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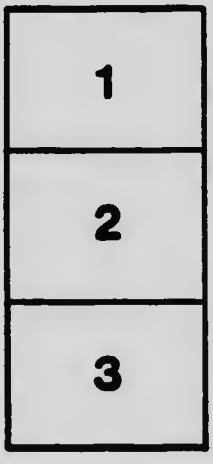

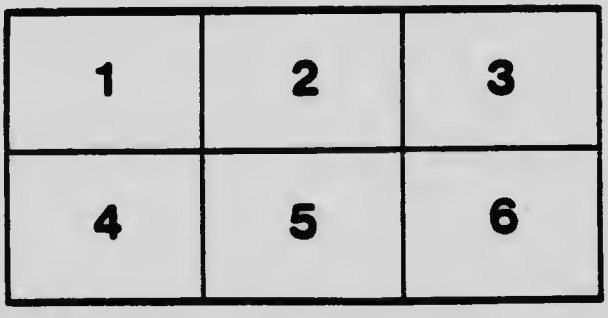

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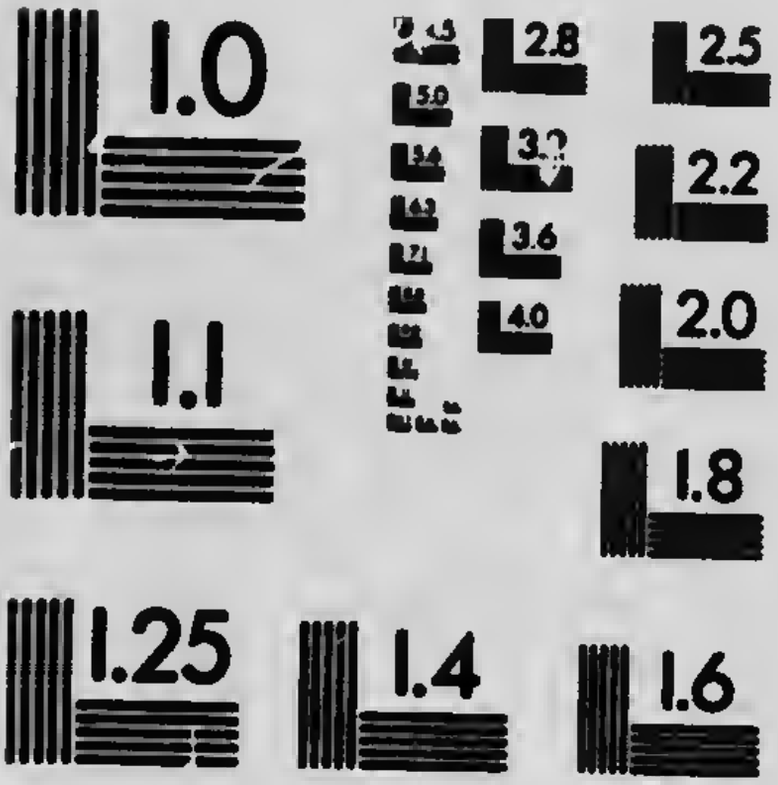

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Hydro-Electric Power Commission
of Ontario

Report on Hydro-Electric Railways

Toronto-Hamilton-Niagara Falls
Toronto and Eastern
and
Hamilton-Galt-Guelph-Elmira

By W. S. MURRAY
Consulting Engineer
New York

Hydro-Electric Power Commission
of Ontario

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Toronto and Eastern
and
Hamilton-Galt-Guelph-Elmira

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New York

WILLIAM S. MURRAY,
CONSULTING ENGINEER,
165 Broadway, New York City.

May 28, 1920

Col. Sir Adam Beck, Chairman,
Hydro-Electric Power Commission, Toronto, Ont., Canada.

Dear Sir:—

In conformity with your request that I report upon the proposed construction of the Toronto and Bowmanville, the Toronto, Hamilton and Niagara Falls, and the Hamilton, Guelph and Elmira radials, I would advise that I have visited Toronto and much of the locality through which it is proposed to build these lines. Your engineering staff has placed at my disposal for inspection their construction and operating plans, together with a canvass showing the estimated income of the proposed radials. I have also examined the very comp[illegible] and illuminating report to Civic Transportation Committee by Messrs. Harris Gaby and Cousins.

