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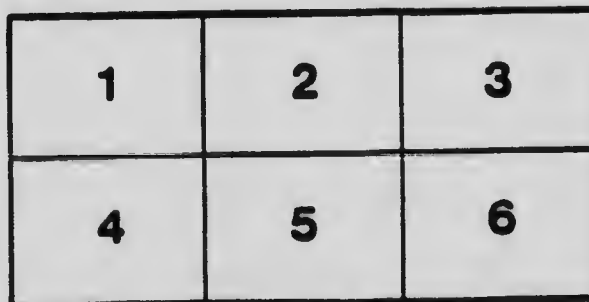
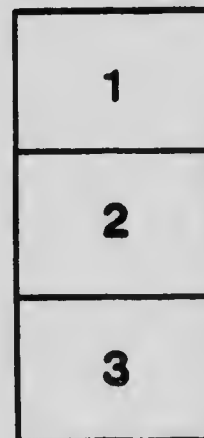
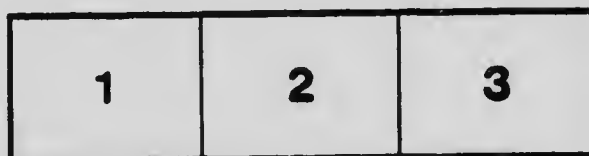
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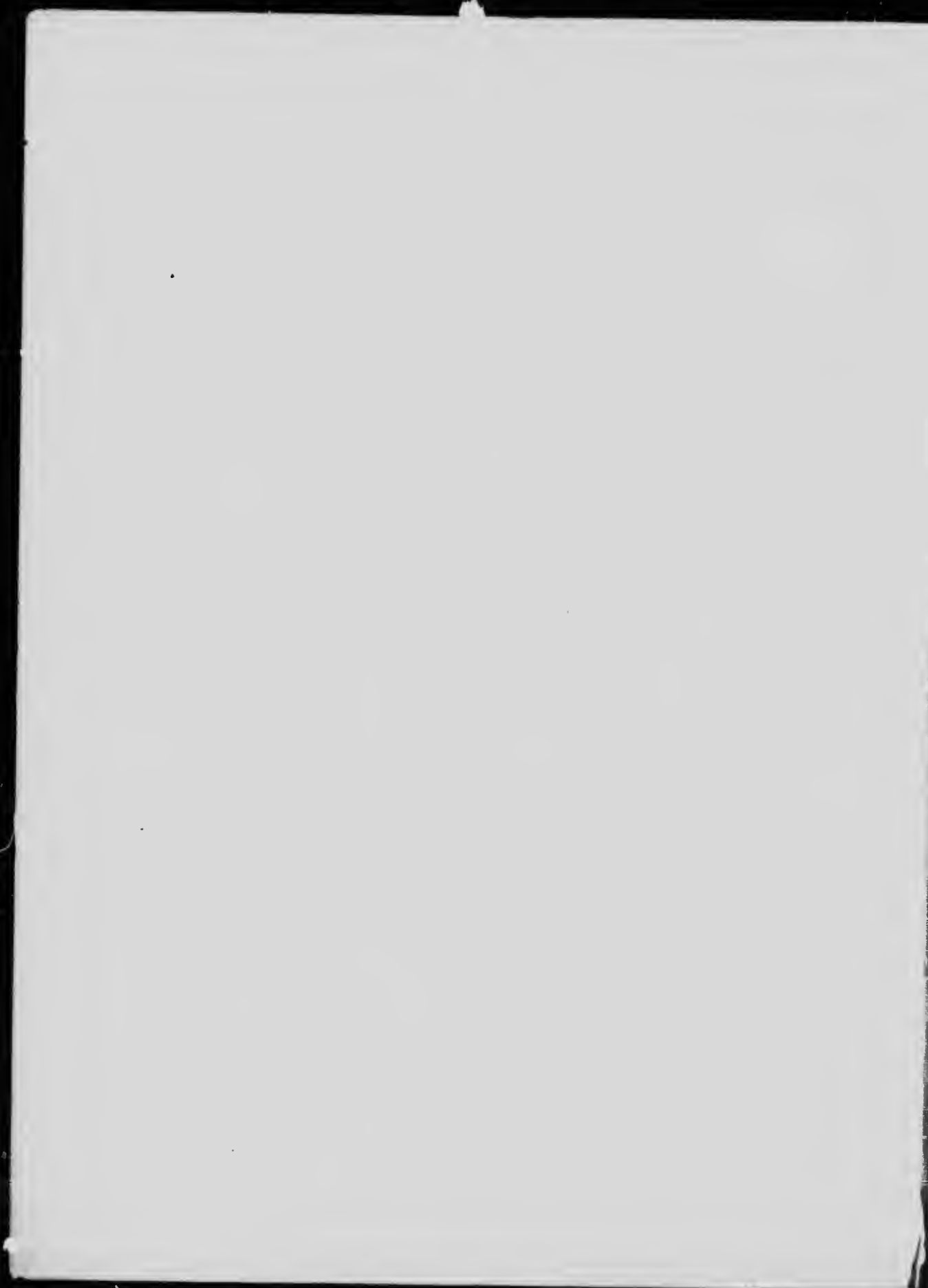
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R E P O R T
on the
CANADIAN NORTHERN RAILWAY SYSTEM

By a Special Commission

composed of

EDWARD E. LOOMIS

President, Lehigh Valley Railroad Company
New York

and

JOHN W. PLATTEN

President, United States Mortgage & Trust Company
New York

COVERDALE & COLPITTS, New York
Consulting Engineers
to the Special Commission

MARCH, 1917.

H.

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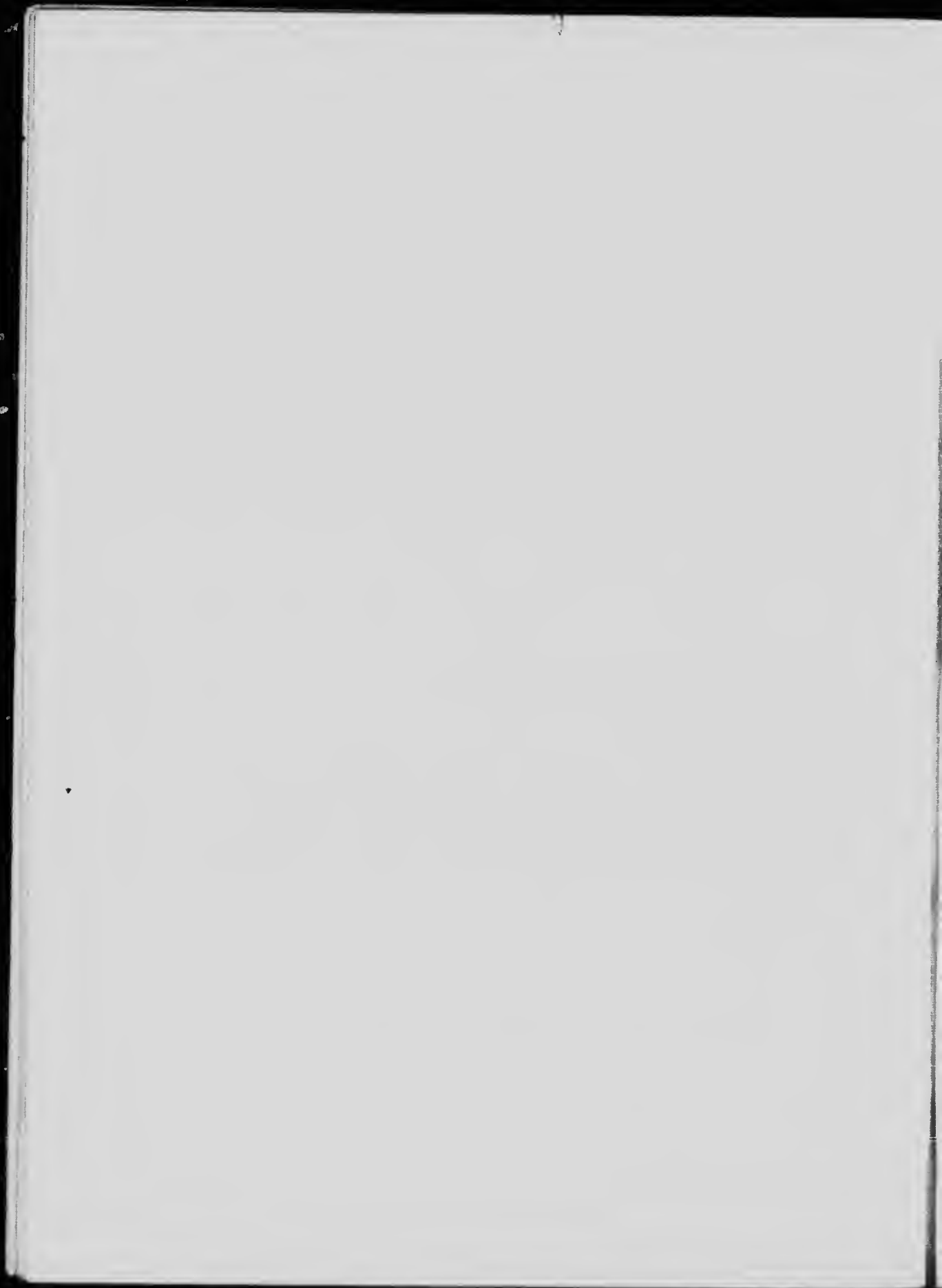
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New York City,

March 26th, 1917.

THE BOARD OF DIRECTORS,
Canadian Northern Railway,
Toronto, Canada.

GENTLEMEN :

In compliance with the terms of our agreement of May, 1916, covering an examination into the affairs of the Canadian Northern Railway System, and following our general inspection of the property made during 1916, we now submit thereon the following report :

INTRODUCTORY STATEMENT.

A transcontinental railway is an undertaking of such magnitude and complexity as to require many years for its development and construction; for the proper adjustment of its co-ordinate parts; for its general acceptance at the hands of its patrons, its competitors, and the public; and for the securing of its definite place in the public service, and in the economic life of the country.

While at this writing the probationary period of the Canadian Northern Railway System has not entirely passed, we are unanimously of the opinion, after many months' consideration of the subject, that the undertaking as a whole is sound, and that its soundness can be demonstrated at this time; that while its revenues will increase as its existing facilities become longer established and better known, yet its greatest opportunity for increased revenue must depend largely upon its ability to provide additional facilities as required by the present and future transportation needs of the country; and also upon its continual ability to meet the competition of the older Canadian lines now existing throughout its entire length—the Canadian Pacific competition being the stronger in the west, and the Grand Trunk competition being the stronger in the east.

In so far as the physical property is concerned there can be no question as to the ability of the Canadian Northern to meet competition as the

railway is well located and well built ; its transcontinental main line grades over practically its entire route are the most favorable in existence ; and under a normally developed traffic density the railway should operate at a ratio previously unknown, and at enormous profit.

About 5,911 miles of prairie lines are already so far developed as to warrant the prediction that they will carry the whole system in the comparatively near future.

The Pacific, Northern Ontario, and Eastern lines may develop more slowly, but can be made self-sustaining and profitable under a proper program.

The Canadian Northern Railway System may be said to occupy at this time a position somewhat analogous to that of the Canadian Pacific, the Great Northern and the Northern Pacific, shortly after each one of those lines was completed to the Pacific coast ; but Canadian Northern possesses great advantages due to the fact that the other lines were built first. Trade routes have been established ; Pacific ports have been opened and developed ; large cities now flourish where but a few years ago no settlements existed ; enormous land areas formerly regarded as worthless have been found to be productive ; all these, and many other improved conditions, being due to the pioneering of the older lines. And in so far as Canadian Northern operates along these trade routes, or serves either directly or indirectly these Pacific ports or cities, or improved lands, or the population induced thereby, in so far will its period of upbuilding be shortened, in so far will its task of colonization be lightened, and in so far will its revenues be increased.

While, generally speaking, the Canadian Northern lies in a more northerly latitude than the other lines, its tributary territory west of Winnipeg is quite as susceptible of agricultural development, and offers equal inducement to settlers ; and upon the continued upbuilding of this territory contiguous to its lines, the future of the Canadian Northern in large measure depends.

That Western Canada and the northwestern part of the United States have grown rapidly in population and in commercial importance during the last two decades may be readily shewn :

The population of the western provinces was about 340,000 in 1891, and about 1,715,000 in 1911, an increase of 1,375,000, or 400 per cent. in twenty years.

The population of the northwestern border states was 2,756,000 in 1890, and 5,753,000 in 1910; an increase of 2,997,000 or over 100 per cent. in twenty years.

The past operating results of the Canadian Pacific, the Great Northern, and the Northern Pacific, following their completion to the Pacific coast, are indicative of the future probabilities of the Canadian Northern as its tributary territory develops.

The Canadian Pacific was completed to the coast about 1887. Its average gross earnings for the first five years thereafter were \$2,800 per mile, and its average net earnings \$1,100 per mile. The average rate per ton per mile was 0.9 cents.

The mileage of its line in 1914 was more than double that in 1888; and notwithstanding a much lower ton mile rate, its gross earnings in the later year were about \$11,000 per mile, and its net earnings \$3,600 per mile.

The Great Northern was completed to the coast in 1893. For the first five years thereafter its gross earnings averaged \$3,800 per mile, and its net earnings about \$1,800 per mile, with an average ton mile rate of 1.03 cents.

With more than double its 1894 mileage, and at a considerably lower ton mile rate, its gross earnings in 1914 were about \$9,700 per mile, and its net earnings about \$3,100 per mile.

The Northern Pacific was completed to the coast in 1883. Its gross earnings for the first five years thereafter averaged \$4,700 per mile, and its net earnings \$2,100 per mile, with an average ton mile rate of 1.70 cents.

With considerably more than double the average mileage of the first five year period, and on a greatly reduced ton mile rate, the gross earnings in 1914 were about \$11,000 per mile and the net earnings about \$3,600 per mile.

GENERAL DESCRIPTION.

The transcontinental main line of the Canadian Northern Railway System extends from Quebec on the Atlantic coast via Montreal, Ottawa, Port Arthur, Winnipeg and Edmonton, to Vancouver on the Pacific coast.

There are other Canadian Northern trunk line routes in Ontario and Quebec, such as the Toronto-Ottawa line, and the Toronto-Capreol line; as well as miscellaneous branch lines.

There are also several Canadian Northern trunk line routes west of Winnipeg including the Portage La Prairie—Calgary line via Brandon, Regina and Saskatoon (the Saskatoon-Calgary part of such route being known as the Goose Lake line); also the Dauphin-Prince Albert line; and there are many branch lines in the central and southern parts of the provinces of Manitoba, Saskatchewan and Alberta. These lines serve the principal cities, viz: Winnipeg, Brandon, Regina, Moose Jaw, Saskatoon, North Battleford, Edmonton and Calgary; and also the best grain territory of the western provinces.

There is also the Fort Frances-Duluth line in Minnesota; and there are detached Canadian Northern lines in Nova Scotia, and lines under construction on Vancouver Island and elsewhere; all as shewn on maps attached hereto and marked Exhibits A, B, and C.

Average Mileage Operated.

The average miles of road in operation during the last two years are as follows:

1915.....	7,269 miles
1916.....	8,048 "

Total System Mileage.

The total miles of road completed as at June 30th, 1916, (owned) were.....	9,455 miles
To which should be added for trackage rights leased from other companies.....	58 "
Making the total miles of road in operation or ready for operation as at June 30th, 1916.....	9,513 "

NOTE: This figure is 217 miles (or 2.3 per cent.) more than was shewn in the company's last annual report, the difference being accounted for by mileage completed ready for operation but not opened for traffic at the date of such report.

Under track owned as above are included:

Northern Pacific & Manitoba Railway.....	351 miles
Minnesota & Manitoba Railroad.....	44 "
Duluth, Rainy Lake & Winnipeg Railway.....	98 "

The first of these lines is under option at a purchase price which is included as an outstanding capital liability of the Canadian Northern Railway System on page 20 of this report.

The second of these lines is owned by the Canadian Northern; and all liabilities in connection therewith are also included in statement on page 20 of this report.

The third of these lines is owned by a company which is controlled by the Canadian Northern through ownership of a majority of its stock; and all liabilities in connection therewith are included in statement on page 20 of this report.

For convenience the above mileage completed as at June 30th, 1916, has been classified as follows:

EASTERN LINES.	
Atlantic Seaboard—Capreol	2,362 miles
NORTHERN ONTARIO LINES.	
Capreol—Port Arthur.....	600 "
PRAIRIE LINES.	
Port Arthur—Tollerton	5,911 "
PACIFIC LINES.	
Tollerton—Vancouver	640 "
TOTAL MAIN TRACK MILEAGE.....	9,513 "
The company also owns and operates as sidings, yard tracks, and miscellaneous tracks,	1,593 "
TOTAL AMOUNT OF ALL TRACKS READY FOR OPERATION AT JUNE 30th, 1916.	11,106 "

Mileage Under Construction.

In addition to the above main track mileage completed as at June 30th, 1916, the Company has under construction 948 miles of main track as shewn below:

Eastern Lines.....	132 miles
Prairie Lines.....	510 "
Pacific Lines.....	306 "
TOTAL CONSTRUCTION MILEAGE....	948 "

Mileage Recapitulation.

Main track completed.	9,513 miles
Main track under construction.....	948 "
TOTAL SYSTEM MILEAGE.....	10,461 "
Deduct trackage.....	58 "
CANADIAN NORTHERN OWNED MILEAGE, WHEN COMPLETED.....	10,403 "

For historical record of the growth of the property see Exhibit C.

DOMINION OF CANADA TRAFFIC FEATURES.

In order to understand the principal transportation functions of this property, the existing traffic features of the Dominion of Canada may be classified as follows:

(a) Non-Productive or Undeveloped Territory.

A portion of the Dominion of Canada, as shewn in gray on Exhibit A herewith, as yet produces but a small amount of railroad traffic, although timber and pulp wood forests exist and extensive mineral deposits occur in the regions prospected to date.

This comparatively unproductive territory includes practically all of that part of the Province of Ontario lying between Lake Superior and James Bay, and all Canadian transcontinental railroads must traverse that portion of it. The Canadian Northern line between Capreol and Port Arthur passes through this area; it is situated about midway between the other two existing railroads, and serves a territory somewhat superior to theirs.

Here pulp wood forests abound; extensive iron ore deposits, and the world's largest nickel mines, are operated in the vicinity of Capreol, as shewn by area tinted blue on Exhibit A.

(b) Agriculture.

The great agricultural region of Western Canada, comprising an area of about 200,000 square miles, extends for 800 miles entirely across the Provinces of Manitoba, Saskatchewan and Alberta; its southern boundary is the dividing line between Canada and the United States; and its width varies from 150 miles in eastern Manitoba to 250 miles in western Alberta.

While practically all of this territory is fertile and productive, the northern portion produces the larger and more dependable crops.

Of the arable lands tributary to the Canadian Northern Railway System in the Prairie Provinces, less than fifteen per cent. is under cultivation, so that large increases in both population and traffic may be expected within a few years.

Under present conditions most of the grain moves from the Prairie Provinces to terminal elevators situated at Port Arthur, Fort William and Duluth.

During the lake season this grain moves from the elevators via steamships to Montreal, Buffalo and other eastern points; and after navigation closes it largely remains stored in the elevators.

Prior to the construction of Canadian Northern and Grand Trunk Pacific, but a small amount of this grain moved east via all rail routes; and while we are of opinion that such rail movement is practicable under normal conditions, it is impossible during the existing period of traffic congestion and scarcity of ocean steamships.

A government terminal elevator has recently been completed at Vancouver and it is expected that grain will move from the Prairie Provinces through Edmonton via this port under normal conditions of ocean transportation, both along Pacific Ocean routes and via the Panama Canal to the Atlantic routes.

At such time as the project of transporting grain from Western Canada to Liverpool, via Hudson Bay, be established, the Canadian Northern Railway System will form an important part of such route.

In eastern Ontario and parts of Quebec, the Canadian Northern extends along the northerly side of the Great Lakes and St. Lawrence River basin, and along the well watered and fertile valley of the Ottawa River, which are well, but not yet fully, settled; and the resources of which are capable of further expansion through the development of the water power reserves.

Hay, fruit, vegetables, fish, butter and cheese are the staple products. Agricultural lands are shewn in red on Exhibit A herewith.

(c) Live Stock.

Live stock is a traffic item of considerable volume in the Prairie Provinces and moves principally to stock yards at Winnipeg, Calgary, and Edmonton, and in lesser degree to Toronto. Dressed beef and provisions, with proper railroad equipment and service, will also be an important item of tonnage.

(d) Forest Products.

Vast forests containing lumber and pulp wood exist in parts of Quebec and Ontario, and also in Manitoba and Saskatchewan along the northerly lines of the Canadian Northern Railway System. There are also large areas of virgin forest in British Columbia. Forest areas tributary to the Canadian Northern Railway System are shown in green on Exhibit A. Lumber is manufactured in large quantities along the Winnipeg-Port Arthur and Fort Frances-Duluth lines; also along the northerly routes in Manitoba, Ontario and Quebec; also at Vancouver, and in Nova Scotia. Large pulp and paper mills are served by the Quebec lines.

An immediate development of the pulp wood traffic on the line in northern Ontario is assured as this territory is the most adjacent to existing pulp and paper mills situated along the Great Lakes, and the Canadian Northern is well located to move such traffic via Port Arthur and Key Harbor; in fact, present prices permit an all rail haul to the Niagara frontier.

Lumber traffic from Vancouver and from other British Columbia lumber producing points along the lines of the Canadian Northern Railway System, the markets of which are in the Prairie Provinces, in Eastern Canada, and in the United States, will expand rapidly with the development of the territory, and will not be subject to water competition.

(e) Mine Products.

