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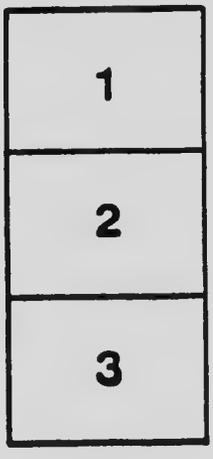

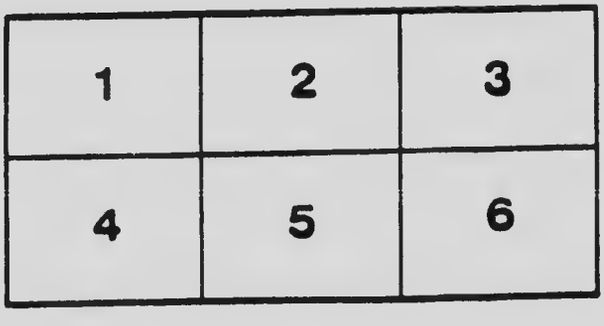

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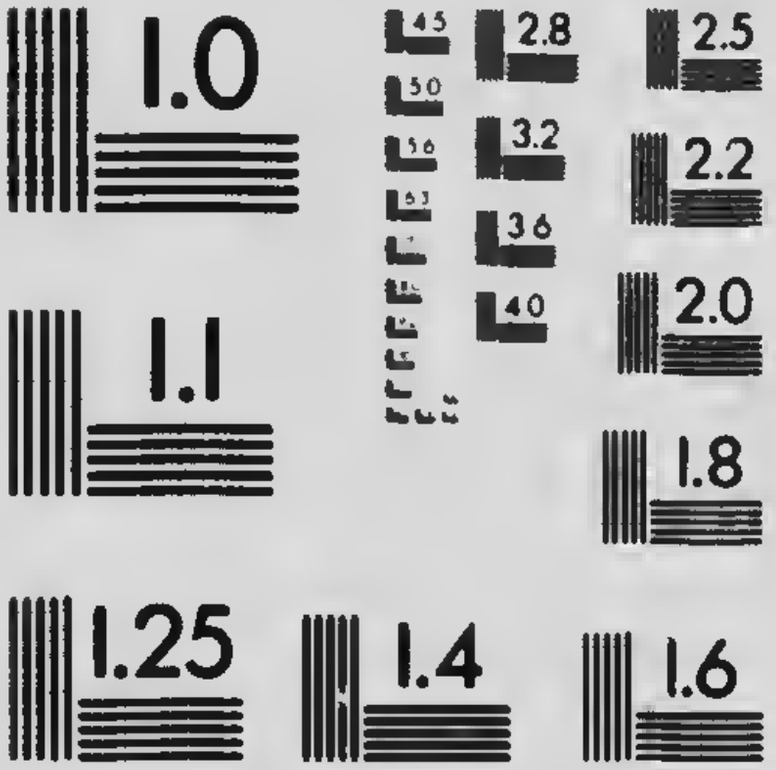

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Hon. W. J. ROCHE, Minister, W. W. CORY Deputy Minister
DOMINION WATER POWER BRANCH
J. B. CHALLIES, C.E., Superintendent

WATER RESOURCES PAPER No. 20

INTERESTS DEPENDENT ON WINNIPEG RIVER POWER

Published under the direction of the Superintendent of Water Power

PUBLISHED BY AUTHORITY OF
HON. W. J. ROCHE, MINISTER OF THE INTERIOR
OTTAWA, 1917

DEPARTMENT OF THE INTERIOR—CANADA
Hon. W. J. ROCHE, Minister, W. W. CORY, Deputy Minister
DOMINION WATER POWER BRANCH
J. B. CHALLIES, C.E., Superintendent

WATER RESOURCES PAPER No. 20

REPORT

ON THE

INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO THE CAPITAL
INVESTED AND THE LABOUR EMPLOYED

BY

H. E. M. KENSIT, M. Am. Inst. E.E., M. Can. Soc. C.E.

Published under the direction of the Superintendent of Water Power

PUBLISHED BY AUTHORITY OF
HON. W. J. ROCHE, MINISTER OF THE INTERIOR
OTTAWA, 1917

DOMINION WATER POWER BRANCH

231 Chambers of Commerce,
Winnipeg, 31st July, 1915.

J. B. CHALLIES, ESQ., C.E.,
Superintendent,
Dominion Water Power Branch,
Department of the Interior,
Ottawa, Ont.

LAKE OF THE WOODS REFERENCE.

INTERESTS DEPENDENT ON WINNIPEG RIVER POWER.

SIR,—In accordance with your instructions of February 10 and 24, 1915, I now beg to submit the accompanying report on the use of hydro-electric power from Winnipeg river and the interests dependent thereon.

I have spent the whole of the time from February 15 to this date in the locality dealt with, in personal study of the conditions and in collecting and arranging the data obtained.

The sources of information are, I believe, fully indicated in the proper places throughout the report and I may add that no pains have been spared in examining, checking and confirming the large amount of figures and data that have been supplied from official sources and direct from power users for the purpose of this report.

My thanks are specially due to the following gentlemen for the trouble taken and courtesy shown in supplying all the information asked for:

CITY OF WINNIPEG.

J. G. Glassco, Manager Light and Power Dept.
E. V. Caton, Chief Engineer, Light and Power Dept.
R. A. Sara, Sales Manager, Light and Power Dept.
W. P. Brereton, City Engineer.
C. F. Roland, Industrial Commissioner.

WINNIPEG ELECTRIC RAILWAY COMPANY.

Wilford Phillips, General Manager.
Wilson Phillips, Superintendent.

PROVINCIAL GOVERNMENT.

Edward McGrath, Factories Inspector.
J. Carroll, Assistant Factories Inspector.

GREATER WINNIPEG WATER DISTRICT.

W. G. Chace, Chief Engineer.

KENORA, ONT.

J. P. Earngey, Mayor.
G. C. Hay, City Clerk and Treasurer.

LAKE OF THE WOODS MILLING CO.

T. J. Cherry, Manager.

I have the honour to be, sir,

Your obedient servant,

H. E. M. KENSIT.

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GENERAL PARTICULARS OF GREATER WINNIPEG

PART II.

MANUFACTURING INDUSTRIES.

PART III.

HYDRO-ELECTRIC UNDERTAKINGS. SUMMARIES.

PART IV.

INTERESTS DEPENDENT ON WINNIPEG RIVER POWER.

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APPENDICES.

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REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

PART I.

GENERAL PARTICULARS OF GREATER WINNIPEG

PART I.

INTRODUCTORY REMARKS

GROWTH OF INDUSTRIES AND CONSUMPTION OF POWER.

In commencing an examination of the amount of capital, labour and power now dependent upon Winnipeg river, some idea of the importance of power supply to Greater Winnipeg may be gained by a brief examination of the growth of industries and consumption of power that has taken place as the price of power has been gradually decreased since the hydro-electric power became available.

The progress and present position of Greater Winnipeg as a manufacturing district and user of power is shown in Table 1, compiled from the Dominion Census of Manufactures 1911 and from records furnished by the City and the Winnipeg Electric Railway Company.

It will be seen from the said Table 1 that Winnipeg, though a mid-west City, far removed from other large centres of population and from the sources of many raw materials, ranked in 1910 as the *fourth manufacturing city in Canada* in a list of 44 cities so classed in the Census.

No later statistics of manufacture in Canadian Cities are available, but in view of the considerable increase in manufactures in Winnipeg since 1910, as shown by the records of the Industrial Bureau and by the Census of Manufactures made for the purpose of this report, it is probable that the present relative position of Winnipeg is even better.

INCREASE OF MANUFACTURES.

It will be seen from Table 1 and from Plate 2 following thereon, that the increase of manufactures *from 1900 to 1915* has been as follows:

Capital invested	1480%
Value of product	1770%
Persons employed	637%
Increase of population	446%
Reduction in price of power	76% ($12\frac{1}{2}$ to 3 cents)

GROWTH IN THE USE OF POWER.

The growth in the use of power from 1907, when hydro-electric power was first made available by the Winnipeg Street Railway Company and the price for power was reduced from $12\frac{1}{2}$ to 6 cents per kilowatt hour, to 1914, is conspicuous.

It will be seen from Table 1 and Plate 1 following thereon that the increase in the use of electric power from *1907 to 1914* has been as follows:

Electric peak load	255%
Electric output	513%
Increase of population	102%
Reduction in price of power	50% (6 to 3 cents)

The above examples do not cover the same periods because in the fi
ease the Census dates are taken and in the second the earliest date fro
which reliable records of electric output are available. The same tendenci
are, however, clearly marked in both examples.

*Special attention is called to Plates 1 and 2, which show the marked increa
in the use of power and in the growth of industries, corresponding with t
introduction of cheap hydro-electric power.*

The foregoing statistics show clearly the influence that cheap an
abundant power has exerted upon the development of industries and of th
City.

This result is all the more remarkable when it is considered that th
years 1913-14 were a period of temporary but distinctly marked financia
stringency.

The point is still further brought out by reference to Table 2, whic
shows particulars of the general progress of the City of Winnipeg. It wi
be seen that from 1913 to 1914, on account of the financial stringency, th
value of the building permits and bank clearings both show a decrease, bu
as shown on Table 1, the capital invested in industries shows an increas
of 6 per cent. and the consumption of power an increase of 18 per cent.

*From the above it will be seen that since low-priced hydro-electric powe
became available in 1907 its use has increased much more rapidly than th
population, and that it has continued to do this even under adverse financia
conditions.*

Reference should also be made to Table 31, which shows the consump
tion of electric power in Winnipeg compared to American and other Cana
dian cities, and to the panoramic views of Greater Winnipeg facing page
8, which give examples of the wide distribution of the power.

*The effect of the cheap hydro-electric power being available is shown by
its having superseded practically all the private fuel power plants.*

A considerable amount of steam power is necessarily maintained as
an accessory to the hydro-electric power for use in industries where steam
is essential in the process of manufacture, as in breweries, laundries, soap
and tar works, etc., and in lumber mills, where the refuse must be burned.

In several cases, such as railway shops and large department stores,
where there is a very large area to be heated during the winter, and this
heating accounts for a large proportion of the steam required, the steam
plant is used during the winter but shut down entirely throughout the
summer, hydro-electric power being then used exclusively.

In the case of the City Water Works, domestic and fire pressure, the
Telephone Department, etc., fuel plants are maintained as a reserve but
seldom used.

Outside of the above cases there are apparently less than 2,000 horse-
power of fuel plants still in use, and the principal of these are negotiating
for hydro-electric power. As the total hydro-electric power connected, not
counting light, heat or street railways, is 66,740 horse-power, the said fuel
plants constitute only 3 per cent. of the total.

Table 1.—Progress of Greater Winnipeg as a Manufacturing District.

(Compiled from the Census of Canada, 1911, and the Records of the City and the Winnipeg Electric Railway Co.)

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.		11.		12.		
Year.	Population.	No. of Factories.	Capital Invested.	No. of Employees.	Salaries and Wages.	Value of Product.	Rank among 44 Manufacturing Cities of Canada in Value of Products.	Increase in Population per Annum.	Peak Load in the City in Horse-Power		Kilowatt Hours Delivered in City		Base Rate for Electric Energy per K.W. Hour		Year.
									Total.	Increase per Annum.	Total.	Increase per Annum.	Light.	Power.	
1899	27,192		$ 3,124,400	2,359	$ 1,176,900	$ 3,084,000	9th	.....	.....	.....	.....	.....	Cents.	Cents.	1899
1900	50,506	103	4,673,200	3,155	1,810,900	5,046,000	5th	.....	.....	.....	.....	.....	...	...	1900
1905	97,401	...	.....	.....	.....	18,983,000	.....	.....	No	.....	No	.....	20	12½	1905
1906	119,837	...	.....	.....	.....	.....	.....	24 4/5%	Records	.....	Records	.....	20	12½	1906
1907	136,953	...	.....	.....	.....	.....	.....	14 3/5%	.....	.....	.....	.....	10	6	1907
1908	139,869	...	.....	.....	.....	.....	.....	2 1/5%	15,500	...	25,854,980	.....	10	6	1908
1909	157,383	...	.....	.....	.....	.....	.....	12 5/5%	16,600	7 1/5%	27,657,380	7 0/5%	10	6	1909
1910	172,865	196	31,910,400	13,115	8,598,600	39,400,600	4th	9 8/5%	19,700	18 7/5%	46,225,550	67 0/5%	10	6	1910
1911	204,145	300	.....	.....	.....	.....	...	18 1/5%	23,200	17 8/5%	48,110,865	4 1/5%	10	6	1911
1912	227,339	346	42,500,000	.....	.....	.....	...	11 4/5%	27,900	20 2/5%	61,257,065	27 3/5%	10	3	1912
1913	260,436	400	50,000,000	16,000	9,600,000	43,000,000	...	14 5/5%	42,600	52 6/5%	96,119,240	56 9/5%	7½	3½	1913
1914	276,177	418	53,000,000	18,500	11,250,000	45,000,000	...	6 1/5%	51,200	20 2/5%	134,117,100	39 5/5%	3½	3 & 3½	1914
									55,400	8 2/5%	158,534,370	18 2/5%	3½	3 & 3½	
Increase in Population and Electric Output, 1907 to 1914								102%	.....	255%	.....	513%	...	...	.....
1915	276,177	479	$73,958,676	23,257	$17,503,717	$94,403,717	.....	.....	.....	.....	.....	.....	...	...	1915
Increase	*per cent. from Census of 1900 to 1915—*														
.....	446%	365%	1480%	637%	866%	1770%	.....	.....	.....	.....	.....	.....	.....	.....	.....

Column 2.—Population of Greater Winnipeg per Henderson Directories Ltd., on basis of 2.75 times the number of names listed. Some cities use 3.5 as a multiplier.
Columns 3 to 7—1890, 1900, 1910 from Dominion Census; 1911 to 1914 by Mr. C. F. Roland, City Industrial Commissioner. Particulars for 1915 specially compiled for this report; see page 14. Figures from Dominion Census and for 1915 include gas manufacture and electric light and power stations. For comparison with other cities see Table 7, page 22.

Column 8.—No later figures available for other cities.
Column 9.—Combined load of the City Power Plant and the Winnipeg Electric Railway Co., including street railway load.
Column 10.—The base rates shown are subject to substantial discounts. See Tariffs in Appendices A and B.
See also the following two diagrams showing the increase of electric output and the increase of manufacturing industries.

PLATE No.

DIAGRAM A I

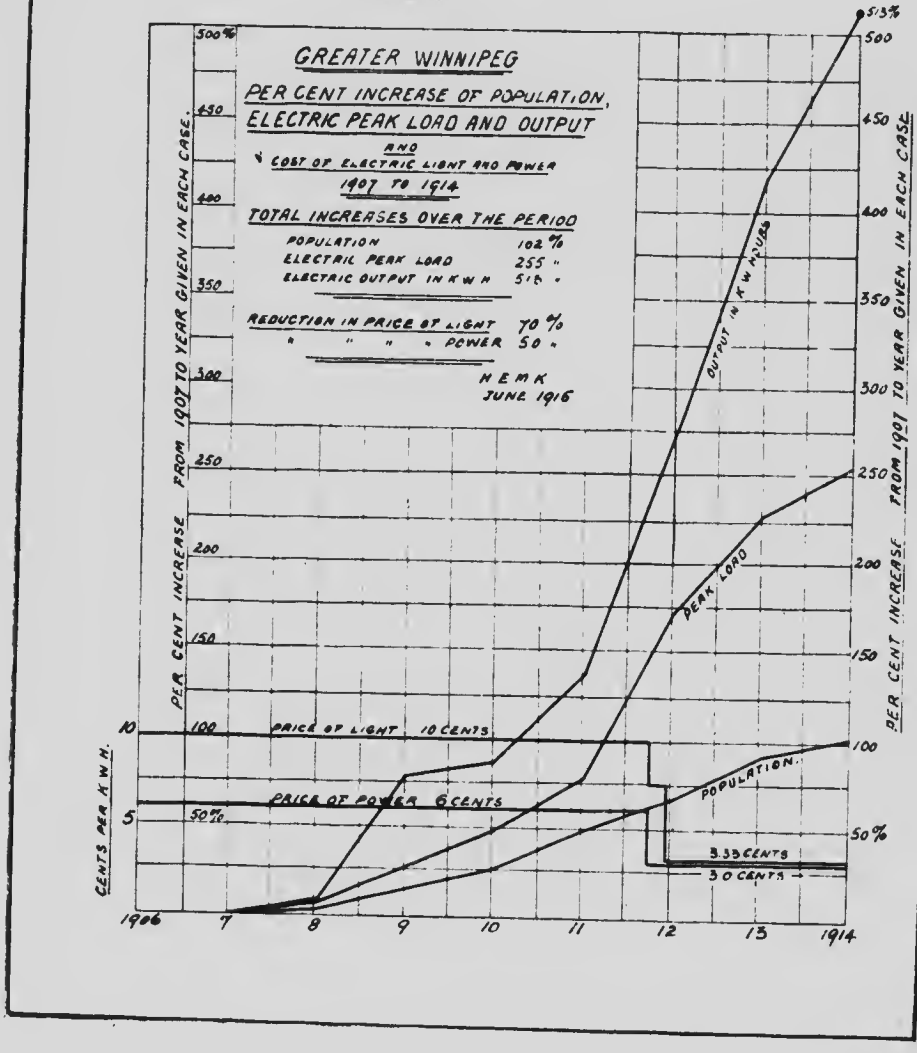

PLATE No. 2

DIAGRAM A.2

GREATER WINNIPEG.

PER CENT INCREASE OF POPULATION AND OF MANUFACTURING INDUSTRIES FROM 1000 TO 1915

1900 & 1910 FROM DOMINION CENSUS REPORTS
1915 FROM CENSUS MADE FOR THIS REPORT
H E M.K.

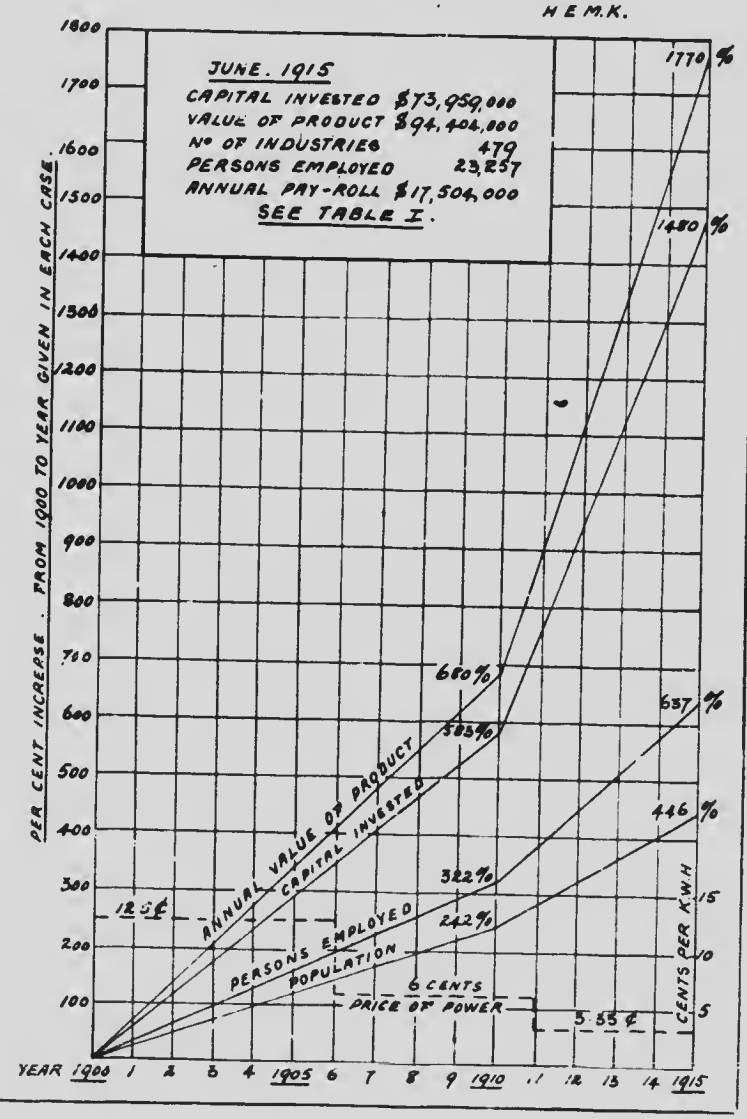

Table 2.—General progress of City of Winnipeg.

(Particulars given in nearest round numbers for ease in reading.)

Year.	Population.	[1]Total Assessment.	Tax Rate.		Building Permits		Bank Clearings
			General, Mills per Dollar.	Business, Mills or Per Cent. on Rental Value.	Number.	Cost.	
1900	42,500	$ 25,077,500	23 25	20 Mills	638	$ 1,442,000	.....
1902	48,400	27,615,800	23 25	.....	973	2,408,000	$ 188,370,000
1904	67,300	48,215,000	17 00	.....	2,268	9,652,000	294,601,000
1905	80,000	62,728,000	19 70	.....	4,099	10,840,000	369,869,000
1906	101,100	80,513,000	17 90	.....	4,204	12,626,000	504,586,000
1907	111,700	96,787,000	16 00	8½%	2,827	6,310,000	599,668,000
1908	118,250	116,101,400	15 00	.....	1,769	5,514,000	614,112,000
1909	122,400	111,091,000	15 00	6½%	2,942	9,226,000	770,649,000
1910	132,700	160,970,000	10 80	6½%	3,916	15,117,000	953,415,000
1911	152,000	176,705,000	13 25	6½%	4,342	17,550,000	1,173 000,000
1912	166,600	218,880,000	12 00	6½%	5,046	20,560,000	1,538,000,000
1913	184,700	265,303,000	13 00	6½%	4,834	18,360,000	1,635,000,000
1914	203,300	287,365,000	14 80	6½%	3,744	12,200,000	1,370,961,000

[1]Includes business assessment but not exemptions, this being the basis on which the tax rate is struck.