Summary of Report

Briefly summarizing the general report which follows:—

(1) I consider the construction and operating estimates made by your engineering staff conservative.

(2) I find the lines admirably located with reference to the passenger and goods traffic they are designed to reach, the density of which is not in unfavorable comparison to existing roads which have thrived in the States.

(3) I do not consider the act of their construction as one against which a charge of duplication can be made.

(4) I am in full accord with the conclusion of the Commission that it is inadvisable to proceed at this time with the full construction of these radials on account of the greatly inflated costs applying both to line and equipment.

(5) I consider it most important, however, that the Commission proceed with the development of its full plans applying to financing as well as construction, in order that it may be in a position to acquire such existing radials and property as may be economically purchased, and which will later form parts of the completed systems.

REPORT

London and Port Stanley Road

In December, 1912, I reported on the electrification of the London and Port Stanley Road, and as that property has since been electrified, and as it is proposed that the line and motive power equipment of the new radials be of similar character, I thought it advisable to make an inspection of the construction and operating features of that road. This I did after leaving the Toronto district.

Fundamental Considerations.

This report considers three fundamental questions: I. Will the proposed lines duplicate any existing steam or electric lines. II. Are the proposed lines adequate, and can

they be constructed for the figures named? III. Is the estimated income reasonably computed and of sufficient amount to cover (a) interest; (b) sinking fund, and (c) operating and maintenance charges?

AS TO DUPLICATION: Whether it is an act of duplication to build the proposed radial lines between Bowmanville, Toronto and Niagara Falls may be justly discussed under two primary heads: First, as to whether the lines now in existence, whether steam or electric, are of proper type and of sufficient physical capacity to handle commodities and persons, with proper schedules maintained and second, whether the proposed radial lines are absolutely required for business other than that physically impossible for the existing lines to handle; and if the latter be found to be correct, it is apparent that a continuance of the existing form of transportation will serve only to throttle industrial and civic development in the territory involved.

As I view the districts the Toronto, Hamilton and Niagara Falls radial proposes to serve, I find located therein a steam trunk line railroad consisting of two tracks, connecting these three cities, and averaging a distance of three-quarters of a mile from the Lake Shore front; and in the section near Toronto a slow speed suburban electric line between Port Credit and Sunnyside, accepting the curves and grades of the streets and highways and connecting at Sunnyside to the Toronto street railway system. Each of these lines are of different gauge, necessitating a transfer of passengers at their junction point.

Not an unlike condition except that gauge is the same, exists on either side of Hamilton; radial lines adjacent to the lake front, twenty miles in length, entering that city from both sides. In the district of the Niagara frontier, however, the rail and roadbed construction for the most part is of a higher order than the radials entering Toronto and Hamilton, but in all three of these districts by reconstruction, a considerable part of the rail and roadbed may be made to lend themselves to a line upon which high speed interurban traffic may be operated.

Looking at the map of the City of Toronto, it is apparent that as time has passed a procedure in rail transportation has been going on which, if continued, will bring about an impossibility of co-ordination as between the urban and suburban districts.

Toronto Street Railway System and Its Relation to Radials.

It is universally recognized in connection with the operation of interurban roads that the highest order of transportation efficiency is effected when such a road can maintain an undiminished schedule speed for its cars operating in city limits. Through the co-operation of the Harbor Commission such a procedure is made possible in the case of Toronto. Tortuous and slow speed operation upon the tracks laid in the city streets may be eliminated, and I find this condition not only applies to the proposed Toronto, Hamilton-Niagara Falls radial, but to that of the Toronto and Eastern

line to Bowmanville, entering the city from its east side. Similarly, from the north in connection with the Metropolitan Division of the Toronto-York radial and those of the Toronto Suburban, if the future warrants their development into first-class high speed interurban lines, their entering routes may be so arranged as to permit the maintenance of undiminished schedule speed to the proposed Yonge Street terminal, with city stops so arranged as to allow transfer of passengers to the uptown city rails.