Bituminous and lignite coal originates along the lines of the Canadian Northern Railway System in Alberta and in parts of Saskatchewan, as shown by areas tinted yellow on map herewith; and that this traffic will grow rapidly is already indicated by Canadian Northern records. Bituminous coal from the United States reaches the system at Port Arthur and

Duluth. The Alberta and Saskatchewan coal moves to points in the Prairie Provinces as far east as Winnipeg, but east of Saskatoon it competes with United States coal from the head of the lakes. As the Canadian Northern Railway System does not yet reach the Niagara frontier and has no car ferry across Lake Ontario, its facilities have attracted but little coal to its lines east of Port Arthur; notwithstanding which, some coal is already moving from the United States via Key Harbor and Sudbury. When improved facilities are provided, a substantial tonnage of commercial coal and coke can be developed for Ontario and Quebec points.

Important nickel ore deposits which are now producing about three-quarters of the world's supply of nickel, exist in the Sudbury district near Capreol throughout an area of about 35 miles in length and 15 miles in width, as shewn by area tinted blue on Exhibit A.

These deposits are worked by the International Nickel Company and the Mond Nickel Company, and the nickel matte formed from this ore is refined near New York and in Wales, and arrangements are now being made to refine a portion of it in Eastern Canada.

Large iron ore deposits also exist in the Sudbury district and their development is well under way.

The territory north of Winnipeg contains extensive gypsum deposits.

Quebec produces zinc, magnesite, china clay, graphite and mica.

Various metals are found in the mountains of British Columbia but are undeveloped along this line.

Building materials, such as granite, marble, limestone, etc., exist in great quantities, and kaolin, lead, silver, talc, and pyrites, are also found.

(f) Manufactures.

Manufacturing is largely confined to Eastern Canada and particularly to those sections already served by hydro-electric power installations. This territory has enormous water power resources available for future commercial development and has also large supplies of the raw materials required for manufacturing purposes. Its pulp wood supply is abundant and is being utilized for the manufacture of pulp and news print, large quantities of which are exported to the United States.

Many large manufacturing concerns are located at Toronto, Hamilton, and throughout the western Ontario peninsula, also at Ottawa, Kingston, Hull, Montreal, St. Jerome, Joliette, Shawinigan Falls and Quebec; their operations cover flour milling; oil and sugar refining; iron and steel fabrication, including locomotive and car building; agricultural implements; electrical and other machinery; woodenware, furniture and matches, cotton goods; saddlery; boots and shoes; cement and brick making.

The peninsula is also well advanced in fruit raising, canned goods etc., in addition to its other varied manufacturing interests.

EXISTING TRAFFIC.

An important item in the transportation function of the Canadian Northern Railway System at this time is to collect the grain tonnage originating in the Prairie Provinces and already moving in large volume over the various Canadian Northern lines, and to deliver it at terminal elevators situated at Port Arthur at the head of Lake Superior where it is either immediately loaded on steamships, or stored to await the opening of navigation.

This traffic on the Canadian Northern Railway System during the season c. 1916 amounted to about 132,000,000 bushels. After navigation closes a small amount of grain moves from Port Arthur to the seaboard via all rail routes, and there is also a continuous movement of rail grain and flour to Eastern Canada for domestic milling and baking purposes.

The grain crops of the Prairie Provinces cause an annual westbound movement of more than 7,000 cars of agricultural implements, binder twine, etc., which should move via Canadian Northern Railway System in proportion to the crops tributary to those lines.

About 30 per cent. of the System's present tonnage is forest products and about 12.5 per cent. is coal, of which latter commodity there is a total annual railroad movement through Port Arthur and Duluth of about 700,000 tons for commercial distribution throughout Western Canada.

Existing traffic between Vancouver and Edmonton, while growing rapidly, is negligible at present for the reasons that the line has been but lately completed; the Vancouver terminals are still under construction; the tributary resources of the line are entirely undeveloped; grain rates have not as yet been put into effect through the port of Vancouver, although a large Government elevator has recently been completed at that point; and ocean transportation is disturbed as war conditions seriously interfere with export and import traffic.

Normal conditions, and the successful operation of the Panama Canal, will create a demand for grain through Vancouver and will compel the resumption of import and export business; and at the same time the completion of the terminal will bring reciprocal switching privileges for handling general merchandise, lumber and shingles; all of which, with a perfected traffic arrangement with the Southern Pacific Railroad, in conjunction with the lumber development on the new line, should create a density of traffic such as to permit of its profitable operation.

Existing traffic between Port Arthur, Ottawa and Montreal, is also negligible at present for the reason that the line has been constructed but recently, and the Montreal-Hawkesbury line, and the Montreal terminal, are still incomplete and not yet in operation. These eastern lines have as yet no direct connections with United States railroads except at Ottawa; they have no through passenger service via Ottawa and Capreol to Port Arthur and the West; and the important traffic agreement with the Cunard Company cannot become operative until ocean facilities can be afforded therefor.

The various conditions under which the Canadian Northern Railway System is now operated as to equipment, terminal and other facilities, financial requirements, organization, etc., render a normal traffic growth difficult of attainment; but with a favorable modification of these conditions it may be asserted that a large and profitable volume of originating traffic can be developed along the lines of the Canadian Northern Railway System, a large interline traffic can also be built up through United States gateways and lake ports, and a fair share of through trans-continental business can be secured.

The existing traffic on the Halifax & Southwestern Railway cannot, in our judgment, be greatly improved excepting in so far as a summer tourist business might be developed by large expenditures for hotels, etc., for which no provision is made in the improvement and betterment program forming part of this report.

The Vancouver Island line should become self-sustaining within a few years after its completion.

PHYSICAL CHARACTERISTICS.

The entire transcontinental main line is well located and well built. As to grades and alignment, it is superior to its competitors, having been built to 0.5 per cent. westbound and to 0.4 per cent. eastbound grades with the exception of 28 miles of 0.7 per cent. eastbound grade on the western slope of the Rocky Mountains; and with the further exceptions of about 101 miles of westbound, and 226 miles of eastbound short momentum pusher grades, which can be reduced when necessary and which are located as shown below:

Distribution.	Grades Heavier than 0.5 per cent. Against Westbound Traffic	Grades Heavier than 0.4 per cent. Against Eastbound Traffic.
Vancouver-Tollerton	2.8 miles	39.4 miles
Tollerton-North Battleford...	10.4 "	40.3 "
North Battleford-Winnipeg...	34.7 "	62.4 "
Winnipeg-Port Arthur.....	20.6 "	51.0 "
Port Arthur-Ottawa.....	12.3 "	7.9 "
Ottawa-Quebec.....	20.6 "	25.5 "

Of the above 327.9 miles of grades in excess of 0.5 per cent. westbound and 0.4 per cent. eastbound, there are only 6 miles of 1.0 per cent. grade, and less than 1 mile of 1.15 per cent. grade. All other temporary grades are less than 1.0 per cent.

Other construction features are favorable to economic operation.

As to maximum grades and summit elevations Canadian Northern Railway compares with other transcontinental routes as follows :

Name of Road.	Maximum Grade.	Summit Elevation.
Canadian Northern .....	.7%	3,706 feet
Canadian Pacific	2.2%	5,321 "
Grand Trunk Pacific.. ..	1.0%	3,719 "
Great Northern.....	2.0%	5,202 "
Northern Pacific.....	1.6%	5,500 "
Union Pacific.....	1.8%	8,200 "
Chicago, Milwaukee & St. Paul.....	2.5%	6,322 "
Santa Fé.....	2.6%	7,421 "

The Canadian Northern Railway between Winnipeg and Vancouver is 1,601 miles long, as against Canadian Pacific's length of 1,484 miles between the same points; and as against Grand Trunk Pacific's length of 1,745 miles between Winnipeg and Prince Rupert; and any one of the above three lines is, of course, much shorter than the Great Northern, Northern Pacific, or Chicago, Milwaukee & St. Paul, between St. Paul and Seattle; much shorter than the Union Pacific between Omaha and Portland; and much shorter than the Santa Fé between Kansas City and San Diego.

The physical characteristics of the branch lines are also favorable for roads of secondary character.

As to the main line—the right of way is of ample width and is fenced; the roadbed is adequate; bridge structures, with minor exceptions, are permanent; track superstructure includes 80 pound rail, and in general, an adequate ballast section.

As to branch lines—the right of way is of ample width and is fenced; the roadbed is adequate; bridge structures are largely permanent; rail varies from 60 to 80 pounds; and portions of such track now require re-ballasting.

By reason of the high standard of construction originally adopted, the Canadian Northern Railway System will not require at any future time such large expenditures for grade and alignment revision as have marked the progress of older lines.

Station buildings and other similar structures are generally of wood and of ample size. Many additional structures are required but their cost is relatively small.

Power and equipment are inadequate for present traffic but in this connection it should be noted that a shortage of rolling stock now exists on all lines in the United States and Canada, and Canadian Northern's future requirements must be based on normal conditions.

Although the line is in operation between Quebec and Vancouver, yet construction work is unfinished at important points such as the Montreal and Vancouver terminals; and general shops are required for the lines east of Port Arthur, together with division terminal improvements at various points. Other important requirements are the construction or completion of the line between the Niagara frontier and Toronto, and added facilities such as car ferries.

Due to the modern character of the railway and to the fact that the property as it now exists has an operating capacity much beyond that indicated by its present revenues, the above additional requirements, while essential to the completion of the system as a whole, involve comparatively unimportant expenditures, when measured on the basis of present mileage or capitalization.

While these features will be considered in detail later as a part of the improvement and betterment program, yet it is deemed important at this time to mention specifically the necessity for the Niagara frontier line and the car ferries.

The existing inadequate transportation service via the frontier lines is detrimental to Canada. The Niagara line is therefore greatly needed for the further development of the Dominion facilities as a whole, as well as to connect the Canadian Northern main line with the city of Hamilton, with its St. Catharines line, with United States railroads, and with the intermediate manufacturing districts.

The construction of this line should produce profitable returns from both freight and passenger traffic because it will afford favorable facilities for Canadian interchange not now enjoyed by certain important United States railroads.

It will also form an essential part of new Toronto-Cleveland-Detroit-Chicago routes, which should make the Canadian Northern a strong contender for the tremendous export and domestic traffic now moving between these points.

It will also permit the Canadian Northern Railway to secure its share of bituminous and anthracite coal and coke traffic moving via the frontier; and in turn, the System's ability to handle coal will be a basic reason for new industries to locate on its rails.

As to the need of car ferries for the development of the eastern Canadian Northern lines, the magnitude of the traffic moving between the eastern Canadian Provinces and New England, including the eastern ends of the trunk lines, warrants the consideration of providing car ferries across Lake Ontario for competing for such business.

And if, as the result of providing proper service, equipment, terminals, and frontier connections, Canadian Northern could increase its 1916 average ton mile haul from 288 to 472 miles, which is the Canadian Pacific average for 1916, as in our opinion appears reasonable under the new conditions; and even if its average ton mile earnings should fall as low as the Canadian Pacific average, namely, 0.641 cents; then Canadian Northern would increase its freight revenue by 55 per cent., or \$1.07 per ton; and would earn on its 1916 freight traffic a revenue of \$40,401,000, an increase of \$14,211,000; and this without any increase whatever in its actual freight tonnage.

Owing to the Canadian Northern's favorable operating conditions, about 60 per cent. of the above increase in gross revenue would also appear as net earnings.

OPERATING RECORD.

No great importance attaches to the past operations of the various constituent parts of the Canadian Northern Railway System for the reason that prior to 1916 these operations were conducted by several detached lines; such condition constituting no basis for comparison with the trans-continental railway system which has since been completed.

It may be stated, however, that in 1903 the parent company operated 1,276 miles of line west of Port Arthur, with a total operating revenue of \$2,450,000, or about \$2,000 per mile; and in 1913 it operated 4,297 miles of line west of Port Arthur, with a total operating revenue of \$24,300,000, or about \$5,650 per mile.

During this ten year period the Company reported annual operating ratios which vary from a minimum of 62.2 per cent. in 1906, to a maximum of 72.1 per cent. in 1913.

During 1914 and 1915 construction progressed rapidly, not only west of Port Arthur but also through northern Ontario and Quebec, and in 1916 the various parts of the existing transcontinental system were completed and united.

During the year 1916 the Canadian Northern Railway System operated 8,048 miles of line with a total operating revenue of \$35,476,000, or about \$4,400 per mile; and at the end of that fiscal year it had in operation 9,513 miles of line, consisting of its transcontinental route and other main lines and branches (of which it owned 9,455 miles) all of which were connected into one system of railway with the exceptions of the Nova Scotia line and the St. Catharines electric line. As the connection between the western lines and the eastern Ontario and Quebec lines was not made until one half of this fiscal year had elapsed, and as the British Columbia line is not completed until about the same time, it is evident that the revenue of \$4,400 per mile was earned in part by disconnected operations, having no helpful relations with each other, and in part by a new through route which lacked practically every element of earning power except a track, *i. e.*, it was without terminals, adequate power and equipment, shops, inter-line connections, etc.; its organization had not been expanded to meet transcontinental operating conditions; and it had no participation in through rates, divisions, etc., except as these could be developed one by one, under proper governmental authority, and by agreement with other lines.

For the first six months of the present fiscal year comparative operating revenues shew an improving situation; the increase in gross revenue over the same period of 1916 being \$4,277,900, which may be attributed entirely to the through transcontinental feature of current operations, as the crop conditions of Western Canada, which form so important a factor in Canadian Northern traffic, were inferior to those of the preceding season.

While several of the Ontario and Quebec lines were acquired as feeders to the through routes, and may not, of themselves, shew as high a gross revenue per mile as those lines in the Prairie Provinces where

conditions for quicker development exist, yet it should be kept clearly in mind that railroad traffic and railroad revenue grow in much faster ratios than the railroad facilities which are provided therefor; that such branches will contribute traffic and revenue which will be reflected in transcontinental operations; and that many of the improvements and betterments recommended in the program of capital expenditures to follow, are for the purpose of improving existing conditions on these Ontario and Quebec lines.

Insufficient power and equipment under the present abnormal conditions also contribute to the existing low revenue per mile; in addition to which the extreme weather during the winter of 1915-1916, especially in Western Canada, seriously affected both gross and net revenue.

As Canada has been in a state of war for about two and one-half years, during which time the entire economic and political life of the country has been seriously disturbed, largely due to the great demand for men for overseas service, and to the suspension of immigration during this period—which has prevented a faster development of the country along the lines of the Canadian Northern Railway System—the revenue of the Railway during this time has been, in our judgment, much lower than it would have been had the country been at peace.

The Company has reported annual operating ratios which vary from a minimum of 62.2% in 1906 to a maximum of 74.4% in 1915; but as the operating expenses include an average maintenance of way expenditure per mile of only \$267 in 1903, and of but \$700 in 1914, it is evident that heavier maintenance of way expenditures will be required in the near future; in fact they are already being made.

Maintenance of equipment expenditures have also been somewhat below normal, and depreciation of equipment has not been charged out; in consequence of which deferred maintenance of equipment has also accrued and some accounting adjustments appear to be necessary.

Notwithstanding this situation, the operating ratio under sound accounting methods should be lower than either of the above figures at such time as the improvement and betterment program is completed, in view of the increase in traffic density which we predict.

In addition to its rail operations the Company conducts a land department and had unsold the following areas as at June 30th, 1916:

In Quebec.....	402,860 acres
“ Ontario.....	2,000,000 “
“ the Prairie Provinces.....	843,127 “

The Company also operates its own express and telegraph companies.

CAPITAL EXPENDITURES TO DATE.

The money now in the property appears to have been secured on a conservative basis and to have been expended wisely. The excellent location of the transcontinental main line has already been referred to, and the various terminals and subsidiary lines will be suitable for their respective purposes when completed.

The capital liabilities (exclusive of common stock) which were outstanding per mile of line, on the 9,455 miles of line owned and completed on June 30th, 1916, and including cost of power and equipment, are as follows:

Bonds.....	\$28,056
Equipment notes.....	1,783
Secured loans, bills payable, and all other net current liabilities.....	11,510
TOTAL AS ABOVE.....	\$41,349
Income charge convertible debenture stock.....	2,644
TOTAL CAPITAL LIABILITIES PER MILE, EXCLUSIVE OF COMMON STOCK.....	\$43,993

The above capital liabilities per mile include those issued for terminal, land, telegraph, and express properties; those issued against the acquisition of securities of other companies, which latter now form assets of the Canadian Northern Railway System; and they also cover the cost to date of 948 miles of incomplete roadbed and track; all as shewn below:

Outstanding capital liabilities issued against lands, or against the securities of land, express, telegraph, steamship and miscellaneous companies.....	\$27,843,000
Outstanding capital liabilities issued against the acquisition of certain terminals, and against the securities of certain terminal companies.....	\$26,923,000
Amount expended to date of June 30th, 1916, on incomplete mileage.....	\$11,038,805

By deducting the liabilities incurred for lands and for securities of various companies (exclusive of certain terminal companies) the total capital liabilities outstanding per mile are reduced to \$38,404 before the income charge convertible debenture stock.

By further deducting the liabilities incurred for certain terminals, and for the securities of certain terminal companies, the total capital liabilities outstanding per mile are reduced to \$35,556 before the income charge convertible debenture stock.

By further deducting the cost of the mileage which was incomplete as of June 30th, 1916, the total capital liabilities outstanding per mile are reduced to \$34,389 before the income charge convertible debenture stock.

And finally, by further deducting the cost of power and equipment as at June 30th, 1916, namely, \$59,721,088, the total capital liabilities outstanding per mile are reduced to \$28,073 before the income charge convertible debenture stock.

Interest charges per mile are relatively lower than the above figures might indicate, for the reason that under Government and Provincial guarantees, rates on the fixed capital liabilities have averaged only 3.927 per cent. If, therefore, the existing net floating liabilities could be funded on a 5 per cent. basis, total interest charges would be about \$1,673 per mile; and if 25 per cent. of gross revenue could be saved for fixed charges, after rentals, taxes, current interest, etc. (as against 26.4 per cent. actually saved in 1916), then the average gross revenue per mile would have to be \$6,692 in order to avoid an annual profit and loss deficit.

Again, if 30 per cent. of gross revenue could be saved for fixed charges, then an average gross revenue per mile of \$5,579 would suffice.

Again, if 35 per cent. of gross revenue could be saved for fixed charges, then an average gross revenue per mile of \$4,780 would suffice.

All as against Canadian Northern gross revenue per mile of \$4,400 in 1916 on the average mileage operated; and as against an average surplus of 38.3 per cent. of gross revenue saved by the Canadian Pacific, Great Northern and Northern Pacific companies in 1916; and as against an average surplus of 38.06 per cent. saved by those companies over the five year period ending with 1916.

Of course, to the above outstanding liabilities must be added those yet required for the extension and completion of the property, as shewn later in this report.

CAPITAL LIABILITIES.

The general balance sheet of the System as at June 30th, 1916, as furnished by the Company's officers, contains the following items, in the consideration of which it should be noted that all lines owned are directly operated; that there are no contingent liabilities; and that rentals are unimportant in amount.

(a) FUNDED DEBT:	
Canadian Northern Railway.....	\$162,192,440
Affiliated Companies.....	123,223,824
Capital Liabilities on account of leased lines owned or controlled as per pages 4 and 5 above.....	9,349,000
	<u>\$294,765,264</u>
(b) EQUIPMENT TRUST OBLIGATIONS.....	16,862,500
(c) TEMPORARY LOANS:	
From Dominion Government and miscellaneous banks and trust companies against deposit of securities as collateral.....	55,912,962
(d) SECURED BILLS PAYABLE DUE ON CONSTRUCTION AC- COUNT INCLUDING BANK OVERDRAFTS.	16,666,957
(e) CURRENT LIABILITIES:	
(1) Payrolls, audited vouchers and other floating liabilities.....	\$12,994,152
(2) Accrued interest.....	4,579,271
(3) Taxes.....	250,000
	<u>17,823,423</u>
(f) TOTAL AS ABOVE.....	<u>\$402,031,106</u>
ADD INCOME CHARGE CONVERTIBLE DEBENTURE STOCK	25,000,000
(g) TOTAL LIABILITIES, exclusive of common stock, surplus, reserves, and advances to affiliated companies.....	<u>\$427,031,106</u>

As against which the following assets may be applied:

(h) MISCELLANEOUS CURRENT ASSETS:	
Exclusive of materials and supplies, and of cash reserves	11,077,228
(i) TOTAL NET LIABILITY AS ABOVE.....	<u>\$415,953,878</u>
(j) NET LIABILITY:	
Exclusive of income charge convertible debenture stock	\$390,953,878
(k) THE FUNDED DEBT OF CANADIAN NORTHERN RAILWAY AS SHEWN IN ITS LAST ANNUAL REPORT, AND AS LISTED UNDER (a) ABOVE INCLUDES THE FOLLOWING SHORT TERM NOTES:	
Secured notes, 1918 (5%).....	\$ 9,733,333
Secured notes, 1919 ".....	2,190,000
One year notes ".....	3,577,000
Two year collateral notes ".....	11,500,000
One year secured notes ".....	2,500,000
TOTAL AS ABOVE.....	<u>\$29,500,333</u>

The net liability (j) as shewn above therefore comprises:

(1) Bonds (a-k) and Equipment Notes (b).....	\$282,127,431
(2) Short term notes (k).....	29,500,333
(3) Temporary loans, bills payable, etc. (c + d).....	72,579,919
(4) Other net current liabilities including accrued in- terest (e-k).....	6,746,195
	<u>6,746,195</u>
TOTAL NET LIABILITY (j)	
Exclusive of income charge convertible debenture stock.....	<u>\$390,953,878</u>

All of which should be provided for in any plan of adjustment, although it should be noted that cash in amount of \$18,143,711 is available under certain Provincial and other agreements, whereunder the above amount will be released for the use of the Company when the Company makes certain expenditures on its lines and terminals in respect of which the securities represented by such cash were issued. Of this amount, \$13,163,592 will be released by the completion of the construction program herein recommended, and such cash item appears as a credit against the maximum construction program as shewn on page 26 of this report.