WINNIPEG AS A MANUFACTURING CENTRE.

Mr. Chas. F. Roland, Commissioner, City of Winnipeg Industrial Bureau in his Annual Report for 1914 states as follows:

"Winnipeg has for years been the distributing and manufacturing "centre of the Canadian West, and owing to its unique position always "will be. . . . At the present time Winnipeg is the pivotal point of "five railroad systems, with 15,519 miles of transportation facilities.

"Winnipeg is annually, at the present time, selling throughout the "extensive area for which this City is the economic distributing centre "manufactured goods to the value of $175,000,000, of which it is conservatively estimated that 75 per cent. is made elsewhere. It offers a gateway "to one of the greatest growing markets in the world today, with a purchasing power of over $500,000,000 annually.

"From a recent compilation of statistics the following car lot commodities billed to Winnipeg will demonstrate Winnipeg's position as a supply "centre:

CARLOAD LOT RECEIPTS AT WINNIPEG.

	Number of Cars		*Number of Cars*
"Agricultural implements	2,120	Brought forward	10,288
"Wire nails and fencing	1,539	Iron pipe	682
"Cement	1,180	Stoves and ranges	584
"Furniture	1,090	Canned goods	571
"Hardware	1,042	Brick	539
"Sugar	972	Barrels	514
"Paper	868	Sewer and drain pipe	667
"Machinery	765	Automobiles	536
Carriages and wagons	712	Glass (window and plate)	406
	10,288		14,787"

This represents one year's delivery of goods in carload lots only.

Several of the above lines are already manufactured in Winnipeg. With the advantages of distribution facilities, good labor market and cheap power that now exist, there can be little doubt that an increasing proportion of the above products will be produced in the City. Some 250 different classes of goods are now manufactured in Winnipeg.

nk Clearings.

	188,370,000
	294,601,000
	369,869,000
	504,586,000
	599,668,000
	614,112,000
	770,649,000
	953,415,000
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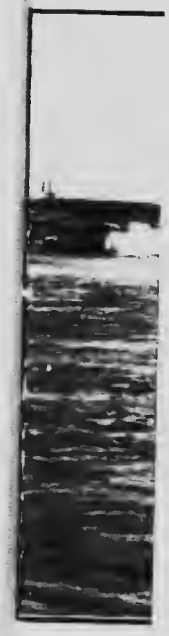

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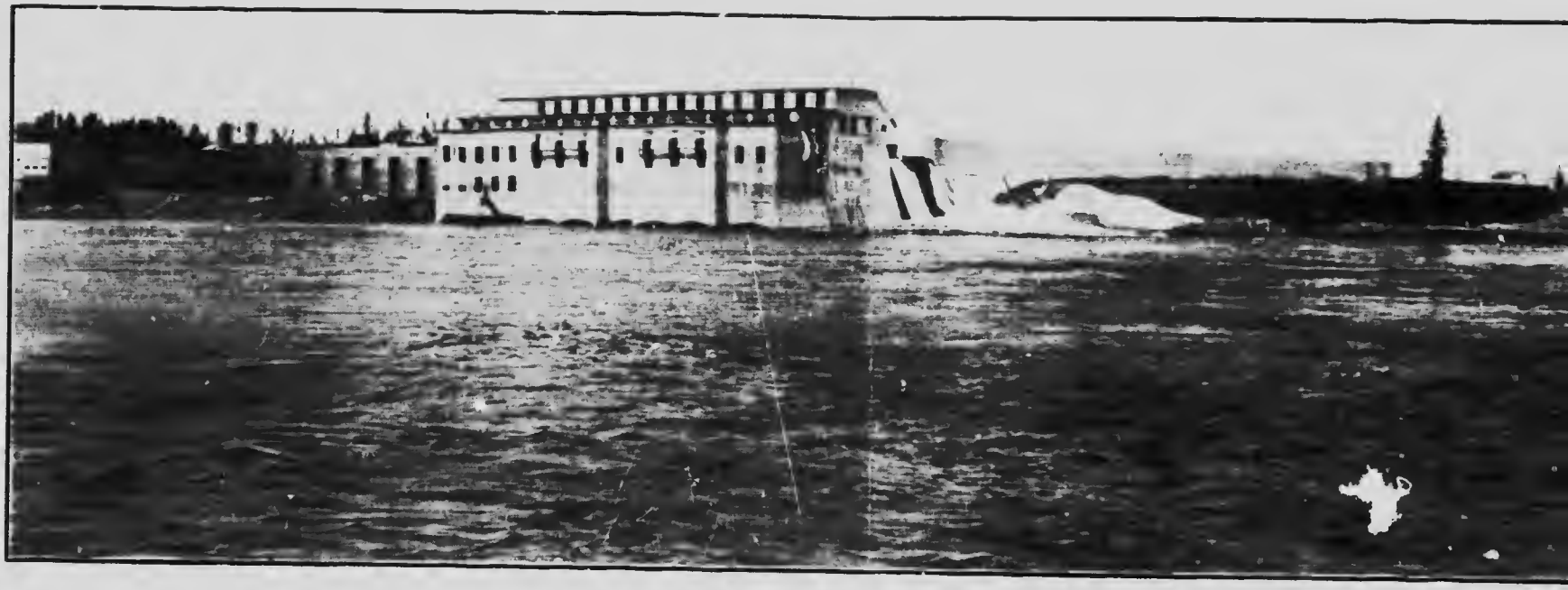


Panoramic View [illegible] Winnipeg Harbour Bridge

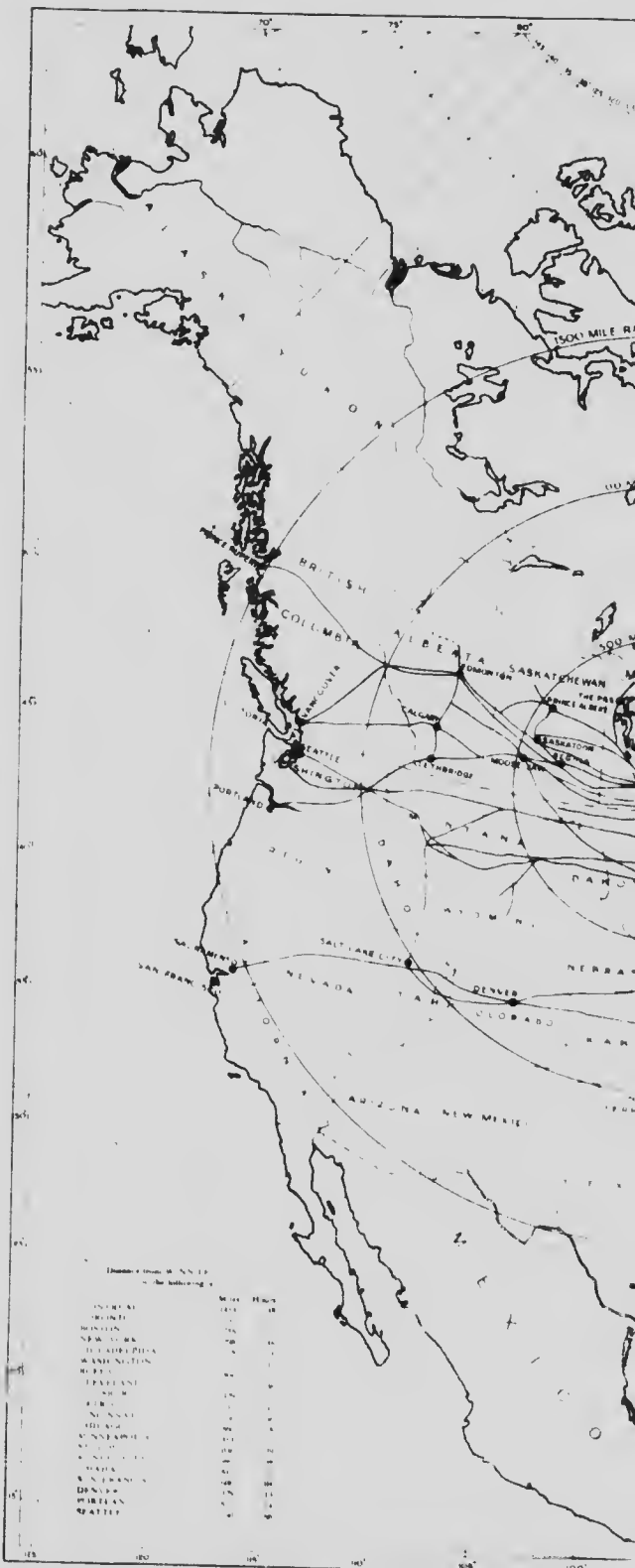
Greater Winnipeg: Illustrating by a Few Examples [illegible]


ST. BOSTON MFG. DISTRICT


NOTRE DAME INVESTMENT BUILDING

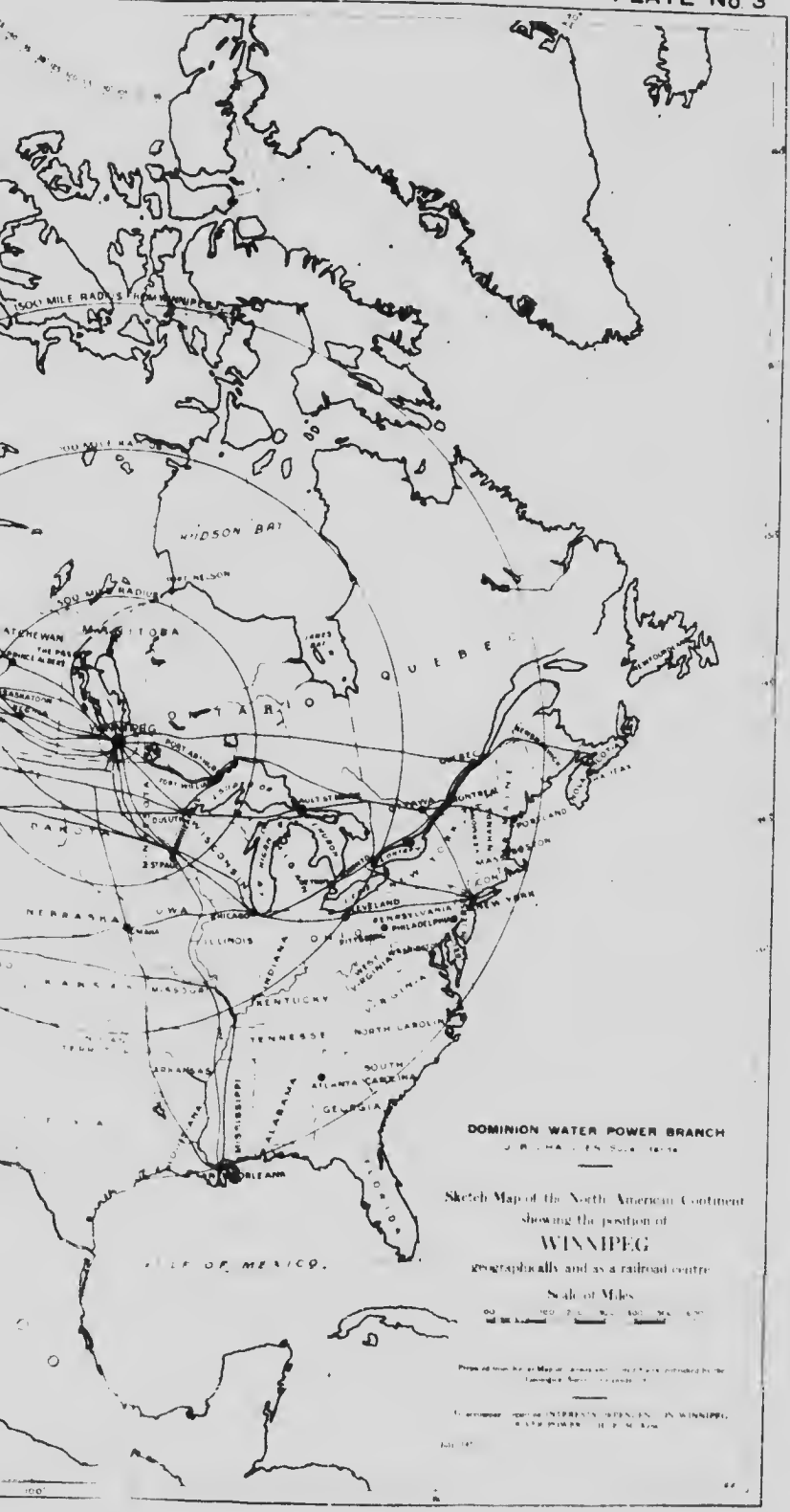

FORT GARRY HOTEL
500 RP

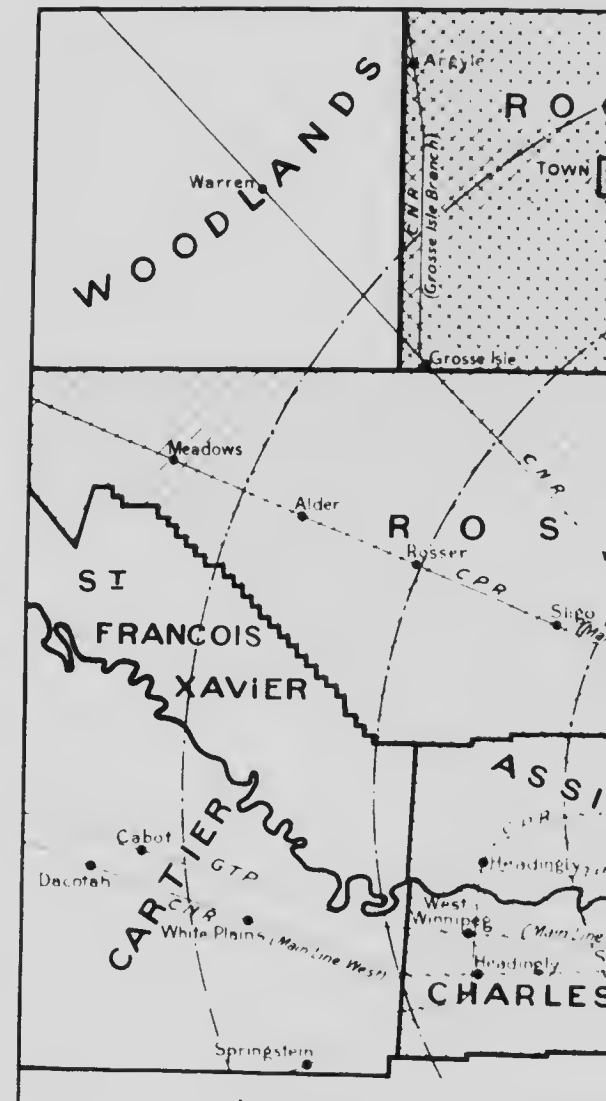

THE BANK OF OTTAWA
SWEET CAPORAL
CIGARETTES



B. E. Norrish, M.Sc., Chief Draughtsman
G. E. Jones, Draughtsman

PLATE No 3


HUDSON BAY
QUEBEC
ONTARIO
MANITOBA
WINNIPEG
PORT ARTHUR
DULUTH
ST PAUL
CHICAGO
CLEVELAND
PHILADELPHIA
NEW YORK
BOSTON
MONTREAL
TORONTO
DETROIT
BUFFALO
KENTUCKY
TENNESSEE
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
ATLANTA
NEW ORLEANS
GULF OF MEXICO
DOMINION WATER POWER BRANCH
Sketch Map of the North American Continent
showing the position of
WINNIPEG
geographically and as a railroad centre
Scale of Miles



Department of the Interior Canada
HON W J ROCHE, Minister
W W CORY, Deputy Minister
Dominion Water Power Branch
J B CHALLIES, C E Superintendent

Plan showing Areas in which Eiectric Suppiy is now give Winnipeg Municipai Light and Powe ment and the W. E. Ry. Co

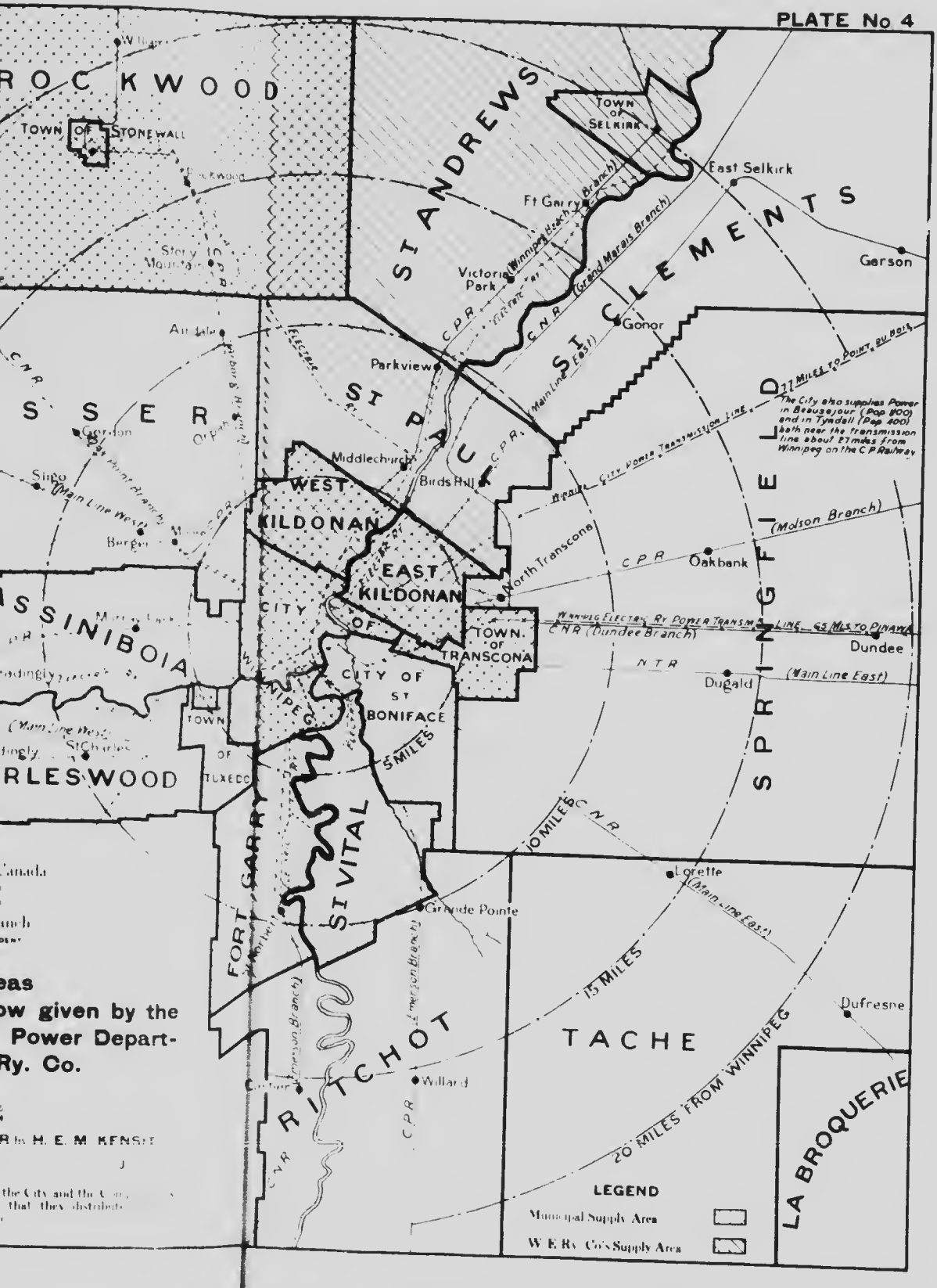
Scale of Miles
0 1 2 3 4 5

To accompany report on WINNIPEG RIVER POWER by H. E.

NOTE. This map is intended to show the area within which the City and supply to some extent. It is not intended to imply that they whole area shown, nor that they have powers to do so.

B. F. Story, A.S. Chief Draughtsman
G. E. Jones, Draughtsman

PLATE No 4



eas
ow given by the
Power Depart-
Ry. Co.

R to H. E. M. KENSIT

the City and the Co
that they distribute

As illustrating the conservative policy adopted by the City of Winnipeg in relation to securing industries, the following extracts may be given from the 1914 report of the Industrial Development Committee, signed by Mr. W. L. Parrish, Chairman:

"Following the appointment at the last annual meeting of the Directors, "your committee met, and after consultation and discussion, adopted certain "policies that would in the opinion of your committee be sound and act "as general principles to follow. While the Bureau organization stands for "everything that will contribute to the upbuilding of a bigger and better "City, the fact remains primarily we are greatly interested in bringing "new industries to the City. In dealing with such, great care must be "exercised by your committee to solicit such industries as are fitted to "make a success of manufacturing in Winnipeg. Your committee's investi- "gations so far lead us to believe that any policy of giving artificial advan- "tages to new concerns must be discouraged. That bonuses, free sites, "remission of taxes, investment in capital stock and new industrial securities, "indorsement of promotion schemes or other methods of establishing "factories must be carefully handled if not completely ignored. . . .

"The world-wide financial stringency naturally affects the work of this "Committee, and during the past year many important enquiries have "been suddenly stopped due to these conditions brought about by the war.