In the above arrangement is recognized the valuable separation of interurban from urban operation. This will fall directly in line and be in conformity with the Act requiring the City of Toronto to take over the operation of its city lines in December, 1921, and the common junction of all immediate and future radials will find itself at a point located at the foot of Yonge Street, which will be the natural distribution point for all passengers seeking the downtown district. Therefore a procedure which will serve the interests of the City of Toronto and both its outlying and interurban districts the best is one recognizing a sharp demarcation between urban and interurban traffic. It is also clear that the industrial and business centre of Toronto is most fortunately located to serve such a purpose. In short, the principle that should govern in all cases is that radial lines bring their cars to the proposed city terminal at the foot of Yonge Street at undiminished schedule speed.

I have dwelt upon the foregoing matter to indicate the importance of classifying and keeping separate the two forms of transportation, urban and interurban, and this in the highest order that it can be effected applies to Hamilton as well as to Toronto. Not to be governed accordingly would be to lower in degree the natural advantage offered and the improved service thus made possible to the people. Much larger construction costs are involved in the creation of these increased facilities, and, indeed, such expenditures can only find justification by such a procedure.

Discussing specifically now the matter of duplication in the case of the proposed Toronto-Hamilton and Niagara Falls radial. Can it be said that the Grand Trunk Railroad and the existing radials provide a service, the nature of which is adequate to the territory involved?

Present Suburban Traffic Situation and Steam Lines' Relation to It.

It is of interest to look at the population and the nature of the business established within this territory. There is an intermediate population between Toronto and Hamilton of 25,000 people. During the last ten years throughout the district immediately west of Toronto there has been a very heavy industrial and residential expansion, and excepting for a few local trains operating from Niagara Falls to Toronto, practically no suburban service on the steam line is offered, such as exists, occurring upon the Mimico Division of the Toronto and York radial; this road, as pointed out previously, being of rural character, its rails having highway location and to these adverse conditions against high-speed suburban service is added the awkwardness incident

to a transfer of passengers at Sunnyside to the city lines. This in my opinion greatly militates against the convenience and comfort of the residents of the district and unquestionably throttles its development.

It would seem, therefore, that the public will demand that a service so requisite to their needs and their natural expansion be given. It is of interest to refer here to the official records in the arbitration proceedings of May 2, 1918, in the matter of the valuation of the Canadian Northern, where much was said to support the point of view of Mr. D. B. Hanna, who held that the facilities offered in the present Grand Trunk two-track system between Niagara Falls and Toronto were not sufficient to handle the traffic. Mr. Hanna said:

"Embargoes were placed by the Grand Trunk. They say to the Pennsylvania, here, we cannot take any more cars from you, we are congested, and until we have had an opportunity to clear up our position keep your cars wherever you please but don't bring them up to this transfer point."

Also:

"Well, here if the United States with a hundred millions of people, and with seven or eight roads feeding up to the boundary, up to the frontier—the Erie Railroad, the Lackawanna Road, the Lehigh Valley, the Pennsylvania, the Buffalo and Pittsburg, and some others I can't think of at the moment. There are seven or eight roads at all events that are feeding into the Niagara frontier, and two roads to take it away. Now, it is manifest that a situation like that cannot continue indefinitely."

And in answer to Mr. Butler's question regarding the need of additional facilities, he replied:

"Yes. My own opinion is, quite regardless of double-tracking the Grand Trunk, whatever the Grand Trunk may do, that there is a real need for another connection at the Niagara frontier."

Again of much interest is a letter to Sir Adam Beck, herewith quoted, from Dr. Reid, having reference to the acquisition by the municipalities of the Toronto and Eastern Railway, as follows:

"Office of the Minister of Railways and Canals:

"My Dear Sir Adam:

"Yours of the 22nd instant duly received.

"As your letter states, you are taking action to have a vote taken in the municipalities with a view of purchasing and taking over the Toronto and Eastern Railway, I have instructed Mr. Hanna to withhold proceeding with any more construction at the present time, pending decision as to whether the municipalities wish to purchase this road and make it part of your system.

"In your previous correspondence you advise the intention of your Commission to build a radial railway from Toronto to Kingston. Of course if this is to be done, it would never do to have two radial lines paralelling each other, and I am prepared to recommend to Council that Toronto and Eastern Railway be handed over for the actual amount paid by the Dominion Government

for same, together with any cost of carrying charges or any work that has been done since.

