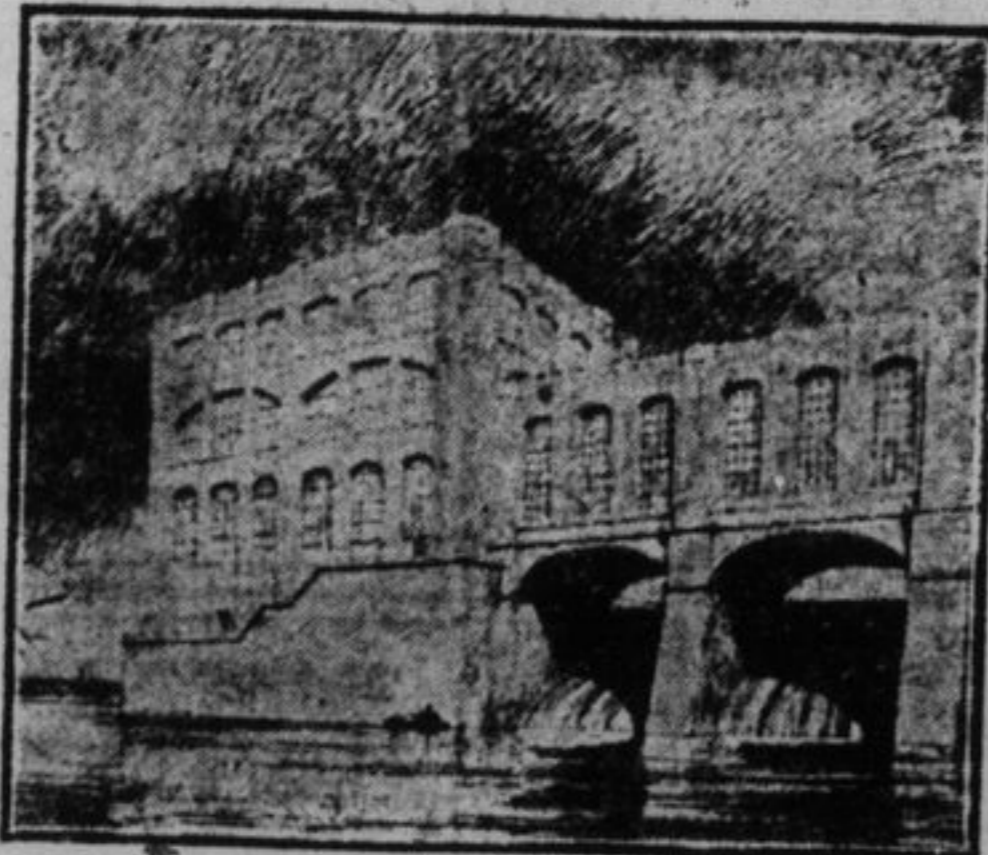


Great St. Lawrence River Water Power Project

For generations a dream of the engineers of the country has been the harnessing of the St. Lawrence River. Like the building of the Panama Canal, it remained in the dream stage for many years. Long dismissed by the cautious as a task too huge to be attempted, the St. Lawrence project is now being seriously considered.

For the last eight or nine months hearings have been held in different parts of the United States as to the best use for navigation and power purposes of the St. Lawrence River. These hearings have been held before the International Joint Commission, composed of three members from the United States and three Canadian members, who were originally appointed for the purpose of adjusting all differences between the United States and Canada respecting boundary streams. The Commission has now before it for consideration recommendations that, if adopted, will mean, probably, the eventual building of five dams in the St. Lawrence (two internationally located and three wholly in Canada), which will produce, when completed, 5,000,000 horse power, 4,000,000 of which will be available for use in Canada and 1,000,000 in New York state and vicinity. The cost of construction is figured at approximately \$1,300,000,000.



Part of One of the Proposed Dam Structures.

The projected dams and power houses at different points in the St. Lawrence will, according to experts, release within a radius of 300 miles (which includes most of New York state and Northern New England, as well as large areas in Canada), power at less than half the cost of present steam power, thus relieving the coal situation and providing new resources of power for lighting systems, traction systems and all kinds of manufacturing undertakings. Instead of the present slack water navigation between Montreal and Lake Ontario, and the score of locks now in use along the 120 miles of the St. Lawrence, there will be only six locks, making vast open stretches for speeding up navigation.