"Winnipeg's water power, our ever-increasing importance as a labor "market, our central position and our unexcelled railroad facilities, are "becoming well known throughout the manufacturing world, and your "Committee believe that the industrial development of this City will receive "a great impetus at the close of the war."

The geographically central position of Winnipeg and its great railroad facilities are indicated on Plate 3.

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

PART II.

MANUFACTURING INDUSTRIES

CAPITAL, LABOUR, POWER, ETC., EMPLOYED IN MANUFACTURES

PART II.

MANUFACTURING INDUSTRIES.

INDUSTRIES DEPENDENT ON WINNIPEG RIVER POWER.

1. In accordance with the instructions received, special attention has been given to the preparation of particulars of the manufacturing industries that are dependent upon Winnipeg River power, with special reference to the amount of power used, capital invested, labour employed, etc.

It is, however, advisable to point out that the term "manufacturing industries" necessitates the exclusion of a very large amount of power in use but which cannot be included under that term. For instance every large office block is dependent on Winnipeg River power not only for electric light but also for operating its elevators and pumps, and therefore for its business, but the capital invested cannot well be included in "manufacturing industries." The same remark applies to warehouses, institutions, hotels, restaurants, etc.

2. A great deal of time and care has been given to the compilation of the particulars regarding industries and power users. Complete lists of power users were obtained from the City Light and Power Department and the Winnipeg Electric Railway Company, covering about 2,300 users of power and the amount installed by each. Another list was obtained from the Provincial Inspector of Factories, showing separately the power installed in each factory in electric motors, steam and producer gas, together with the labour employed, and a list was obtained from the City Industrial Bureau of all industries established in the City according to its records.

All these lists were compared and checked with one another and doubtful points referred back for confirmation or correction. While there are doubtless still small inaccuracies, it is believed that the information re industries as finally listed is substantially accurate.

3. The manner in which the detailed lists were compiled is fully described under the head of "Basis of Particulars re Manufactures" on page 14.

4. A general summary of the said detailed lists of industries and of other power users is given in Part 4 of this report. The detailed lists themselves are not attached for the reason that the particulars as to capital and value of product or annual turnover were given in confidence.

5. It should be pointed out that the very presentation of a list of *manufacturing industries* dependent on Winnipeg River power, *taken by itself*, tends to belittle those interests.

The population of Greater Winnipeg is approximately 276,000. The number of power users is about 2,300, and of these less than 500 represent what are usually termed "manufacturing industries."

But practically all the 276,000 inhabitants of Greater Winnipeg and Selkirk are dependent on Winnipeg River power for light, power, traction and water supply, and, except as to traction, this also applies to Kenora and Keewatin.

The matter of the total interests involved is therefore separately dealt wit 'n Part 4 of this report.

BASIS OF PARTICULARS RE MANUFACTURING INDUSTRIES.

1. Referring to Table 1, the particulars there given in columns 2 to 7 as to manufacturing industries in Greater Winnipeg are compiled as to the years 1890, 1900 and 1910, from the Dominion Census.

For 1912 and 1914 they were compiled by Mr. Chas. F. Roland, Commission of the City Industrial Bureau. Mr. Roland has been commissioner for a number of years and has devoted much attention and care to the compilation of accurate information re industries in Winnipeg, the information being obtained in confidence from each firm on the form of which a copy is given on page 17.

For 1915 they are compiled from the information specially collected for this report as detailed below.

2. Before commencing the collection of particulars a careful examination was made of the methods employed and definitions adopted in taking the Dominion Census and the United States Census of Manufactures, and these were followed as closely as possible.

As in any consideration of these particulars questions will arise as to the basis on which they are made up, extracts from the Dominion Census and the United States Census bearing on these points are given on page 18. For the purpose of the present report the information was collected by mail by means of the circular letter and form of which copies are given on pages 19 and 20, and these were supplemented by personal explanation wherever such appeared necessary or desirable.

3. As stated in the preceding section, complete lists of power users and factories were first obtained from official sources and used as a mailing list.

The particulars obtained direct from the firms were then classified into factories, miscellaneous power users, office blocks, etc., as shown in the summary given in Table 27.

4. *Definition of Manufacturing Industry.* The more closely the details of product, horse-power used, labour employed, etc., are examined, the clearer it becomes that it is not easy to draw the line as to what is and what is not to be considered a manufacturing industry.

The Dominion Census of Manufatures, 1911, is stated to include all industrial establishments having five employees and over, and the United States Census of Manufactures, 1910, is stated to exclude establishments having a less value of product than $500 per annum, but neither take into account for classification purposes the amount of power used.

One of the principal objects of the present inquiry, however, is the amount of power used and the capital invested that is more or less dependent thereon.

Examination of actual cases shows that an industry employing less than five persons may use considerable power and represent considerable capital and value of product, also that a factory using but little power may represent considerable labour and capital.

On the basis of excluding factories employing less than five persons considerable interests would be left out of consideration as shown by a few sample cases in Table 3.

Table 3.—Typical examples of power used by interests in Winnipeg employing less than five persons.

Ref. No.	Nature of Business	Horse-Power.	Persons.	Capital Invested.	Gross Annual Receipts.
1	Cold storage	50	3	$50,000	$12,000
2	Grain elevator	15	3	20,000	60,000
3	Creamery	10	4	10,000	40,000
4	Coal and Wood	27	3	5,000	12,500

Similarly, factories using less than 5 horse-power may represent considerable interests as shown in Table 4.

Table 4.—Typical examples of manufacturing interests in Winnipeg using less than five horse-power.

Ref. No.	Nature of Business.	Horse-Power.	Employees.	Capital Invested.	Value of Product.
5	Glove manufacturer	4	45	$37,100	$100,000
6	Bread manufacturer	3	11	16,436	28,520
7	Clothing manufacturer	3	30	3,000	35,000
8	Engraving	4	9	5,000	8,000

Large amounts of power, and large interests, are represented by power users who cannot be included in any list of "industries," as shown in Table 5:

Table 5—Typical examples of interests using blocks of power and not classed as "industries."

	Connected Horse-Power.
Confederation Life Block	145
McIntyre Block	130
Union Bank Block	110
Somerset Block	100
Manitoba University	73
Manitoba Agricultural College	1,569
Kelvin Technical School	154
King Edward Hospital	158
King George Hospital	108

All the above tables are from actual cases in Greater Winnipeg.

5. After weighing the above considerations it appeared advisable to classify the power users according to the nature of the business.

Under "Factories," therefore, only businesses that are undoubtedly of a manufacturing nature are included, and even some of these when quite small are listed under "Miscellaneous."

Other power users are classified and listed under the headings shown in Table 27.

6. There were of course a proportion of cases in which no replies had been received at the time of completing the tables or in which the replies were incomplete.

The definite replies received covered, however, nearly 80 per cent. of the total horse-power employed.

As previously explained, the power users were classified under different classes or headings. All items of capital, labour, etc., definitely ascertained were then entered and added up and the average obtained for each class. The horse-power employed was known in every case from the sources stated on page 13, and each table was completed by taking the total horse-power not accounted for in each class and estimating the other factors of capital, labour, etc., pro-rata to the known horse-power on the average results shown for that class of power user.

As definite particulars were obtained of capital, labour, etc., for 80 per cent. of the total horse-power employed, the estimating of the remainder on the same basis probably gives a total that is very close to accurate. If for instance there was an error of even 10 per cent in estimating the capital for the 20 per cent. of horse-power for which particulars were not obtained this would be 10 per cent. on only 20 per cent. of the whole, or a possible error of 2 per cent. on the totals given.

TRADE EXPANSION COMMITTEE OF THE WINNIPEG INDUSTRIAL BUREAU.

Confidential and not for publication. To enable the Bureau to deal intelligently with all matters pertaining to Legislation, Extension of Trade, etc., the following information is necessary. The Committee will appreciate the favor of having the form below filled out and returned at once.

Confidential Enquiry Blank of Greater Winnipeg's present industrial position.

November 1st, 1914.

Name of firm

Location of factory Office

Average number of salaried employees: Male Female

Average monthly payroll.

Investment in Plant $

Capital employed $ Working Capital $

Estimated Annual Output $

Chief lines of manufacture. City where raw products are purchased:

Chief raw materials used:

Kinds of partially manufactured goods used: City where manufactured goods are used:

Remarks:

Table 6.—Definitions given in Canadian and United States Census of Manufacturers.

CANADA—CENSUS, 1910.	UNITED STATES—CENSUS, 1910.
CAPITAL.	**CAPITAL**
"The capital employed has been defined as: "1. Value of land, buildings and plant occupied by "the factory. "2. Amount of working capital employed, including "money borrowed to carry on factory operation. "It meant the capital for the census year and would "be practieally the capital for every year, as it often "happens that money is borrowed for carrying on fac-"tory operations."—Page VI.	"The instructions on the schedule for securing "capital were as follows: "The answer should show the total amount of "capital, both owned and borrowed, on the last day "of the business year reported. All the items of "fixed and live capital may be taken at the amounts "carried on the books. If land or buildings are "rented, that fact should be stated and no value "given. If a part of the land or buildings is owned, "the remainder being rented, that fact should be so "stated and only the value of the owned property "given. Do not include securities and loans repre-"senting investments in other enterprises."—Page 3.
SALARIES AND WAGES.	
Relate to all officers, managers or workers to whom employment was given during the year.—Page VI.	Statistics of number of proprietors and firm members and the number of salaried employees are based on the returns for a single representative day. In the case of wage earners the average of the number employed on the 15th of each month during the year were taken.—Page 3.
NUMBER OF INDUSTRIES	
No factory was recognized in the industries of flour and grist mills, saw and shingle mills, fish-curing plants, lime kilns, electric light and power plants, butter and cheese factories and brick and tile plants, when operated by less than five persons.—Page VII.	The census was confined to manufacturing establishments conducted under the factory system as distinguished from the neighborhood, hand and building industries . . . and does not include establishments which . . . had a value of products of less than $500, or the manufacturing done in educational, eleemosynary and penal institutions or in governmental establishments, except those of the federal government.—Page 2.
VALUE OF PRODUCTS.	
The above (under "Number of Industries") added $14,658,010 to the value of capital and $8,901,486 to the value of products, or a little over 1 per cent. of the value of capital and 1.52 per cent. of the value of products.—Page VII.	Selling value at the factory of all products manufactured.—Page 3.
PRIMARY HORSE-POWER.	
Not given for cities separately.	The total primary power generated plus the amount of power, principally electric, rented from other concerns. Does not include electric power developed by the primary power which would result in duplication.—Page 3.

DOMINION WATER POWER BRANCH.

231 Chambers of Commerce,

Winnipeg, Man.,

May 25, 1915.

SIR,—An inquiry will shortly be held by the International Joint Commission with reference to the matter of regulating the level of the Lake of the Woods. The decision will largely affect the amount of hydro-electric power available from the Winnipeg river and will thereby affect the interests of all users of that power.

The Dominion Water Power Branch of the Department of the Interior has carried out exhaustive investigations for several years on the physical features of the case with a view to conserving and developing the power to the utmost extent, and it is now desirous of obtaining information as to the amount of use that is at present being made of Winnipeg river power and the interests thereby represented.

You can greatly assist the Department in its investigations and your own interests by carefully filling in the enclosed form and returning the same as early as possible.

The particulars there given will be used for tabulation purposes only, and no names will be published.

It is of the utmost importance for the purpose of the above-mentioned inquiry that particulars of the Capital, etc., now involved in industries employing power generated by the Winnipeg river should be available and your careful attention to this matter will therefore be greatly appreciated.

Your obedient servant.

Dominion Water Power Branch,

H. E. M. KENSIT.

DO INION WATER POWER BRANCH.

(Garry 1397

231 Chambers of Commerce,

Winnipeg, Man.,

May 25, 1915.

Memorandum

The following particulars should cover the whole investment if the concern is a factory or industry depedent on hydro-electric power for the whole or part of the year.

Hydro-electric power in this connection means power purchased from the City of Winnipeg or the Winnipeg Electric Railawy Company.

If the business is not entirely manufacturing, as for instance if it handles goods to ..ich value is not added by manufacturing process, then the particulars should cover such portion of the business as may be considered dependent on hydro-electric power.

If an office block, hotel, etc., a figure should be given for the gross annual rental value of the premises.

In the case of institutions where there is no annual value or produc that item may be left blank.

Capital invested, including all bonds and loans but not value of rented premises..... $

Gross value of product at factory, per annum ..... $

or

Gross annual value of premises $

Persons engaged in the industry, including office staff and managers, average number

Total pay roll of the above, per annum $

Electric motors or other apparatus using purchased electric power. Total rated horse-power...

Brake horse-power of engines, if any. State whether steam, producer gas or and do not include electric apparatus driven by the engines.

Signature.. Dated .. 1915

Address..

COMPARISON WITH OTHER CITIES AS TO MANUFACTURING INDUSTRIES.

As a check on the figures obtained and shown for manufacturing industries in Greater Winnipeg, similar particulars were taken from the United States and Canadian Census for cities of as nearly as possible similar size to Winnipeg.

These are listed and compared with Winnipeg on Table 7.

In all other parts of this report only the industries dependent on hydro-electric power have been considered.

In the United States and Canadian Census of Manufactures, industries are of course included irrespective of the source of power.

For the purpose of Table 7, therefore, an estimate of Winnipeg industries operated by other than hydro-electric power has been added to the Winnipeg figures, this estimate being based on particulars of horse-power used and labour employed furnished by the Provincial Factory Inspector.

It will be noted that United States returns include only industries within the city limits. The particulars for Greater Winnipeg include industries outside the limits of the City of Winnipeg, but the population given also includes the whole district so that the comparison is fair in this respect.

It is probable that the United States and Canadian Census returns are more exhaustive than those for Greater Winnipeg, as the latter do not include industries using no power and many very small industries which have been classed under "Miscellaneous."

In considering this comparison it should be borne in mind that all the cities listed have the advantage of Winnipeg in that they are:

1. Surrounded by more densely populated districts.
2. Nearer to sources of a larger range of raw materials.
3. With the exception of Minneapolis, all located in the Eastern manufacturing district.

Table 7.—Manufacturing Data of Canadian and United States Cities.

Comparisons with Winnipeg.

From United States Census of Manufactures, 1910. Includes manufacture of gas, light and heat.

1. Cities.	2. Population, 1910.	3. Number of Industries.	4. Capital Invested.	5. Persons Engaged in Industries.	6. Salaries and Wages.	7. Value of Product per Annum.	8. Primary Horse-Power.	9. Horse-Power per Capita.
Cincinnati	364,500	2,184	$150,254,000	72,488	$43,860,000	$194,516,000	88,600	0 242
Indianapolis	233,700	855	76,497,000	37,929	23,051,000	126,522,000	50,900	0 218
Jersey City	267,800	745	79,794,000	30,239	18,265,000	128,775,000	35,900	0 134
Louisville	223,900	903	79,437,000	32,397	17,993,000	101,284,000	49,900	0 223
Minneapolis	301,400	1,102	90,382,000	33,923	21,915,000	165,405,000	89,300	0 296
Newark	347,500	1,858	154,233,000	69,986	44,853,000	202,511,000	78,300	0 226
New Orleans	229,100	848	56,934,000	20,938	11,260,000	78,794,000	38,158	0 112
Providence	224,300	1,080	118,512,000	51,667	30,099,000	120,241,000	56,400	0 250
Rochester	218,100	1,203	95,708,000	46,617	29,252,000	112,676,000	38,460	0 176
Average	280,033	1,198	$100,194,555	44,020	$26,727,555	$136,747,111	58,434	0 208
Greater Winnipeg, 1915	276,177	477	$ 72,369,560	23,097	$17,363,559	$ 94,142,232	60,673	0 220

MANUFACTURING DATA OF EASTERN CANADIAN CITIES.

Dominion Census Report, 1911.—Includes manufacture of gas light and heat and manufacture of electric light and power.

Montreal	470,480	1,104	$132,475,800	67,841	$34,270,835	$166,296,972		
Toronto	376,538	1,100	145,799,300	65,274	36,064,815	154,306,948		
Ottawa and Hull	105,284	234	29,879,178	12,150	6,028,501	28,183,632		
Hamilton	81,969	364	58,013,800	21,149	11,600,898	55,125,946		
Average	258,570	701	$ 91,542,019	41,603	$21,991,262	$100,978,374		
Greater Winnipeg, 1915	276,177	479	$ 73,958,676	23,257	$17,503,717	$ 94,403,347	82,673	0 295

Note—That figures for Winnipeg are for 1915, for other cities 1910 and 1911.
Figures for Winnipeg are not exhaustive for small industries, and do not include those in which no power is used.
The comparatively small number of "persons engaged" is probably due to absence of textile and similar factories, which employ large numbers of women and children.

The average of the figures shown in Table 7 are, for ready comparison retabulated in Table 8.

Bearing in mind how recently Winnipeg has entered the field as a manufacturing city, and that it is only since 1911 that cheap power has been available, the progress made may be fairly said to be remarkable. (See Plates 1 and 2.)

It will also be seen from the said Table 8 that the position of Winnipeg as a manufacturing centre now compares favourably with manufacturing cities of similar size in the United States and with the principal manufacturing cities in Canada.

In Table 9 the deductions from Table 8 are shown in the form of "Per Capita," etc., which enables ready comparison from this point of view.

The footnote to the said table, as to the basis of comparison, should be carefully read.

The following remarks on Table 9 should also be considered:

The comparatively low number of manufacturing employees in Winnipeg is probably due to there being at present no textile and similar industries that employ a large number of women and children.

The exceptionally high horse-power used in Winnipeg is probably largely due to the following cause. The very low price of hydro-electric power has led to its almost entirely supplanting individual fuel power plants in Winnipeg. In other cities where the cost of public electric power supply is high a large number of individual fuel power plants are maintained. In the case of individual fuel power plants the power is usually installed in one or two large units and the connected horse-power may be little if any greater than the peak load. In the case of electric equipment, however, the power is usually subdivided into a large number of separate motors, each with a margin of capacity; the aggregate rated or connected horse-power of the motors is therefore usually considerably in excess of the peak load of the individual works as a whole.

Table 8.—Summary of Table 7. Comparison of Manufacturing Data for United States and Canadian Cities.

	Average of Nine United States Cities, as per Table 7.	Average of Four Canadian Cities as per Table 7.	GREATER WINNIPEG, On Dominion Census Basis.
Population	280,000	258,570	276,177
Capital invested	$100,194,600	$ 91,542,019	$73,958,676
Industries or establishments	1,198	701	479
Persons engaged in industry	44,020	41,603	23,257
Salaries and wages	$ 26,727,600	$ 21,991,262	$17,503,717
Value of product	$136,747,100	$100,978,374	$94,403,347
Primary horse-power installed	58,434	...	82,673

Table 9.—Comparison per capita deduced from Table 7.

	Average of Nine United States Cities as per Table 7.	Average of Four Canadian Cities as per Table 7.	Greater Winnipeg.
Per Capita or Per Cent.—			
Capital invested, per capita	$ 357.00	$ 354 00	$ 267.00
Employees, per cent. of population	15.70	16 2	8.4
Salaries and wages, per capita	95.30	$ 85.00	$ 63.3
Value of products, per capita	$ 488.00	$ 390 00	$ 342.00
Horse-power installed, per capita	0.208	.....	0.295
Per Horse-Power Installed—			
Capital	$ 1,715.00	.....	$ 893.00
Employees	0.755	.....	0.282
Salaries and wages	$ 457.00	.....	$ 212 00
Value of product	$ 2,340.00	.....	$ 1,140.00
Per Establishment[1]—			
Capital	$ 83,800.00	$130,000.00	$154,000.00
Employees	36.8	59.4	48.6
Salaries and wages	$ 22,300 00	$ 31,300.00	$ 36,500.00
Value of product	$114,000.00	$143,000.00	$197,000.00
Horse-power installed	48.7	.....	173.00

[1] The United States Census does not include factories that have a less value of output than $500.00 per annum The Canadian Census does not include factories employing less than 5 persons. It would appear that "less than 5 persons" is a considerably higher standard than "less value of product than $500.00 per annum."
It appears, therefore, that the United States Census includes smaller industries than the Canadian Census, which would account for the apparent higher average "per establishment" in Canada. See also remarks on page 23

The installed or connected horse-power is therefore usually greater in the case of electric power than with fuel power.

The horse-power given in the tables is that installed (not the peak load), in order to put it on the same basis as the United States and Canadian Census.

It should be added that while the installed horse-power is usually greater with electric drive on account of the subdivision of the power as above shown, the resulting peak load is less on account of the greater efficiency secured.

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

PART III.

HYDRO-ELECTRIC UNDERTAKINGS

IN OPERATION OR PROJECTED

PART III.

HYDRO-ELECTRIC POWER UNDERTAKINGS.

WINNIPEG MUNICIPAL POWER PLANT.

HISTORY, FINANCIAL INVESTMENT AND PARTICULARS OF PLANT.

The City supplies electric light and power both inside and outside the City boundaries.

A detailed statement by the City is attached hereto as Appendix I.

The following is a condensed summary thereof:

CHRONOLOGICAL HISTORY.

In 1905 the price of electric light in Winnipeg was 20 cents per kilowatt-hour and of power 12½ cents.

The City was strongly desirous of obtaining lower rates and of attracting industries and undertook an investigation of power possibilities on the Winnipeg river in that and the following year.

1906. The engineers submitted a report recommending the Point du Bois site and estimating the cost of the initial development at $3,250,000. A by-law for this amount was authorized by the Provincial Legislature and passed by the citizens.