It should be noted also that the above liabilities are as at June 30th, 1916; and as no important financing has occurred since that time, the estimated deficit after interest charges for the current year of \$1,827,000 as shewn on page 28 of this report, and as provided for in both maximum and minimum programs as recommended on page 29 of this report, brings this situation down to date.

The details of the funded debt outstanding are shewn on the mortgage map attached hereto and marked Exhibit B.

SHORT TERM NOTES AND TEMPORARY LOANS TO BE FUNDED.

Any plan which may be formulated to cover the financial requirements of the Canadian Northern Railway System must include the funding of the short term notes, and a portion of the temporary loans and bills payable, as shewn below:

Short term notes.....		\$29,500,333
Temporary loans, bills payable, etc.....	\$72,579,919	
Less Dominion Government loans which do not require refunding during the period covered by the construction program.....	15,878,167	<u>56,701,752</u>
Net amount of short term notes and temporary loans to be funded		\$86,202,085

Treasury securities in the following amounts are now deposited as collateral under these loans.

Securities Guaranteed by Governments.

By Dominion Government —4 %..	\$27,833,334	
By Dominion Government —3½%..	<u>5,110,000</u>	\$ 32,943,334
By Provincial Governments—4½%..	11,513,940	
By Provincial Governments—4 %..	<u>15,745,428</u>	27,259,368
TOTAL SECURITIES GUARANTEED AS ABOVE...		<u>\$ 60,202,702</u>

Other Securities.

C. N. R. 4% Perpetual Cons. Deb. Stock	\$14,806,106	
C. N. O. 4% Perpetual Cons. Deb. Stock	6,082,949	
C. N. Q. 4% Debenture Stock.....	184,758	
D. W. & P. Ry. 4% Debenture Stock.	1,210,583	
H. & S. W. Ry. 3½% Debenture Stock	1,216,667	
J. B. & E. 5% Debenture Stock.....	300,000	
Q. & L. St. J. 4% 1st Mortgage Bonds.	127,799	
N. St. C. & T. Ry. 5% 1st Mortgage Bonds.....	406,000	
N. St. C. & T. Ry. 5% 2nd Mortgage Bonds.....	536,500	
Mt. R. T. & T. Co. 5% Rent Charge Bonds.....	6,773,898	
National Trust Co. Certificates.....	1,657,500	
C. N. R. 5% Land Mortgage Debentures.....	<u>9,733,334</u>	\$ 43,036,094
TOTAL SECURITIES PLEDGED AS COLLATERAL UNDER LOANS.....		<u>\$103,238,796</u>

NOTE: In addition to the above securities pledged as collateral under loans, the system owns, and has pledged as additional collateral thereto 2,402,860 acres of Ontario and Quebec land grants carried at..... \$ 7,208,580

For the purposes of this report it is assumed that with the return of normal financial conditions these securities can be sold to advantage thereby funding the short term notes and temporary loan

IMPROVEMENT AND BETTERMENT PROGRAM.

In formulating such an improvement and betterment program as would, when completed, place the Canadian Northern Railway System on a basis of substantial competitive equality with the older Canadian railroads, consideration has been given not only to the existing condition of the physical property and to the various improvements and betterments required to promote its efficiency as a transportation entity, but also to the System's existing credit position as shewn by its outstanding capital liabilities in the form of funded and floating debt, and to the probable effect produced upon such credit position by the financing required to complete the program suggested hereunder; but since no opinion is expressed at this time as to the method or methods which may be adopted for the purpose of carrying the recommendations contained in this report into effect, the program is submitted upon a maximum and also upon a minimum basis, to the end that with the flexibility thus afforded, the System's property and also its credit position may find a common basis of mutual improvement.

Estimates of gross and net revenue are also submitted which are regarded as reasonably certain of attainment following the completion of either program; and in this connection the necessity is emphasized of such an operating organization as can and will contribute towards increased efficiency of service; towards co-operation with the shippers in matters of solicitations, of claims, of industrial development, of rate adjustments, and of tariff regulations; and toward securing full benefits from the System's improved connections, enlarged terminal facilities, more adequate power and equipment, and from the various other improvement and betterment items outlined below.

The importance of the Niagara frontier line, and of the car ferry across Lake Ontario, has already been dwelt upon. These facilities will connect by direct routes certain parts of Canada and of the United States, between which traffic now moves in large volume—such traffic including both anthracite and bituminous coal, and iron and steel products; they will tend to increase greatly the System's average freight haul; they will improve conditions under which certain United States railroads are now operating at serious disadvantages, so that these railroads will work heartily

with the Canadian Northern Railway System ; and they will provide interchange points which will put the Canadian Northern Railway System on a parity with its competitors as to rates and divisions.

The importance of completing the freight and passenger terminals at Montreal and Vancouver requires no comment. Without these facilities the System must continue to operate at a serious competitive disadvantage ; as against which, improvements insuring a fair share of competitive business not only pay for themselves, but also greatly increase the earning power of the System as a whole. With adequate terminals and equal service to Western Canada, not only would the eastern and Niagara gateways be open, but effective solicitation would, for obvious reasons not herein enlarged upon, attract the support of all Chicago lines ending at St. Paul and Duluth ; such support should also enable the Canadian Northern Railway System to secure and hold a large share of the controllable competitive business, such as manufactured products, now moving westward from southern Ontario and the eastern United States points.

As to power and equipment, the Canadian Northern Railway System had 740 locomotives, 1,264 passenger train cars, and 29,368 freight train cars, in service on 9,513 miles of line on June 30th, 1916.

This is equivalent to one locomotive for every 12.86 miles of line operated ; as against which the Canadian Pacific, Great Northern and Northern Pacific companies each owns—on an average—one locomotive for every 5.59 miles of line, or two and three-tenths times the ratable number now owned by the Canadian Northern Railway System.

Again, the number of passenger train cars is equivalent to one such car for every 7.53 miles of line operated ; as against which the Canadian Pacific, Great Northern and Northern Pacific companies each owns—on an average—one such car for every 5.46 miles of line, or about one and one-third times the ratable number now owned by the Canadian Northern Railway System.

Again, the number of freight train cars is equivalent to 3.09 such cars per mile of line operated, as against which the Canadian Pacific, Great Northern and Northern Pacific companies each owns—on an average—6.98 such cars per mile of line operated ; or nearly two and three-tenths times the ratable number now owned by the Canadian Northern Railway System.

The existing numbers of locomotives, passenger cars, and freight cars per mile of line are too low for existing traffic (under the present abnormal conditions) and are wholly inadequate in view of the prospective increase in traffic due to improved facilities.

If, therefore, the Canadian Northern Railway System can be improved in such manner as to make it self-sustaining at the earliest possible date, namely four years, or by 1921, by carrying out during the interim the program recommended in this report, its gross revenue in that year would approximate \$67,000,000 which is at the rate of \$6,748 per mile on its 9,929 miles of line estimated as completed by that time; as against which its gross revenue in 1916 was at the rate of about \$4,400 per mile on the average mileage in operation during that year; and the average gross revenue of the Canadian Pacific, Great Northern and Northern Pacific companies in 1916 was at the rate of about \$10,579 per mile of line; and their average gross revenue during the five year period ending with 1916 was at the rate of about \$10,155 per mile of line.

With power and equipment in Canada costing somewhat more than in the United States, the Canadian Northern may be said to have expended on its existing units about \$7,500 per mile of line, as against about \$14,000 per mile as the average of the three other railroads.

From the above it is evident that the three railroads earn on the average \$6,000 more per mile than Canadian Northern, and that they have about \$6,500 more of power and equipment per mile to earn it with; and as Canadian Northern must earn (in order to become self-sustaining) \$2,348 more per mile in 1921 than it earned in 1916, it should therefore have about \$2,500 more of power and equipment per mile to earn it with; and should also have at least \$10,000 of power and equipment per mile on all of the mileage above the average mileage operated in 1916 which is required to complete a system of 10,403 miles.

Existing locomotive and car repair shops are inadequate to keep the power and equipment in good condition at reasonable cost; in fact the lines in Ontario are practically without any such facilities. This item of the improvement program is as important, in our judgment, as the furnishing of additional locomotives and cars.

The extensions and branch lines item of the program covers mainly expenditures estimated as necessary to put into operating condition certain lines in British Columbia and in the Prairie Provinces, upon the construction of which large sums have already been expended and which sums are unproductive as the lines are as yet incomplete.

As the company's general balance sheet shews cash items reserved by the Dominion and Provincial Governments, aggregating about \$13,000,000

on account of these lines, credit is taken in that amount on the improvement and betterment program, in our consideration of which the following items appear in the order of their importance.

Program of Expenditures.

Item.	Expenditures.	
	Maximum Five Year Period.	Minimum Three Year Period.
(1) Power and equipment.....	\$50,000,000	\$30,000,000
(2) General shops.....	2,000,000	2,000,000
(3) Niagara frontier line and car ferry..	7,000,000	7,000,000
(4) Terminals.....	8,000,000	5,000,000
(5) Extensions and branch lines already under construction.....	16,000,000	8,000,000
(6) Miscellaneous improvements and betterments.....	11,000,000	6,000,000
(7) New working capital.....	5,000,000	5,000,000
TOTAL AS ABOVE.....	\$99,000,000	\$63,000,000
Less cash assets.....	13,000,000	9,000,000
Net cash requirement.....	\$86,000,000	\$54,000,000

The proper rehabilitation of the existing property can be accomplished out of net income if provision be made for such portion of the interest charges as may be unearned over the next three years.

ADDITIONAL CAPITAL REQUIREMENT.

In addition to the money required for the above improvement and betterment program, funds must also be provided for meeting maturing equipment obligations, and for the payment of such portion of the fixed charges as may be unearned during the next three years.

Equipment Obligations.

All of the System's outstanding equipment obligations are provided for in the five year program.

Future Interest Charges.

Interest charges over the next six years are estimated to be as follows:

ESTIMATED INTEREST CHARGES.

Item.	1917	1918	1919	1920	1921	1922	1923
BONDS:							
\$265,264.931 @ 3.927%.	10,417,000	10,417,000	10,417,000	10,417,000	10,417,000	10,417,000	10,417,000
SHORT TERM NOTES:							
\$79,500,333 @ 5%.....	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000
EQUIPMENT NOTES:							
Varying amounts at 4.5 and 5%.....	764,000	646,000	507,000	377,000	257,000	137,000	40,000
TEMPORARY LOANS AND BILLS PAYABLE:							
\$72,579,919 @ 5%....	3,629,000	3,629,000	3,629,000	3,629,000	3,629,000	3,629,000	3,629,000
INTEREST ON FIXED CHARGES WHICH GOVERNMENTS ARE OBLIGATED TO PAY.....	92,000	210,000	370,000	435,000	450,000	450,000	450,000
CONSTRUCT'N PROGRAM:							
Varying amounts @ 5%.....	.....	630,000	1,495,000	2,345,000	3,195,000	4,045,000	4,300,000
TOTAL AS ABOVE.....	16,377,000	17,037,000	17,893,000	18,678,000	19,423,000	20,153,000	20,311,000
DEDUCTIONS:							
Fixed charges which governments are obligated to pay.....	3,700,000	4,500,000	2,300,000	500,000	.....	.....	.....
Interest on cash reserves.....	600,000	520,000	440,000	360,000	280,000	200,000	200,000
TOTAL DEDUCTIONS:	4,300,000	5,020,000	2,740,000	860,000	280,000	200,000	200,000
BALANCE AS ABOVE.....	12,077,000	12,017,000	15,153,000	17,818,000	19,143,000	19,953,000	20,111,000
INTEREST ON UNEARNED INTEREST FOR PERIOD.....	.....	91,000	91,000	124,000	174,000	174,000	174,000
TOTAL ESTIMATED INTEREST CHARGES(NET).	12,077,000	12,108,000	15,244,000	17,942,000	19,317,000	20,127,000	20,285,000

The method of estimating the amounts of interest for which capital provision should be made, is as follows:

Gross revenues are taken as increasing by \$6,500,000 annually.

The operating ratio is taken as 75 per cent. in 1917, and as thereafter decreasing by 1 per cent. annually throughout the period.

INTEREST CHARGES TO BE CAPITALIZED.

Year.	Estimated Gross Revenue.	Operating Ratio.	Estimated Operating Expenses.	Estimated Net Income.	Estimated Interest Charges.	ESTIMATED PROFIT AND LOSS.	
						Deficit.	Surplus.
1917.....	\$41,000,000	75	\$30,750,000	\$10,250,000	\$12,077,000	\$1,827,000	.....
1918.....	47,500,000	74	35,150,000	12,350,000	12,108,000	.....	\$ 242,000
1919.....	54,000,000	73	39,420,000	14,580,000	15,244,000	664,000	.....
1920.....	60,500,000	72	43,560,000	16,940,000	17,942,000	1,002,000	.....
1921.....	67,000,000	71	47,570,000	19,430,000	19,317,000	.....	113,000
1922.....	73,500,000	70	51,450,000	22,050,000	20,127,000	.....	1,923,000
1923.....	80,000,000	69	55,200,000	24,800,000	20,285,000	.....	4,515,000

Total Unearned Interest for which Capital should be provided..... \$3,138,000

In addition to the refunding of temporary loans, the total amounts of money which should be provided for the property within the periods shewn are approximately as follows:

Item	Maximum Five Year Period	Minimum Three Year Period
Improvement program	\$ 86,000,000	\$54,000,000
Equipment trust obligations.....	17,000,000	13,000,000
Unearned interest charges for period.....	3,000,000	3,000,000
TOTAL AS ABOVE.....	\$106,000,000	\$70,000,000
Credit land sales estimated at.. ..	5,000,000	3,000,000
CASH REQUIREMENT.	\$101,000,000	\$67,000,000

ESTIMATED FIXED CAPITAL LIABILITIES FOLLOWING COMPLETION OF EITHER PROGRAM.

By carrying out either of the above programs, the System's outstanding fixed capital liabilities, including those covering fixed charges payable by Governments, but before income charge convertible debenture stock, may be estimated as follows:

Item.	1923.	1921.
Present funded debt excluding short term notes Collateral to short term notes, temporary loans etc., estimated as sold and outstanding....	\$265,264,931	\$265,264,931
Cash requirement.....	103,238,796	103,238,796
Liabilities covering Dominion Government loans to date of June 30th, 1916.....	101,000,000	67,000,000
Liabilities covering fixed charges during period which Governments are obligated to pay..	15,878,167	15,878,167
	11,000,000	11,000,000
TOTAL ESTIMATED FIXED LIABILITIES.	\$496,381,894	\$462,381,894

ESTIMATES OF GROSS REVENUE.

By the carrying out of the above maximum program over the five year period, the Canadian Northern Railway System mileage will be increased to 10,403 miles in 1923; and its total fixed capital liabilities including those covering fixed charges payable by Governments during the period under existing agreements, but before income charge convertible debenture stock, will then be about \$496,000,000, which is at the rate of \$47.715 per mile.

Fixed charges, as shewn in detail on page 27 above, will then amount to \$20,285,000; and if, with the heavier traffic density at the end of the five year period, and with the benefits which may be expected to follow the expenditure of the new money as outlined in the maximum program, 31 per cent. of the estimated gross revenues can be saved for meeting fixed charges, which, in our judgment, is a reasonable and conservative estimate under the circumstances, then the annual gross revenue in 1923 would have to be about \$65,000,000 in order to meet fixed charges of \$20,285,000.

The above estimated gross revenue is at the rate of \$6,248 per mile of line, and the fixed charges are at the rate of \$1,950 per mile of line.

The only other railroad which has been built in recent years, the capital liabilities and interest charges of which may be compared with those of Canadian Northern, is the Chicago, Milwaukee & Puget Sound Railway (now a part of the Chicago, Milwaukee & St. Paul Railway). This line extends from Mobridge, a point on the Missouri River nearly south of Winnipeg, to Everett, Seattle, Tacoma, and Gray's Harbor, all Pacific coast points; a distance including branches of 2,437 miles of line owned. In 1912, three years after the line was opened for operation, its capital liabilities exclusive of capital stock averaged about \$76,000 per mile, its interest charges were about \$2,735 per mile, and its gross revenue and other income combined averaged \$8,400 per mile.

As against the above estimate of gross revenue it should be noted that the Canadian Pacific, Great Northern and Northern Pacific companies, in 1916, saved on the average 38.3 per cent. of their operating revenues, or \$4,052 per mile of line, as a surplus available for fixed charges and dividends; and if the Canadian Northern Railway System should operate on as low a ratio as this average, it would be necessary for Canadian Northern to earn a gross revenue of only \$53,000,000 instead of \$65,000,000 in 1923; which is at the rate of only \$5,094 per mile of line instead of \$6,248.

The conservatism of the following estimates is thus apparent:

Estimate of Gross Revenue During First Year Following the Five Year Construction Period.

The actual gross revenue of the Canadian Northern Railway System for the year ended June 30th, 1916, was \$35,476,000; and if an annual rate of increase of but five per cent. be applied against the average mileage operated in 1916 over a period of six years (taking June 30th, 1917, as the date of commencement of program) then estimated gross revenue of such mileage during the first year following completion of five year program becomes, on above basis,

	\$49,917,000
Allow as additional revenue to be derived from 2,355 miles of branches and extensions required to complete System of 10,403 miles, @ \$4,000 per mile.....	9,420,000
As above.....	<u>\$59,337,000</u>

With 75 per cent. of such revenue derived from freight traffic as at present, its distribution is as follows:

Freight Revenue.....	\$44,503,000
Passenger Revenue	9,447,000
Miscellaneous Revenue.....	5,387,000

Freight Traffic Density.

The above item of estimated freight revenue from the sources shewn is equivalent to an average of \$4,278 per mile of the completed System, as against \$3,300 per mile earned on the average mileage operated in 1916; an increase of only \$978 per mile, or say 30 per cent.; and with the same rate per ton mile, and the same average haul as in 1916, the average freight density in 1923 would also be increased 30 per cent. and would therefore become:

Average freight density, 1916.....	478,618 ton miles
Add 30 per cent.....	143,585 " "
Estimated freight density in 1923 on above basis.....	622,203 " "

As against a freight traffic density on certain other railroads as shewn below:

Name of Railroad.	Freight Density.	
	1916.	Five Years Ending 1916.
Canadian Pacific.....	1,070,000 ton miles	905,000 ton miles
Great Northern.....	970,000 " "	883,000 " "
Northern Pacific.....	1,079,000 " "	909,000 " "
Average.....	1,040,000 " "	899,000 " "

From which it appears that Canadian Northern's estimated freight density in 1923, before giving effect to the new operating conditions which will be produced by the construction of the Niagara frontier line, car ferry, terminals, etc., would be but 60 per cent. of the 1916 average of the above lines, and but 69 per cent. of their average over the five year period ending with 1916. And the conservatism of the above estimate is shewn by the

fact that it contemplates for Canadian Northern an increase in freight density of only 143,585 ton miles in seven years, or, say, 20,500 ton miles increase per annum, as against an average increase of 54,200 ton miles annually for the above railroads during the five year period ending with 1916.

In other words, the rate of increase in the freight density of the Canadian Northern Railway System is estimated at only 38 per cent. of the actual rate of increase of the other railroads used as a basis of comparison.

Freight Earnings Per Ton Mile.

The freight earnings per ton mile of the Canadian Northern compare with those of the other railroads as shewn below :

Name of Railroad.	Average Freight Revenue per Ton Mile.		
	1915.	1916.	Average.
Canadian Northern.....	0.831 cents	0.679 cents	0.755 cents
Canadian Pacific.....	0.733 "	0.641 "	0.682 "
Great Northern.....	0.817 "	0.771 "	0.793 "
Northern Pacific.....	0.849 "	0.793 "	0.821 "

As freight revenue per ton mile has a constantly decreasing tendency, no useful purpose would be served by shewing average results over a series of years; but on the contrary the most recent, and consequently the lowest figures should be used (with further suitable deductions) for the purpose of estimating future freight revenue.

Neither does the revenue per ton mile on the Great Northern and Northern Pacific railroads afford so close a basis of comparison as that on the Canadian Pacific, as the latter is a Canadian transcontinental route with traffic conditions generally similar to those which should obtain on Canadian Northern with the completion of the five year program.

As the Canadian Pacific freight revenue per ton mile in 1916 was the lowest of those shewn above it has been used (with suitable modifications) as a basis of estimating future freight revenue.

Average Freight Haul.

The average revenue freight haul on Canadian Northern compares with the average revenue freight haul of other lines as shown below :

Name of Railroad.	Average Freight Haul.		
	1915.	1916.	Increase.
Canadian Northern.....	204 miles	288 miles	84 miles
Canadian Pacific.....	360 "	472 "	112 "
Great Northern.....	246 "	270 "	24 "
Northern Pacific.....	293 "	334 "	41 "

In this respect also, Canadian Pacific should be used in preference to the other railroads as a basis of comparison, but as the year 1916 was abnormal, it would not do to take advantage of the greatly increased freight haul enjoyed by Canadian Pacific during that year; and Canadian Pacific's average revenue freight haul over a period of five years ending with 1916, which amounts to 397 miles, has therefore been substituted as a more conservative basis of estimating Canadian Northern's future freight revenue under approximately similar transcontinental conditions of operation.

From the above it appears that the average revenue freight haul on Canadian Northern in 1916 was 184 miles shorter than that of Canadian Pacific in the same year, and was 109 miles shorter than the average revenue freight haul of Canadian Pacific over the five year period ending with 1916.

Increased Freight Revenue due to Completion of System.

If now, by reason of the completion of the above improvement and betterment program the Canadian Northern can be made into a complete and well balanced railway system by or before 1923, having additional points of interchange with the United States railroads, adequate terminals, sufficient power and equipment, etc., there can be no doubt but that a much greater traffic density can be secured from the tonnage estimated for 1923 than that which would be produced by perpetuating the 1916 conditions as shown by the estimate on page 31 above, of 622,203 ton miles per mile of line per annum.