Through this series of dams and power houses it is believed that it will be possible to increase the flow of the St. Lawrence River by controlling the level of Lake Erie. Where now a minimum of 150,000 cubic feet of water per second must be figured on this vast project undertakes to "balance the flow" of the St. Lawrence River, using Lake Ontario and Lake Erie as reservoirs, and thus make available for navigation and power approximately 200,000 cubic feet per second.

Of course the engineering difficulties to be met with are gigantic. The first steps have already been taken in using diamond drills to find rock bottom on the river bed, approximately sixty feet below the surface of the water. The depth of foundations at the proposed sites, and the general difficulties incident to uncovering these foundations, are matters which complicate the undertaking.

Another problem to be met is that of ice on the river. The proposed plant must be so designed that it can safely and automatically handle as much as 3,000 tons of ice per minute, an amount equal to a trainload of ice three-quarters of a mile long every minute. Ice defenses to break

up blocks are necessary. In addition, the masonry around the control system through which the water rushes must be heated to a temperature above 32 degrees Fahrenheit, so that the water will not freeze on the masonry and block the flow.

Revolving pieces of machinery weighing a million pounds must be so accurately constructed and installed as to maintain clearances not to exceed two one-thousandths of an inch. Special tools and special cofferdam construction, costing in the aggregate more than \$25,000,000, must come into commission to achieve the desired results. Automatic governors will have to be perfected capable of instantly controlling the quantity of water used through the turbines for all of the various load changes incident to the distribution of the power over more than 2,000 miles.

These are a few of the problems that the projected plans must meet. The first section to be built will be a great dam and power house stretching across the St. Lawrence from the American to the Canadian side. Such a structure will cost approximately \$200,000,000. This dam by itself will release power over a large area. One of the comforting features of the project when the tremendous sum to be raised by private capital to finance the work is complete in itself and justifies its own existence. Yet each section, useful in itself, is but a part of a vast scheme, sometimes said to be three times as great an undertaking as the building of the Panama Canal.

Complete plans for the work extending over five years or more have been drawn up by the offices of Hugh L. Cooper of New York. Mr. Cooper, who is an expert hydraulic engineer and who built the Mississippi Water Power Project, says: "No engineering proposal in the past even approximates in magnitude and far-reaching influence upon the general public the engineering proposal that is now before the International Joint Commission with respect to the St. Lawrence River. Aside from releasing 5,000,000 horse power, the engineering plans will show and competent engineering authorities will agree that the problems of preserving the scenic beauty at Niagara Falls and facilitating navigation on the Great Lakes

system while bringing to highest development the water powers of the region may be solved in a way that will stand one as a world monument to engineering—an achievement compared to which all past achievements, however great they seemed at the time of the accomplishment, will look small.

"The World War has removed from the normal available man supply more than 20,000,000 men. Probably 85 per cent. of these men belonged to the laboring class. As time goes on engineers must provide substitutes for the loss of man power, falling on a lower standard of living. In this problem all branches of engineering will make a contribution to relieve the situation. The civil, the railroad, the mechanical, the mining and the hydraulic engineer will each come forward with new projects.

"It has been known for a long time that one of the quickest helps for this labor shortage will come from the hydro-electric engineering branch of the profession. The farmer, the manufacturer and the general public all need labor and are therefore vitally interested in everything that will increase this supply. The extent to which the public interest is dependent upon power, while generally admitted, is but little understood. Our modern civilization requires, normally, one horse power for every five of its people. Every twenty-five hydro-electric horse power saves for one year the labor of one man engaged in producing steam horse power—when we come to figure all the expenditures from the mine to the ash heap. To produce any given quantity of electrical energy, using steam as a prime mover, requires seventy times as much man power as is required where hydro-electric power is the prime mover. Every hydro-electric horse power saves, on the average, ten tons of coal per annum.