1911. Supply was commenced from such portion of the plant as was then completed.

1912. Base rates were fixed at 3⅓ cents for light and power, subject to discounts.

1913. The original installation was considered to be complete, capacity 26,000 horse-power.

1914. Three additional main units were installed, totalling 21,660 horse-power, and bringing up the total capacity to 47,660 horse-power. (One unit not yet ready for service.)

The results of operation to date according to information furnished by the City may be summarized as follows:

SUMMARY OF POSITION ON APRIL 30, 1915.

TOTAL CAPITAL EXPENDITURE			$7,339,538
BALANCE SHEET			
Total revenue from all sources			$976,854
Operating expenses			327,882
Gross balance			$648,972
Interest on funded debt	$310,253		
Less credit interest	4,727		
		$305,526	
Sinking fund and depreciation. (See page 72 of Appendix 1)		264,255	
			569,781
Net Surplus for Year 1914-15			$79,191
Total deficit at April 30, 1914			$81,917
Less surplus on operation 1914-1915			79,191
Deficit April 30, 1915			$2,726

On April, 1913, the total deficit on operation was **$142,275**. The operation for 1913-14 gave a net profit of **$60,222**, reducing the deficit to **$81,917**. The operation for 1914-15 gave a net profit of **$79,191**, further reducing the deficit to **$2,726** as above. This is more fully set out in the City's statement (Appendix I).

It therefore appears from the statements supplied by the City that for the last two years the City has made net profits of about **$70,000** per annum, though these have so far been absorbed in clearing off past deficits created in the early years of the undertaking.

The accounts are kept in the form provided by the Public Utilities Commission of Manitoba, which also fixes the depreciation to be allowed, and audits the books.

Return on investment. The foregoing balance sheet shows the following return on the investment of $7,339,538:

Gross balance			$648,972
Interest	4.16%	$305,526	
Sinking fund and depreciation	3.61%	264,255	
	7.77%		569,781
Net balance	1.07%		$79,191
Return on Capital	8.84%		

City of Winnipeg Light and Power Department Receiving Station for Hydro-Electric Power from Point du Bois Falls, Winnipeg River.

The total investment as above represents 47,660 turbine horse-power installed, or about $150 per horse-power installed. As the expenditure now made covers headworks and wheelpits for 8 additional units, aggregating

about 57,760 horse-power, the capital cost per horse-power installed will be very largely reduced when the development is completed. For details of investment see Appendix I.

Debentures. The total amount issued is $7,402,000, which realized $7,184,694, or 2.93 per cent. for discount and expenses. (See Appendix I.)

The general progress of the undertaking is shown in Table 10:

Table 10.—General Progress of Municipal Plant of City of Winnipeg.

	Plant Capacity in Horse-Power.	Peak Load in Horse-Power.	Number of Consumers.	Kilowatt Hours Generated.
1911-12	26,000	4,000	6,686	7,071,735
1912-13	26,000	15,600	21,724	39,071,750
1913-14	26,000	21,800	28,788	59,138,154
1914-15	47,660	25,400	32,953	70,743,274

PARTICULARS OF PLANT.

Location. The hydraulic works and generating station are located at Point du Bois, on the Winnipeg river, 77 miles east of Winnipeg. The power station is connected to the Canadian Pacific Railway at Lac du Bonnet by 27 miles of railway owned by the City.

Power. The normal head is 45 feet; the minimum low water flow under present conditions is 12,000 cubic feet per second, and the continuous power available with the present plant installed is 49,000 horse-power. The pondage of approximately seven square miles, with three feet draw down, will provide a further 27,600 horse-power for 24 hours.

Capacity. Installed 5 units of 5,200 horse-power . . . . . 47,660 H.P.
Headworks and Wheelpits provided for 8 units of about 7,220 horse-power . . . . . 57,760 H.P.

Ultimate capacity . . . . . 105,420 H.P.

Transmission. The three-phase 60-cycle 6600-volt current delivered by the generators is transformed up to 66,000 volts and transmitted to Winnipeg, 77 miles, on a double circuit steel tower transmission line built on a 100-foot private right of way.

POWER DEMAND AND CAPACITY.

The total connected load for light and power at March 31, 1915, was approximately . . . . . 82,500 H.P.

Table 11.—Peak Load and Plant Capacity of the Municipal Plant of the City of Winnipeg.

	Horse-Power at Generating Station, Point du Bois.	Horse-Power in the City.
Peak load, 1914	25,400	21,200
Peak load, 1915 (estimated)	29,200	24,000
Capacity of plant installed	47,660	39,600
Ultimate capacity for which headworks are provided	105,420	88,000

For fuller particulars see Appendix I.

THE WINNIPEG ELECTRIC RAILWAY COMPANY.

HISTORY, FINANCIAL INVESTMENT AND PARTICULARS OF PLANT.

This Company supplies electric light and power over a large area in and around Winnipeg in addition to operating the street and interurban railways.

A detailed statement by the Compay is attached hereto as Appendix II.

The following is a condensed summary thereof:

CHRONOLOGICAL HISTORY.

1880. The Manitoba Electric and Gas Light Company was incorporated and commenced operations.

1882. The Winnipeg Street Railway Company was incorporated, absorbed the above Company and operated the first horse-drawn street cars in Winnipeg.

1891. The Winnipeg Street Railway Company operated the first electric street cars in Winnipeg from a small steam plant.

1892. The Winnipeg *Electric* Street Railway Company was incorporated, was granted an exclusive franchise to operate electric street cars for 35 years (subject to the rights of the Winnipeg Street Railway Company), and started in opposition to the latter Company.

1894. The Winnipeg Electric Street Railway Company bought out the Winnipeg Street Railway Company.

Winnipeg Electric Railway Company, Power House on Pinawa Channel, Winnipeg River.

1900. The Company was opertaing 16 miles of street railway and supplying about 1,700 horse-power for electric light. This load was rapidly growing and has now increased to about 170 miles of street railway and 50,000 horse-power connected in electric light and motors.

1902. It was now evident to the Company that the growing load and increasing number of manufacturing industries necessitated more and cheaper power.

The Winnipeg General Power Company was therefore formed to investigate the possibility of obtaining power from the Winnipeg river. It came to the conclusion that that source would give a large saving in the cost of power.

1903. Construction commenced on a 30,000 horse-power hydro-electric plant on the Pinawa Channel.

1904. The Winnipeg General Power Company amalgamated with the Winnipeg Electric Street Railway Company under the name of the Winnipeg Electric Railway Company. This is the present company.

1905. Up to this time all electric light and power was supplied from a 5,000 horse-power steam plant on Assiniboine avenue.

1906. The supply of hydro-electric power was commenced in June. The base rate for electricity, which had hitherto been 20 cents per kilowatt hour for light and 12½ cents for power, was now reduced to 10 cents and 6 cents respectively.

1907. The hydro-electric plant was completed at a cost of approximately $3,055,000. The power therefrom is now distributed in the cities of Winnipeg and St. Boniface, the towns of Transcona, Stony Mountain and Stonewall, the rural municipalities of Fort Garry, Assiniboia, East Kildonan, West Kildonan, St. Andrews, St. Vital, St. Pauls and Rockwood, and is supplied in bulk to the municipality of West Selkirk, thus serving a population of over 250,000.

Negotiations are pending with other municipalities.

1911. Base rates were further reduced in September to 7½ cents for light and 3 cents per kilowatt hour for power, and in December to 3½ cents for light and 3 cents per kilowatt hour for power.

A new auxiliary steam turbine plant of 12,000 horse-power, capable of 50 per cent. overload, was constructed to supplement the water power.

1913. An electric storage battery was installed in the City with a capacity of 5,000 ampere hours; this is equivalent to about 3,800 horse-power for one hour, more or less, according to rate of discharge.

On account of the rapidly increasing demand for power the Winnipeg River Power Company was incorporated with power to acquire and operate water powers.

At this time the Company was supplying large blocks of power to the Ogilvie Flour Mills, the Western Canada Flour Mills, the Canada Cement Company, the Canadian Pacific Railway, the Canadian Northern Railway, etc.

1914. Under the charter of the Winnipeg River Power Company the Winnipeg Electric Railway Company actively proceeded with the preliminary steps to develop a hydro-electric power at Grand du Bonnet falls, acquiring sites, licenses and leases and expending considerable sums in engineering work and the construction of a 14-mile railroad from Lac du Bonnet to the site. This development will give an ultimate capacity of nearly 100,000 continuous 24-hour power at a cost of $6,000,000 to $7,000,000 (See Appendix II.)

Winnipeg Electric Railway Company, Interior of Power Station.

1915. At the present time the Company has invested in street railways and light and power supply $20,586,000 and has some 1870 employees, with an annual payroll of $1,432,500.

It has available, including steam reserve, some 44,500 horse-power, and a connected load of over 99,000 horse-power.

Table 12 illustrates the general progress of the Company:

Table 12.—General Progress of the Winnipeg Electric Railway Company

Year.	Plant Capacity in Horse-Power.	Passengers Carried.	Gross Receipts, including Light and Power.
1900	...	3,002,500	$ 286,132
1905	5,000	13,081,380	1,119,800
1907	27,500	21,080,000	1,722,400
1910	28,500	31,369,480	3,284,300
1911	40,500	40,281,200	3,829,800
1912	40,500	51,106,000	3,765,400
1913	40,500	59,563,800	4,078,700
1914	44,500	58,490,080	4,101,300

FINANCIAL INVESTMENT.

At December 31, 1914, the Company's investment stood as follows:

Winnipeg Electric Railway Company, Railway and Power and Light Supply	$18,475,440
Suburban Rapid Transit Company	551,418
Winnipeg, Selkirk and Lake Winnipeg Railway Company	1,559,116
	$20,585,974

On account of the overlapping of expenditures on the Street Railway and Light and Power Departments, the following must be considered as approximate only:

CAPITAL EXPENDITURE ON POWER AND LIGHT DEPARTMENTS.

General—	
Preliminary expenses, purchase of companies' office buildings, and general	$ 2,940,228
Hydro-electric plant	4,125,862
Steam plants and battery	1,589,116
Distribution system	2,133,576
	$10,788,782

Directors. The present directors of the Company are:

Sir Wm. Mackenzie	President
A. M. Nanton	Vice-President
F. Morton Morse	Secretary-Treasurer
Sir W. C. Van Horne	G. V. Hastings
Sir D. D. Mann	Hugh Sutherland
D. B. Hanna	R. J. Mackenzie

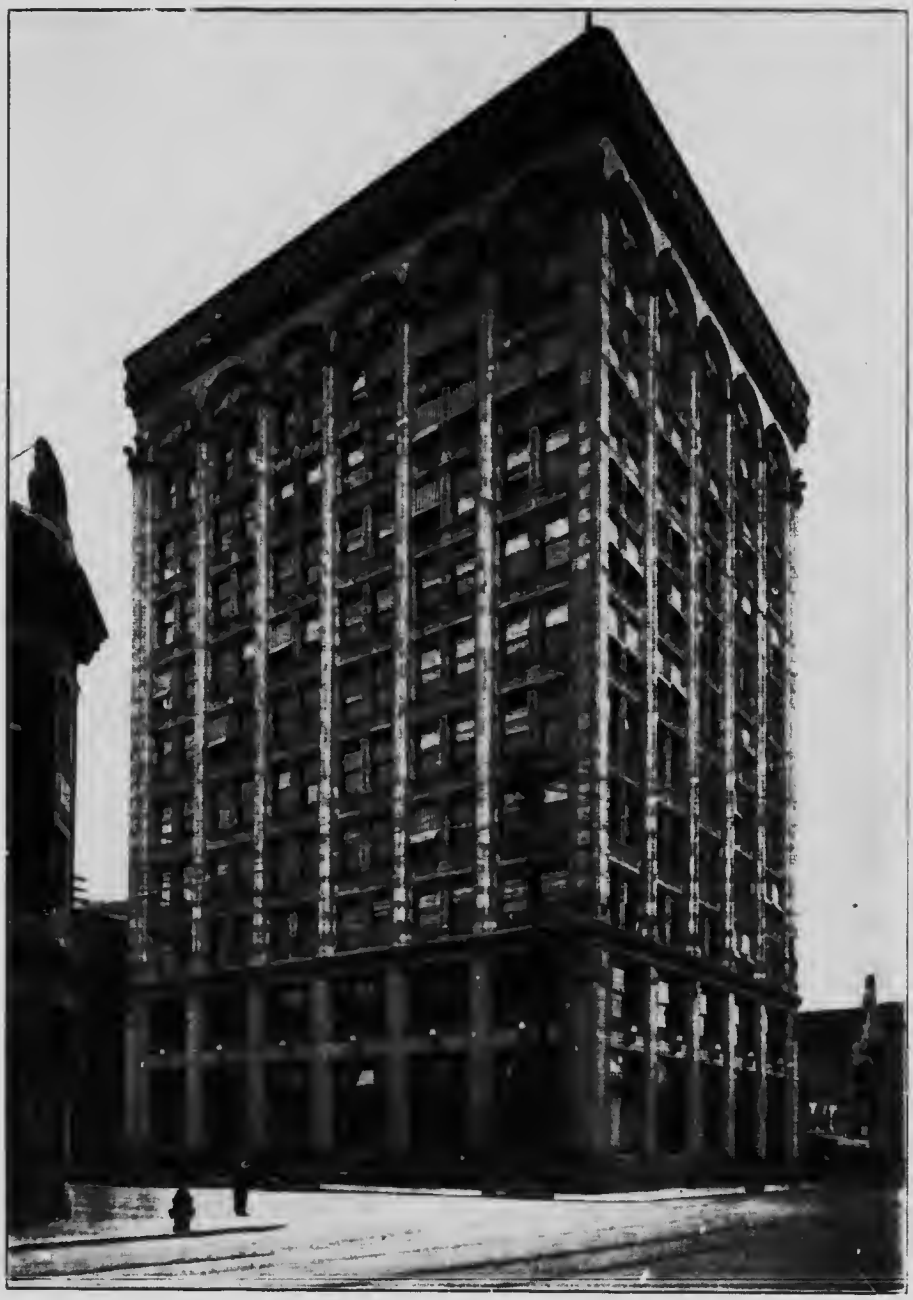
General Manager, Wilford Phillips.

PARTICULARS OF PLANT.

Hydro-Electric. The plant is located on the Pinawa channel of the Winnipeg river, 65 miles east of Winnipeg. The continuous power available is about 28,200 horse-power on the tubrine shafts.

The plant consists of five units of 4,144 horse-power each, and four units of 2,400 horse-power each, total 30,230 horse-power on the turbine shafts and two exciters of 200 horse-power each.

The energy is transmitted to Winnipeg at 66,000 volts over a double-circuit steel tower transmission line and distributed to the districts named in the foregoing history under the year 1907.



Winnipeg Electric Railway Company, City Offices, Electric Railway Chambers.

Steam Auxiliary Plants. There are two steam power plants in Winnipeg; that at Mill street has a capacity of 16,000 horse-power in steam turbines and that at Assiniboine avenue of 6,000 horse-power. At the Mill street station there is also an electric storage battery of 5,000 ampere hours' capacity to assist in meeting peak loads; this is equivalent to about 3,800 horse-power for one hour, or more or less, according to rate of discharge.

POWER DEMAND AND CAPACITY

The total connected load for light, power and street railways at March 31, 1915, was approximately	99,050 H.-P.
The peak load in the City in 1914 was:	
For Light and Power	23,600 H.-P.
For Street Railways	10,600 H.-P.
	34,200 H.-P.
The amount of power available in the City to meet this peak load is:	
Hydro-Electric	22,500 H.-P.
Steam	22,000 H.-P.
	44,500 H.-P.

but a part of this should be considered as reserve against temporary breakdowns of machinery.

The steam and storage battery plants were orginally intended only as a standby in case of accident to the hydro-electric plant.

Owing, however, to the growth of the light and power load and the heavy demand of the street railways under severe weather conditions, the whole of the steam and battery plants have at times had to be operated at full capacity, thus leaving no spare plant in reserve.

The necessity of both maintaining undiminished the power at the existing hydro-electric plant and of developing further hydro-electric power is therefore apparent.

For further particulars see Appenix II.

SELKIRK MUNICIPAL POWER PLANT.

The town of Selkirk possesses no hydro-electric plant, but is supplied with Winnipeg river power in bulk by the Winnipeg Electric Railway Company and itself carries out the distribution.

A few particulars will be given here for the reason that it is an interesting example of the benefit of the power to outlying municipalities.

This town is about 22 miles northeast of Winnipeg on the Canadian Pacific Railway and is also served by the Winnipeg, Selkirk and Lake Winnipeg Electric Railway Company. The present population is about 4,000.

In 1893 a private company installed a steam plant for electric light and commenced supply at 20 cents per kilowatt hour for general supply and

$2.50 per month per 16-candle power lamp for street lighting, giving a night service only.

The supply is stated to have been subject to frequent interruptions, and about 1908 the town endeavored to buy out the Company but could not agree on a price. Conditions became worse, and finally the Company shut down the plant on the ground that it could not be made to pay, with the result that during 1910 and part of 1911 the town was without electric light.

Eventually a contract was entered into to take a supply of hydro-electric energy from the above-named Electric Railway Company, the distribution to be carried out by the town. The contract provided for an initial amount of 100 horse-power at $30 per horse-power year on a 20-minute peak load basis.

The supply commenced November, 1911, giving a day and night service, and table 13 shows the results obtained by the introduction of the hydro-electric power:

Table 13.—Results Arising from the Introduction of Hydro-Electric Power into the Municipality of Selkirk.

	1910. Steam.	1912. Hydro-Electric.	1913.	1914.	1915. Est'd.
Population	.....	2,900	3,401	3,575	4,000
Capital expended	.....	28,125	34,918	43,112	.....
Connected load (horse-power)	125	250	400	700	.....
Consumers	71	150	230	390	415
Rate charged, base—					
Light	20	10	10	8	7 and 5
Power	.....	6	6	6	6 and 3
Heat	.....	.....	.....	2	2

The general manager, Mr. Robert Maurice, states in his annual report, dated February 19, 1915, as follows:

"You are aware that our method of business is to purchase electrical energy and in turn sell it at a profit. With this in mind I beg to call your attention to the fact that in 1912 we sold our energy for $3\frac{1}{2}$ times what we paid for it, in 1913 four times, and in 1914 five times the amount paid.

"It is gratifying to note that we had an increase of 11 per cent. on domestic lighting and 141 per cent. on commercial power over the previous year.

"In 1912 it cost us 6.5 cents per kilowatt hour to purchase and handle energy, in 1913 5.8, and in 1914 3.9 cents. Therefore we have reduced our handling and purchasing cost nearly 40 per cent. in three years.

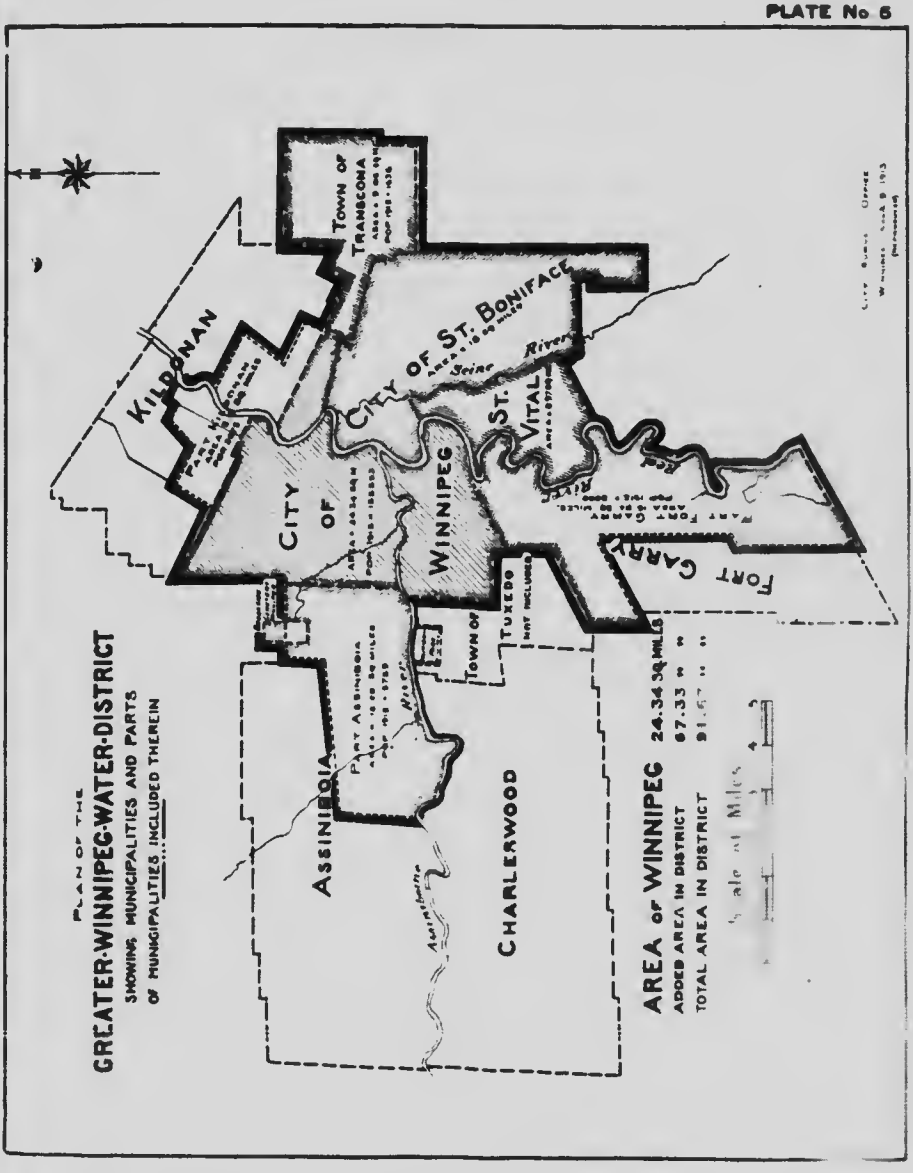
"A look into our financial statement will convince you that we can easily reduce the lighting rates for this year."

