from the cold storage of the abattoir in cold storage on the steamer to the cold storage at the place of consumption, delivering the meat in the best condition for a quarter the present freight charges ; which saving will go to the farmer, and add so much to his profits.

The benefit to the farmer will not be limited to increased profits on the crops he now sells. Other crops, such as straw, which he cannot now market will be saleable. It is pretty hard on the farmer in Manitoba to read that straw sells for \$20 a ton in New York, and is worth nothing to him. To so reduce freights and other charges as to make straw worth \$5 a ton where it is now worth nothing would raise the farmers from penury to comfort, and do more than a thousand emigration bureaux to populate the North-west.

Nor will the benefits be limited to the Western farmer. The farmer in Ontario will be able to send his fruits, vegetables, meats and other high grade products cheaply and quickly, by steamer, with cold storage, to the best markets in the world, and there to command the best prices because his products will be in prime condition. All classes and callings will be equally benefited. Trade will feel the all powerful stimulus of perfected transportation arrangements.

Quebec and Ontario in particular will be benefited by having a short outlet to the South. The trade with the West Indies, the Central and South American Coasts, and the United States Coast, which is now hampered by the expense of railroad freights and re-handling at New York, will be done direct. Steamers will leave Toronto and Montreal loaded with Canadian products destined for these countries ; and return with cargoes of sugar, rubber, coffee, dye-stuffs, tobacco, etc., thus creating a direct and profitable commerce between the Northern and the Southern climes.

At first thought it might appear that such a resolution in the carrying trade would injure the railroads. This, however, will not be true. The great increase in volume of trade resulting from

cheap transportation for low grade freights will so augment the volume of high grade and fast freights that the railroads will carry more freights and make more money than they do now.

GENERAL FEATURES.

To reduce transportation to the lowest possible cost we propose to make a navigation as free from detention as any lake or river. To that end the channels will be so wide and deep that the largest lake vessels can steam through them at full speed, there being sufficient current to neutralize as far as may be, the formation of waves; there will be the least number of locks, but seven between Lake Erie and the terminals, and but four between Montreal and New York, and the locks will move two vessels at a time, one ascending while the other is descending, the speed being as great as is consistent with safety; the double balanced locks being built of steel and operated by compressed air at $11\frac{1}{2}$ lbs. pressure per square inch. The principle of the locks is the familiar one of weighing in a scale, the locks representing the scale pans and the compressed air the scale beam; and the motion being caused by a small *difference* in the total weights of water in the locks, just as the motion of a scale is caused by a smaller difference between the weight and the object weighed.

The lowest lift will be 45 ft. at Montreal; the highest 95-98 ft. at Troy. The average lift will be 72 ft. All the locks, except that at Montreal, will have duplicated working parts, and the same pressures of water and air, and the lock gates will be duplicates. At Montreal the lock and canal will admit vessels of 27 ft. draft, and Montreal Harbor will be practically extended to Lake St. Louis; to the great cheapening and bettering of facilities for handling freights.

Ample harbors and terminal facilities will be provided wherever desirable. It is probable that cable towing plants will be installed in the canals.

THE ROUTE.

It is proposed to widen, deepen and straighten the Welland Canal from Lake Erie to a point just south of the existing locks, which will be undisturbed, and thence turn toward the Niagara River, descending the escarpment with two lifts and make a long level, to be called the Niagara Section, reaching to the Niagara gorge, the descent into which will be made with two lifts. The route from Erie to Ontario will have two long levels and 4 lifts, and a vessel will traverse it in 4 hours.

The Niagara and St. Lawrence Rivers will be improved, no canals or locks being necessary until the Cornwall Canal is reached. The summit level of the Cornwall Canal will be improved and the descent therefrom to Lake St. Francis made with one lift of 48 feet. From the south-eastern corner of Lake St. Francis a canal, to be called the Chateaugay Section, will be made across the valley of that name, descending to the Champlain level with one lift of about 55 feet.

From the Chateaugay Section an arm, to be called the St. Louis Section, will descend the Chateaugay valley, coming out on Lake St. Louis probably at Caughnawaga, the descent from Lake St. Francis, 82 feet, being made in one lift.

The Lachine Canal will be widened and deepened to a point just above St. Gabriel's Lock, whence a new canal will be made through the high land adjacent to the river to the head of the new harbor in Montreal, where will be one lift 45 feet high, the locks being 27 feet draft, 60 feet wide, and 450 to 500 feet long.

The canal will also be 27 feet deep, and make an inner harbor extending to Lake St. Louis, and ample for the commercial growth of many years.

The reasons for adopting the route from Lake St. Francis to Lake Champlain, and making an arm therefrom to Lake St. Louis, are as follows :—

1. The route from Montreal to New York, and so to the West Indies, etc., is some 40 miles shorter. It is to be expected that this southern outlet will prove as valuable to Montreal as the St. Lawrence route to the Sea ; it must, therefore, be as direct as possible.

2. The canal can be abundantly supplied with water from Lake St Francis instead of insufficiently from Lake Champlain. Any other plan would call on Lake Champlain to supply water for three canals and the Richelieu River, to which demands its supply is inadequate.