In other words, while the existing average ton mile rate may be expected to decrease slightly, the average freight haul may be expected to increase greatly; the estimated net result being a large increase in the revenue to be derived from the same volume of tonnage which was estimated on page 31 above to produce by the perpetuation of existing rate and haul conditions, a freight revenue in 1923 of \$44,503,000.

If Canadian Northern in 1923 can increase its freight haul from its 1916 average of 288 miles to 397 miles, which was the Canadian Pacific's average haul over the five year period ending 1916, and which, in our judgment, is a reasonable expectation, it would increase its 1916 average haul by 109 miles, or about 38 per cent.; and if Canadian Northern in 1923 should earn but six mills per ton mile as against the six and seventy-nine hundredth mills which it earned in 1916, it would decrease its ton mile revenue by about 12 per cent., as a result of which Canadian Northern would earn on each ton of freight

397 ton miles @ 6 mills	\$2.38
As against 1916 revenue per ton of	1.96
An increase of	<u>\$0.42</u>

which is equivalent to an increase of 21 per cent. in the 1923 freight revenue estimated on page 31 above, as \$44,503,000; such increase being \$9,346,000.

Increased Passenger Revenue Due to Completion of System.

The passenger traffic of the Canadian Northern Railway System is at this writing much less developed than the freight traffic. The large passenger terminals at Montreal, Toronto and Vancouver are as yet incomplete; passenger power and equipment are lacking; schedules of important through trains provide a most inadequate service; and, in fact, the trans-continental passenger traffic is negligible in volume and must remain so until adequate facilities are provided therefor.

To illustrate the undeveloped condition of the passenger traffic it may be stated that in 1916 Canadian Northern carried only 31,629 passengers one mile per mile of line, as against Canadian Pacific's average of 125,557 passengers one mile per mile of line over the five year period ending with 1916; from which it is evident that Canadian Northern's passenger traffic density during the year which we have used as a basis for future estimates was but one-fourth of Canadian Pacific's average passenger traffic density over the last five year period, and of which two years reflect reduced passenger revenue due to war conditions.

Again, Canadian Northern's passenger revenue in 1916 amounted to \$5,503,822, which is equivalent to \$684 per mile of line operated, as against Canadian Pacific's average passenger revenue per mile of line operated of \$3,087 over the five year period ending with 1916; from which it is evident that Canadian Northern in 1916 earned less than one-fourth of Canadian Pacific's average passenger revenue per mile over the last five year period.

In both instances Canadian Northern averages of passenger density and passenger revenue include results of operation of the St. Catharines electric line, where the passenger density is much higher and the revenue per passenger mile is lower than on the steam lines of the system; in consequence of which the Canadian Northern steam lines (forming all but 61 miles of the system mileage) really do somewhat less than is indicated by the above comparison with Canadian Pacific.

If now an annual rate of increase of but five per cent. be applied against Canadian Northern's passenger density and revenue over a period of six years from June 30th, 1916 (on the 1916 mileage only), then such passenger density during the first year following completion of the five-year program becomes, on above basis, 44,503 passenger miles per mile of line; and such passenger revenue becomes on above basis \$963 per mile of line.

And if 75 per cent. of such passenger density and passenger revenue be taken as representing conditions on the 2,355 miles of line required to complete a system of 10,403 miles by 1923, then Canadian Northern System's average in 1923 would be 41,984 passenger miles per mile of line, as against Canadian Pacific's annual average of 125,557 passenger miles per mile of line over the last five year period; and Canadian Northern System's average in 1923 would be \$908 passenger revenue per mile of line as against Canadian Pacific's annual average of \$3,087 over the last five year period.

The System's total passenger revenue in 1923, based upon the above low rate of increase, and upon 1916 average revenue of \$1.31 per capita (on its steam lines) would therefore be \$9,447,000; but if, without increasing the number of its passengers, Canadian Northern in 1923 could approximate Canadian Pacific's average receipts per passenger of \$2.05 over the five year period ending with 1916, which we consider as entirely feasible under its improved transcontinental conditions, then Canadian Northern would increase its revenue by 74 cents per passenger, or by about 56 per cent., which would produce a passenger traffic density of 65,495 passenger miles per mile of track which is about one-half of Canadian Pacific's density over the five years ending with 1916. Such increase would also produce a passenger revenue of \$1,416 per mile of track, which

is less than one-half of Canadian Pacific's average passenger revenue per mile over the same period; and it would also produce an annual increase in gross passenger revenue of \$5,290,000.

Increased Miscellaneous Revenue Due to Completion of System.

The miscellaneous revenue earned in 1916, if increased by 5 per cent. annually, would amount to \$5,387,000 in 1923. That portion of this revenue earned on passenger trains, such as excess baggage, mail, and express revenue, would, in our judgment, also reflect the improved transcontinental conditions in about the same ratio as passenger revenue; but as no investigation has been made of the probable effect of the improved conditions on the balance of this item which is earned by telegraph, elevator, land and other subsidiary companies, the total additional miscellaneous revenue due to transcontinental conditions is estimated at 25 per cent. of the above amount, or \$1,347,000.

Increased Revenue from Traffic Sources Not Now Served.

Each of the above revenue items covers only that volume of freight, passenger, or miscellaneous traffic in 1923, which would result from increasing the 1916 volume of traffic by 5 per cent. annually.

There remains therefore for consideration the item of revenue to be derived from new traffic resulting from the completion of the improvement and betterment program herein recommended, and of which the most important additional traffic producing items are the Niagara frontier line, the Lake Ontario car ferry, and the Montreal and Vancouver terminals.

The traffic benefits to be derived from these new facilities have been indicated generally on pages 14, 15, 23, and 24 of this report; but the above estimates of revenue for the year 1923 include none of the benefits to be derived from the terminals and the car ferry, and only \$4,000 per mile for the Niagara frontier line on its own rails.

We have made a careful study of the volume of traffic now moving over routes which will be served by these new facilities, and we find such volume to be enormous, and existing facilities to be inadequate; we find also that the construction of these new facilities will greatly improve conditions now existing on certain United States railroads with which Canadian Northern will enjoy direct interchange; and that in consequence a large volume of interline traffic should move in both directions almost immediately upon their completion.

Without setting forth in detail the traffic statistics upon which our conclusions are based, we are of opinion that during the first year following the completion of the improvement and betterment program Canadian Northern should derive from these sources an additional revenue of at least \$5,000,000, and that thereafter such revenue should increase at a rapid rate.

Recapitulation of Revenue Estimates for the Year 1923.

Recapitulation of the above estimates of Canadian Northern revenue for the first year following the completion of the improvement and betterment program is as follows:

Estimated freight revenue based on perpetuating 1916 conditions as to average haul and revenue per ton, and on increasing the volume of such traffic at the rate of 5 per cent. per annum.....	\$44,503,000
Additional freight revenue to be derived from the above volume of traffic by approximating in 1923 the average conditions as to freight haul and revenue per ton which obtained on the Canadian Pacific during the five years ending with 1916.....	9,346,000
Estimated passenger revenue based on perpetuating 1916 conditions as to average journey and revenue per passenger, and on increasing the volume of such traffic at the rate of 5 per cent. per annum.....	9,447,000
Additional passenger revenue to be derived from the above volume of traffic by approximating in 1923 the average conditions as to average journey and revenue per passenger which obtained on the Canadian Pacific during the five years ending with 1916.....	5,290,000
Estimated miscellaneous revenue based on perpetuating 1916 conditions, and on increasing the volume of such traffic at the rate of 5 per cent. per annum.....	5,387,000
Additional miscellaneous revenue due to transcontinental conditions.....	1,347,000
Additional freight, passenger and miscellaneous revenue, earned on additional traffic to be derived from proposed facilities as recommended in the improvement and betterment program, estimated at a minimum of.....	<u>5,000,000</u>
Total revenue estimated to be earned by Canadian Northern Railway System during first year following the completion of the five year program.....	\$80,320,000

**Estimate of Gross Revenue During First Year
Following the Three Year Construction Period.**

The actual gross revenue of the Canadian Northern Railway System for the year ended June 30th, 1916, was \$35,476,000; and if an annual rate of increase of but five per cent. be applied against the average mileage operated in 1916 over a period of four years (taking June 30th, 1917, as the date of commencement of program) then estimated gross revenue of such mileage during the first year following completion of the three year program becomes, on above basis.....

.....	\$45,276,000
Allow as additional revenue to be derived from about 1881 miles of branches and extensions, to be added under the minimum program, at \$4,000 per mile.....	7,524,000
As Above	\$52,800,000

With 75 per cent. of such revenue derived from freight traffic, as at present, its distribution is as follows :

Freight Revenue	\$39,600,000
Passenger Revenue	8,800,000
Miscellaneous Revenue.....	4,400,000

Increased Freight Revenue Due to Improved Conditions.

As the three year program includes the construction of the Niagara frontier line and car ferry, and contains large appropriations for freight power and equipment, shops, working capital, etc., all of which will be reflected in improved freight traffic conditions, we are of opinion that during the first year following the completion of such program Canadian Northern can increase its average freight haul by 72 miles or 25 per cent.; and if Canadian Northern in 1921 should earn but 6.3 mills per ton mile as against the 6.79 mills which it earned in 1916, it would decrease its ton mile revenue by about 7 per cent. ; as a result of which Canadian Northern would earn on each ton of freight :

360 ton miles @ 6.3 mills.....	\$2.26
As against 1916 revenue per ton of.....	1.96
An increase of.....	\$0.30

which is equivalent to an increase of 15 per cent. in the 1921 freight revenue estimated on page 38 above as \$39,600,000; such increase being \$5,940,000.

Increased Passenger Revenue Due to Improved Conditions.

As the three year program includes large appropriations for passenger power and equipment, terminals, etc., which will be reflected in improved passenger traffic conditions, we are of opinion that during the first year following the completion of such program Canadian Northern can increase its revenue by 50 cents per passenger or by about 38 per cent.; this would produce an annual increase in gross passenger revenue of \$3,344,000.

Increased Miscellaneous Revenue Due to Improved Conditions.

The total additional miscellaneous revenue due to improved conditions during the first year following the completion of the three year program is estimated at 15 per cent. of the miscellaneous revenue of \$4,400,000 shewn on page 38 above, or \$660,000.

Increased Revenue from Traffic Sources not now Served.

As the improvement and betterment items which are estimated to produce additional traffic, such as the Niagara frontier line, Lake Ontario car ferry, Montreal and Vancouver terminals, etc., are included in both maximum and minimum program, and can be completed within three years, we are of opinion that Canadian Northern should derive from these sources in 1921 an additional revenue of at least \$5,000,000, and that thereafter such revenue should increase at a rapid rate.

Recapitulation of Revenue Estimates for the Year 1921.

Estimated freight revenue based on perpetuating 1916 conditions as to average haul and revenue per ton, and on increasing the volume of such traffic at the rate of 5 per cent. per annum.....	\$39,600,000
Additional freight revenue to be derived from the above volume of traffic by increasing the average freight haul by 72 miles, or 25 per cent., and by reducing the average revenue per ton mile by 0.49 mills, or 7 per cent.....	5,940,000
Estimated passenger revenue based on perpetuating 1916 conditions as to average journey and revenue per passenger, and on increasing the volume of such traffic at the rate of 5 per cent. per annum.....	8,800,000
Additional passenger revenue to be derived from the above volume of traffic by increasing the average revenue by 50 cents per passenger, or 38 per cent.....	3,344,000
Estimated miscellaneous revenue based on perpetuating 1916 conditions, and on increasing the volume of such traffic at the rate of 5 per cent. per annum.....	4,400,000
Additional miscellaneous revenue due to improved conditions.....	660,000
Additional freight, passenger and miscellaneous revenue, earned on additional traffic to be derived from proposed facilities as recommended in the improvement and betterment program—estimated at a minimum of.....	5,000,000
Total revenue estimated to be earned by Canadian Northern Railway System during first year following the completion of the three year program.....	<u>\$67,744,000</u>

**Estimated Results of Operation Following
Completion of Maximum and Minimum Programs.**

The results of operation during the first year following the completion of the maximum and minimum programs of expenditures are estimated as follows:

Item.	Program of Expenditures	
	Maximum Five years	Minimum Three years
Estimated gross revenue during first year following completion of either program	\$80,320,000	\$67,744,000
Estimated operating expenses, taxes, and other income debits excepting interest charges, taken at 69% of gross revenue for maximum, and at 71% of gross revenue for minimum program	55,420,000	48,098,000
Estimated net income available for interest charges	24,900,000	19,646,000
Estimated interest charges as per page 27 of this report	20,285,000	19,317,000
SURPLUS	\$ 4,615,000	\$ 329,000

In connection with the above estimates of income, it should be noted that the maximum and minimum programs of capital requirements cover items for interest charges which may be unearned during the construction period; and that such amounts of unearned interest are not likely to increase, but they may be greatly reduced. This would be true also if either program of expenditures could be completed before the expiration of the periods shewn above.

CONCLUSIONS.

Our conclusions are briefly as follows:

First.

The Canadian Northern Railway project, as a whole, is sound.

Second.

The traffic resources of its tributary territory should develop rapidly under normal immigration and labor conditions.

Third.

Its general topographic features are favorable for economic operation ; its character is modern, and therefore such large expenditures for grade and alignment revision as have marked the progress of older lines will not be required ; its operating capacity is greatly in excess of its existing traffic ; its physical property, generally speaking, is in good condition ; but it is incomplete as to certain important features, and future annual expenditures for maintenance should exceed those made to date.

Fourth.

(a) The capital now invested in the property appears to have been secured economically, and expended wisely. In our judgment the railroad could not be duplicated for anything like its cost.

(b) Its fixed capital liabilities cover all of its 9,513 miles of line owned or operated with exception of but 58 miles of trackage, and may be summarized as follows:

Bonds and equipment notes outstanding.....	\$282,127,431
Short date notes, loans, etc., "	102,080,252
TOTAL AS ABOVE.....	<u>\$384,207,683</u>

NOTE: Income charge convertible debenture stock, and common stock, are not included.

Fifth.

Outstanding short date notes, temporary loans, etc., which must be funded amount to \$86,202,085 against treasury assets of \$103,238,796.

Sixth.

As the maximum program herein submitted covers the minimum program and such further expenditures as, in our judgment, will be required over the two-year period supplemental thereto, we estimate the System's net cash requirement for improvements and betterments, and working capital, at \$54,000,000 over the three-year period; and at \$86,000,000 over the five-year period.

Seventh.

We estimate the System's total cash requirement, including SIXTH above, at \$67,000,000 for the three-year period; and at \$101,000,000 for the five-year period.

Eighth.

We estimate the fixed capital liabilities of the property at \$462,000,000 exclusive of income charge convertible debenture stock at the end of the three-year period, which is at the rate of \$46,569 per mile; and at \$496,000,000 at the end of the five-year period, which is at the rate of \$47,715 per mile.

Ninth.

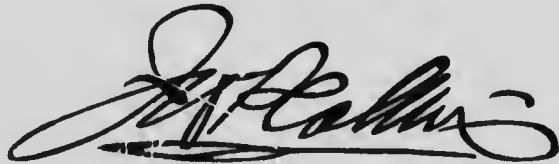
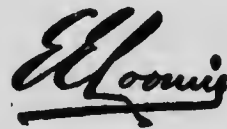
We estimate that the capital invested in the property will amount to \$521,000,000 at the end of the three-year period; and that such capital will amount to \$555,000,000 at the end of the five-year period.

Tenth.

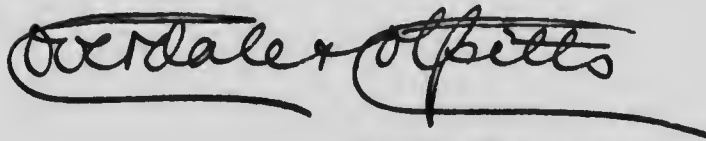
We estimate the System's gross revenue at \$67,744,000 during the first year following the completion of the three-year program; and at \$80,320,000 during the first year following the completion of the five-year program.

Eleventh.

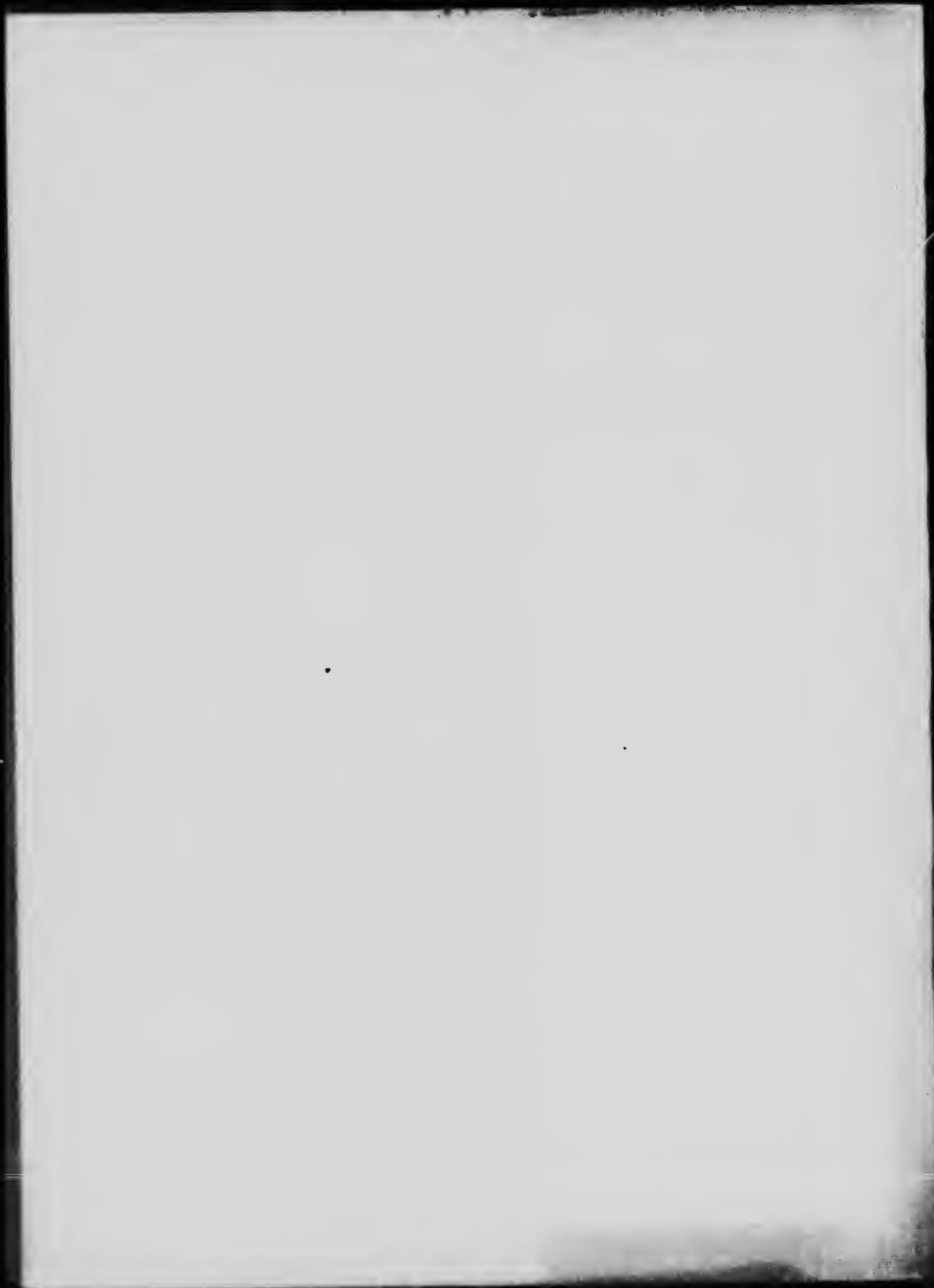
We estimate the System's profit and loss surplus at \$329,000 during the first year following the completion of the three-year program; and at \$4,615,000 during the first year following the completion of the five-year program.



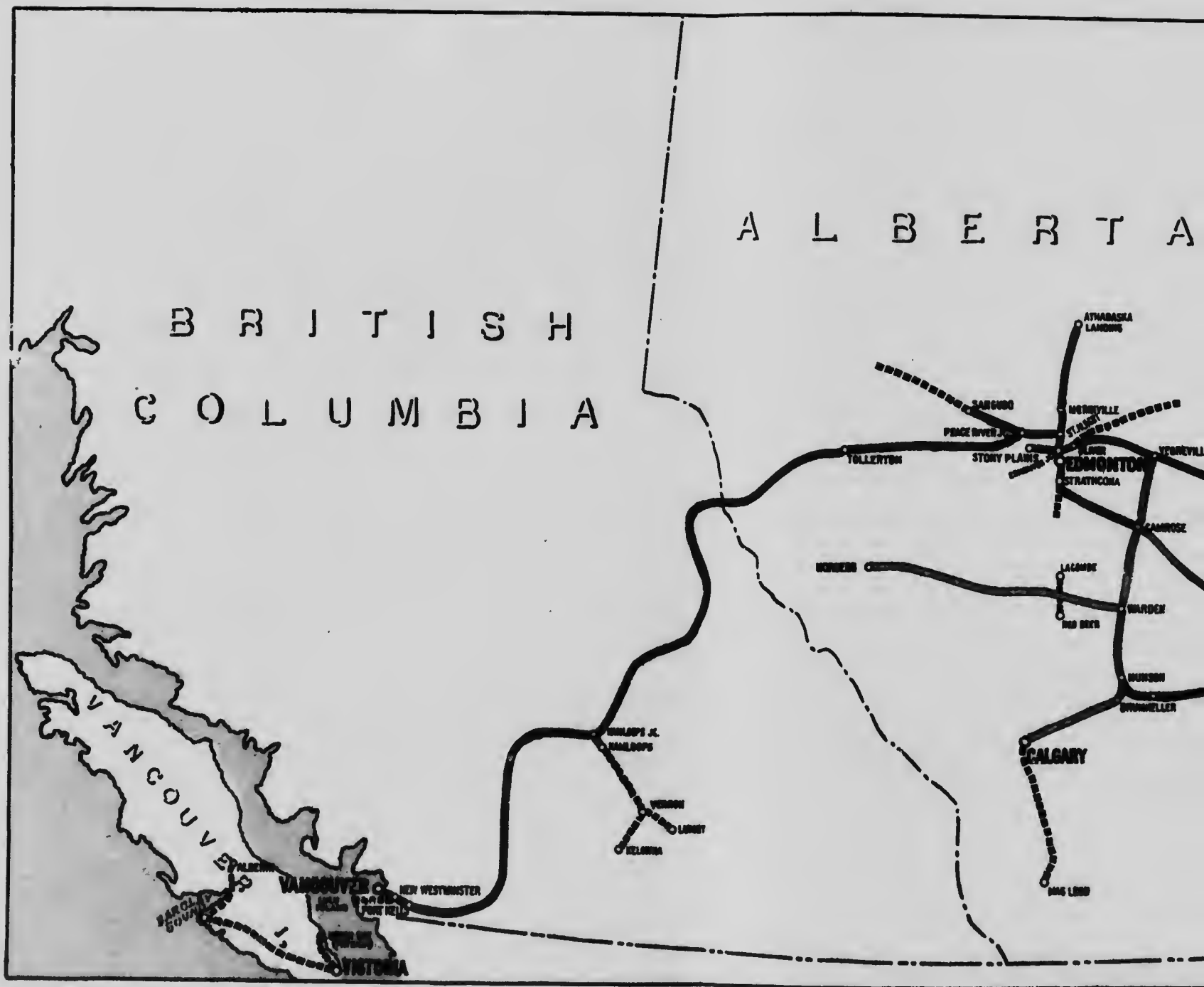
Commission.