GREATER WINNIPEG WATER DISTRICT.

A considerable block of power will probably be eventually re[illegible] this undertaking.

A pumping station is under consideration at Red river and may be installed about 1920. The object would be to deliver the supply under pressure to the district west of Red river, including the city of Winnipeg, and the effect of such pumping would also, by the suction created, increase

PLATE No 6



the capacity of the portion of the conduit immediately east of the river. This would involve pumping fifty million gallons per day against a head of 160 feet and would require about 2,400 horse-power, equivalent to about 2,600 horse-power on the City Electrical Terminal Station.

The installation of a pumping station at Red river is, however, dependent upon further consideration of the advisability of a large pumping station at the main reservoir to be built later near Navin. The object of this would be to deliver the entire supply under pressure, thus rendering unnecessary any separate pumping plants operated by the various municipalities and increasing the capacity of the western portion of the conduit.

This pumping station would probably be divided into an initial and ultimate development.

The initial development would deal with fifty million gallons per day against a head of about 250 feet and would require about 3,760 horse-power at the pumping station or 4,050 at the City Electrical Terminal Station.

The final development would probably be designed to deal with eighty-five million gallons per day against a head of 300 feet and would require about 8,400 horse-power at the pumping station or 9,100 horse-power at the City Electrical Terminal Station.

Summing up the above:

1.	The Red river pumping station would require	2,600 H.P.
2.	The Reservoir pumping station would require:	
	For the initial development	4,050 H.P.
	For the ultimate development	9,100 H.P.

KENORA UNICIPAL UNDERTAKINGS.

The town of Kenora, population (500, is situated on the main line of the Canadian Pacific Railway and at the northerly end of the Lake of the Woods, 126 miles east of Winnipeg.

A detailed statement by the town, with tables of capital expenditure, etc., is attached hereto as Appendix III. This is short and not capable of much condensation. It should therefore be read in full.

The following points should, however, be drawn attention to:

HYDRO-ELECTRIC DEVELOPMENT.

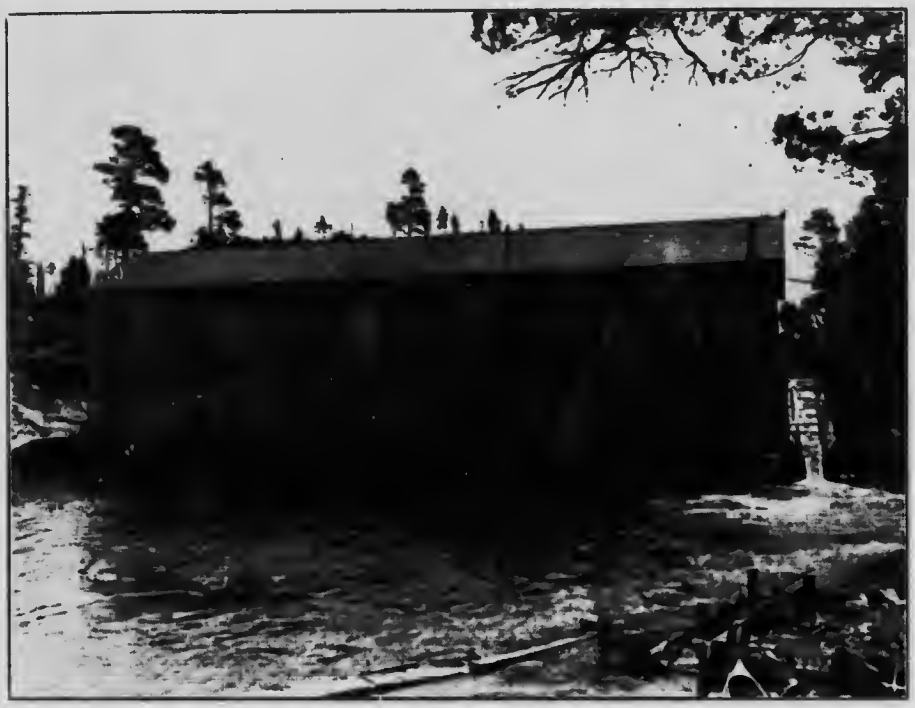
This is situated on the eastern outlet at the north-end of the Lake of the Woods. The present capacity is 3,600 horse-power and it is designed for an ultimate capacity of 5,800 horse-power

The load is distributed about as follows

General light and power supply	1,200 H.P
C P. Railway, repairs, roundhouse, etc	100 H.P
Village of Keewatin (3 miles west)	100 H.P
Homestake Mining Co. (6 miles out) .	200 H.P
Maple Leaf Milling Co	1,100 H.P
	2,700 H P

Financial Investment. The town first bought out the Citizens' Telephone & Electric Power Company, which operated a small development under lease, at a cost of $65,000, of which two-thirds, or $43,333, was considered chargeable against the power undertaking and the balance against the telephone system. The power development has been rebuilt and the telephone system replaced with modern equipment.

The land for an adequate development was acquired by expropriation. This led to legal actions, claiming for the value of the land as a hydro-



Kenora Power Station, View Looking Up-Stream.

electric site instead of as wild land. These actions resulted in awards of $80,000 for the value of the land, with costs against the town and interest on the awards for about six years. The total cost of water rights and land alone was thus brought up to $141,000

These two items, $141,000 and $43,333, total $184,333, account for nearly 30 per cent. of the entire cost of the light and power undertaking, and render the investment a heavy one for the size of the town.

The investment now stands as follows

Hydraulic Works and Power Plant	$554,035
Distributing System	67,314
	$621,349

or $173 per horse-power installed

Kenora Power Station, View Looking Down Stream.

Kenora Power Station, Interior.

This provides 3,600 horse-power but the expenditure covers headworks and bays for two further units of 900 horse-power each, which will bring up the capacity to 5,800 horse-power and reduce the cost per horse-power installed.

Other Utilities. The town owns and operates the Water Works and the Telephone System. Both these are operated solely by hydro-electric power and are as dependent upon it as the light and power supply. Furthermore the capital expenditure, to some extent, and the operating staffs and supervision, overlap so that it is difficult to separate them accurately. It is therefore felt that these utilities should be included with the light and power undetaking in a statement of the interests of the town of Kenora, dependent on Winnipeg River power.

The capital invested stands as follows:

Waterworks	$237,134
Telephone System	34,175
	$271,309

LAKE OF THE WOODS MILLING COMPANY, KEEWATIN, ONTARIO

A detailed statement by this Company is attached hereto as Appenix IV. The following is a brief summary thereof:

This Company owns and operates mills at Keewatin and Portage la Prairie and one hundred elevators through the Northwest.

As the mills at Keewatin are the only portion of the Company's property dependent on Winnipeg river power, they are the only portion herein considered.

Location. The mills are located on artificial outlets from the Lake of the Woods to Winnipeg river, near the town of Keewatin, and about $2\frac{1}{2}$ miles west of the eastern outlet of the lake.

Capital. The capital invested at Keewatin is $5,500,000, the number of employees 350 and the annual value of the product nearly $14,500,000.

Table 14.—General Particulars re Lake of the Woods Milling Company.

	Mill "A"	Mill "C"	Total
Operation commenced, year	1887	1905	
First development, horse-power	850	2,400	3,251
Present capacity in horse-power	3,395	2,400	5,795
Estimated requirements, 1,925 horse-power			6,795
Output in barrels per 24 hours	5,000	6,000	11,000
Capital invested at Keewatin			$ 5,500,000
Persons employed at Keewatin			350
Annual pay-roll at Keewatin			$ 175,860
Annual value of product			$14,291,800

Difficulties of Operation. Particular attention is called to the Company's statement as to effect of low water in the lake (Appendix IV) which is for convenience repeated here.

"The stage of water in the Lake of the Woods in the years 1910 and 1911 was unusually low, the gauge reading for October 18, 1911, being

Lake of the Woods Milling Company's Mills, Keewatin, Ontario.

at the extremely low stage of 95.0. During this period we were badly handicapped for power, having a head of only 15 feet. We could not operate the mills at more than half their capacity. On this account we were forced to temporarily lay off a number of our employees, which was a great hardship to them and a financial loss to the town. We are satisfied that it would be absolutely impossible to operate the mills here to advantage under a lower head than 20 feet, which we have at present."

Winnipeg River, Norman Dam Controlling Outlet Lake of the Woods.

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

PART IV.

GENERAL SUMMARY AS TO THE INTERESTS

REPRESENTED BY

CAPITAL, LABOUR, POWER, ETC.

EMPLOYED IN

GREATER WINNIPEG, KENORA AND KEEWATIN

AND

DEPENDENT ON OR AFFECTED BY THE SUPPLY OF WINNIPEG RIVER POWER

PART IV.

TOTAL INTERESTS DEPENDENT ON WINNIPEG RIVER POWER.

A previous chapter dealt with the industries dependent on Winnipeg river power.

In conclusion it was shown that:

1. Out of a population of about 276,000 only about 2,300 are users of power, and of that 2,300 only about 500 represent "Manufacturing Industries."

2. That practically all the 276,000 inhabitants of Greater Winnipeg and Selkirk are dependent on hydro-electric power for light, power, traction and water supply, and that, except as to traction, this also applies to Kenora and Keewatin. The total urban population served is approximately 288,000.

An examination of the interests involved in Winnipeg river power must therefore be carried further than a consideration of manufacturing industries or power users only.

The present connected load in Greater Winnipeg expressed in horse-power is given in Table 15. From which it will be seen that "power" alone, as distinguished from that for light, heat, and traction purposes, is little more than one-third of the total hydro-electric energy used, and also that the number of users is but a small proportion of the whole. There are of course also a large number of employees dependent on the "power" in addition to the 2,300 "users," but the same is also true of clerks, assistants, etc., dependent on the lighting of the premises in which they work. It must also be borne in mind that "lighting" represents not only domestic use, but the lighting of the whole of the streets and business premises of the City.

Table 15.—Present Connected Load in Greater Winnipeg.

	Connected Load in Horse-Power.	Per Cent. of Total.	Number of Users.
Electric power	66,740	36·6	2,280
Light and heat	65,900	36·2	46,200
Street railways	49,600	27·2	58,500,000 (per annum)
Total	182,240	100·0	

It is appropriate here to draw attention to the paragraph in a previous chapter, page 3, which shows that *since hydro-electric power became available at low rates in 1907 the use thereof has increased 513 per cent., while the population increased 102 per cent.* It must be admitted therefore that the use

of this power is intimately bound up with the development of the City, and that any change in conditions in this respect would affect nearly every citizen and the basis on which he does business.

Considering the position as above outlined it appears reasonable to say that the interests more or less affected by the supply of Winnipeg River power are practically the whole capital invested in the area supplied, a sum which even the entire assessment rolls would not fully represent.

To give some idea of what this amounts to, a tabulation is given (see Table 16) of the total assessments of the municipalities in which light, power and traction obtained from Winnipeg River power are now supplied. The districts surrounding Winnipeg in which supply is now given are shown on Plate 4.

Table 16.—Particulars of Rateable Assessments in Area of Supply.

Compiled from table issued by the Provincial Municipal Commissioner and dated January 1, 1915.

Municipality.	Description.	Population.	Assessment.
Assiniboia	Urban and Rural	10,288	$ 16,916,963
Charleswood	Rural	1,110	5,093,429
Fort Garry	Rural	1,480	12,500,367
Kildonan East	Urban and Rural	2,945	9,800,488
Kildonan West	Urban and Rural	2,633	9,013,118
Rockwood	Rural	3,944	2,246,980
Rosser	Rural	3,200	4,587,765
St. Andrews	Rural	2,077	1,256,927
St. Boniface	City	12,025	21,633,120
St. Paul	Rural	900	1,645,710
St. Vital	Urban and Rural	2,518	7,915,128
Selkirk	Town	3,581	3,186,515
Stonewall	Town	1,044	616,675
Transcona	Town	3,412	8,700,050
Tuxedo	Town	222	8,664,130
		51,439	$115,317,285
Winnipeg City		204,255	280,791,340
Winnipeg and District		254,594	$396,108,625
Kenora, Ont.	Town	5,319	3,335,215
Keewatin, Ont.	Village	1,365	711,745
Totals for present area of supply		261,278	$400,155,605

The figures in Table 16 include a proportion of the rural areas that are not actually supplied and which cannot be separated, but that proportion is small. Excluding all rural or partly urban and partly rural districts, the cities and towns alone account for 82 per cent. of the total shown.

This subject may be profitably pursued a little further, though it does not appear possible to arrive at an exact conclusion.

Take as an example the largest figure in the foregoing list of assessments, that of the City of Winnipeg. This includes only two-thirds of the value of improvements, so that to get the approximate capital value one-third more should be added.

Exemptions represent the capital invested in railways, institutions, etc., not otherwise included, and should be added.

The complete statement for Winnipeg may therefore be given as follows:

CITY OF WINNIPEG

TOTAL RATEABLE ASSESSMENT, 1914.

Land at full value	$199,082,890	
Improvements at two-thirds of value	81,708,450	
		$280,791,340
add one-third value of improvements		40,854,230

EXEMPTIONS (RAILWAYS, INSTITUTIONS, ETC.)

Land at full value	$ 28,253,670	
Improvements at two-thirds of value	15,899,600	
		44,153,270
Add one-third value of improvements.		7,949,800
Total value of assessable property		$373,748,640

The figure of $374,000,000, however, represents only the value of land and buildings. Land and buildings in many cases represent only a small percentage of the total capital invested in manufacturing industries but a large percentage in the case of residential property. If it is assumed that they average 50 per cent. of the total capital employed it would probably be conservative.

This would mean that 50 per cent. must be added to the above figure to get an approximate estimate of the capital represented and this would give:

Total value of land and buildings	$373,748,640
Add 50 per cent. as above for capital contained or dependent.	186,874,320
	$560,622,960
Net debenture debt of the City, representing capital expenditure	37,193,830
	$597,816,790

Referring back to the table of rateable assessments, it will be seen that the amount for the city of Winnipeg was $280,790,000, so that on the above basis the "value" represented is 113 per cent. greater than the assessment.

Applying the same percentage to the total of $400,156,000 for the purpose of a rough approximation we obtain:

Approximate capital invested in the area of supply..... $852,332,000

This is a big total but it probably underestimates the capital invested in the district.

The question now arises, this amount of capital might be affected, but to what extent could it be affected?

This can perhaps be best considered in the first place from the point

of view of what would be the extra cost to the community as a whole if the present cheap power were not available.

Winnipeg is at present in the enviable position of being supplied with light and power at rates as low if not lower than any other city in North America.

The steps in obtaining this cheap power are given in Tables 17 and 18

Table 17.—Base Rates in City of Winnipeg in Cents per Kilowatt Hour

	Light.	Power.
Previous to 1906, steam power	20	12½
1906—First hydro-electric power available	10	6
1911—Second hydro-electric power available	7½	3
1912—Both plants in full operation	3½	3½ or 3

Table 18.—Average Rate Received by the City of Winnipeg Light and Power Department.

Approximate.	Power
1914—Average rate paid by customers	2 01
1914—Average rate paid for all purposes	11

On the question that naturally arises, how the City can supply energy can be supplied at these rates without loss [illegible] condensed balance sheet of the City Light and [illegible] 27 and to the calculation as to return on the investment [illegible]

In most cities the charge for electric energy [illegible] sliding tariffs that depend on several factors and which are [illegible] complicated to express briefly, but the base rates for a few [illegible] possessing no special advantages in the way of cheap power may be given for comparison with the above. See Table 19.

Table 19.—Rates for Electric Light and Power 1914-15 in United States Cities.[1]

		Cents per Kilowatt-Hour.			Price of Coal[2]
		Light.		Power.	
		Residential.	Commercial		
Boston	Steam power	10	10	10 0	$3 80
Chicago	Steam and hydro	11	11	11 0	2 30
Detroit	Steam power	14	12	4 0	2 35
Duluth	Steam and hydro	6	6	4 5	
Jersey City, Newark	Steam power	10	10	10 0	3 00
Minneapolis	Steam and hydro	9	8	6 0	1 85
New York	Steam power	8	8	8 6	3
Portland, Ore.	Hydro power	9	9	7 0	
St. Louis	Steam and hydro	10	10	8 0	1
Salt Lake City	Hydro power	9	9	8 0	2
Worcester	Steam	9	9		4 20
Average		9 84	27	7 65	$2 89
Winnipeg, Man., hydro power		2 33	73	3 0	$5 76

[1] Many of these are on sliding scales and subject to discount.
So also are the Winnipeg rates, which in actual cases have worked out as low as about three-fourths of a c
[2] Price of coal in American cities from McGraw's electrical directory, 1914, representing cost to power stati

Particular attention is drawn to the fact that in Winnipeg it is the base or maximum rate that is 3⅛ cents per kilowatt hour, whereas in other large cities the average base rates are as shown from 9.54 to 7.65 cents

Table 20 from the United States Census of central electric light and power stations gives a summary of the rates charged in 30 cities of the United States in 1913 and 1914.

Table 20.—Average Rates for Central Station Service in Thirty United States Cities.

Installation.	Connected Load. Kilowatt.	Maximum Demand. Kilowatt.	Monthly Amount. Kilowatt-Hour.	Average Rates per Kilowatt-Hour. Cents.
Residence, large	3 0	2 2	127	9 1
Residence, small	0 6	0 5	27	9 4
Retail store, large	7 0	7 0	1,126	6 3
Retail store, small	0 5	0 5	67	8 1
Drug store	1 5	1 5	200	7 4
Saloon	1 5	1 5	377	6 4
Church	5 0	5 0	156	8 7
Industrial, 1 motor	1 5	2 0	109	6 6
" 2 motors	1 7	5 0	286	6 0
" 4 motors	10 4	10 0	244	6 7
" 8 motors	18 7	25 0	3,318	3 2
" 20 motors	59 7	50 0	4,180	3 5
Average of the above				6 78
Winnipeg, approximate average price to consumers				2 47

Table 20, it will be noted, gives the actual rates to both large and small consumers, and therefore averages lower than the previous table, 19, which give base or maximum rates.

In Canada the larger cities are supplied with hydro-electric power and in some cases there is competition between the municipality and a company. They cannot therefore in all cases be said to "possess no special advantages in the provision of cheap power," but the base or maximum rates for a few cities may be given here as of interest in this discussion. (See Table 21.)

Table 21.—Base Rates for Electric Light and Power 1914-15 in Canadian Cities.

	In Cents per Kilowatt-Hour.		
	Light.		Power.
	Residential.	Commercial.	
Toronto Electric Light Co	8		6 5
Toronto Hydro-Electric System	Floor		6 5
Hamilton Hydro-Electric System	Area	6	4 31
Guelph Hydro-Electric System	Charges	6	5 65[1]
Montreal L. H. & P. Co	8	8	6 25
Vancouver Br. Elec. Tr. Co	10	11	7 0
Saskatoon Municipality	9	9	6 0
Regina Municipality	7	7	
Edmonton Municipality	8	8	8 0
Average	8 3	7 8	7 82

[1] Worked out on basis of one kilowatt at five per cent. load factor as giving practically the base rate.

From the foregoing we may repeat the following in order to form a judgment as to the minimum base rates that would be likely to obtain in Winnipeg if special advantages in the way of hydro-electric power were not available.

Table 22.—Comparison of Base Rates and Price of Coal in Canadian and United States Cities.

	Base Rates. Cents per Kilowatt-Hour.			Price of Coal.
	Light.		Power.	
	Residential.	Commercial.		
Chicago (highest of cities listed), Table 19	11 00	11 00	11 00	$2 30
Average of 11 United States cities, Table 20	9 54	9 27	7 65	2 89
Average of 8 Canadian cities, Table 21	8 30	7 80	7.52	.....
Winnipeg, 1906. Steam power. Page 50	20 00	20 00	12.50	5.76

From a consideration of Tables 19, 20, 21 and 22 it appears reasonable to assume that without special advantages in connection with hydro-electric power the base rates for light and power in Winnipeg would not likely be less than 8 and 5 cents per kilowatt hour, respectively, and might be considerably more. This would be an average of 6.5 cents, or 3.17 cents above the present rate.

The present maximum rate of $3\frac{1}{3}$ cents per kilowatt hour produced a net average return of approximately 2.11 cents. An average maximum rate of 6.5 cents at the same ratio would give 4.33 cents.

In 1914 about 136,000,000 kilowatt hours were actually sold or used. *The difference in cost to the community would therefore stand as follows:*

136,000,000 kilowatt hours at 4.33 cents	$5,900,000
136,000,000 kilowatt hours at 2.11 cents	2,870,000
Extra annual cost	$3,030,000

Additional cost of 3.17 cents per kilowatt hour would therefore be equivalent to an extra cost of $3,030,000 per annum, which, capitalized at 5 per cent., represents $60,600,000.

Looked at in another way this sum of $3,030,000 would provide $2 per day for over 5,000 men or support a population of about 25,000 people.

From the above it will be seen that the present low rates for electric light and power in Winnipeg, compared with those obtaining in other large American and Canadian cities, represent an annual saving to the community of over $3,000,000.

This is at the present time, but this loss would increase year by year in proportion to the growth of population and demand for power.

From Table 1 it will be seen that the consumption of electric energy over the past 7 years has increased at the average rate of 7.3 per cent. per annum.