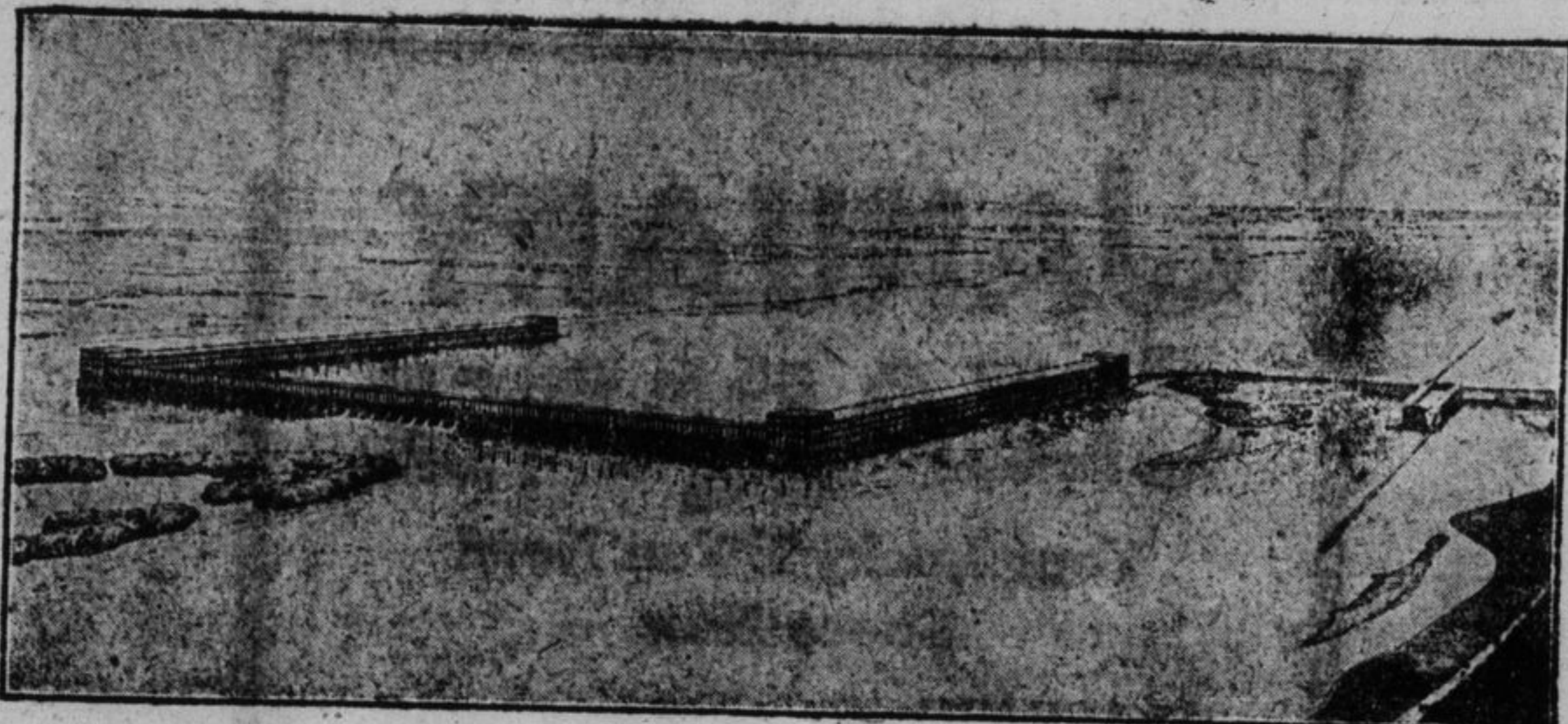
"This is to show how the public is dependent upon and interested in the most efficient development of all undeveloped water-power resources. The American Congress, after ten years of debate, has finally passed a Federal water power law that provides for the leasing of undeveloped water power sites to private capital for a period of fifty years on terms

that absolutely protect the public and capital, and on terms where rigid regulation of rates and service is fully guaranteed.

"Before this time development has been blocked in the St. Lawrence by the laws of the United States. Also, 1340, the ordinary water wheel had an efficiency of 50 per cent. Today it is 80 per cent. In 1890 transmissions of power ten miles were considered marvelous. Today transmission of 250 miles is quite feasible. This great transmission reach brings into consideration a market that will justify the vast expenditure required for the initial installation on the St. Lawrence. In my opinion the application of present-day standard engineering practice to the St. Lawrence will result in the generation of power on the St. Lawrence at a price less than it can now be produced at Niagara Falls, and thus give to Eastern New York and Canada advantages, with references to cheap power, like those hitherto supposed to belong exclusively to Niagara Falls, the great natural water power machine of the American Continent.