"As you are of the opinion you will want this road I think it is better that we do no more construction in the meantime, but of course it is urgent that a decision be arrived at at the earliest possible moment in order that the road be constructed as a feeder for the Canadian National Railway System, as originally intended.

"Hoping you will give this matter your personal consideration as soon as you can conveniently arrange to do so,

"Yours truly,

(Sgd.) "J. D. REID."

The above is an excellent presentation of the Minister of Railways' point of view regarding the feeder relation of the steam road to the Toronto and Eastern radial.

I am advised also that at a recent hearing regarding the rates for the proposed new traffic, counsel for the steam lines held that they did not wish this business developed on their lines, as it was obviously the duty of an electric railway to take care of such traffic.

In rendering you an opinion, therefore, as to whether the charge of duplication of transportation facilities can be sustained by the building of the proposed Hydro radials discussed in this report, as I view the present population both from a civic and industrial standpoint, I find both classes strategically located for imminent expansion if provided with power and transportation facilities; this applying throughout the whole Lake Shore district from Bowmanville to Niagara Falls, and in saying this I am convinced that the present lines have neither a capacity nor a facility of location to assume the care of the reasonable demands of the people, and I further feel that this point of view is shared by those operating the existing transportation lines. Tersely speaking, therefore, and from a purely transportation standpoint I do not find duplication, but on the contrary, and as brought out by Dr. Reid and Mr. Hanna, if the proposed radials are built a facility will be provided not only to take care of the increasing and expressed public demand, but they will automatically release the steam line from a form of transportation which they have stated they are not equipped to handle, and further that they will contribute to rather than take traffic away from the present steam lines. This policy cannot be construed as unfair to present radial systems. In the case of the Toronto and Eastern and those radials now in existence between Toronto and Niagara Falls, these should be amortised by purchase to the extent of their contributing value, and it is equally clear that the people should not be made to foot the bill where a transportation facility has not kept pace with the growing demand incident to civic and industrial expansion. In such cases substituted transportation systems are justification and not duplication.

An examination of the existing steam schedules for through trains between Buffalo and Toronto shows that during the 18 hours between 6 o'clock a.m. and 12 midnight (counting one train for two when their departure is at approxi-

mately the same time) six trains are provided, thus giving a headway of three hours. The fastest schedule speed of any one of these six is indicated as less than 29 miles an hour, this also allowing for deduction of time for frontier inspection.

Comparative Schedules With Other Roads.

As an example of other through practice, the distance from New York to Philadelphia is 90 miles with two stops, Manhattan Junction and Trenton, and the time is two hours, thus giving a schedule speed of 45 miles an hour.

Innumerable examples can be given, such as the through time between Washington and Baltimore, cities at approximately the same distance that Toronto is from Hamilton, where the schedule is 40 miles per hour. A double track electric system parallels the four track system of the Pennsylvania and the two-track system of the Baltimore and Ohio Railroad between these two cities. The electrical trains are operated on hourly headway, and although the electric line does not give as high a schedule as that sustained by the trains of the steam lines, their hourly headway is a factor which offsets their not greatly lesser speed. Inconvenience of present steam schedules in the district under discussion is found in the fact that no trains between Buffalo and Toronto are made up for departure to or from either city after 7 p.m.

Density of Traffic.

Again looking at the relation of intercity rails in the case of Hamilton and Toronto as against Baltimore and Washington, the combined total population of Washington and Baltimore is a million people, while the combined total population of Hamilton and Toronto is 610,000. Their distances apart are about the same. There are 8½ tracks existing between Baltimore and Washington and two tracks between Hamilton and Toronto. Therefore, the Hamilton-Toronto rails are serving 305,000 persons per track, while the Baltimore-Washington rails are serving 118,000 persons per track. Thus the Canadian rails are carrying a density of nearly three times that upon the States' rails. It may be argued that the States' rails are handling a traffic of greater volume north of Baltimore and south of Washington, and so they are. But it must also be remembered that the two Canadian tracks meet, as Mr. Hanna has pointed out, seven or eight States' tracks at the frontier south of Hamilton, furnishing traffic for points north and east of Toronto, and there is added to this traffic that which is delivered at Hamilton from the Grand Trunk Division operating between Hamilton, London and Detroit.