If for the purpose of the argument we assume only 10 per cent. per annum, in 10 years the extra cost to the community due to the high price of electric energy would be nearly $8,000,000 per annum.

The matter may now be looked at from the point of view of increased cost to individual consumers.

Assuming as before that the initial rates for light and power were 8 and 5 cents, respectively, *followed by a sliding scale* and discounts similar to those now in force, then the present net bills would be increased in the proportion of 8 to 3.33 and 5 to 3.33 respectively.

Table 23 is compiled from the actual consumption and accounts for one complete year of individual consumers in Winnipeg and shows the annual saving to such individual concerns.

Table 23.—Sample Yearly Accounts of Consumers in Winnipeg.

Ref. No.	Power.	Connected Horse-Power.	What They Would Pay at 8 and 5 Cents.	What They Actually Do Pay at 3½ Cents.	Annual Savings.	Present Rate in Cents per Kilowatt-Hour.	Equivalent Price per Horse-Power Year.
1	Department store [1]	590	$22,490	$11,994	$10,496	0 71	$20 30
2	Machine shops	3,000	21,800	14,500[2]	7,300	0 50	9 68
3	Malting company	325	10,250	6,834	3,416	0 77	21 00
4	Foundry	80	1,390	927	463	1 10	11 60
5	Plaster manufacturer	180	4,050	2,696	1,354	1 71	7 10
6	Motor company	205	7,250	4,821	2,429	1 27	23 50
	Average					1 34	$18 51
	Light.						
7	Hotel	34 2	$2,580	$1,080	$1,500	2 08	$31 50
8	Millinery and furs	35 0	2,380	984	1,397	2 12	28 00
9	Theatre	100 0	1,600	667	933	2 22	66 65
10	Hotel	38 7	2,390	996	1,394	2 12	25 80
11	Drug store	20 0	2,050	852	1,198	2 17	42 60
12	Clothing Store	10 0	1,300	540	760	2 30	54 00
	Average					2 17	$41 43
	Total Average					1 76	$28 48

[1] About 41.5 per cent light and 58.5 per cent. power all through the same meter at power rates.
[2] Supply taken 6 months in each year.

Table 23 shows the figures for some of the largest consumers. It will be seen that:

1. *The saving is very large*, going as high as $10,000 per annum on a single account.

2. *The price received is extremely low*, averaging for the consumers shown 1.76 cents per kilowatt hour and being equivalent to $28.48 per horse-power year.

These figures do not represent the average price obtained from both large and small consumers. The latter, as shown on page 50, is approximately 2.47 cents.

Table 23 however deals with large consumers for the purpose of showing how large a saving the present rates give in individual industries and that it would not be possible for such concerns to approach the present prices

by means of private fuel plants. The managers or owners of a number of concerns stated freely in conversation that their costs with steam power had been from two to three times the present cost with hydro-electric power.

The actual costs of steam power were obtained in detail for two cases where the plant was of several thousand horse-power, modern and economical, and operated at a good load factor, and where the costs had been carefully kept. (See Table 24.)

Table 24.—Cost per Horse-Power Year in Large Steam Plants in Winnipeg.

	Load Factor.		
	44 per Cent.	52 per Cent.	60 per Cent.
Case 1		$71 40	$99 50
Case 2	$139		

The high cost in the second case is due to operation for a considerable part of the time at very light load.

The average of the costs is $103 per horse-power year.

For smaller plants, of about 250 horse-power, a careful study of local conditions gives the results in Table 25 as about the lowest costs obtainable.

Table 25. Costs per Horse-Power Year in Steam Plants of 200 to 300 Horse-Power in Winnipeg.

	Load Factor.		
	25 per Cent.	50 per Cent.	75 per Cent.
Steam	$60 00	$100 00	$134 00
Producer Gas	47 00	77 50	108 00

For still smaller plants reference may be made to the "Report on Projected Hydro-Electric System for the Province of Manitoba" made by Judge H. A. Robson, K.C., Public Utilities Commissioner, to the Provincial Government dated February 3, 1914, which gives figures on the cost of steam and gasoline power.

These figures deal with the cost of power locally in small units, were prepared by Mr. W. E. Skinner, Consulting Engineer of Winnipeg, and are shown in full detail in the above quoted report.

They have been summarized in Table 26.

Table 26.—Costs per Horse-Power Year in Fuel Plants of 2 to 20 Horse-Power in Winnipeg. Ten Hour Use per Day.

	Size of Plant.			
	2 Horse-Power.	6 Horse-Power.	10 Horse-Power.	20 Horse-Power
Steam		$331 60	$238 25	$175 00
Gasoline	$397 50	216 60	168 45	112 85
	Per Horse-Power Hour in Cents.			
Steam		11 05	7 94	5 85
Gasoline	13 25	7 22	5 61	3 76

In the last example there is no electrical equipment, but if it is desired to compare the cost with that per kilowatt hour, in Winnipeg it must be borne in mind that the "kilowatt" is one-third greater that the "horse-power," and that the above prices per horse-power hour expressed as per kilowatt hour would therefore be about one-third greater.

As the foregoing discussion has turned largely on the cost of power two diagrams are given (see Plates 6 and 7) to show the relation between prices per kilowatt hour and the corresponding cost per horse-power year. It is assumed that the energy is used at steady full load. If it is desired to allow say 60 days per annum for Sundays and holidays, $16\frac{1}{2}$ per cent. must be deducted from the hours of use.

The point may be raised that, if so many other cities that have been quoted in other parts of this discussion, have grown and flourished without low-priced power, why should it be so necessary to Winnipeg.

The reply is that if other cities have not had a public supply of low-priced power they have usually had cheap fuel available so that manufacturers and others requiring large amounts of power were able to produce it in private plants at reasonable cost.

For instance, taking the list of representative American cities in Table 19 it will be seen that the average price of steam coal is $2.89 per ton as against $5 76 in Winnipeg, so that the cost of coal in Winnipeg is 100 per cent greater

In the principal Eastern Canadian cities Montreal, Toronto, Ottawa, London the average price of coal is $4 90, so that the price in Winnipeg is about 47 per cent above that in Eastern Canada

In Pacific Coast cities fuel oil has been obtainable at about 50 to 70 cents per barrel, and it is very extensively used, producing power for manufacturing purposes at less than 1 cent per kilowatt hour, including all fixed charges

Summing up the foregoing, it has been endeavored to show

1 That the total capital invested in urban districts dependent on Winnipeg river power is approximately $85 2,000,000 (Page 49)

PLATE No 6

PER K.W. HOUR TO PER H.P. YEAR

EQUIVALENT COST OF ELECTRIC ENERGY PER H.P YEAR
AT VARIOUS RATES PER KILOWATT HOUR
AND
VARIOUS HOURS OF USE PER DAY FOR 365 DAYS PER YEAR

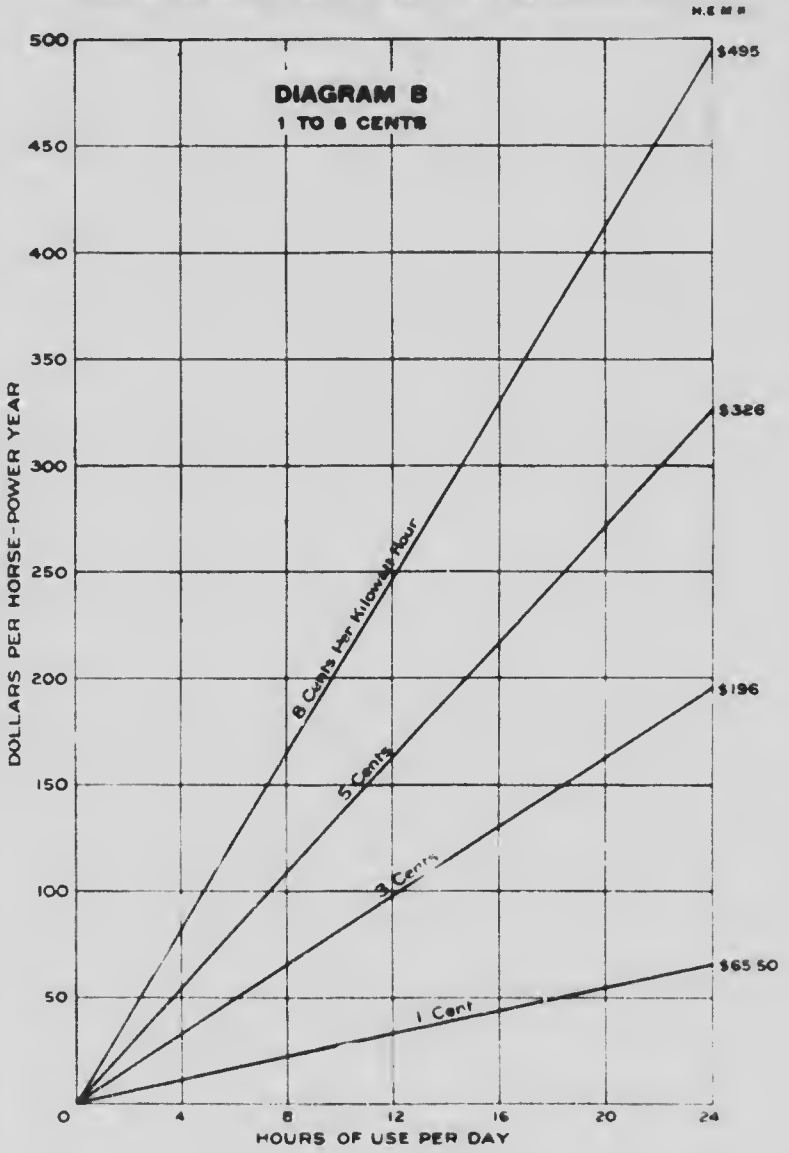
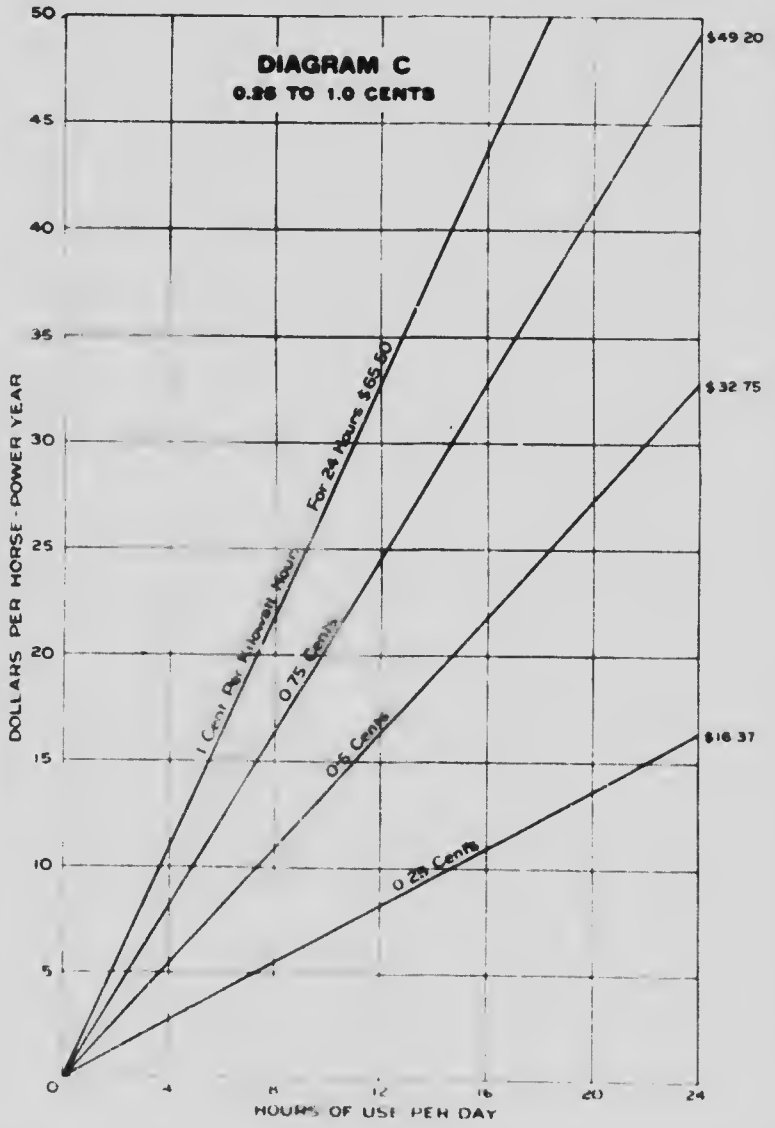


PLATE No 7

PER K.W. HOUR TO PER H.P. YEAR

EQUIVALENT COST OF ELECTRIC ENERGY PER H.P. YEAR
AT VARIOUS RATES PER KILOWATT HOUR
AND
VARIOUS HOURS OF USE PER DAY FOR 365 DAYS PER YEAR

M E M R



2. That the annual saving to the community at the present time from the supply of this power at very low rates is over $3,000,000 per annum and that this will become greater every year. (Page 52.)

3. That the annual saving to individual consumers runs as high as $10,000 per annum. (Page 53.)

4. That the cost of fuel power in Winnipeg is from two to four times as great as the cost of hydro-electric power. (Pages 54 and 55.)

5. That power users in Winnipeg cannot produce power from steam at reasonable cost because the cost of coal is 100 per cent. greater than the average in American cities and about 47 per cent. greater than in Eastern Canadian cities. (Page 55.)

SUMMARY OF DIRECT INTERESTS.

Herein are summarized lists showing the capital invested, labour employed, etc., in specified industries and specified localities. (See Tables 27 and 28.)

The detailed lists of which Tables 27 and 28 are the summaries, were prepared in the manner fully explained in Part 2 of this report.

Attention is also called to Table 31, which shows the large use of electric power in Winnipeg compared to other cities in Canada and the United States.

Table 27.—Capital, Labour, Power, etc., that are Employed in Greater Winnipeg Industries, etc., and that are Dependent on Winnipeg River Power.

1.	2.	3.	4.	5.	6.	7.	8.	9.
Number	Nature of Business	Capital Invested.	Persons Engaged.	Annual Pay-roll.	Value of Product.	Horse-Power Installed.		
						Hydro-Electric	Other.	Total.
3	Street railway, power and light	$ 20,586,000	1,866	$ 1,432,500	$ 4,101,300	28,200	22,000	50,200
1	Municipal power and light	7,219,000	300	351,900	976,854	47,660	.....	47,660
1	Municipal street lighting	405,000	32	35,000	80,540	.....	.....	.....
466	Factories	69,463,827	22,439	17,121,829	93,414,828	51,708	8,765	60,473
1,627	Miscellaneous power users	37,867,427	4,383	3,974,633	30,055,889	11,207	7,030	18,237
71	Office and apartment blocks	22,394,840	498	304,431	3,359,226	3,064	55	3,119
14	Hotels	6,191,500	858	505,466	2,322,983	875	610	1,485
9	Theatres	249,300	153	135,000	1,017,000	288	.....	288
38	Schools	4,944,069	85	84,310	.....	1,129	.....	1,129
2,230	*Totals*	$169,260,963	30,614	$ 23,945,069	$135,328,620	144,131	38,460	182,591
37	Institutions and churches	.....	.....	.....	.....	2,523	.....	2,523
46,200	Electric lighting and heat	.....	.....	.....	.....	65,879	.....	65,879
48,467	*Total power installed*	.....	.....	.....	.....	212,533	38,460	250,993

Note.—The figures in this table for "Factories" are lower than in Tables 1 and 7, because only factories using hydro-electric power are included herein.
It will be noted that "Capital Invested" does not include that representing "Institutions and Churches" nor that representing the use of electric light and heat for domestic purposes

Table 28.—Summary of Capital, Labour, Power, etc., Dependent on Winnipeg River Power.

1.	2.	3.	4.	5.	6.	7.	8.
District.	Capital Invested.	Persons Engaged in the Industry.	Total Annual Pay-roll.	Value of Product.	Horse-Power Installed.		
					Hydro-Electric.	Steam or Gas.	Total Horse-Power.
Greater Winnipeg.							
Street Railway Co.	$ 20,586,000	1,866	$ 1,432,500	$ 4,101,300	28,200	22,000	50,200
Municipal plant	7,624,000	332	386,900	1,057,394	47,660		47,660
Factories[1]	69,403,827	22,439	17,121,829	93,414,828	51,708	8,765	60,473
Other power users	71,647,136	5,977	5,003,840	36,755,098	16,563	7,695	24,258
Totals	$169,260,963	30,614	$23,945,069	$135,328,620	144,131	38,460	182,591
Selkirk.							
Municipal system	$ 43,110	4	$ 4,095	$ 19,730	700		700
Power users (Estd.)	375,000	210	160,000	202,600	447		447
Totals	$418,110	214	$164,095	$311,730	1,147		1,147
Kenora and Keewatin							
Municipal plants	$ 892,658	30	$ 24,980	$ 108,470	3,600		3,600
Power users	6,775,135	855	617,874	17,494,850	7,822		7,822
Norman dam	122,674						
Totals	$7,790,467	885	$642,804	$17,603,320	11,422		11,422
Grand Totals	$177,469,540[2]	31,713	$24,751,968	$153,243,670	156,700	38,460	195,160

Note—[1] These figures are lower than in Tables 1 and 7 because *they include only factories that are using hydro-electric power.*

[2] The above figures do not include the capital represented by institutions and by domestic lighting and heating, which accounts for an additional 65,879 horse-power in Winnipeg of connected load supplied by hydro-electric power. In this connection refer to remarks on pages 47 and 49 and table of rateable assessments on page 48.

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

PART V.

GENERAL PARTICULARS

OF

HYDRO-ELECTRIC SUPPLY IN GREATER WINNIPEG

USE OF ELECTRIC POWER IN WINNIPEG

COMPARED WITH OTHER LARGE CITIES

FUTURE DEMAND

FOR HYDRO-ELECTRIC POWER

PART V.

GENERAL PARTICULARS.

Table 29.—General Particulars of Hydro-Electric Supply in Greater Winnipeg in 1914.

Showing the combined figures for the City Light and Power Department and the Winnipeg Electric Railway Company (which also gives light and power supply.)

1.	Capital invested	$27,804,747
2.	Cash receipts (value of product)	5,081,300
3.	Annual pay-roll	1,784,400
4.	Employees (total)	2,166
5.	Capacity of plant, horse-power at works	97,860
6.	Capacity of plant, equivalent horse-power in city	85,960
	Connected Load in Horse-Power—	
7.	(a) Power	66,740
8	(b) Light and heat	65,879
9.	(c) Street railways	49,590
10.	(d) Total	182,209
11.	*Connected load per capita*, based on total load (10). (See footnote)	0.66
	Peak Load—	
12.	On power stations (horse-power)	64,300
13.	In the city (horse-power)	55,400
14.	*Peak Load per Capita—*	
	On power station load (12)	0.233
	On city load (13)	0.200
15.	Per cent. of peak load in the city to connected load	30.5
	Annual Load Factor (per cent)—	
16	(a) On peak load at plant	44.5
17.	(b) On plant installed	27.6
18.	Kilowatt hours generated	167,765,000
	Consumers, Number of—	
19.	(a) Power	2,283
20.	(b) Light and heat	46,200
21.	(c) Total	48,483

Population of Winnipeg taken at the figures given by Henderson Directories Limited, 276,177 for 1914.

Table 30.—Approximate Distribution of the use of Electric Power in Greater Winnipeg in Rated Horse-Power Connected, 1914.

Use of the Power.	Number.	Horse-Power.	Per Cent.	Remarks.
MOTORS.				
Factories	466	51,708	73.2	28 per cent. of the "Grand Total" of 186,263 horse-power connected.
Office and Apartment blocks	71	3,064	4.3	
Miscellaneous power users	1,627	11,207	15.7	Includes City Water Works.
Hotels	14	875	1.2	
Theatres	9	288	0.4	
Schools	38	1,129	1.6	
Institutions and churches	37	2,523	3.6	
Totals	2,262	70,794	100.0	
Motors (Power)	2,262	70,794	38.0	For all purposes.
Street railways	3	49,590	26.7	
Light and heat	46,200	65,879	35.3	
Grand Totals	48,465	186,263	100.0	
Motors and street railways	2,265	120,384	64.6	
Light and heat	46,200	65,879	35.5	
Grand Totals	48,465	186,263	100.0	

Not including Selkirk, which is supplied from the same system but is not within "Greater Winnipeg."

The result of the actual census of hydro-electric power installed came out a little higher than the total connected horse-power as given by the City and by the Street Railway Company.

USE OF ELECTRIC POWER IN WINNIPEG COMPARED WITH OTHER LARGE CITIES.

Table 31 shows the connected load, peak load and total electrical output in a number of large cities compared with Winnipeg.

From this table it will be seen that the supply of electric power is of at least as great importance to Winnipeg as to other cities of equal and greater size and standing.

In fact, it will be seen that out of 19 leading cities in the United States and Canada that are listed, only one shows a greater peak load per capita and none shows a greater *output* of electric energy per capita than Winnipeg.

The list of cities was not selected for this report, but all the cities for which full particulars were obtained were listed.

The particulars are offered as approximate, for the reason that while care has been taken to check them by correspondence and otherwise there may be unknown local conditions that could only be ascertained by visiting each city.

This high consumption in Winnipeg may be accounted for by:

1. The extremely low price of electric power in Winnipeg.
2. The high cost of coal and gas ($9.55 for Scranton nut to $5.25 for slack and $1.50 per 1,000 cubic feet for gas), whereas most, if not all, of the other cities listed have much cheaper coal available. (See Table 19.)