Consulting Engineers.



W. B. I. T. H. B.
R. I. C. H. A. R. D. S.

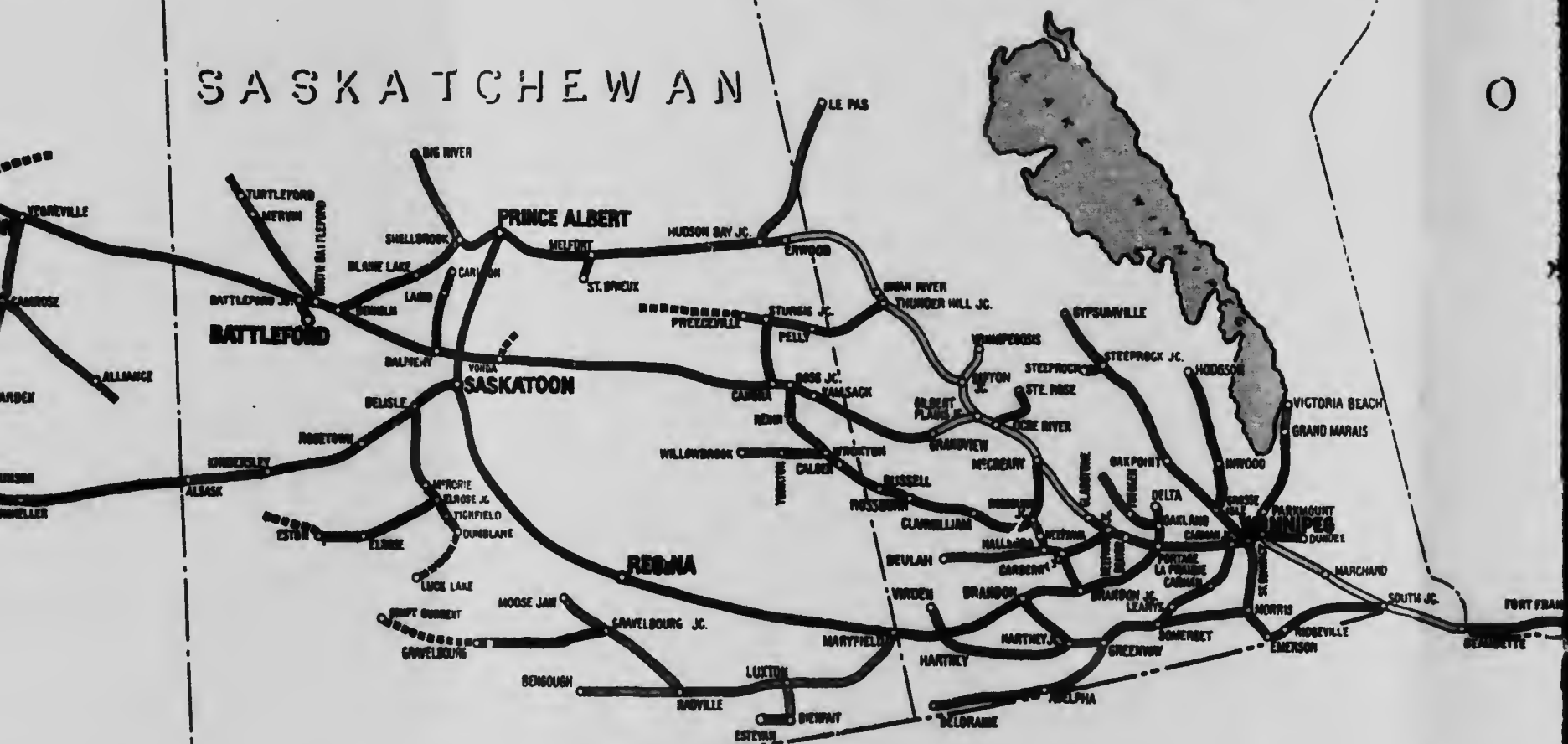


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SANDY BEACH

MARCHAND

WINDYVILLE
MORSON

SOUTH J.C.
FORT FRANCES

SEABOYETTE

VIRGINIA

DULUTH

STANLEY J.C.

NORTH LAKE

POINT ARTHUR

SUPERIOR

HORNEMAYNE

FOLEYET

MAKANA
RUEL

COMPLANDA J.C.

SELLWOOD

SELLWOOD J.C.

CAPREOL
GARDNER BROS
GROBURY J.C.

GROBURY

KEY J.C.

KEY HARBOR

JAMES BAY

GEORGIAN BAY

LAKE HURON

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**CANADIAN NORTHERN RAILWAY SYSTEM
HISTORICAL MAP**

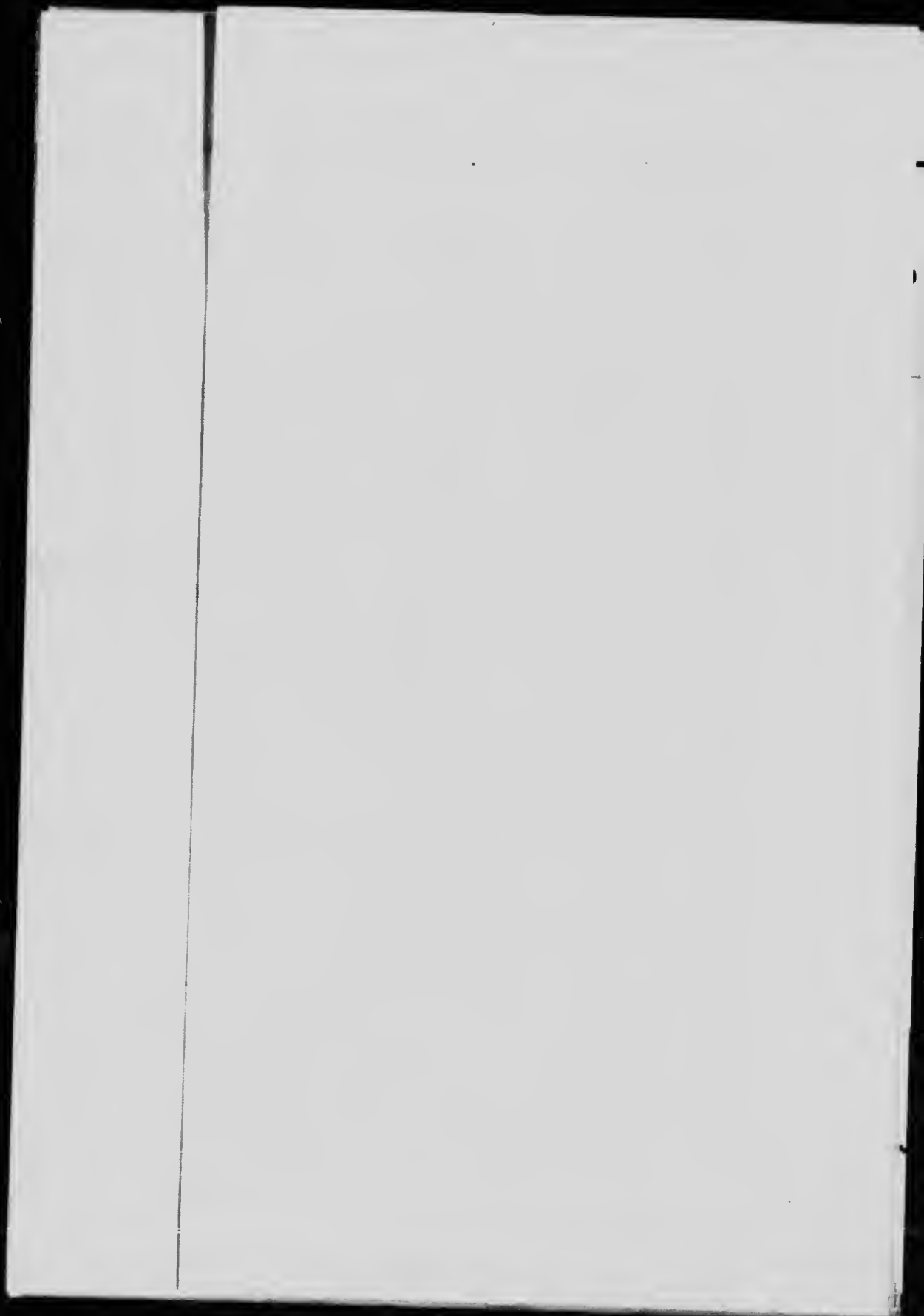
SHOWING
**ACQUISITIONS & EXTENSIONS
OF VARIOUS LINES PRIOR TO AND SINCE
THE ORGANIZATION OF THE CANADIAN NORTHERN RAILWAY IN 1900.**

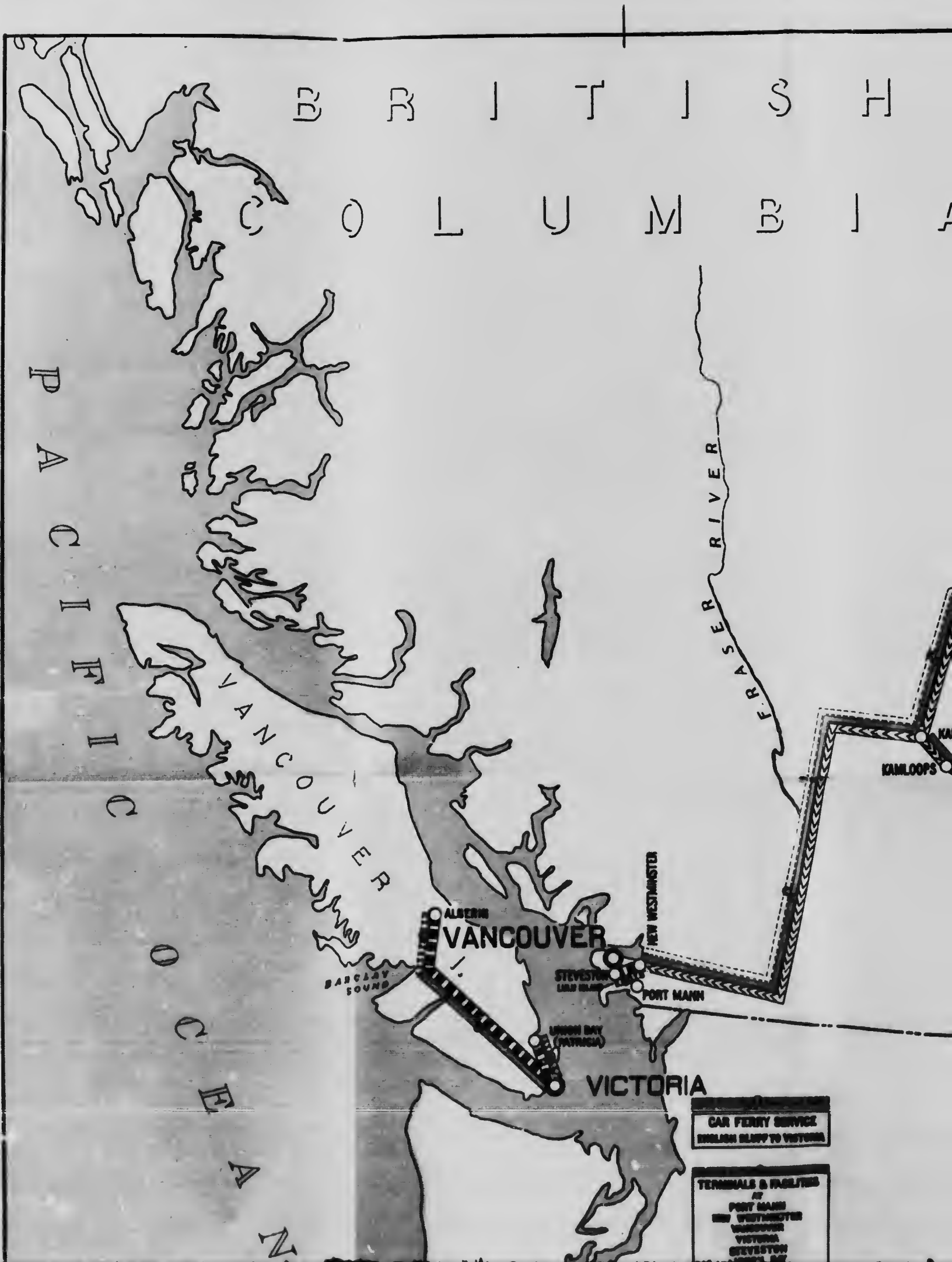
LEGEND

- LINES PRIOR TO 1901. SHOWN THUS. ———
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- " " 1911 ———
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- " " 1914 - - - - -
- " " 1915 ———
- " " 1916 - - - - -
- " UNDER CONSTRUCTION. - - - - -

COVERDALE & COLPITTS
CONSULTING ENGINEERS
66 BROADWAY, NEW YORK

MARCH 26, 1917.





BRITISH COLUMBIA

PACIFIC OCEAN

VANCOUVER

BARCLAY SOUND

ALBERNI
VANCOUVER

STEVESTON
LIND ISLAND

NEW WESTMINSTER

PORT MANN

UNION BAY
(PATRICIA)

VICTORIA

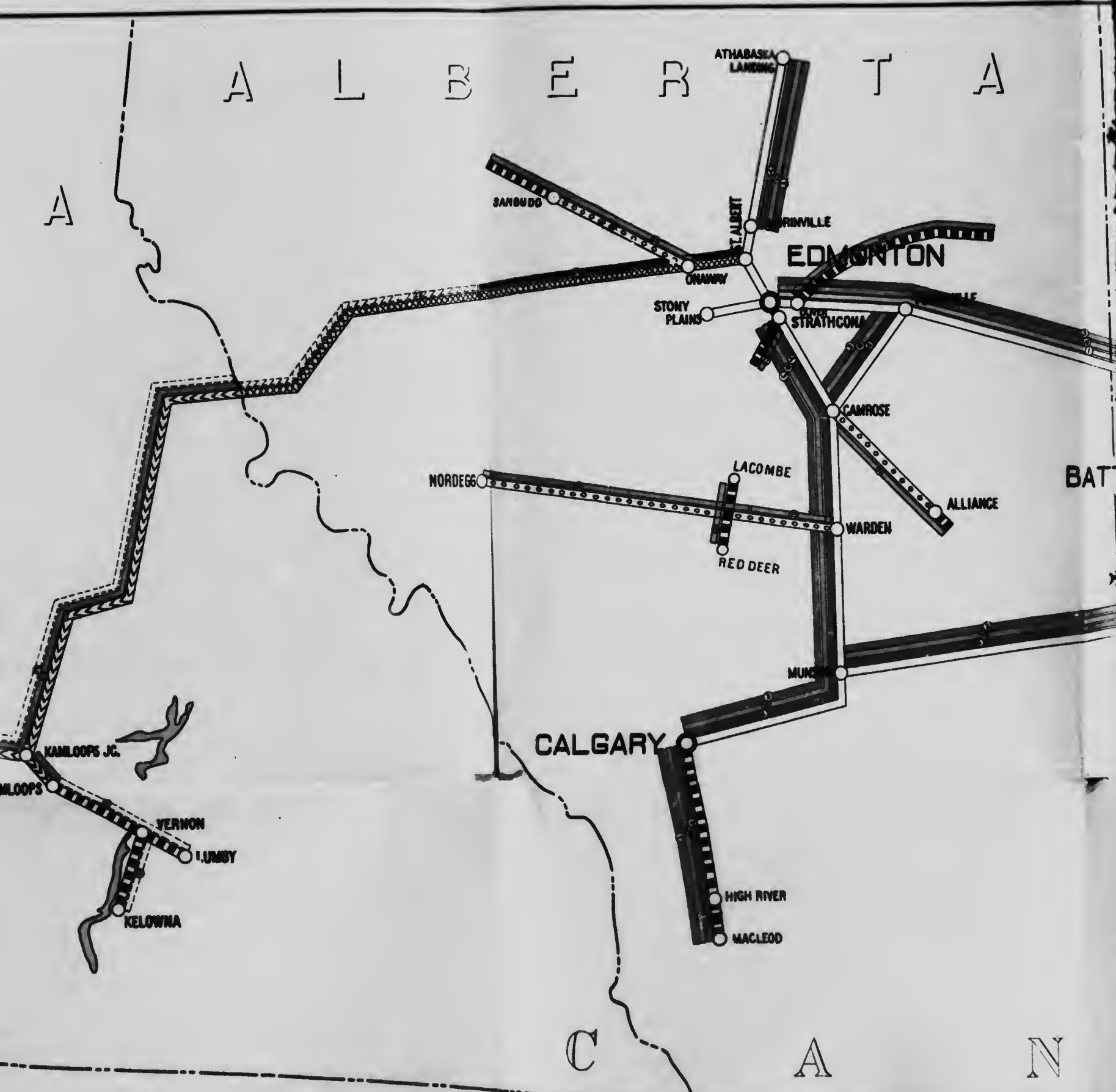
CAR FERRY SERVICE
ENGLISH BAY TO VICTORIA

TERMINALS & FACILITIES
AT
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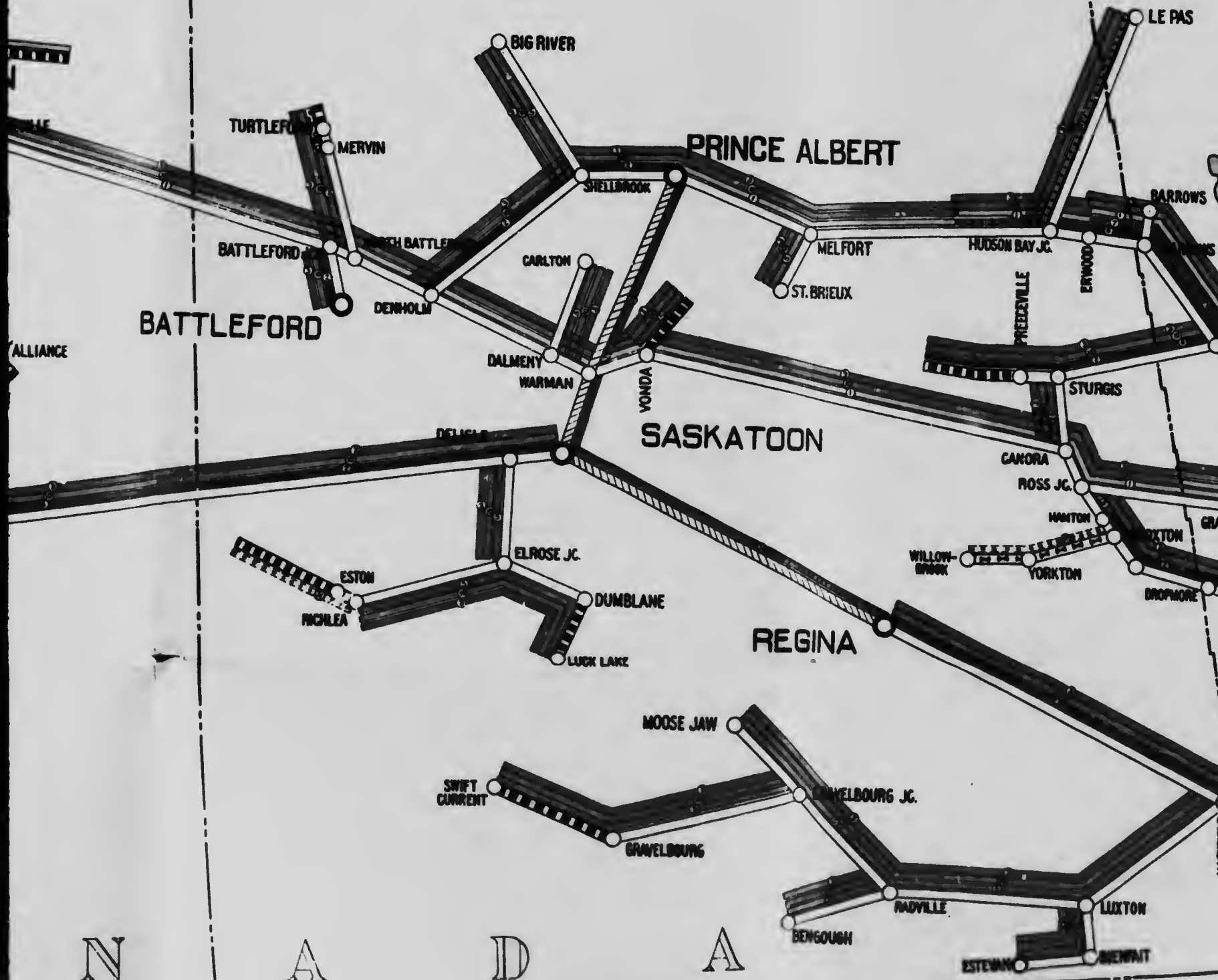
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ALLIANCE