AS TO ESTIMATED COST AND ADEQUACY OF TRANSPORTATION FACILITY:

The discussion of this matter naturally falls under two heads: (1) general fixed construction inclusive of roadbed, rails, contact lines, feeders, sub-stations, terminals, passenger stations, car barns, etc., and (2) rolling equipment, including motor, trail, work and freight cars and electric locomotives.

The proposed radial between Toronto and St. Catharines contemplates the use of single track all the way, with the exception of two double-track sections, each six miles in length, in the immediate vicinities of Toronto and Hamilton.

I shall not attempt in this report to outline any engineering and construction details submitted to me by your staff. I wish to say, however, that all of my inquiries with reference to such matters have been fully and satisfactorily answered. In particular I would like to make reference to the conscientious and extremely able presentation of these matters that has been made to me by Mr. Gaby's principal assistants, Mr. W. G. Hewson, regarding the electrical equipment, and Mr. T. U. Fairlie, concerning way matters.

Realizing the important bearing of present day costs as against those of the past, I have requested up-to-date figures on both the line and motive power equipment. In connection with the line, there has been submitted to me sectionalized estimates under nine divisions between Toronto and St. Catharines. These are as follows:

Miles.	Section.	Amount.
5.16	Toronto to Queen St. Etobicoke	$ 5,114,993
0.79	Mimico Yard Section	925,511
7.50	Mimico-Port Credit	1,221,368
7.15	Port Credit-Oakville	562,433
10.70	Oakville-Burlington	1,021,860
7.56	Burlington-Hamilton	1,305,640
4.33	Hamilton City Section	1,250,937
1.93	Bartonville Section	548,150
27.54	Stoney Creek-St. Catharines	3,087,052
72.66		$15,037,944
	Contingencies at 15% (engineering already in)	2,255,692
		$17,293,635
	Additional allowances for Overhead at $1,500 per mile	105,000
	Car Barn equipment	100,000
	Total line costs	$17,498,635

I consider these estimates ample under present day cost to complete the proposed construction.

Regarding the rolling equipment, a very considerable rise in cost has taken place; and notwithstanding that the revised estimates given me were based on the new figures, I have made certain additions to the unit prices on trail cars, locomotives, and sub-stations which would make the total figure to cover rolling equipment and sub-stations $4,800,000 instead of $4,150,000, as shown in the figures herewith appended:—

	Commission's figures.	Increased figures.
35 motor cars at $45,000	$1,575,000	$1,750,000
15 trail cars at $25,000	375,000	450,000
5 work cars at $40,000	200,000	200,000
8 locomotives	200,000	400,000
500 freight cars	1,500,000	1,500,000
5 sub-stations	300,000	500,000
	$4,150,000	$4,800,000

Therefore the revised up-to-date estimated total cost of the Toronto and St. Catharines radial would be $22,298,635, and were its construction undertaken to-day, it is my opinion that such a figure would represent a conservative estimate and provide an adequate facility for the contemplated transportation.

Niagara, St. Catharines and Toronto Railway

In my opinion frontier connections east of St. Catharines are essentially necessary to the success of this radial. An examination of the returns upon the various divisions of the Niagara, St. Catharines and Toronto Railway system indicate them to be self-supporting, and the proposed acquisition of this property, if made upon a sound economic basis, would provide not only the necessary frontier connec-

tions, but the reactions which would arise between the proposed new lines and the ones now established would, under proper traffic administration, serve to make them both increasingly productive and valuable.

New Cut-off Line from St. Catharines to Niagara Falls.

Your staff have discussed with me the propriety of the construction of a new cut-off, low per cent. grade, line between St. Catharines and Niagara Falls, and while this doubtless later and especially in connection with the development of the future freight business, will be justified, it is my conclusion that if the Niagara, St. Catharines and Toronto property is acquired, the new line should be made to connect with the Niagara Falls branch of the Niagara, St. Catharines and Toronto line near the foot of St. Davids Street in Merriton for the purpose of operation to Niagara Falls, and the necessary betterments placed upon the present Merriton and Niagara Falls connection to bring it up as near as possible to the construction standards to be established on the proposed new line.