THE WORK IN NEW YORK STATE.

It is proposed to obtain a charter from the State of New York, and make a canal, to be called the Hudson Canal, from Lake Champlain to tidewater in the Hudson River. There will be one lift of about 95-98 feet. No United States charter or other action or favor from the United States Government will be required, as the work will be entirely within the State of New York.

COURSES.

A vessel leaving Lake Erie will descend to the Niagara River and Lake Ontario, descend the St. Lawrence, the Cornwall Canal and Lake St. Francis, pass via the Chateauguay and St. Louis Sections and Lake St. Louis and the Lachine Canal to Montreal. Her time will be 32 hours. If she be destined for New York her total time will be 60 hours—28 hours longer ; and she will continue her southerly course via the Chateauguay Section, Lake Champlain, and the Hudson Canal and River.

A vessel leaving Montreal for the West Indies or other Southern ports will ascend the Lachine Canal, cross Lake St. Louis, and reach the open ocean via the St. Louis and Chateauguay Sections, Lake Champlain. and the Hudson Canal and River.

DISTANCE AND TIME.

Between Port Colborne and Montreal will be 7 locks and 365

miles, or 32 hours' navigation.

Between Port Colborne and New York will be 7 locks and 706 miles, or 60 hours' navigation.

Between Montreal and New York will be 4 locks and 360 miles, or 33 hours' navigation.

THE LOCKS.

The excellence of this project depends upon the new type of lock which will be used, rendering practical and highly advantageous lifts 4 times as high as any hitherto constructed.

GENERAL DESCRIPTION.

The Pneumatic Balance Lock is primarily a steel caisson of tank structure, working up and down in a water well or pit formed in the lower level of the canal. Compressed air is the motive agent. In all the proposed works the pits will be sunk in rock. The cost will therefore be a minimum; and there is no element of uncertainty.

The tanks or caissons will be balanced in pairs, each caisson having an upper gated lock chamber adapted to retain the vessel to be locked and water to the stated depth (say 27 feet); and a lower open-bottomed air chamber containing compressed air which is retained by a water seal formed by the immersion of the lower walls of the air chamber in the water of the pit, as in gas-holders. The air chambers of the caissons are connected by a valve-controlled conduit.

The locks operate oppositely (one up and one down) and synchronously, there being a sensibly constant volume of air contained in the two, and kept at a uniform pressure above the atmosphere, the disturbance due to thermometric and barometric changes being compensated by a small equalizing tank weighted to give the proper working pressure.

For purposes of stability and economy of construction and

facility and certainty in operation, only 95 per cent of the weight is carried on the compressed air, and 5 per cent is carried on a hydraulic auxiliary system which levels, actuates and controls the locks, absorbs the unequal pressures due to wind and wave action and removes all the detrimental features incident to a purely pneumatic system; and adds the good qualities peculiar to hydraulic power. This combination avoids the objectionable features inevitably to be encountered were either hydraulics or pneumatics made the sole reliance.

THE GATES.

The type of gate proposed to be used is a modification of the familiar pontoon gate, used in dry docks. It is built of steel, very simple in construction and is operated by a pinion and wheel, as draw bridges are operated. All the gates are duplicates, and while so simple and strong as to be practically safe from damage, an injured gate can be removed and replaced in a very few minutes.

OPERATION OF THE LOCKS.

The depressed lock contains the stated depth (say 22 feet) of water, and the hydraulic and pneumatic connections are closed; the elevated lock contains a maximum depth (say 23 feet) of water and is consequently (say) 4 per cent heavier, and its pneumatic connection is open and its hydraulic connection is shut.

The depressed lock merely floats, like a pontoon. The elevated lock is supported partly by the air pressure and rigidly by the hydraulic auxiliary. If now the lock gates be closed and the valves operated, the heavier elevated lock will descend and elevate the lighter depressed lock, reversing their relative positions—the principle being that of weighing in a scale.

Attention is especially called to the reduced necessity for re-handling and the consequent saving in commissions, terminal charges, etc., which will be effected by this project.

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possible rail haul ; and to most of the important distributing centres with no rail haul whatever.

A vessel loaded with flour, provisions, lumber, or other cargo at Montreal, Chicago, or any point on the great lakes or the St. Lawrence, will enter Lake Champlain and the Hudson, and reach Burlington, Troy, Albany, Fishkill, Newburg, New York, Brooklyn and Jersey City, touching the terminals of all the important east and west railroads in the New England States, New York State, New Jersey and Pennsylvania. Continuing her voyage through Long Island Sound and around the East Coast she will reach Bridgeport, New Haven, Hartford, Providence, Fall River, Boston, Portland, Bangor, and the coast terminals of every railroad in New England.