BATTLEFORD

PRINCE ALBERT

SASKATOON

REGINA

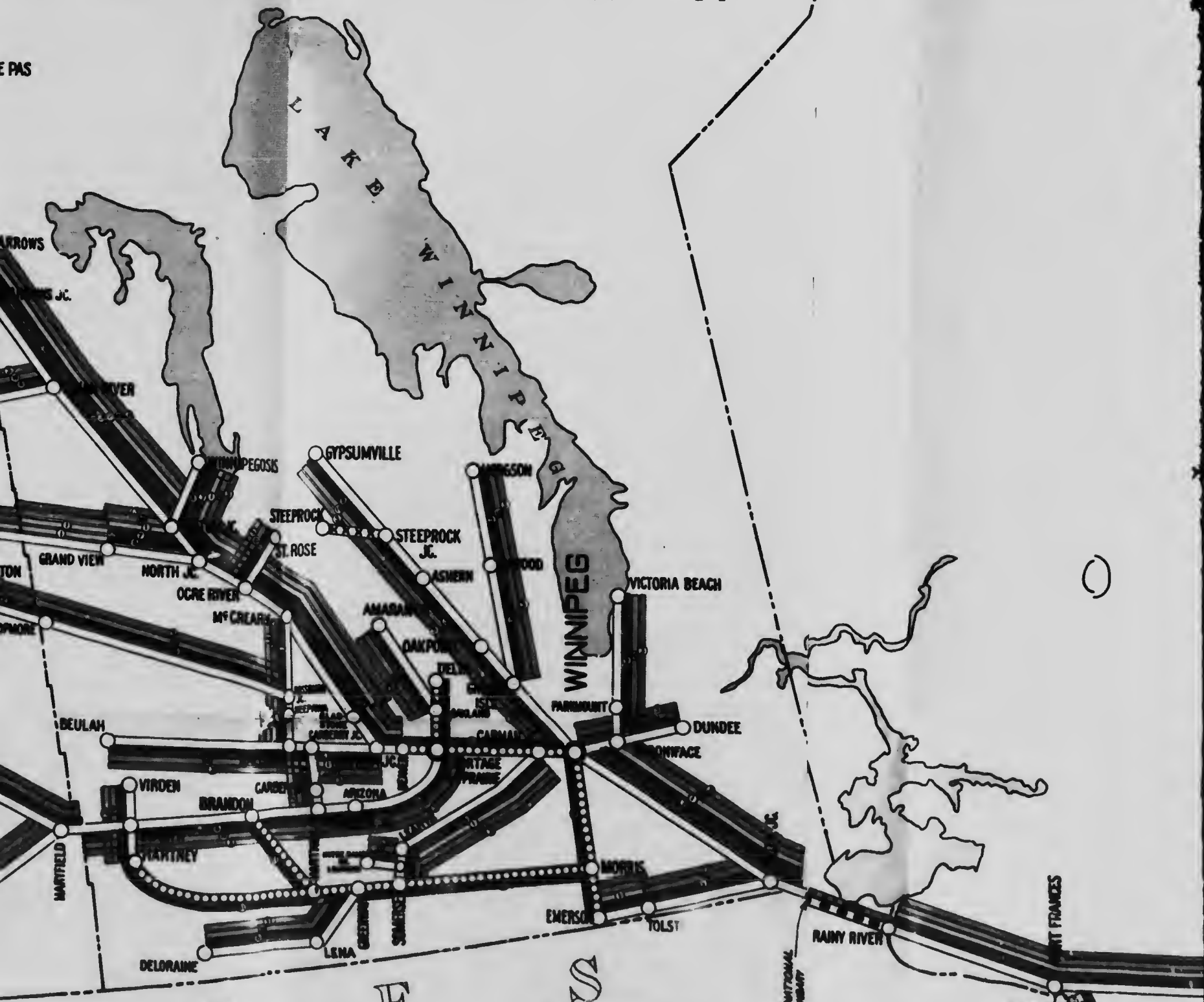
LEGE

TOTAL STOCK
PURE STOCK

TOWNSHIP LANDS AND CROWN
PATENTS TO BE

NAME OF COMPANY	TRACKS SHOWN THUS	NO. OF MYS.	MORTGAGE SHOWN THUS	TITLE OF MORTGAGE
		1		3% First Mortgage, Dominion Over Deb. Stock
		2		3 1/2% First Mortgage, Dominion Over Deb. Stock
		3		4% Dominion Guaranteed Debenture Stock
		4		4% First Mortgage Debenture Stock
		5		4% First Mortgage Debenture Stock
		6		4% Consolidated Debenture Bonds
		7		4% Ontario Dominion Bonds

M A N I T O B A



WINNIPEG TERMINAL
 LAND, TRACKS
 BRIDGE OVER ASSUMINGE RIVER
 AGREEMENT WITH G.T.P. RY. CO.

Note: Mortgage No. 7 also covers all terminals of Port Arthur and lines with Minn. & Man. Ry. Co. Also Ontario Bridge Co. with rights over Rainy River Bridge and lines of Man. Pac. & Manitoba Ry. Co.

A T E N D

MORTGAGE	GUARANTEED BY	DATE OF MORTGAGE	DATE OF MATURITY	TOTAL AMOUNT	IN HANDS OF PUBLIC	PLEDGED TO GROUP LOANS	IN TREASURY
Man. Deb. Stock	Dominion	July 22, 1903	July 10, 1953	9,359,996.72	9,359,996.72		
Over. Deb. Stock	"	Oct. 21, 1908	July 20, 1958	7,896,590.00	7,896,590.00		
Man. Deb. Stock	"	July 15, 1914	Sept. 1, 1934	44,866,867.33	17,033,333.35	27,833,534.00	
Man. Deb. Stock	Alberta	June 10, 1909	Feb. 25, 1939	9,786,364.26	5,506,665.64	4,138,698.62	
Man. Deb. Stock	Saskatchewan	May 18, 1909	Jan. 23, 1939	13,587,733.33	8,029,999.99	5,557,733.34	
Man. Deb. Stock	Manitoba	May 30, 1904	June 30, 1913	12,458,279.50	12,458,279.50		
Man. Deb. Stock	"	Sept. 30, 1901	Aug. 30, 1910	5,264,506.64	5,264,506.64		

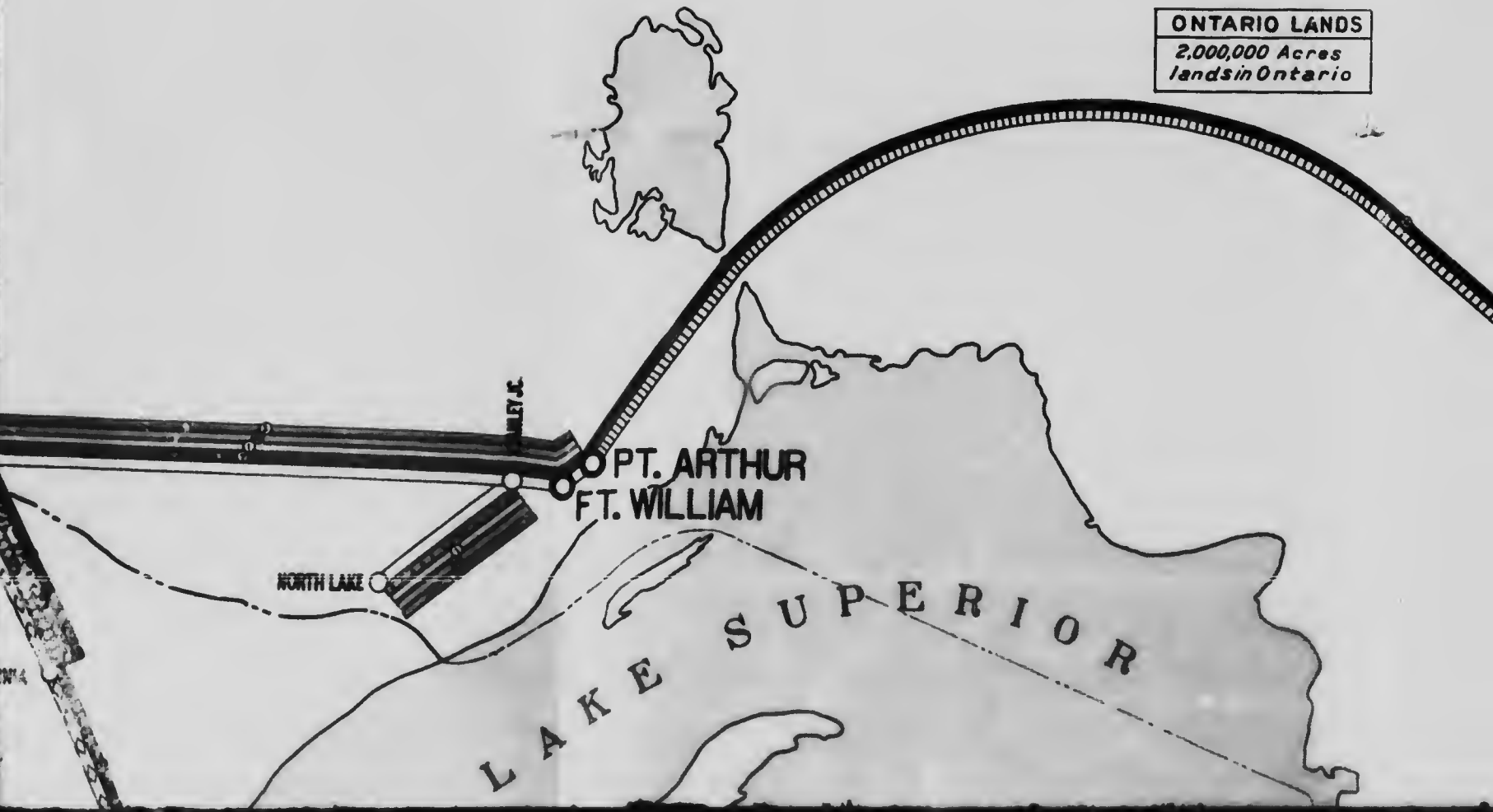
VIRGINIA

SECURITIES PLEDGED

NAME OF ISSUE	STOCKS	BONDS
1. Lake Superior Terminals Co. Limited.	500,000	1,000,000
2. Winnipeg Land Co. Limited	100,000	300,000
3. Minnesota and Manitoba Railroad Co.	400,000	250,000
4. Minnesota and Ontario Bridge Co.	100,000	100,000
5. Canadian Northern Telegraph Co.	500,000	800,000
6. Canadian Northern System Terminals Limited		7,000,000
7. St. Boniface Western Land Co.	250,000	750,000
8. Lake Superior Terminals Co. Ltd. (New Issue)		1,000,000
9. Canadian Northern Coal & Ore Dock Co. Ltd.		375,000
10. Edmonton & Slave Lake Railway Co.		420,000
11. Canadian Northern Steamships, Limited	2,000,000	2,920,000
12. Canadian Northern Express Co. Limited.	1,000,000	3,000,000
	4,850,000	17,985,000

N T A R

ONTARIO LANDS
2,000,000 Acres
lands in Ontario



THE CANADIAN NORTHERN RAILWAY

MAP SHEWING

DESCRIPTION & DISTRIBUTION

OF FUNDED DEBENTURES

SECURITIES PLEDGED	
NAME OF ISSUE	STOCKS
12 The Bay of Quinte Railway Co.	1,396,000
13 Canadian Northern Pacific Railway Co.	25,000,000
14 The Canadian Northern Alberta Railway Co.	3,000,000
15 Canadian Northern Western Railway Co.	2,000,000
16 The Canadian Northern Saskatchewan Ry. Co.	1,000,000
17 The Manitoba Ry. Co.	250,000
18 The Ontario Ry. Co.	10,000,000
19 The Quebec Ry. Co.	2,000,000
20 Canadian Northern System Terminals, Ltd.	2,000,000
21 Central Ontario Railway	3,929,000
22 Duluth, Winnipeg & Pacific Ry. Co.	3,064,000
23 The Halifax & South Western Ry. Co.	1,000,000
24 The Ironstone, Bancroft & Ottawa Ry. Co.	53,000
25 Mount Royal Tunnel & Terminal Co.	5,000,000
26 The Marmora Ry. & Mining Co.	100,000
27 The Northern Consolidated Holding Co. Ltd.	4,446,700
28 The Quebec & Lake St. John Ry. Co.	4,002,800
29 The Qu'Appelle, Long Lake & South RR & Steamship Co.	201,000
	67,837,500

COVERDALE & COLPITTS
CONSULTING ENGINEERS
66 BROADWAY
NEW YORK
MARCH 26, 1917.

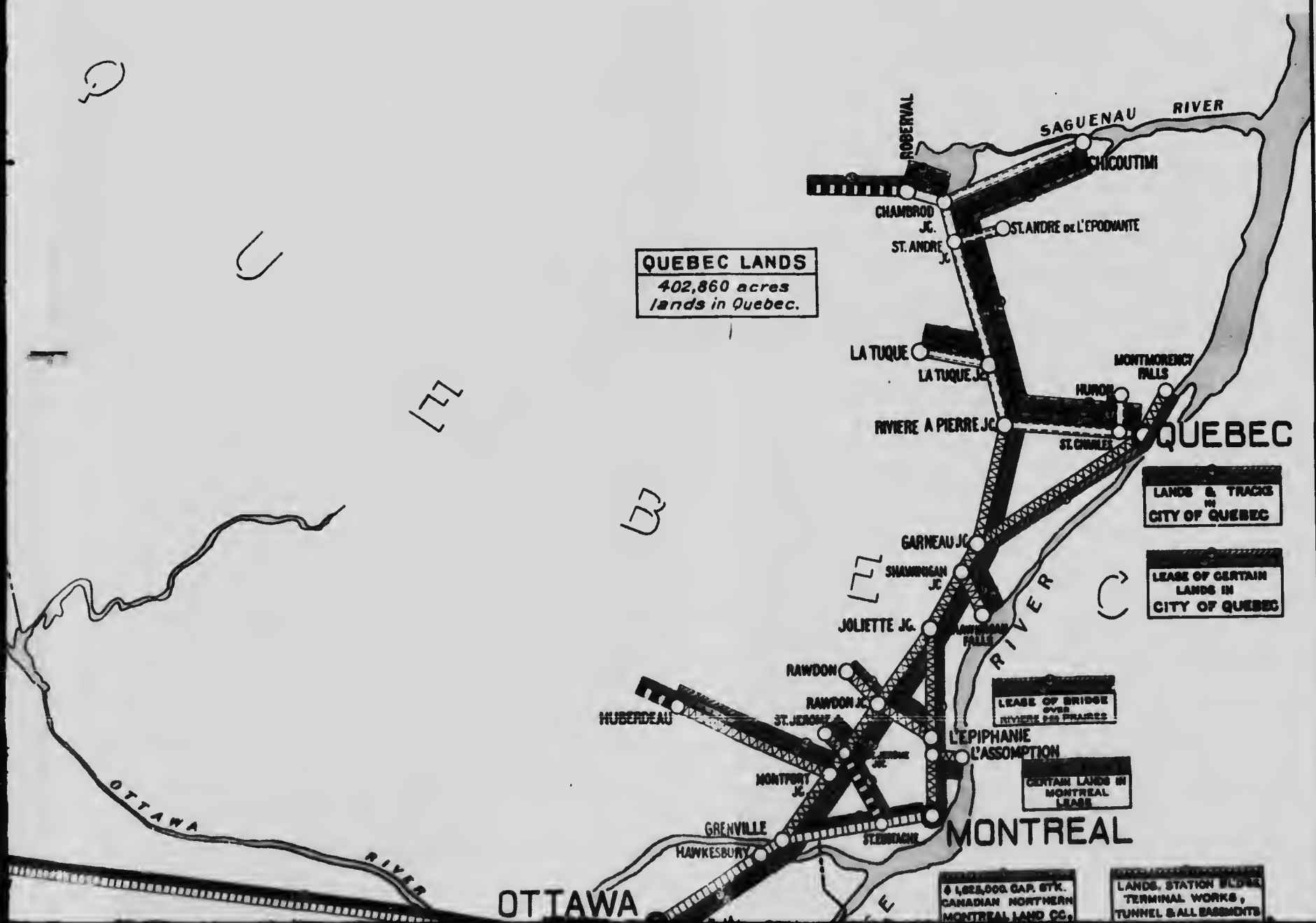
LINES UNDER CONSTRUCTION SHOWN THIN

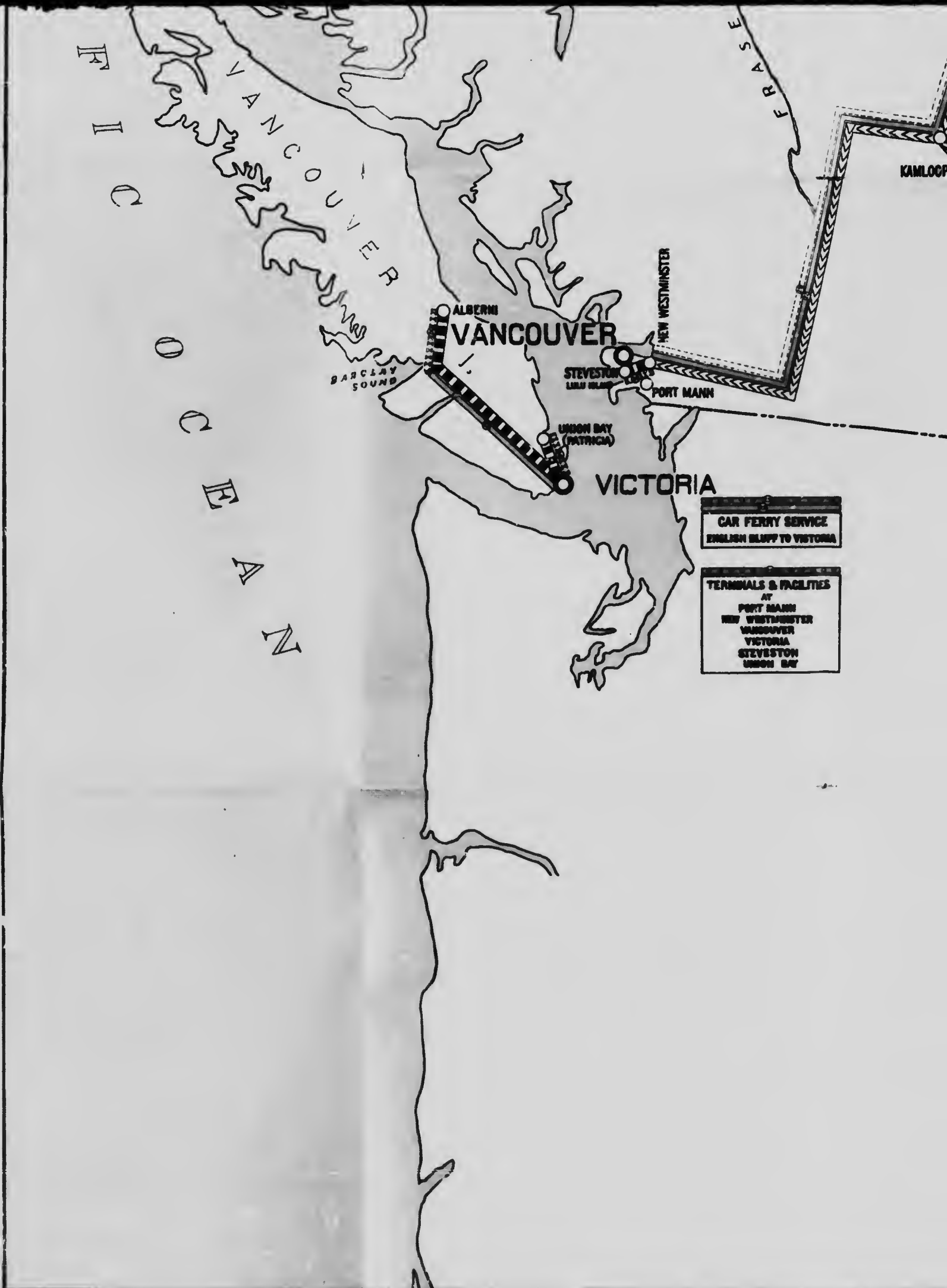


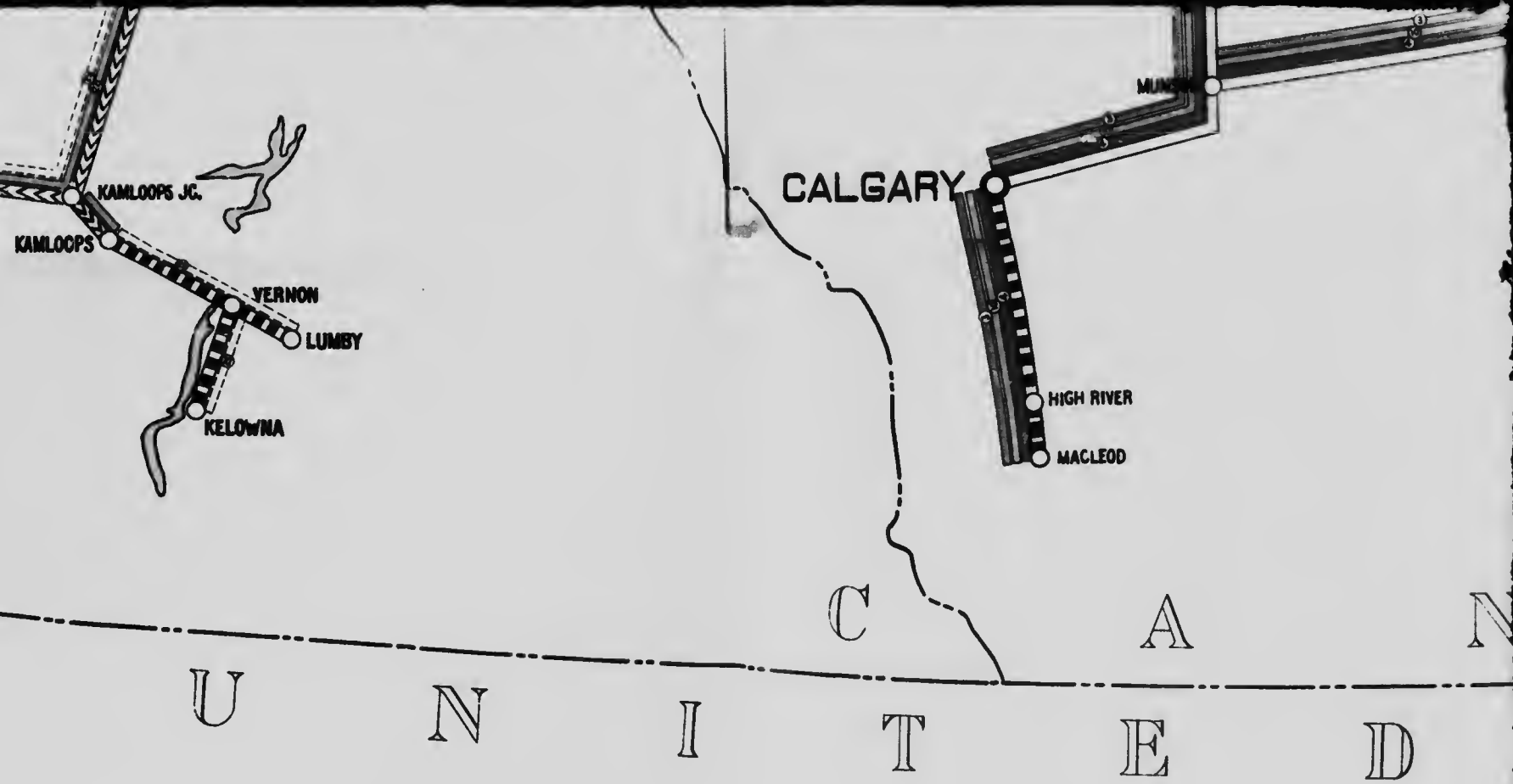
THE CANADIAN NORTHERN RAILWAY SYSTEM
MAP SHEWING
DESCRIPTION & DISTRIBUTION
OF
FUNDED DEBT

COVERDALE & COLPITTS
 CONSULTING ENGINEERS
 66 BROADWAY
 NEW YORK
 MARCH 26, 1917.