Traffic Investigation by Mr. J. K. Punderford, Vice-President, Connecticut Company.

AS TO INCOME: The civic and industrial developments throughout the entire zone between Bowmanville and Niagara Falls are not unlike those which have taken place in the State of Connecticut. These latter have been under my observation during the past 15 years, having been a resident of that State during that period. The Connecticut Company practically owns and operates all the urban and interurban railway lines in that State. Mr. J. K. Punderford, Vice-President and General Manager of the Connecticut Company, has long been identified with its interests, and at my request you have permitted me to seek his judgment and advice regarding the traffic possibilities upon your proposed radials. I append his letter of May 21, and will be glad if you will consider it as a part of this report.

An epitome of Mr. Punderford's findings is to say that he has checked the canvass made of your traffic returns, and they have his approval.

I find Mr. Punderford brings back the same impression that has become mine since I have studied your traffic situation, namely, that the unprecedented opportunities of your civic and industrial expansion are being retarded due to a lack of proper and adequate transportation facility—proper in the same sense that the present lines are not in proper association with the nature of the transportation required; adequate in the sense that they lack the capacity required.

Excessive Construction Costs.

To-day the construction and operating costs of transportation are all out of proportion to income. We have in the States, as in Canada, watched construction and operating costs steadily rise, while the return for the transportation rendered has until very recently remained unchanged. The natural thought, therefore, is, can this construction be delayed until costs come down?

The canvass of income as presented to Mr. Punderford and to myself is in our opinion justified, and it is shown to be $2,500,000 per annum.

Even with present high construction costs, Toronto, Hamilton and Niagara Falls Radial shows close balance between income and operating costs.

The annual sum to cover operating and maintenance costs is $1,438,000, and basing the interest charges upon the rate of 5 per cent., which you advise will be the average over the fifty-year life of your bonds, the annual cost of the money would therefore be $1,115,000, making the total annual costs $2,553,000. These figures, however, do not include any allowance for depreciation of equipment, sinking fund, or the use of the Grand Trunk property at Hamilton. On the other hand, an item of $250,000 to cover "general" operating expenses over and above those anticipated has been allowed, which if not included would throw the small deficit shown into a substantial surplus.

It is patent that if other roads have justified their installation under less advantageous conditions than those surrounding this radial, this line is fully justified. The present condition with regard to the relation of cost of transportation vs. income return cannot continue, and while for the moment the full construction of these radials should be deferred it is, however, of the greatest importance, recognizing that the general radial development as proposed is correct, that the Hydro-Electric Power Commission be placed in a position to acquire between now and the time when the complete radial systems are put together, such properties as will naturally form parts of the whole.

The present condition with regard to the relation of costs of transportation vs. income return cannot continue. Either cost must come down, or income go up. Probably a combination of both will very shortly solve the problem, as the present state of affairs serves to help none and hurt all.

Territory Potentially Sound for the Construction of High Speed Interurban Lines.

I wish to convey the thought that I thoroughly believe in the construction of this proposed Toronto, Hamilton and Niagara Falls radial, for I consider it to be one of the most important adjuncts looking toward the building up of the civic and industrial communities it is proposed to serve, and it seems to me of greatest importance that its value should not be impaired by imposing upon it a burden of cost wholly out of proportion to what it should be, at least until it has been demonstrated that equilibrium is established between cost and income.

What I have had to say about the Toronto, Hamilton and Niagara Falls radial applies equally well to the Toronto and Eastern and the Hamilton and Guelph radials. I have checked the figures covering their proposed construction and operating costs and those pertaining to their income have been reviewed by Mr. Punderford and myself.

Acquisition of Present Radials.

There seems to be harmonious recognition on the part of the steam railroad officials that your proposed radials will serve a purpose for which the present transportation lines are not designed, and as it is my understanding that there is at present under way negotiations on the part of the Hydro-Electric Power Commission to purchase certain radials in the Toronto, Hamilton and Niagara districts, inclusive of the Niagara, St. Catharines and Toronto road, granting that these properties can be acquired at reasonable figures, the Commission should be placed in a position to purchase them, for not to do so might lead to their development along lines which would be away from, rather than toward the plan which would serve the greatest number of people for the greatest good.