Where electricity costs as high as it does in many other cities (see Table 19), it means that there will be extensive use of gas and other illuminants and that many private fuel-operated plants will be maintained for the production of power, so that the central station load is smaller than it otherwise would be.

Cheap fuel and gas are not available in Winnipeg, and there is no present prospect that they will be, on account of the distance from sources of fuel. It therefore appears essential that abundant and low-priced hydro-electric power must continue to be available in the future, if the past progress and present position of Winnipeg as a manufacturing centre is to be maintained.

Other cities with the advantages of harbour facilities, or water transportation, adjacent to a great variety of raw materials, with dense populations and markets in their immediate neighborhood, cheap labour, etc., may progress without cheap power, but cheap power is undoubtedly of primary importance to the progress and prosperity of the city of Winnipeg.

Table 31 — Electric Central Station Load and Output in Canadian and United States Cities, Compared with Winnipeg.

A.	B.	C.	D.	E.		F.		G.		H.
	United States.	Population.		Connected Load in Kilowatts.		Peak Load in Kilowatts.		Output in Kilowatt-Hours Generated.		Figures Include:
		Census, 1910.	Est'd. 1914.	Total.	Per Cap.	Total.	Per Cap.	Total.	Per Cap.	
1	Atlanta, Ga.	154,839	199,740	88,000	0 440	44,320	0 222	145,684,803	730	Georgia Railway & Power Co.
2	Buffalo, N.Y.	423,715	457,900	137,872	0 310	67,424	0 147	302,220,107	660	Buffalo Gen. Elec. Co. and Cataract Power & Conduit Co.
3	Chicago, Ill.	2,185,283	2,436,000	852,000	0 350	344,500	0 142	1,280,962,600	527	C'wealth Edison Co., Street Railway Co's and Sanitary District.
4	Columbus, Ohio	181,548	213,900	49,309	0 230	19,471	0 091	70,283 250	329	Columbus Railway, P. & L. Co., and Municipal Dept.
5	Detroit, Mich.	465,766	583,000	.....	.....	87,800	0 150	329,395,900	565	Edison Ill'g Co. and Municipal Dept.
6	Louisville, Ky.	223,928	232,350	97,000	0 417	28,200	0 122	100,692,219	433	Louisville Gas & Elec. Co. and Street Railways.
7	Milwaukee, Wis.	373,857	420,000	.....	.....	46,924	0 112	170,889,000	406	Wisconsin Edison Co. and C'wealth Power Co.
8	Minneapolis and St. Paul	516,152	601,900	144,778	0 240	91,655	0 152	270,168,475	450	Minneapolis Gen. Elec. Co., Consumers Power Co. and Twin City Rapid Transit Co.
9	Nashville and Chattanooga	154,968	179,590	60,843	0 338	20,200	0 113	71,401,500	398	Nashville Railway and Light Co.
10	Philadelphia	1,549,008	1,671,000	202,086	0 121	82,078	0 049	275,711,745	165	Phil. Electric Co. and Street Railways.
11	Pittsburg	553,905	572,700	.....	.....	71,000	0 124	316,500,000	553	Duquesne Light Co. and Penn. Light & Power Co.
12	Portland, Ore.	207,214	314,000	.....	.....	47,775	0 152	199,166,000	634	Portland Rv. L. & P. Co. and N.W. Electric Co.
13	Providence, R.I.	224,326	249,000	82,060	0 330	39,700	0 160	113,286,600	455	Narragansett Elec. Lt. Co. and Rhode Island Co.
14	Rochester, N.Y.	218,149	248,000	68,177	0 274	29,813	0 120	123,850,785	500	Rochester Ry. & Light Co.
15	St. Louis, Mo.	687,029	740,400	.....	.....	92,176	0 125	319,151,753	430	Union Elec. Lt. & Power Co., The Elec. Co. of Missouri, United Rys. Co. and Laclede Gas Light Co.
16	Toledo, Ohio	168,497	187,250	60,315	0 322	23,965	0 128	91,996,426	491	Toledo Railways and Light Co.
	Canada.	Census, 1911.								
17	Montreal, Que.	470,480	570,500	222,000	0 384	65,000	0 113	300,003,000	520	Montreal Light, Heat and Power Co.
18	Toronto, Ont.	376,538	468,000	178,677	0 382	64,064	0 137	250,240,500	535	Elec. Lt. Co., St. Ry. Co. and Hydro-Electric System.
19	Vancouver, B.C.	100,401	186,400	61,290	0 330	34,300	0 184	124,884,565	668	B.C. Electric Traction Co.
20	Winnipeg, Man.	136,035	226,000	136,000	0 600	43,300	0 191	167,765,000	740	Winnipeg Electric Ry. Co. and City Light & Power Dept.

Notes—The above particulars were obtained by correspondence with the respective undertakings. Special care was taken to cover all sources of public electric supply for each city, including street and elevated railways; the figures are, therefore, believed to be substantially correct, but as the local conditions are not known in each case, the figures are only given as approximate. The electric load and output covers the city *and district* in every case. The figures per capita cannot be exact as the population in 1914 had to be estimated as below.

Column D—Estimated on basis of average annual increase shown by census returns for 1900 and 1910.

Item 20—For the above purpose the population of Winnipeg in 1914 is estimated on the same basis as the other cities. The 1914 population was estimated for assessment purposes at 203,255, so that the figure taken (226,000) is unfavorable to the city for the above purpose. The population of Greater Winnipeg in 1914 is estimated by Henderson Directories Ltd. at 276,177, but for the other cities only the population within the city limits is included, and Winnipeg is therefore taken on the same basis.

FUTURE DEMAND FOR WINNIPEG RIVER POWER.

It is within the scope of this report to consider what the demand for hydro-electric power may rise to in Greater Winnipeg within a reasonable time.

The total power capacity of the Winnipeg river is given in a report on the "Winnipeg River Power and Storage Investigations," Water Resources Paper No. 3 of the Dominion Water Power Branch, pages 258 and 259, as:

Regulated flow, 20,000 c.f.s.....418,000 H.P.
Unregulated flow, 12,000 c.f.s.....249,000 H.P.

This however represents 24-hour continuous power; that is the regulated flow would give 418,000 horse-power for 24 hours a day, 365 days a year, or in other words supply that amount of power on a 100 per cent. load factor. The load factor for the city as a whole is now 44.5 per cent. and may be assumed not to greatly exceed 50 per cent., so that with the water storage and pondage that can be made available *the capacity of the river with full regulation is equal to a peak load of double the above amount, or about 836,000 horse-power.*

Peak Load—In Table 29, item 12, it will be seen that *the total peak load* of Greater Winnipeg on the City and the Street Railway Company's power stations was *64,300 horse-power in 1914.*

From Table 1 it will be seen that from 1907 to 1914, the period over which records are available, the peak load increased 255 per cent. The average *annual* increase over the same period was 20.7 per cent.

(Note—Table 29 gives the peak load at the power stations, Table 1 the peak load in the city, the latter being less than the first by the loss in transmission.)

This rate of increase is probably greater than will be maintained and for the purpose of this estimate it will be assumed that the annual increase will be only 8 per cent.

Then at 8 per cent. increase per annum the load due to Greater Winnipeg alone will compare with the total peak load capacity of the river at the periods shown. (See Table 32.)

Table 32.—Comparison of Future Power Demand with Winnipeg River Power Supply.

	Number of Years from 1914.	Peak Load in Horse-Power.	
		Of Greater Winnipeg.	Total Capacity of the River.
Full regulated flow	33 years	815,830	838,000
Unregulated flow	26 years	475,630	498,000

The above estimates do not take into account the supply that may be required for general distribution in other parts of the Province, nor the

large demand that is likely to arise from the installation of pulp mills and other industries consuming large amounts of power.

It will therefore be seen that allowing only 8 per cent. increase per annum, the demand for power in Greater Winnipeg alone within the next 33 years will equal the total capacity of the river with full regulated flow.

CONCLUSION AND SUMMARY.

The foregoing report deals only with one phase of the Lake of the Woods Reference, i.e., that of the amount of hydro-electric power used and the capital, labour, etc., dependent on or affected thereby.

It will be concluded by a resume of the principal points that have been brought out in the foregoing pages:

1. *The population* of the area of hydro-electric supply is approximately—Greater Winnipeg 276,177, Selkirk 4,000, Kenora and Keewatin 6,684. Total, 286,681.

2. *The total capital* invested in the area is approximately $852,332,000. (Page 49.)

3. *The manufacturing industries* in Greater Winnipeg *alone* are as follows:

Number of factories	479
Capital invested	$73,959,000
Salaries and wages	17,504,000
Value of product per annum (Table 1)	94,404,000

Winnipeg ranked in 1910 as the fourth manufacturing city in Canada.

Winnipeg now compares favorably as a manufacturing city with other cities of similar size in both the United States and Canada. (Table 7.)

4. *The interests owning or using* Winnipeg river power but *excluding institutions and domestic supply* may be summarized as follows:

Capital invested	$177,470,000
Persons employed	31,713
Annual pay-roll	24,752,000
Value of product	153,244,000
Electric apparatus installed (Horse-power) (Table 28)	156,700

5. *The Total Connected Load* dependent on Winnipeg river power is—In Greater Winnipeg, 186,263 horse-power (page 63); in Kenora and Keewatin approximately 9,000. Total, 195,263 horse-power.

6. *Increase in Demand for Power*—From 1907, when hydro-electric power was first available, to 1914, the consumption increased 513 per cent. while the population increased 102 per cent. (Table 1 and Plate 1.)

7. *Increase in Manufactures*—From 1900 to 1915 the capital invested increased 1,480 per cent. and the value of product 1,770 per cent., the population increasing 446 per cent. (Table 1 and Plate 2.)

8. *Saving to the Community*—The present rates for light and power mean an annual saving to the community of over **$3,000,000**, which moreover will inerease yearly. (Page 52.)

9. *Hydro-Electric Power is Essential to Winnipeg* on account of the high eost of fuel. (Page 55.)

10. Winnipeg ranks as one of the greatest consumers of power per capita amongst the principal American and Canadian cities. (Table 31).

11. *Future Demand for Hydro-Electric Power*—The entire power available from Winnipeg river with full regulation will probably be required in Greater Winnipeg alone within the next thirty years. (Page 66.)

All of which is respectfully submitted.

H. E. M. KENSIT.

July 31, 1915.

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

APPENDIX I.

STATEMENT RE THE CITY OF WINNIPEG HYDRO-ELECTRIC POWER UNDERTAKINGS

DATED 1915

APPENDIX I.

WINNIPEG MUNICIPAL HYDRO-ELECTRIC POWER PLANT HISTORY, FINANCIAL INVESTMENT AND PARTICULARS OF PLANT.

CHRONOLOGICAL HISTORY OF THE DEVELOPMENT.

In 1905 the base rate for electric light in Winnipeg was 20 cents per kilowatt hour and of electric power 12.5 cents per kilowatt hour.

The City had for some years been fully alive to the necessity of attracting further manufacturing industries and of the importance of cheap power as a means to this end. Owing to the great distance from coal and oil fields the price of fuel was, and still is, very high, and the competition with other cities possessing cheap hydro-electric, fuel and natural gas power was felt to be very keen.

Application for reduction of the rates for electric light and power from existing sources were unsuccessful and the City then negotiated with many persons who offered to form companies to supply power in the City, but these offers involved the granting of franchises on terms that were not considered to be in the interests of the City. The best of these offers was $50.00 per horse-power year supplied for municipal purposes and with no restriction as to the price to be charged to the citizens.

The City then seriously considered the possibility of developing hydro-electric power itself, and the succeeding steps were as follows:

1905-1906. Examinations and surveys were made of several power sites on the Winnipeg river.

1906. The engineers submitted reports on several sites, recommended that at Point du Bois, and estimated the cost of the initial development at $3,250,000. The Provincial Legislature then empowered the City to submit a money by-law to the citizens to construct the power plant and distribute electricity, and a by-law for $3,250,000 of forty-year debentures was passed by a large majority.

Mr. Cecil B. Smith was retained to design and supervise construction in collaboration with a Board of Consulting Engineers consisting of Messrs. H. N. Ruttan, Louis A. Herdt, and William Kennedy, Jr.

The work then proceeded continuously.

1908. Mr. W. G. Chace was appointed resident engineer to continue the construction, and remained in charge till December, 1911.

1911. On October 15 the supply to Winnipeg was commenced from such part of the plant as was then completed and carried on continuously. The maximum load in December of this year was 2,700 kilowatts.

1912. The rates were fixed early in the year at $3\frac{1}{3}$ cents per kilowatt hour for lighting and for power, both rates being subject to discount for

payment within ten days and to further large discounts according to class of service and consumption. These rates are shown more fully on the attached schedules and diagrams.

1913. On April 30 the original installation was considered to be completed. As shown in greater detail under "Particulars of Plant," this gave a capacity of 26,000 horse-power.

By December of this year the load had reached 14,600 kilowatts, or at 92 per cent. efficiency, nearly 21,500 horse-power on the turbines, and it had been considered advisable to order three additional main units of plant.

On the second anniversary of commencing supply there were 25,600 consumers connected.

1914. The three additional main units were installed. The second transmission line was started, the footings for same being almost completed when war broke out and caused temporary cessation of the work. In December of this year the maxiumm load on the power station had risen to 17,100 kilowatts, or about 25,000 horse-power.

The net financial result of the second complete year's operation, after full payment for interest, sinking fund and depreciation, was a profit of $60,223.00. (See Table 35.)

1915. The three new main units were completed in February and showed by test that they developed 7,220 horse-power each at 80 per cent. gate opening, bringing up the total capacity of the generating plant installed to date to 46,660 horse-power.

The estimated maximum load for the year will be 29,200 horse-power at the generating station.

The growth of the undertaking is shown on Table 35.

FINANCIAL INVESTMENT.

On the following Table 33 is given a complete list of all the money by-laws that have been passed for the purpose of construction and development of the undertaking to March 15, 1915, and on Table No. 34 is shown the total expenditure to the same date.

For depreciation a levy is fixed by the Public Utilities Commissioner each year according to investments on the integral part of the plant, the rate being determined according to the life of the different structures. The total approximates 4 per cent. of the amount invested in property. Out of this is taken the sinking fund (about 1.83 per cent.), leaving ample provision to meet depreciation and obsolescence on all depreciable parts of the undertaking. This is in addition to expenditure on maintenance and repairs.

Table 33.—Approximations for City of Winnipeg Municipal Power Plant.

Date.	For What Use.	By-law.	Amount.	Period in Years.	Interest Per Cent.	Issued at Per Cent.	Net Amount Realized.	Issued in
1906	Hydro-electric	4138	$ 490,000	40	4	95 5	$ 467,950 00	England
1909	Hydro-electric	5509	900,000	31	4	100 0	883,884 51	England
1910	Hydro-electric	5885	850,000	30	4	103.0	859,031 51	England
1911	Hydro-electric	6412	950,000	35	4	100 0	929,969 77	England
1912	Hydro-electric	6969	60,000	34	4	98.0	57,604 80	England
1913	Hydro-electric	7525	500,000	40	4½	97 0	479,943 12	England
912	Distribution	6969	1,120,000	40	4	98 0	1,075,289 58	England
913	Distribution	7525	750,000	40	4½	97 0	719,914 69	England
913	Distribution	7525	700,000	40	4½	97.0	671,920 39	England
914	Distribution	8288	750,000	40	4½	98.0	716,872 08	England
110	Conduits	5885	50,000	30	4	103 0	50,531.28	England
111	Conduits	6412	80,000	32	4	100 0	78,313 24	England
112	Conduits	6969	20,000	32	4	98 0	19,201.58	England
112	Conduits	6969	72,000	32	4	98 0	69,125.76	England
114	Conduits	8288	110,000	32	4½	98.0	105,141.24	England
	Totals		$7,402,000				$7,184,694 00	

(Average discount and expenses on debentures, 2.93 per cent.)

Table 34.—Capital Expenditure on City of Winnipeg Municipal Power Plant to March, 1915.

Original Installation. Started Supply Oct., 1911; Completed April, 1913.	Hydraulic Works, Power Plant and Tramway.	Transmission and Telephone Lines and Receiving Stations.	Sub-Stations and Distribution System.	Total Cost.
Hydro-electric development and installation of five 5,200 horse-power units; total, 26,000 horsepower	$2,209,838	$1,015,892	$1,740,200	$4,965,930
Engineering	97,237	97,237	40,000	234,474
Interest during construction	73,675	33,869	58,013	165,557
Discount on debentures	34,173	17,087	74,795	126,055
Totals	$2,414,923	$1,164,085	$1,913,008	$5,492,016
Extensions to January, 1915.				
Three 7,220 horse-power units; total, 21,600 horse-power	$235,443	$228,190	$761,360	$1,224,993
Engineering	8,000	9,618	20,000	37,618
Interest during construction	7,850	7,608	25,381	40,839
Discount on debentures	10,028	10,028	61,207	81,263
Conduit system—capital expenditure	.....	.....	330,980	.....
Conduit system—interest during construction	.....	.....	11,038	342,018
Totals, 47,600 horse-power	$261,321	$255,444	$1,209,966	$1,726,731
Grand Totals	$2,678,244	$1,419,529	$3,122,974	$7,218,747

PARTICULARS OF PLANT.

Location—The hydraulic works and generating station are located at Point du Bois, on the Winnipeg river, 77 miles east of Winnipeg. The power station is connected to the Canadian Pacific Railway branch at terminus at Lac du Bonnet by 27 miles of standard gauge railway, and owned by the City at a cost of about $400,000, including equipment.

Hydraulic Works—The power station is of steel and concrete, forebay being formed by retaining walls and spillways and the entrance being controlled by a sluiceway headgate equipped with stoplogs. The elevation of the headwaters is controlled by two spillways, which, together with a rock dam, divert the water into the forebay.

The head varies from 45 to 48 feet, the normal head being considered to be 45 feet.

Power—The continuous power available on the average minimum flow of 12,000 cubic feet per second is 49,000 horse-power. The pondage of approximately 7 square miles, with three feet draw down (from 48 to 45 feet) will provide a further 27,600 horse-power for 24 hours.

Plant—The powerhouse building now covers 8 wheel pits, but 8 additional wheelpits are provided in the dam, all wheelpits for generator units being of identical size. The original installation, completed April, 1913, consisted of five 5,200 horse-power turbines, aggregate 26,000 horse-power and two exciter turbines of 400 horse-power each.

In 1914 three additional main turbines of *different design* to the orignal units were installed, and it has been shown by official tests that these will develop 7,220 horse-power each at 80 per cent. gate opening and 46 feet head. This gives a total capacity for the new units of 21,660 horse-power. The exciter units above referred to are of sufficient capacity to take care of the whole eight units now installed.

The total horse-power of turbines now installed is therefore:

First 5 main units	26,000 H.P.[1]
Next 3 main uni	21,660 H.P.
Two exciter units	800 H.P.
	48,460 H.P.

Considering however the ultimate capacity of the works, as above shown, headworks and wheelpits are provided for a further 8 units which it may be assumed will be equal in capacity to the last units instaled and will, therefore, aggregate 57,760 horse-power.

The total horse-power that may be installed at the municipal plant at Point du Bois is therefore:

Present Installation—		
8 main units	47,660	
2 exciter units	800	
		48,460 H.P.
Future Units, for which headworks and wheelpits are provided—		
8 main units	57,760	
2 exciter units	1,000	
		58,760 H.P.
Ultimate horse-power of plant		107,220 H.P.

The city has at present no steam or other fuel plant in reserve with the exception of a small steam plant at one of the pumping stations, which amounts to only 1,500 kilowatts.

[1] The maker's rating of these sets was 5,200 horse-power each, this being taken as the maximum output without overheating at the nominal operating load factor. It has since been found that owing to the improved conditions of operation now obtaining with the synchronous condensers that have been installed the power factor at the power house has been improved so that these machines can be loaded up to 6,000 horse-power without injurious heating.

The above figures show the horse-power of turbines. The loss in generators is 4 per cent. and in transformation and transmission about 13 per cent., so that the present installation as shown would be equivalent to about 39,600 horse-power at the terminal station available for distribution (in which there is a further 13 per cent. loss), and the ultimate installation to a little less than 88,800 horse-power.

Transmission—The three-phase, 60-cycle, 6600-volt current delivered by the generators is transformed up to 66,000 volts for transmission to Winnipeg, 77 miles, on a single line of steel towers carrying two circuits of aluminum conductors with a total capacity of 42,800 horse-power.

A private right-of-way provides space to install a second transmission line of steel towers to carry two circuits of 110,000 volts when necessary.

The Terminal Receiving Station is on the west bank of the Red river near the eastern boundary of the city. The pressure is here stepped down to 12,000 volts for distribution to sub-stations in lead covered cables laid in conduits. Three main substations are now in use in the City, and one in Transcona, a town of 7,000 population, 7 miles east of Winnipeg.

Distribution to Consumers from the substations is by underground conduits in the principal down town streets and by overhead lines on wood poles in all other localities.

Direct current power is distributed in the business district mainly for operating elevators. Alternating current for both power and lighting is available at all parts of the distributing system.

Table 35.—General Particulars re City of Winnipeg Municipal Power Plant. Plant Commenced Operating October 15, 1911.