LINES UNDER CONSTRUCTION SHOWN THUS... [---]



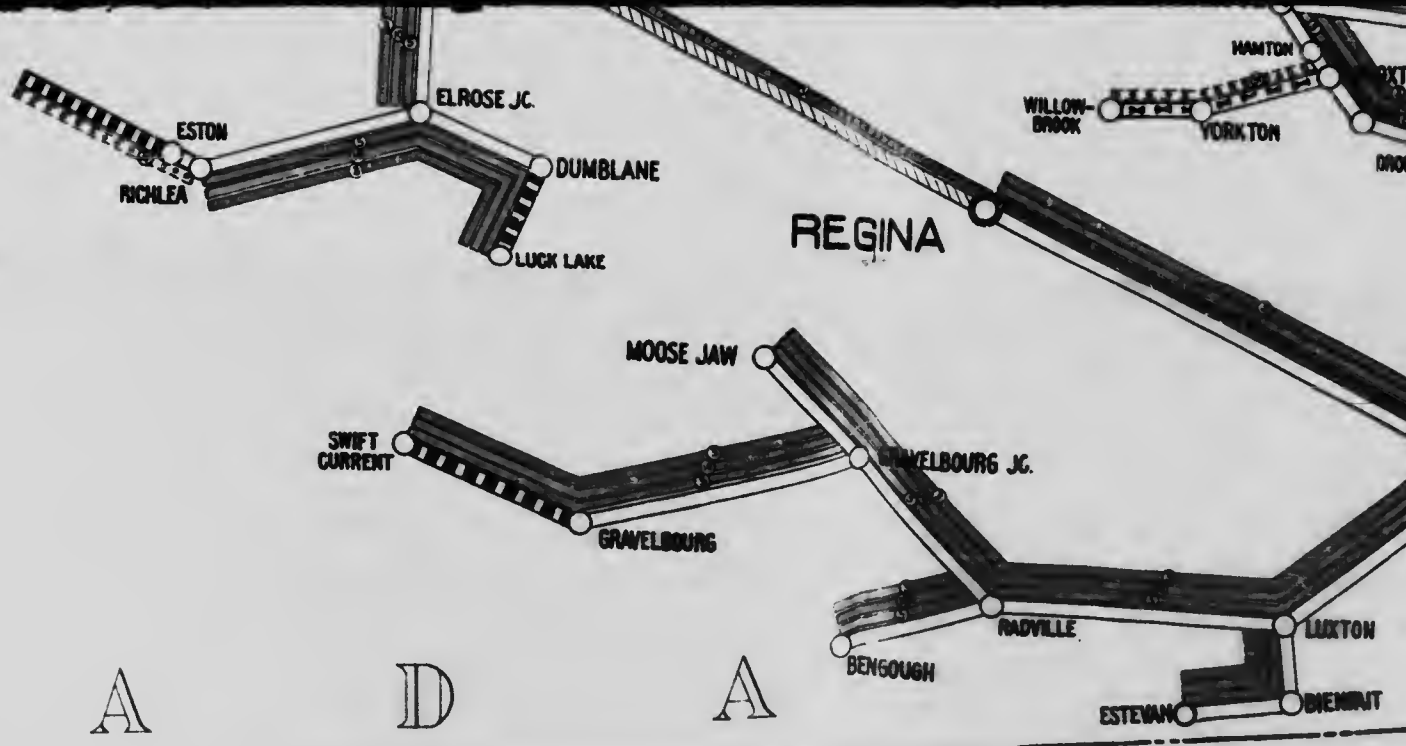




\$10,000,000. CAPITAL STOCK
 \$10,000,000. 12% DEBENTURE STOCK
 CANADIAN NORTHERN TOWN PROPERTIES CO. LTD.

643,127 ACRES LAND IN MANITOBA
 SASKATCHEWAN & ALBERTA

N A D A S T LEG

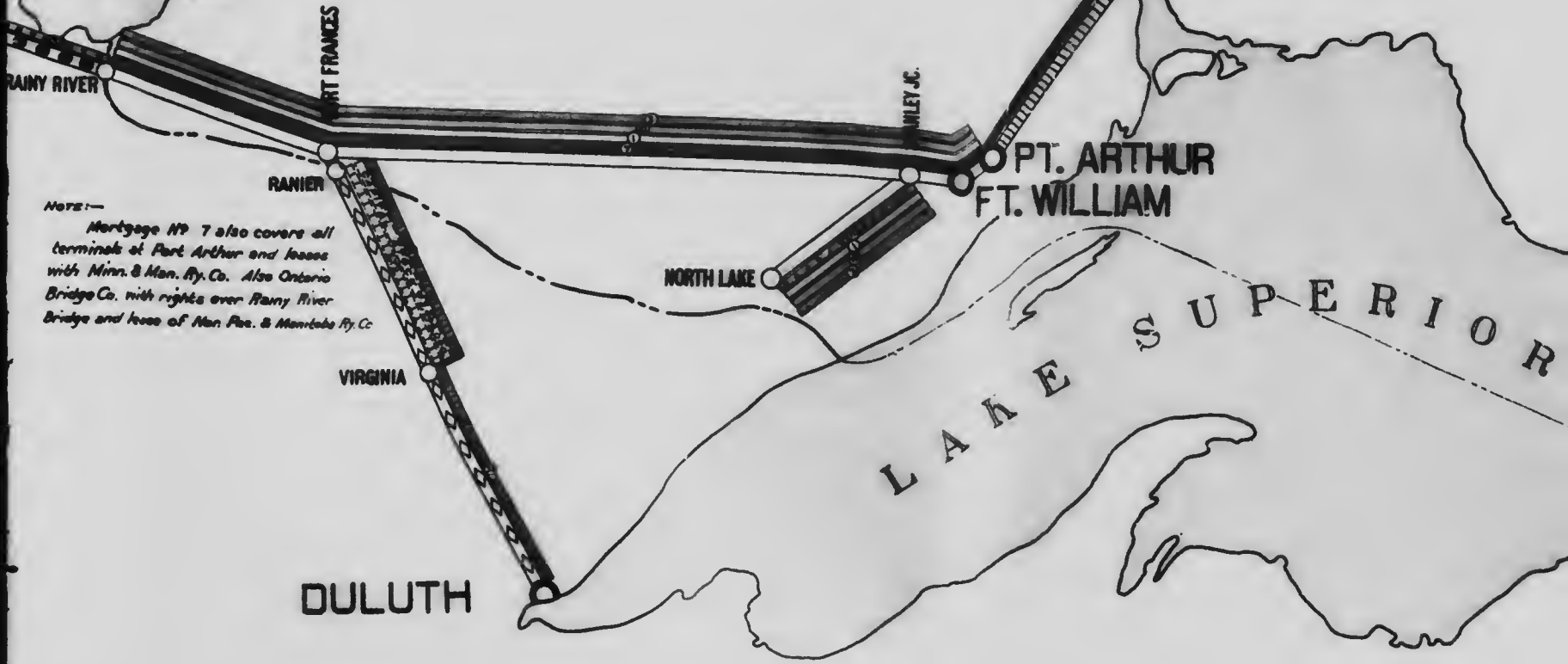


1000. CAPITAL STOCK
OF DEBENTURE STOCK
NORTH WEST TERRITORIES CO. LTD.

ACRES LAND IN MANITOBA
& ALBERTA

TOWNSHIP LANDS AND CROWN
PATENTS TO BE GRANTED TO
LANDS IN ONTARIO, MANITOBA
SASKATCHEWAN AND ALBERTA
AND ALL UNPAID INSTALLMENTS
TO BE PAID AND ALL SUMS
IN HANDS OF TRUSTEES TO
SECURE DEEDS OF 1899 & 1909
ALL SUBJECT TO BONDS
OF 1899 & 1909

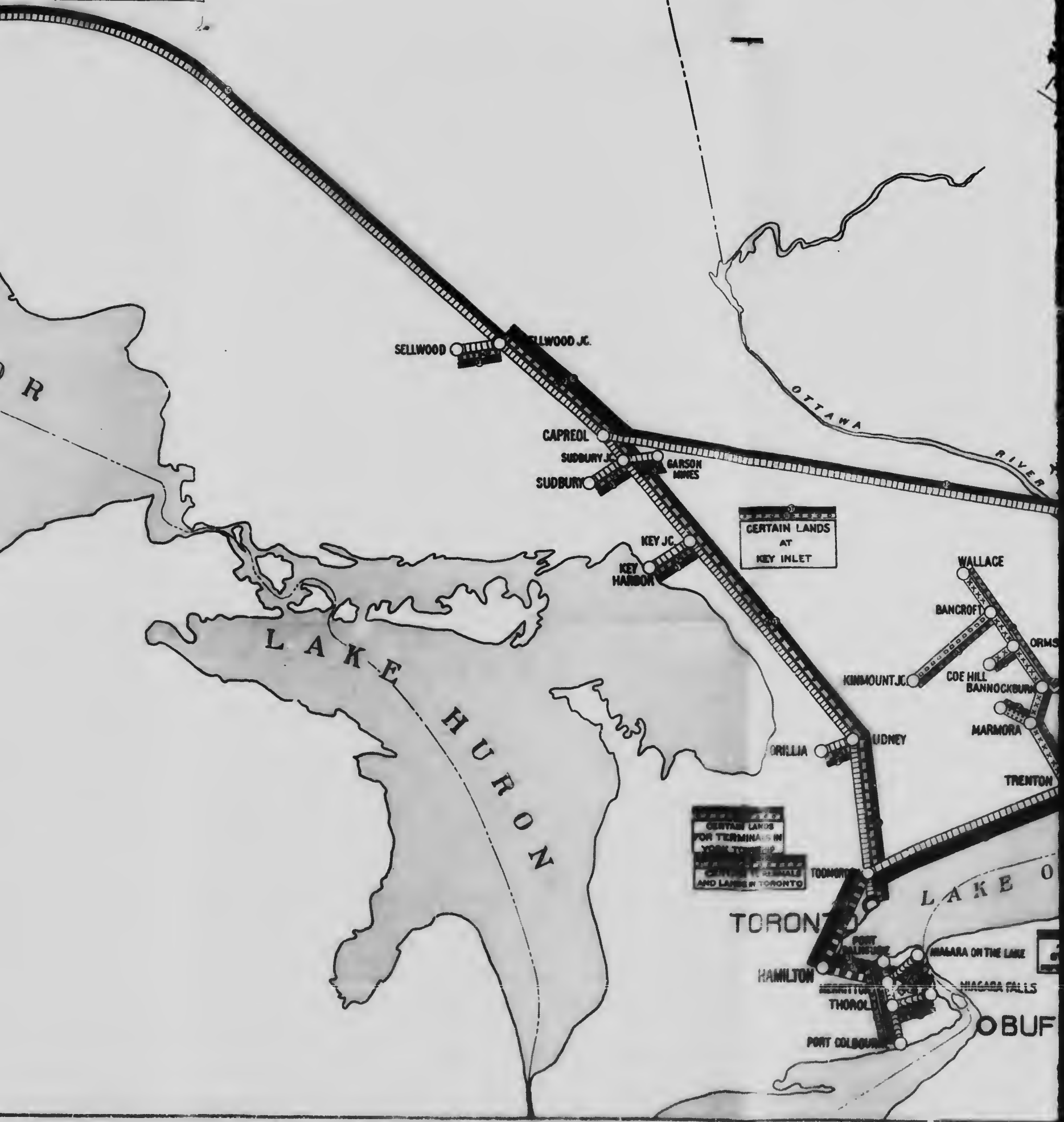
NAME OF COMPANY	TRACKS SHOWN THUS	NO. OF MILES	MORTGAGE SHOWN THUS	TITLE OF MORTGAGE
THE CANADIAN NORTHERN RAILWAY COMPANY	[Symbol]	1	[Symbol]	3% First Mortgage, Dominion Guar.
		2	[Symbol]	3 1/2% First Mortgage, Dominion Guar.
		3	[Symbol]	4% Dominion Guaranteed Debenture
		4	[Symbol]	4% First Mortgage Debenture Stock
		5	[Symbol]	4% First Mortgage Debenture Stock
		6	[Symbol]	4% Consolidated Debenture Bonds
		7	[Symbol]	4% Ontario Division Bonds
		8	[Symbol]	4% Winnipeg Terminal Bonds
		9	[Symbol]	4% First Mortgage Debenture Stock
		10	[Symbol]	4% Perpetual Consolidated Debenture
		11	[Symbol]	4% First Mortgage Pas Mission Br.
		12	[Symbol]	4% First Mortgage Gunflint Br.
		13	[Symbol]	4% First Mortgage Prince Albert
		14	[Symbol]	5% Secured Notes (1916)
		15	[Symbol]	5% Secured Notes (1919)
		16	[Symbol]	5% One Year Notes
		17	[Symbol]	5% Two Year Collateral Notes
		18	[Symbol]	5% One Year Secured Notes
		19	[Symbol]	4% Land Grant Bonds 1899
		20	[Symbol]	5% Land Mortgage Debentures
21	[Symbol]	4 1/2% Debenture Stock		
				TOTAL OUTSTANDING CANADIAN NORTHERN RAILWAY COMPANY
THE CANADIAN NORTHERN PACIFIC RAILWAY CO.	[Symbol]	22	[Symbol]	4% First Mortgage Debenture Stock
THE CANADIAN NORTHERN ALBERTA RAILWAY CO.	[Symbol]	23	[Symbol]	4 1/2% First Mortgage Terminal Deb.
THE CANADIAN NORTHERN WESTERN RAILWAY CO.	[Symbol]	24	[Symbol]	4 1/2% Branch Lines Debenture Stock
THE QU'APPELLE, LONG LAKE & SASK. RY. & S. CO.	[Symbol]	25	[Symbol]	4 1/2% Second Charge Debenture Stock
THE CANADIAN NORTHERN SASKATCHEWAN RY.	[Symbol]	26	[Symbol]	3 1/2% First Mortgage Dominion Guar.
THE NIAGARA, ST. CATHARINES & TORONTO NAV. CO.	[Symbol]	27	[Symbol]	3 1/2% First Mortgage Dominion Guar.
THE DULUTH, WINNIPEG & PACIFIC RY. CO.	[Symbol]	28	[Symbol]	4% First Mortgage Debenture Stock
THE DULUTH, RAINY LAKE & WINNIPEG RY. CO.	[Symbol]	29	[Symbol]	4% First Mortgage Debenture Stock
THE CANADIAN NORTHERN ONTARIO RY. CO.	[Symbol]	30	[Symbol]	4% Guaranteed Debenture Stock
THE NIAGARA, ST. CATHARINES & TORONTO RY. CO.	[Symbol]	31	[Symbol]	4% Guaranteed Debenture Stock
THE CENTRAL ONTARIO RAILWAY COMPANY	[Symbol]	32	[Symbol]	5% Mortgage Bonds
THE IRONDALE, BANGROFT & OTTAWA RY. CO.	[Symbol]	33	[Symbol]	4% First Mortgage Debenture Stock
THE BAY OF QUINTE RAILWAY COMPANY	[Symbol]	34	[Symbol]	First Mortgage Bonds
MOUNT ROYAL TUNNEL & TERMINAL CO. LTD.	[Symbol]	35	[Symbol]	3 1/2% First Mortgage Dominion Guar.
THE CANADIAN NORTHERN QUEBEC RY. CO.	[Symbol]	36	[Symbol]	3 1/2% First Mortgage Debenture Stock
GREAT NORTHERN RAILWAY OF CANADA	[Symbol]	37	[Symbol]	4% Perpetual Consolidated Debenture
THE QUEBEC & LAKE ST. JOHN RAILWAY COMPANY	[Symbol]	38	[Symbol]	5% First Mortgage Bonds
THE HALIFAX & SOUTH WESTERN RAILWAY CO.	[Symbol]	39	[Symbol]	5% Second Mortgage Bonds
NORTHERN PACIFIC & MANITOBA RY. (Leased)	[Symbol]	40	[Symbol]	5% First Mortgage Bonds
MINNESOTA & MANITOBA R.R. (Leased)	[Symbol]	41	[Symbol]	5% First Mortgage Bonds
THE JAMES BAY & EASTERN RAILWAY COMPANY	[Symbol]	42	[Symbol]	5% First Mortgage Bonds
THE HARMORA RAILWAY & MINING COMPANY	[Symbol]	43	[Symbol]	5% First Mortgage Bonds (Short)
NATIONAL TRUST COMPANY	[Symbol]	44	[Symbol]	4% Perpetual Consolidated Debenture
		45	[Symbol]	4% First Mortgage Gold Bonds
		46	[Symbol]	4% Perpetual Debenture Stock
		47	[Symbol]	First Mortgage Bonds
		48	[Symbol]	Income Bonds
		49	[Symbol]	3 1/2% First Mortgage Bonds
		50	[Symbol]	4% Province of Manitoba Bonds
		51	[Symbol]	5% Debenture Stock
		52	[Symbol]	
		53	[Symbol]	
		54	[Symbol]	
				TOTAL OUTSTANDING AFFILIATED COMPANIES
				TOTAL OUTSTANDING CANADIAN NORTHERN RAILWAY COMPANY
				NOT INCLUDED IN
				Equipment Trusts
				5% Income Charge Convertible Debenture



NOTE:
 Mortgage No. 7 also covers all
 terminals at Port Arthur and leases
 with Minn. & Man. Ry. Co. Also Ontario
 Bridge Co. with rights over Rainy River
 Bridge and lease of Man. Pac. & Manitoba Ry. Co.