An inspection of a number of these radials indicates that by a moderate expenditure of money upon them, they could be made to serve the purpose for which they are designed in a much larger degree than they are now performing that duty, and at the same time permit the Commission to plan their future merging into the larger system proposed.

Conservation of Coal.

Now passing from the specific discussion of transportation to a more fundamental principle, I would like to touch upon a matter of prime importance, the economic nature of which will, in my judgment, have much to do with the future soundness of your civic nd industrial situation. I refer to an extension of the wonderfully sound and economic fabric that is being woven through the agency of the Hydro-Electric Power Commission. Increased production is the only solution of the present world's distress, and Canada and the United States through co-operative effort, assisted by their strategic location, are in a position to contribute the most. The two most powerful agents are increased production and transportation. Canada has demonstrated to the world as to herself the results to be effected through the use of electricity as an agent of power. Power in the form of coal is maximum in bulk and minimum in efficiency. Power in the form of electricity is minimum in bulk and maximum in efficiency.

The Congress of the United States has passed a bill to appropriate money with which to investigate and report upon the proper method by which its larger industrial and railroad zones can be operated from a common electric transmission system. Canada has shown the way in this matter, for it is not being considered; it is being done. Your future expansion in tranportation capacity should be effected through the use of electricity. Already the people of the States are awakened to the fact that their uneconomic use of coal must cease. In one zone alone, that between Washington and Boston, there is at present being wasted, due to an inadequate form of power generation and distribution, over thirty million tons of coal a year, representing at least one hundred and fifty million dollars per annum. The natural water power resources of this zone unfortunately

represent but ten per cent. of the power requirement. The utilization of a super-power system employing the use of high efficiency steam turbo units will effect the above-mentioned coal savings and the railways now carrying that amount of coal will be relieved of its transportation. I make mention of this matter here simply to show that the United States is now awakened to the fact that with its congested railways, with the almost impossible condition of acquiring new right-of-way it must solve its transportation problem through the use of electricity universally applied to industry and transportation. It would seem reasonable, therefore, that Ontario, largely dependent upon the United States for her coal supply, should exercise every possible means to eliminate any inefficient use of coal, and I gain such an impression of her people by their overwhelming vote to support the Hydro radial movement.

In Ontario you have 90 per cent. water power at your command. In the Eastern United States this ratio is reversed, 90 per cent. of our power being developed by coal. Therefore, every pound of coal you can save through the use of Hydro Power lessens the coal burden the railroads are carrying and opens up their cargo space for the transportation of commodities essential to the maintenance and expansion of general trade. I endorse the Commission's program and believe that it should be placed in position to exercise its judgment, as outlined, as time and conditions permit.

Very truly yours,

WM. S. MURRAY.

THE CONNECTICUT COMPANY

Second National Bank Building,
New Haven, Conn.

May 21, 1920.

Mr. Wm. S. Murray, Consulting Engineer, 165 Broadway, New York, N.Y.

My Dear Mr. Murray:

Referring to yours of the 7th inst., in which you ask me to join you in a portion of your Report to Sir Adam Beck, Chairman of the Hydro-Electric Power Commission of Ontario, beg to report as follows:

I have been to Toronto and have gone over the major portion of the field work and have examined as carefully as possible in the time at my disposal, the data prepared by the Commission's staff. To have gone into this matter as thoroughly as I would have liked, would have taken a large staff and more time than could be allowed me before the date at which you wish to make your report. I was very greatly assisted in my work by the personnel of Mr. Gaby's staff and the carefully prepared accumulation of data available.

First, with regard to the Toronto Eastern Division:

This proposed line will extend easterly from Toronto along the northern shore of Lake Ontario for a distance of approximately forty-three and a half miles to Bowmanville. My information is, that beginning at a distance of fifteen miles east of Toronto, there is a fine bathing beach, and from my experience with similar natural facilities, there should develop within a rea-

sonable time a considerable summer colony at least, with possible amusement resorts At Oshawa there is a rapidly growing automobile assembling plant, together with other industries. With the probable growth in population and the wages of the employees, it is likely that there will be a considerable revenue from both passenger and freight business. In the eastern section of Toronto, especially Ward Eight, it is likely that with rapid transit facilities, there will be developed a large passenger revenue. This business depends, to a greater or less degree upon proper transportation facilities being provided between the depot and business centre. I am informed that in order to take care of this business satisfactorily, a loop, either on the ground level or on an elevated structure, will be provided.