If her course be southerly from New York she can pass through the proposed Hudson and Delaware Canal to the Delaware River and Bay, and reach Philadelphia, Camden, Chester and Wilmington ; and passing through the Delaware and Chesapeake Canal into Chesapeake Bay and its waters, reach Baltimore, Washington, Norfolk and Richmond. Continuing her southerly course she can pass through Albemarle and Pimlico Sounds ; and before many years can navigate through inland waters from Duluth to the Florida Keys and deliver her cargo direct or by the shortest possible rail haul to the vast armies of consumers between the Allegheny Mountains and the Sea. It must be borne in mind that practically all the people on this part of the Continent are consumers of Western produce, not even excepting the farmers, most of whom buy food for themselves and for their stock, and raise more profitable crops. It may seem that great stress is laid upon the gains in domestic trade and little attention paid to the export trade.

The facts justify such a treatment. The total annual exports of agricultural products from all the coasts of the United States for the past three years have averaged \$670,000,000, of which \$266,714,310 was cotton ; the values being taken at the port of

export. The total annual value of the farm products of the United States is about \$4,500,000,000 *at the farm*. If the exports be diminished by the cost of handling them, or the value of the farm products be increased to their value at a port of export, it will be seen that the ratio of exports to farm products is about as 1 to 13½, or say, 7½ p.c. If the comparison be extended to include forest, mineral, and manufactured products the ratio of exports to products becomes even less. The total tons of exports are not one per cent of the total tons of domestic freight movement. If all the tons of freight moving in the export and import trades of the entire American Continent were to pass through the projected waterways, the tolls therefrom would not pay 2 per cent on the cost. The domestic trade is the trade which justifies the outlay. The disproportion between domestic and foreign trade is not likely to decrease but rather to increase. The North American Continent will become less and less an exporter of food products. Unless all signs fail, we will see the day when we will use all our own breadstuffs and our agricultural exports will be principally cotton and meat.

As the future agricultural development of Canada must be principally in the line of breadstuffs, and as the nearest and best markets will be in the United States and the West Indies, &c., the Southern outlet afforded by this project must be increasingly valuable to the farmers and millers of Canada. It even now rivals the St. Lawrence outlet in the value of the commerce moving over it: the total value of the foreign trade *via* the St. Lawrence being \$78,261,124, and the commerce southward, with and by way of the United States, reaching \$77,626,220; but the tonnage of the southern route probably greatly exceeds that of the St. Lawrence, as the commodities sent and received thereby are of a coarser grade, such as coal, lumber, etc.

Important as the Southern route promises to become. The route to the West is not less so to Montreal.

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in the territory commercially tributary to Montreal sets the limits of her trans-Atlantic trade ; and her commercially tributary territory is much reduced by the cheaper freight rates prevailing at New York. These facts being recognized it logically follows that there are but two ways in which Montreal's trans-Atlantic trade can be increased, namely :

1. By increase of population in the territory now commercially her tributary ; and
2. By the enlargement of her commercially tributary territory.

The second is the speedier way ; and can only be accomplished by some project which will make western freight rates less from Montreal than from New York. The proposed deep-draft canal is such a project.

It will give Montreal 28 hours or 45 p.c. advantage over New York to all points west of Lake Ontario.

This will enable Montreal to lay down cargoes cheaper than they can be laid down from New York in Buffalo, Cleveland, Detroit, Chicago, Milwaukee, Duluth and other railroad terminals of the Great Lakes. At present Montreal cannot compete with New York or Philadelphia or Baltimore in any of these points, consequently no part of the United States is commercially her tributary.

To give Montreal such transportation facilities as we propose to do will enable her to receive from Europe, tranship in bond, and lay down in the lake ports, at the great railroad terminals, for eight months of the year a large proportion of the imports destined to be consumed by the residents of the great and populous States bordering on and west of the great lakes.

Thus obediently to natural laws, the commercial possibilities of Montreal in trans-Atlantic trade will be many times enlarged and her prosperity be firmly rooted in that of the great reservoirs of the wealth of the Great Republic.

Thus, and only thus, can the trans-Atlantic trade of Montreal be augmented independently of the growth of population in Ontario and Quebec.

To unite the Lake and River shipping with that of the coast will greatly benefit the maritime interests. Direct east and west traffic between the now widely severed provinces will be stimulated to large and healthy growth. A schooner, leaving Halifax or St. John with fish, lumber or ice can sail to the West Indies, dispose of her cargo and take on a cargo of sugar, tobacco, coffee or asphalt and carry it to New York: there discharge and take anthracite coal for Montreal; and at Montreal take on flour and provisions for her home port, catching four good cargoes in one trip.

THE FINANCIAL MEASURES.

It may seem a striking innovation to propose a bonded debt twenty times as large as the common stock: or, counting the debenture stock as bonded debt, twenty-four times as large.

A little reflection, however, will convince anyone that this is sound financiering. Practically all works nowadays are built with the proceeds of the bonds; and the bondholders get a majority interest of the stock as a bonus. The money paid on the stock is merely enough to cover the expenses of promoting the enterprise to that stage at which it becomes attractive as a permanent investment.

This being true, why make a vast stock issue? A large stock issue must make the enterprise more difficult to start, more speculative in its nature, and more likely to become the football of the stock exchanges; and must result in excessive tolls, levied in the attempt to raise the price of the stock and bearing on the producer with unjust severity.

The small stock issue together with the clause in the charter limiting the earnings of the common stock, insures the lowest possible tolls: tolls which will just pay interest on the actual money spent.

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