"Another thing—this project will relieve the coal situation. It is greatly in the interest of the United States to see that Canada is relieved from her present necessity of purchasing coal in the United States. The development of six and one-half million horse power will substitute sixty-five million tons of coal per annum in the zone easily within transmission distance. The saving of this coal in the United States and Canada will reduce the price of coal to the household consumer and to the remaining steam-power consumers. It is a striking fact that hydro-electric power reduces the cost of the commodity against which it has to compete and thus intensifies the competition. High coal prices are driving industry out of New York and preventing expansion in the State of New York and in Canada. In the zone reachable from the St. Lawrence practically all of the elements needed for a great industrial expansion are now available—all except cheap power.

"Many honest friends of the Erie Canal are afraid that the improvement of the St. Lawrence will reduce the amount of freight handled by the canal. The great trouble with the Erie Canal today, without the St. Lawrence improvement, is that it has no justifying tonnage through it. If you can make available for industry all along the 356 miles of the length of the Erie Canal cheap electrical power (and by cheap I mean as cheap as it can be had from Niagara Falls), then you will have in such a facility, together with cheap navigation in a country thirsty for industrial expansion, an amount of new business in actual tonnage of raw-materials-in and manufactured-materials-out that will make the whole canal zone a great big industrial success instead of the apology that it now is. The tonnage that will thus come to the City of New York will be much greater in amount and value to the City of New York and to the canal than would be represented by possible diverted freight through the new St. Lawrence route."



Proposed St. Lawrence River Water Power Dam to Cost \$200,000,000.

What We Need
The Joseph (Ore.) Herald.
What we need in this country is something that will induce us to make the best of what we have.

Criminal Carelessness in Building
Bantford Express.
According to the New York Herald, 1,500 men, women and children are burned to death every year. "A few of these deaths are the outcome of unavoidable misadventures which human prescience could not foresee, and human ingenuity could not guard against," but most of them arose from causes easily preventable, and too often from criminal carelessness. The Herald adds: "This appalling and heartrending death list is a monument to stupid, criminal disregard of elementary principles of sound building construction and simple good behavior. It is the terrible price the nation pays for heedlessness and short-sighted selfishness in individuals."

Hard of Father.
London Tit-Bits.
An Irish servant girl asked leave of absence for an hour to consult a fortune-teller. She returned wailing miserably.
"Did she predict some great trouble?" asked her mistress, sympathetically.
"Och, ma'am, sich terrible news!" moaned the girl, wringing her hands.
"Tell me what she said," asked the mistress, wishing to comfort the girl.
"She told me that me father works hard shevelin' coal an' tinding foires for a livin'!"
"But that's no disgrace," said the mistress, a trifle vexed at such affectation.
"Och, ma'am, me poor father," sobbed the girl. "What a hard time he must be havin'! He's been dead these noine years!"

The devil can usually be found on both sides in the church membership disagreement.
A good many times there are weak links in the chain of a quickly formed friendship.

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—the one adopted generally in Canadian homes, is the policy of keeping Zam-Buk always handy. Zam-Buk ensures quick clean healing in cuts, burns, scalds, cold-sores, and all injuries and skin troubles. It promptly ends pain, irritation and inflammation; it purifies the tissues, prevents blood-poison and ulceration. It is a ready, reliable character and powerful antiseptic properties make Zam-Buk the safest and best healer ever discovered.
Miss Belle Grant, Beaulieu, N.S., says: "Cold got into my breast band, and I began to fear blood-poison. I hadn't used Zam-Buk long before it took out all pain, soreness and inflammation."
Mr. Jonathan Beaton, of Delta, Alta., writes: "With the freezing outfit last fall, many little accidents happened, cuts, bruises, frost bites, etc., for which we found nothing so good as Zam-Buk. There's nothing like it."
Childs, cold-sores, winter sores, ulcers, piles, hemorrhoids, and skin sores and lesions generally are all cured with Zam-Buk. It is available in all drug stores and carries \$2.50 a box; 5 for \$12.50. Write to Zam-Buk Co., Dupont Street, Toronto.



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There is no place in business to-day for the "calamity howler." He is drawing salary or wages under false pretences. More distressing still, he is weakening the "morale" of other workers, and of the business itself. Strengthen your business morale.

Take stock of your men as well as your goods.

Retain enthusiastic, profitable, workers even at a temporary loss.

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