With regard to the possible freight earnings on this division, I examined data secured by the Commission which gave in unusual detail, the prospects of a very large majority of both shippers and receivers of freight, based on the present movement of freight. Referring to the estimate made by the Commission as to the per capita passenger receipts on the interurban portion of this line, having some doubt as to whether the figure of ten dollars per capita per annum used by the Commission was reached by the proper method, I went into this matter at quite some length and am of the opinion that the figure is fully justified. With regard to the suburban earnings on this line, I felt that the figure used by the Commission was high, but upon examination of statistics prepared by the Toronto Civic Transportation Commission and data prepared by the Hydro-Electric Commission, I found that the riding habit for this district was unusually high and believe will fully justify the figure used.

With reference to the proposed line between Toronto, Hamilton and Niagara Falls, there is already on these lines a large acreage devoted to the growth of fruit and vegetable products. This perishable material, I am informed, is not now being handled in a dependable and speedy manner, as concerns delivery for both local and more remote points. I questioned somewhat the figure claimed as to the amount of freight destined to remote points which would be obtained by this line, but in quite a number of cases I find that shippers will have sidings and spurs from this line which are not practicable on competing lines, and which will undoubtedly influence routing in favor of the line in question. With reference to the passenger business on this line and speaking first of the portion of the line between Toronto and Hamilton, this territory is now served by an infrequent, and I am informed, quite irregular train service with rather remote station stops from the centres of population and, excepting the central section, by slow speed trolley operation. The proposed line running at the distance it will from the shore front, it would seem more than likely that there will be a very large and rapid residential development which is now discouraged by lack of satisfactory transportation facilities. Secondly, between Hamilton and Niagara

Falls, my information is that the train service has in the past been very irregular, and that a dependable service would secure the business to a very large degree. I have been through the claimed per capita annual riding through the above sections and I believe them, as a whole, to be conservative.

My agreement on the amount of probable passenger and freight revenue above mentioned, is with the understanding that the service afforded will be dependable, reasonably high speed, station stops at proper distances and with equipment of the type shown on the blueprints, seen by me in the Commission's office.

The possible earnings of the above mentioned line are greatly enhanced by the business which may be obtained from Port Colborne and from connections at the Niagara frontier.

The above covers briefly that portion of your report, which I understand is all that you care for me to consider, and I trust it may be of service to you. With the exhaustive data which I know you to have, I have refrained from going into detailed figures in this report, but if you care for a more definite analysis kindly advise me.

Yours very truly,

(Sgd.) J. K. PUNDERFORD.

CONCERNING W. S. MURRAY, CONSULTING ENGINEER, NEW YORK CITY

1. Graduate Electrical Engineer. Class of 1895, Lehigh University.

2. With Westinghouse Electric and Manufacturing Co. 7 years. Departments of manufacturing, engineering and construction.

3. Consulting Electrical Engineer, Boston, 4 years.

4. Chief Electrical Engineer, New York, New Haven and Hartford Railroad. In full charge of electrical engineering and construction details of the New Haven electrification. Complete electrification costing $25,000,000.00.

   Later, Consulting Engineer for the New Haven in charge of all features of electrical operation.

5. Firm of McHenry & Murray. Practicing in general railway electrification. (Mr. McHenry, past Chief Engineer, Northern Pacific, Canadian Pacific, and Vice-President of the New York, New Haven and Hartford Railroad, 4 years).

6. At present, Consulting Engineer, New York City.

   Past President, American Institute Electrical Engineers.

   Fellow, American Institute Electrical Engineers.

   Chairman, Super-Power Committee, U.S. Engineering Council, presenting super-power matter recently passed by Congress for electrification of Northeast Atlantic Seaboard between Boston and Washington.

   Author of "Electrification Analyzed and Its Application to Freight and Passenger Operations."

   Author of "Conditions Affecting Success of Main Line Electrification."

   A. I. E. E. Transactions.