ONTARIO LANDS

2,000,000 Acres
lands in Ontario



CERTAIN LANDS
AT
KEY INLET

CERTAIN LANDS
FOR TERMINALS IN
YORK TOWNSHIP
CERTAIN LANDS FOR TERMINALS
AND LANDS IN TORONTO

U

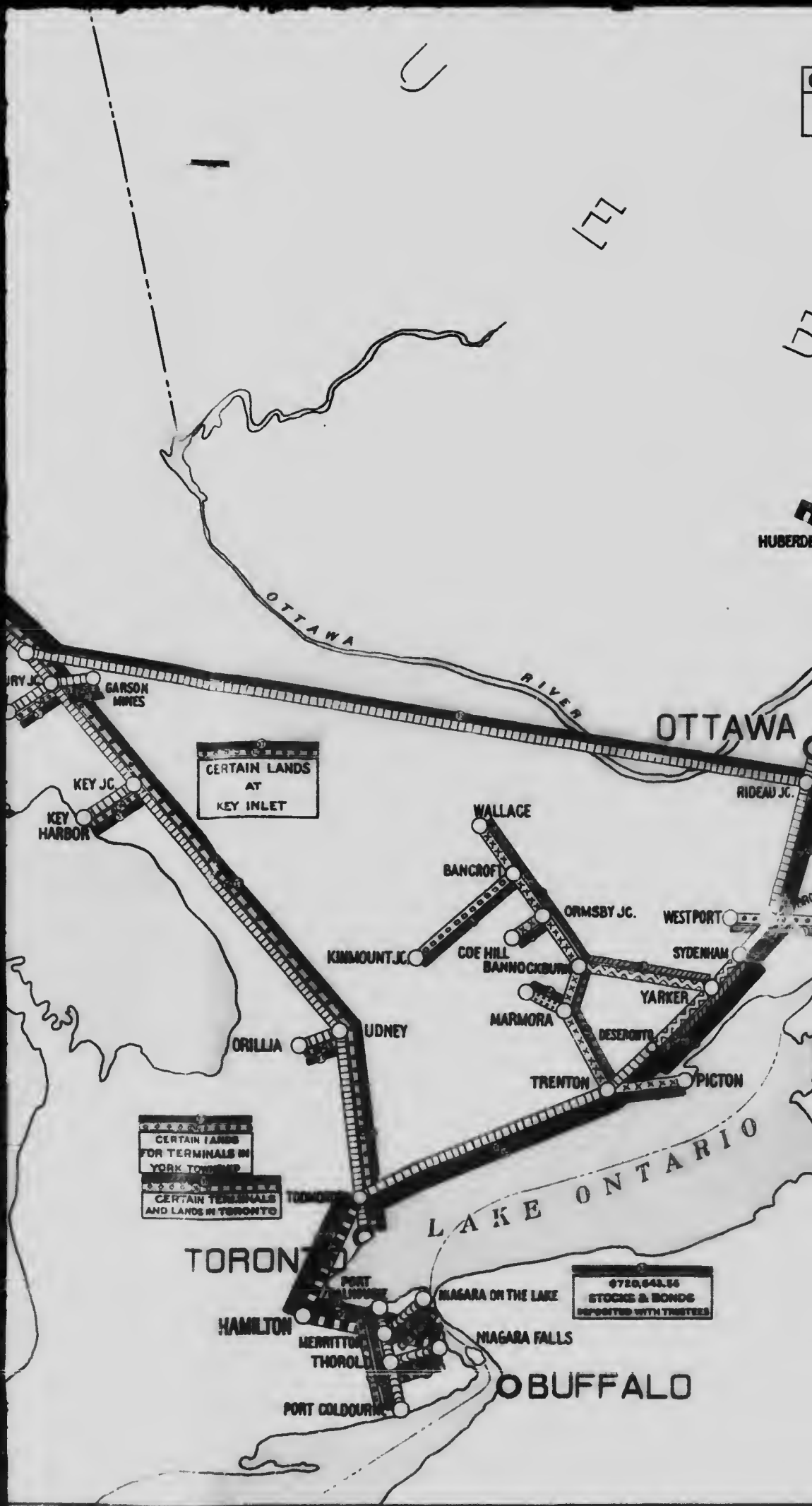
R

LAKE HURON

TORONTO

LAKE O

BUF



QUEBEC LANDS

402,860 acres
lands in Quebec.

CHAMBRUD JC.
ST. ANDRE
ST. ANDRE DE L'EPOUVANTE

LA TUQUE

LA TUQUE JC.

MONTMORENCY FALLS

RIVIERE A PIERRE JC.

ST. CHARLES

QUEBEC

**LANDS & TRACIS
IN
CITY OF QUEBEC**

**LEASE OF CERTAIN
LANDS IN
CITY OF QUEBEC**

GARNEAU JC.

SHAWINGAN JC.

JOLIETTE JC.

LAURENT FALLS

**LEASE OF BRIDGE
OVER
RIVIERE DES PRAMES**

**CERTAIN LANDS IN
MONTREAL LEASE**

**\$ 1,025,000. CAP. STK.
CANADIAN NORTHERN
MONTREAL LAND CO.**

**LANDS, STATION BLDGS,
TERMINAL WORKS,
TUNNEL & ALL EASEMENTS
ETC. OF CAN. NOR. MONTREAL
TUNNEL & TERMINAL CO. LTD.**

RAWDON

RAWDON JC.

MONTFORT JC.

GRENVILLE

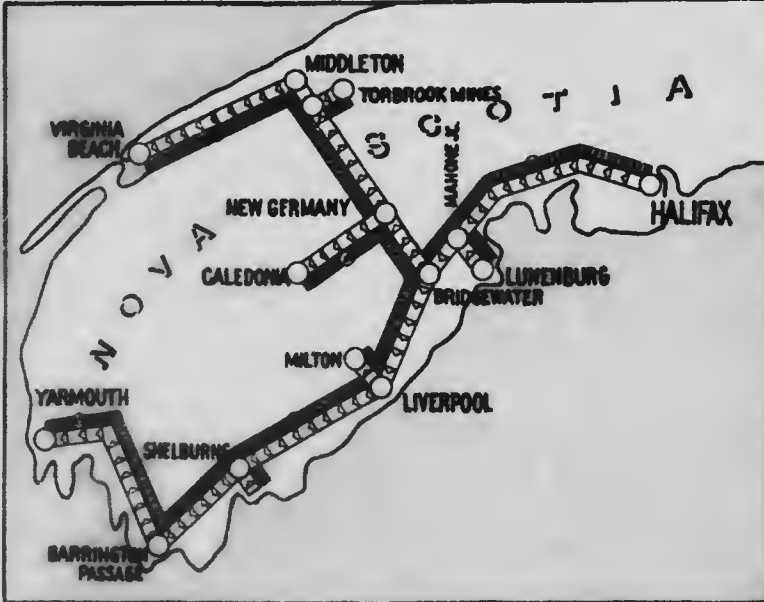
HAWKESBURY

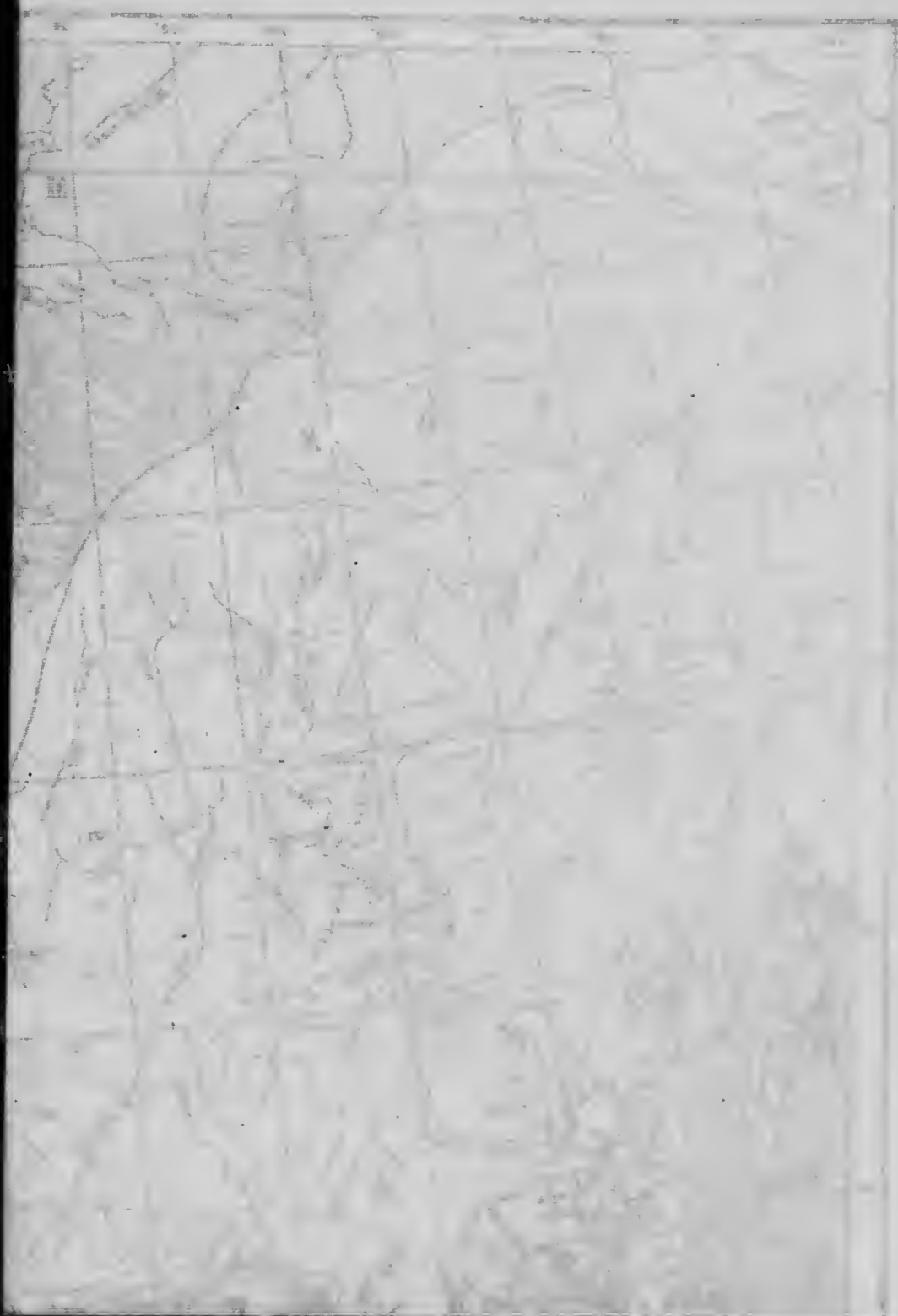
MONTREAL

ST. LAWRENCE

BROCKVILLE

**ON \$ 2,530,000.
BONDS OF NO. 27
DEPOSITED**

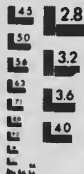
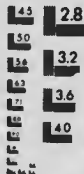
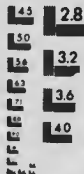
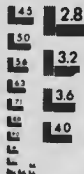
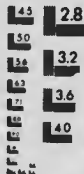
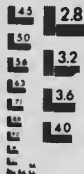
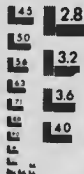






MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



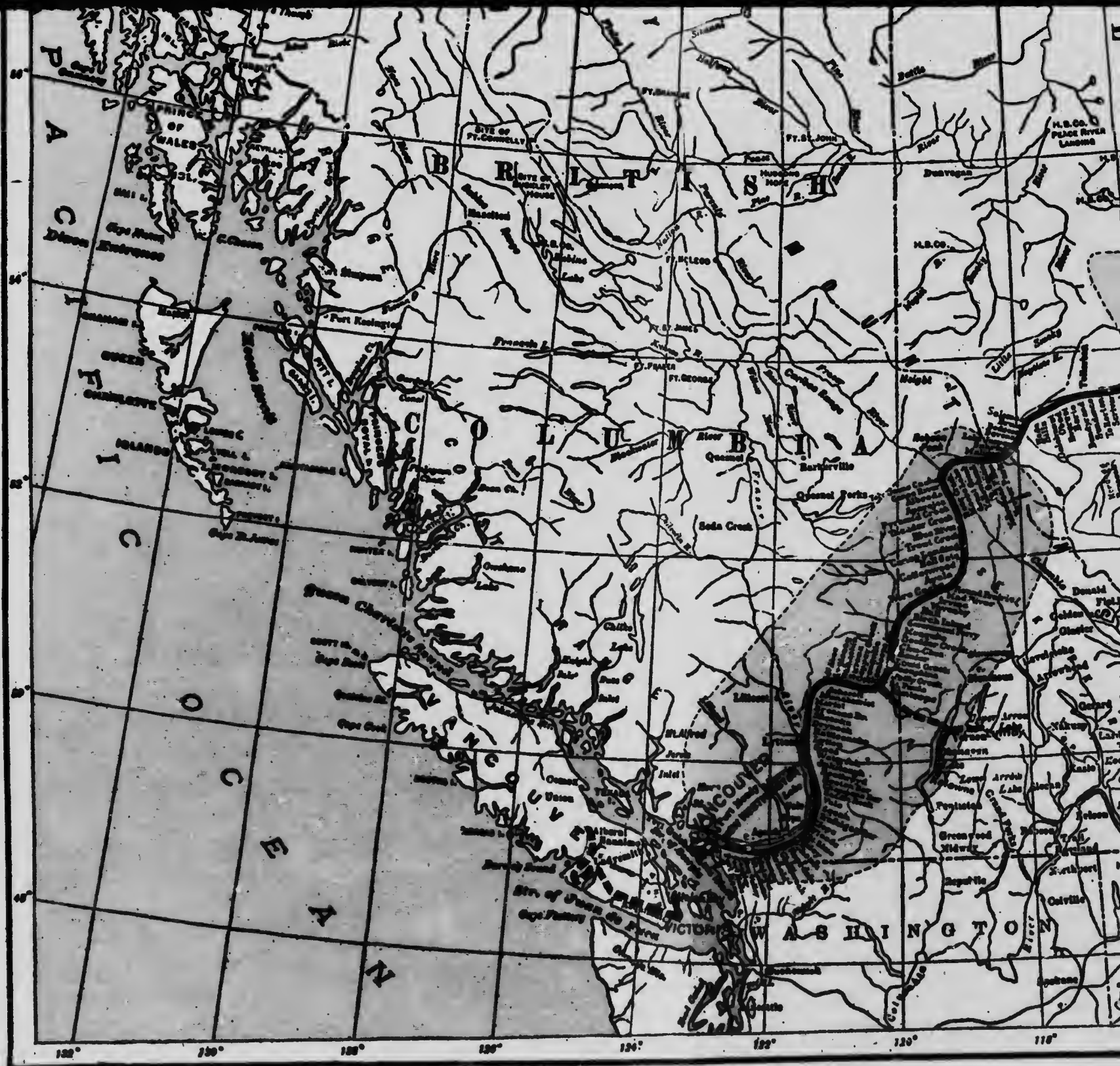
APPLIED IMAGE Inc

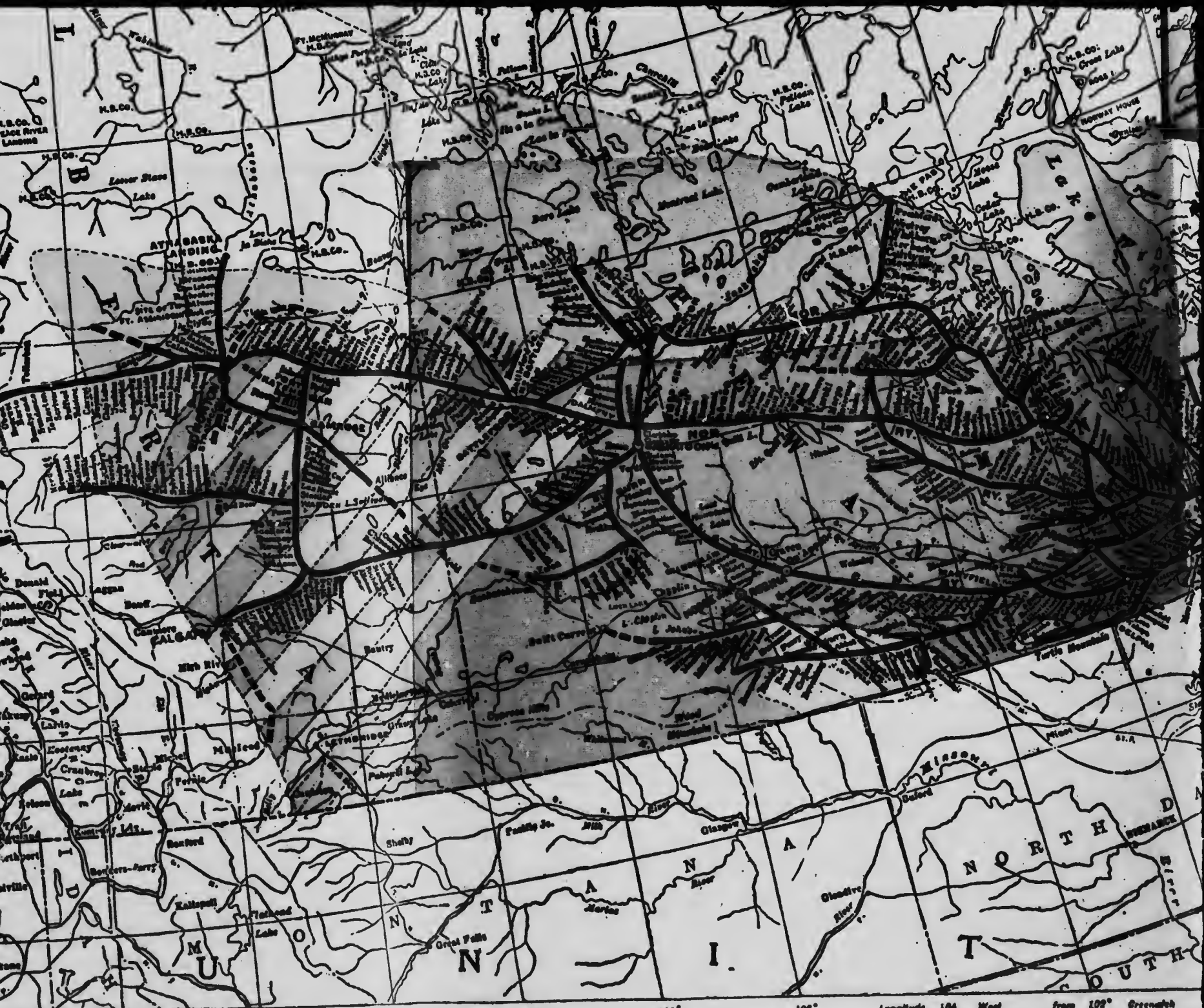
1653 East Main Street
Rochester, New York 14609 USA
(716) 482 - 0300 - Phone
(716) 288 - 5989 - Fax



EXHIBIT A







110°

114°

112°

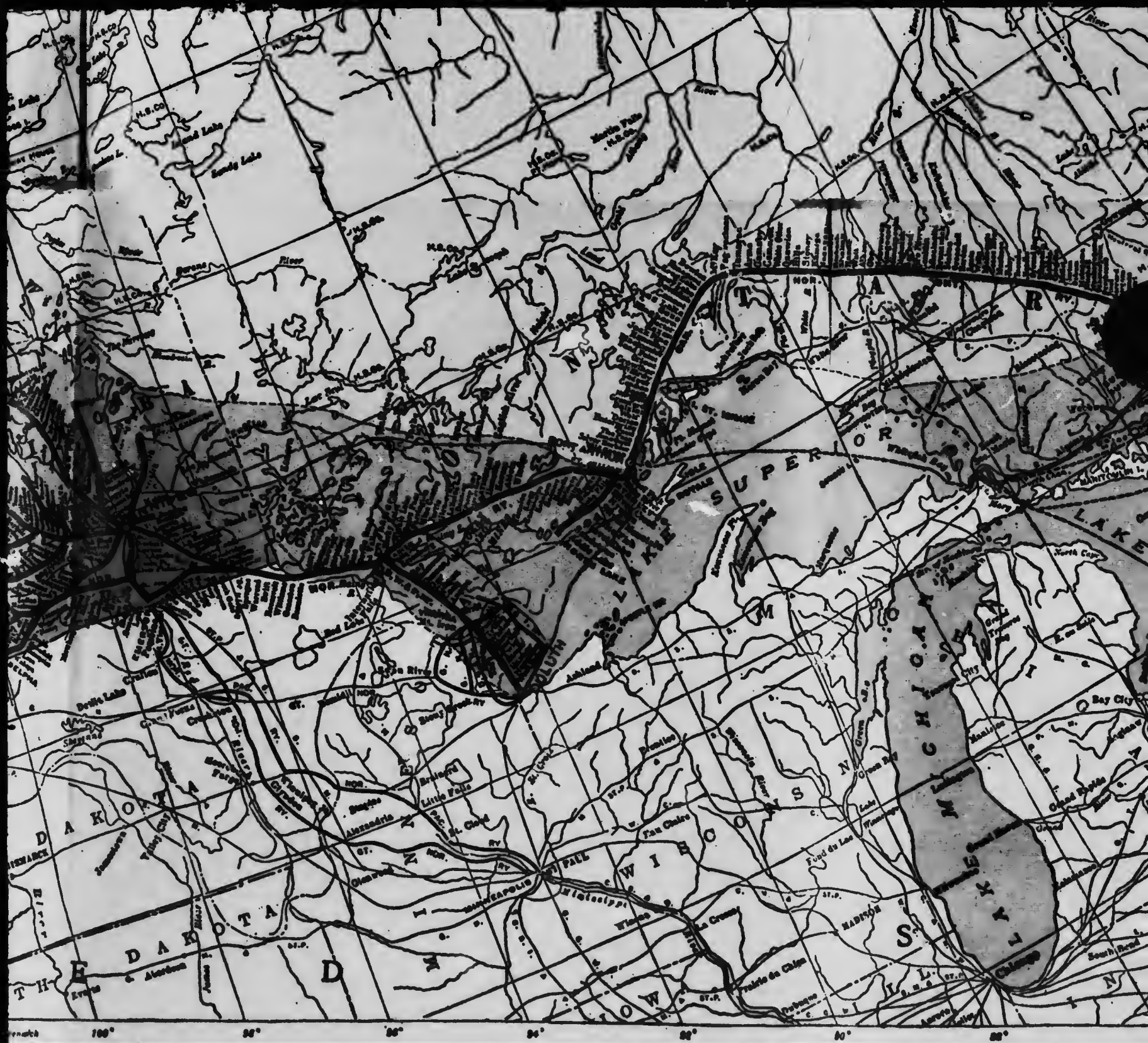
110°

108°

106°

Longitude 104 West

from 102° Greenwich





**MAP SHEWING
TRAFFIC RESOURCES
OF TERRITORY TRIBUTARY TO THE
CANADIAN NORTHERN RAILWAY SYSTEM**

LEGEND

- | | | | |
|-------------------------------|--|-------------------------------|--|
| AGRICULTURAL LANDS..... | | MINE PRODUCTS..... | |
| FOREST PRODUCTS..... | | NICKEL DEPOSIT..... | |
| NON-PRODUCTIVE TERRITORY..... | | | |
| Constructed Lines..... | | Lines Under Construction..... | |

COVERDALE & L PITTS
CONSULTING ENGINEERS
66 BROADWAY, NEW YORK

SCALE 1" = 83 MILES

MARCH 26, 1917.