Financial—Year Ending April 30.	1911-12.	1912-13.	1913-14.	1914-15.
Total investment	.....	$6,143,693	$6,724,373	$7,339,538
Total revenue	$ 68,534	544,736	865,805	976,854
Total expenses	127,376	628,169	805,583	897,628
Net financial result for the year, plus or minus	−58,842	−83,433	+60,222	+79,226
Total deficit to date	58,842	142,275	82,053	2,726
Technical—Capacity of Plant Installed—				
Turbines, maximum continuous capacity (horse-power)	26,000	26,000	26,000	47,660
Generators, capacity at 96 per cent. efficiency (kilowatts)	18,600	18,600	18,600	34,000
Peak load at power station in kilowatts	2,700	10,500	14,600	17,100
Number of consumers	6,686	21,724	28,788	32,953
Kilowatt hours generated	7,071,735	39,071,750	59,138,154	70,743,274

Connected Load to 1st March, 1915—		
Power	34,297	horse-power
House and street lighting	46,319	horse-power
Heating and cooking	1,900	horse-power
	82,516	horse-power
Total Payroll, 1914-15	$351,900	
Employees, average	300	

Approximate average price received from consumers, 1914, per kilowatt hour—
Light, 2.93; power (A.C.), 1.87; (D.C.), 3.28 cents. Mean rate for power, 2.01 cents.

COMMENTS.

It is important to emphasize the fact that the figures showing the total expenses of the plant for the year include the cost of keeping and auditing the books, the salary of every official and employee connected with every

branch of generation and distribution, and also all financial expenses such as interest on floating debt, fiscal agents' commission, etc., etc. The details of all these items can be found in the yearly balance sheet of the undertaking which is issued by the City.

The importance of cheap power to the City of Winnipeg cannot be overstated. Winnipeg depends entirely on electric power for the operation of its civic utilities, viz., the water works system, the street lighting system, asphalt plant for street paving, machine shops, sand pits, quarries, etc.

Although at the present time there is a small steam plant at the water works, now only used as a stand-by, it is not nearly large enough to take care of the present water works demand, and no portion would be available for purposes other than pumping in the event of accident to the hydro-electric power.

Looking into the future, there is no doubt that the power required by the City for its utilities will increase. This will be due to the natural increase in the demand by the public for light and power with the growth of the City, to the extension of street lighting, the provision of a sewage disposal system and the extension of the water works plant.

The Greater Winnipeg water district will also require some 3,000 horse-power for distribution of the soft water supply which is shortly to be brought into Winnipeg. They intend to use city power and will not install any steam stand-by plant.

Electric power is also practically entirely used in the manufacturing of various products throughout Winnipeg. In addition to the large number of smaller manufacturers there are several large firms supplied from the City plant, viz., the Canadian Pacific Railway shops; the Grand Trunk Pacific shops; the Dominion Bridge works; the Swift Canadian Co. packing plant, all of which would be put to considerable extra expense if hydro-electric power was not available.

Owing to the distance which Winnipeg is from the coal fields and the high price of coal laid down in Winnipeg, it would be impossible to supply power manufactured from steam generating plant at anything like the present prices at which hydro-electric power is supplied.

Any increase in the price of hydro-electric power would mean serious inconvenience and loss to both large and small manufacturers and the effect on the City would be decrease of employment and a heavy handicap on its future growth and prosperity.

When one considers the geographical position of Winnipeg and its distance from any natural resources other than water power, it is obvious that a restriction of this power would be a great hardship for the City and would put it at a great disadvantage over other cities more favorably situated.

(Signed) JOHN G. GLASSCO,
Manager.

Winnipeg, July 31, 1915.

CITY OF WINNIPEG.

CITY LIGHT AND POWER DEPARTMENT.

RATES

SCHEDULE A—COMMERCIAL LIGHTING.

(Subject to wholesale discounts.)

Rate—$3\frac{1}{3}$ cents per Kilowatt Hour.

Minimum Monthly Payments—Subject to a net Minimum Monthly Payment of One Dollar per Kilowatt of total connected load, but in no case less than One Dollar net per month per meter.

Prompt Payment Discounts—1 year contract, 10 per cent.; 3 year contract, 15 per cent.; 5 year contract, 20 per cent.

Wholesale Discounts—Apply on gross bills over $25.00 per month.

For the first	$25.00	per month	consumption		No discount
" second	25.00	"	"	excess over $ 25.00	20 per cent.
" next	50.00	"	"	" 50.00	25 per cent.
" next	50.00	"	"	" 100.00	30 per cent.
" next	50.00	"	"	" 150.00	35 per cent.
" next	50.00	"	"	" 200.00	40 per cent.
From $250.00 to	500.00	"	"	" 250.00	50 per cent.
Excess over	500.00	"	"		60 per cent.

SCHEDULE B—RESIDENCE LIGHTING.

Rate—$3\frac{1}{3}$ cents per Kilowatt Hour.

Minimum Monthly Payments—Subject to a net Minimum Monthly Payment of Fifty Cents per meter.

Prompt Payment Discount—10 per cent. on bills paid within ten days from date of bill.

SCHEDULE C—ALTERNATING CURRENT POWER.

(Subject to wholesale discounts.)

The first	50	hours use	per month	of total connected load	@ 3 $\frac{1}{3}$ cents per kilowatt hour
next	50	"	"	"	@ 2 5 " "
" "	50	"	"	"	@ 1 9 " "
" "	50	"	"	"	@ 1 4 " "
" "	50	"	"	"	@ 1 1 " "
Excess over	250	"	"	"	@ 0 8 " "

Minimum Monthly Payments—Subject to a net Minimum Monthly Payment of Seventy-five Cents per Horse-Power of total connected load, but in no case less than One Dollar net per month per meter.

Prompt Payment Discounts—1 year contract, 10 per cent.; 3 year contract 15 per cent.; 5 year contract, 20 per cent.

Wholesale Discounts—Apply on gross bills of over $100.00 per month.

For the first	$100.00	per month	consumption		No discount
" second	100.00	"	"	excess over $100.00	10 per cent.
" third	100.00	"	"	" 200.00	20 per cent.
" fourth	100.00	"	"	" 300.00	30 per cent.
" fifth	100.00	"	"	" 400.00	40 per cent.
From $500 to	1,000.00	"	"	" 500.00	50 per cent.
Excess over	1,000.00	"	"		60 per cent.

Schedule D—Sign and Outline Lighting.

Prompt Payment Discount—1 year contract, 10 per cent.

Schedule E—Domestic Heating.

Requiring Separate Meter.

Rate—1 cent per Kilowatt Hour.

Subject to a net Minimum Monthly Payment of Seventy-five Cents per Kilowatt of total connected load, but in no case less than 75 cents net per month per meter.

Prompt Payment Discount—10 per cent. on Bills paid within ten days from date of Bill.

Schedule F—Direct Current Power.

The first		50	hours use per month of total connected load				@ 3.½	cents per kilowatt hour	
"	next	50	"	"	"	"	@ 2.5	"	"
"	"	50	"	"	"	"	@ 1.9	"	"
"	"	50	"	"	"	"	@ 1.4	"	"
"	"	50	"	"	"	"	@ 1.1	"	"
Excess over		250	"	"	"	"	@ 0.8	"	"

Minimum Monthly Payments—Subject to a net Minimum Monthly Payment of Seventy-five Cents per Horse-Power of total connected load, but in no case less than One Dollar net per month per meter.

Prompt Payment Discounts—1 year contract, 10 per cent.; 3 year contract 15 per cent.; 5 year contract, 20 per cent.

PLATE No. 8

CITY OF WINNIPEG LIGHT AND POWER DEPARTMENT

SCHEDULE C

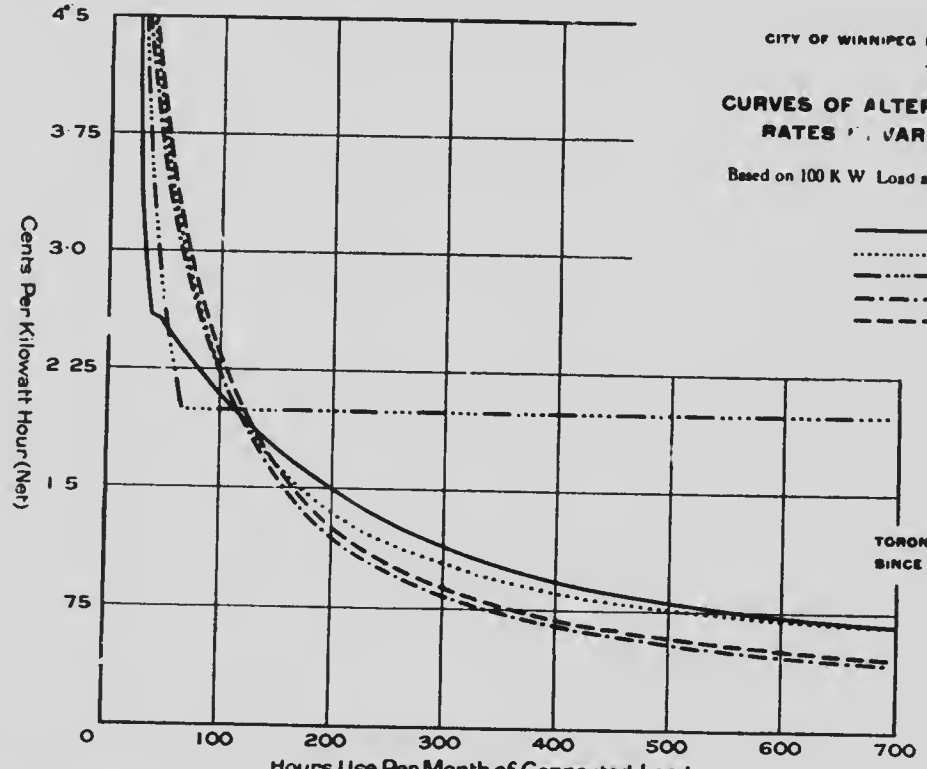
ALTERNATING CURRENT POWER RATE, NET

Charges based on a five-year contract with 20% Prompt Payment Discount

CITY OF WINNIPEG LIGHT AND POWER DEPARTMENT

CURVES OF ALTERNATING CURRENT POWER RATES IN VARIOUS CANADIAN CITIES

Based on 100 K W Load and Unrestricted 24-hour Service net rate



TORONTO RATES HAVE BEEN REDUCED SINCE THIS DIAGRAM WAS MADE

PLATE No 9

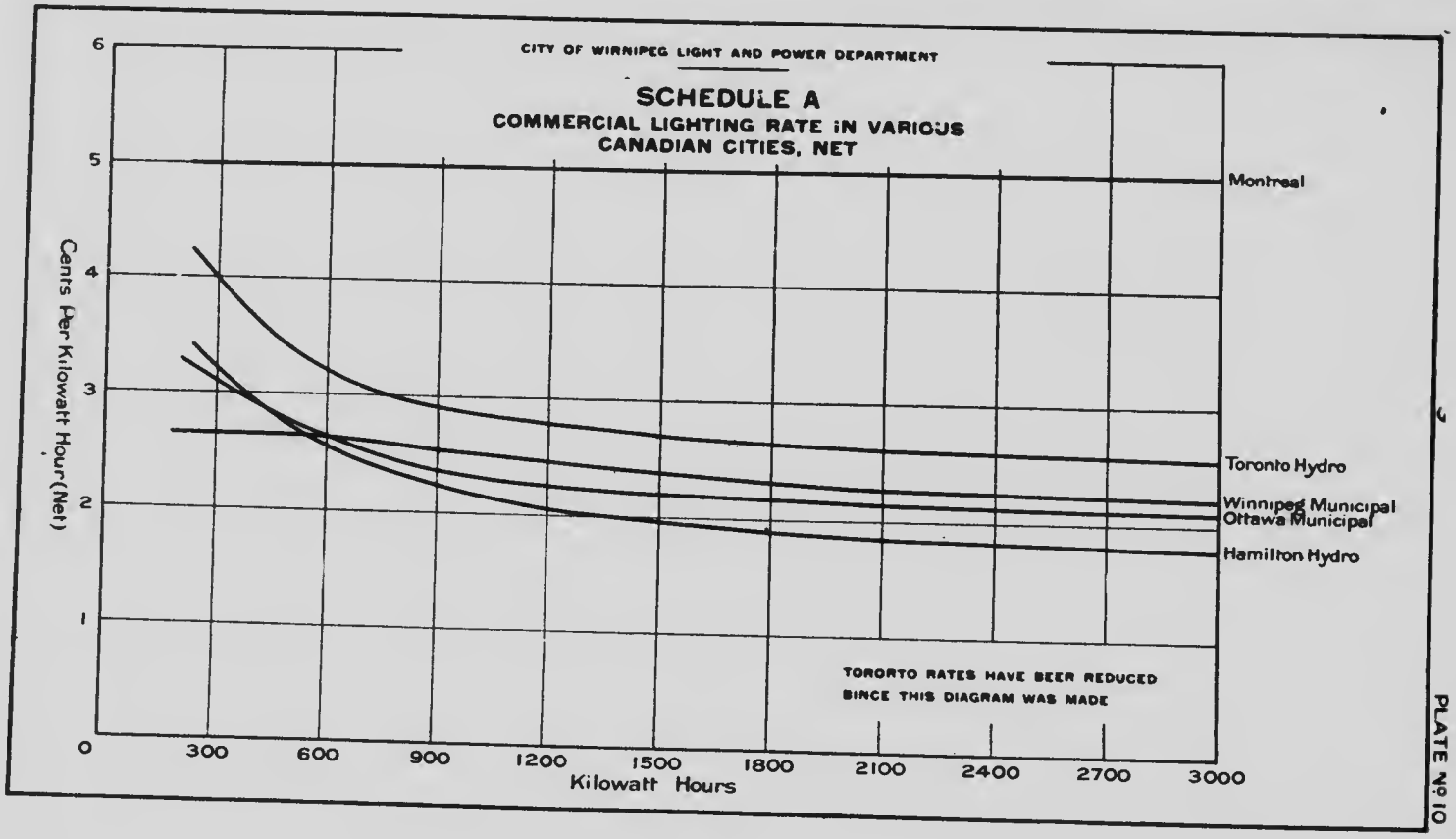

CITY OF WINNIPEG LIGHT AND POWER DEPARTMENT
SCHEDULE A
COMMERCIAL LIGHTING RATE IN VARIOUS CANADIAN CITIES, NET
Cents Per Kilowatt Hour (Net)
0
1
2
3
4
5
6
300
600
900
1200
1500
1800
2100
2400
2700
3000
Kilowatt Hours
Montreal
Toronto Hydro
Winnipeg Municipal
Ottawa Municipal
Hamilton Hydro
TORONTO RATES HAVE BEEN REDUCED SINCE THIS DIAGRAM WAS MADE

PLATE No. 10

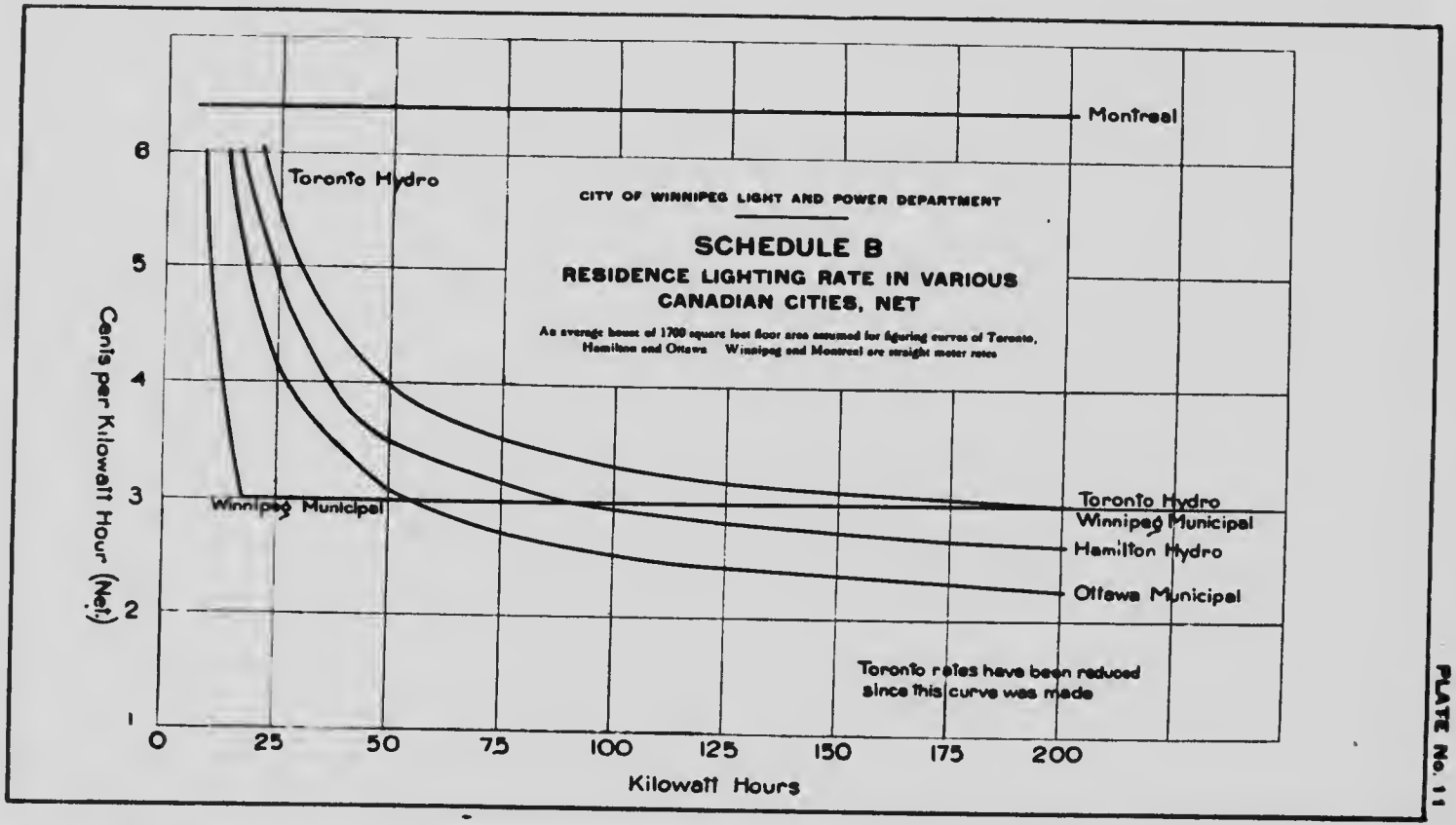

CITY OF WINNIPEG LIGHT AND POWER DEPARTMENT
SCHEDULE B
RESIDENCE LIGHTING RATE IN VARIOUS CANADIAN CITIES, NET
An average house of 1700 square foot floor area assumed for figuring curves of Toronto, Hamilton and Ottawa Winnipeg and Montreal are straight meter rates
Montreal
Toronto Hydro
Winnipeg Municipal
Toronto Hydro
Winnipeg Municipal
Hamilton Hydro
Ottawa Municipal
Toronto rates have been reduced since this curve was made
Cents per Kilowatt Hour (Net)
Kilowatt Hours
0
25
50
75
100
125
150
175
200
1
2
3
4
5
6

PLATE No. 11

CITY OF WINNIPEG.

CITY LIGHT AND POWER DEPARTMENT.

Contract for Wholesale Electric Power Service.

THIS AGREEMENT, made this .....day of..... ....., 19....., by and between the City of Winnipeg (hereinafter called the City) and.....
.....
(hereinafter called the Consumer), engaged in the business of..... with premises located at.....

WITNESSETH

That in consideration of the mutual promises herein contained and the expected performance thereof, the said parties hereto have mutually agreed and by these presents do mutually promise and agree as follows:

1. So long as the Consumer shall faithfully observe the terms and conditions of this agreement, the City will, for the purpose and within the limits herein stated, keep available for use and deliver to the Consumer's premises, electrical energy, to the amount of..... ..... kilowatts, to be used solely for the operation of.....
.....which the Consumer will receive, take and pay for in accordance with the terms and conditions of this agreement for a period of.....years, beginning on the .....day of....., 19....

2. The Consumer will not use the electrical energy to be supplied hereunder directly from static transformers for electric lighting, or for the manufacture or generating of electric current for distribution outside of said premises, and will only use such electrical energy for the operation of power motors on said premises. The consumer will not permit the energy to be supplied hereunder to be used by or for the benefit of any other person whatsoever, either directly or indirectly, and will not assign this agreement or any right accruing to the Comsumer hereunder except upon the written consent of the City endorsed hereon.

The Consumer further agrees that his consumption shall be no less than.....
total requirements in.....and that he will not use any other medium, generate or take energy to operate said.....
.....from any other source.....
.....
.....

3. The electrical energy furnished shall be what is known as..... current, shall be delivered at a nominal voltage of.....and a nominal frequency of sixty (60) cycles per second, shall not be subject to fluctuations of potential or frequency of sufficient extent to prevent the successful operation of motors upon said premises, and shall be measured, upon the transmitting conductors, at the voltage hereinbefore stated, at or near the

point where said conductors enter upon the said premises of the Consumer. The measurements shall be by a standard meter or meters furnished by the City, and in standard electrical units. Should the meter or meters fail to register the current, the consumption will be averaged by another meter or meters, or by the amount charged for a month, in which the Consumer's plant was operated under conditions similar to those existing during the month in which said instrument failed to register.

4. The Consumer will pay monthly (or at such other times as the meters may be read) at the City's Office on or before ten days after date of bill, for said electric current used as measured at the service and by the meters provided by the City, at the rates following:

Schedule C—*Power Rate*—(Subject to wholesale discounts)—

The first	50	hours use per month of total connected load				@ 3.1	cents per kilowatt hour	
" next	50	"	"	"	"	@ 2.5	"	"
" "	50	"	"	"	"	@ 1.9	"	"
" "	50	"	"	"	"	@ 1.4	"	"
" "	50	"	"	"	"	@ 1.1	"	"
Excess over 250		"	"	"	"	@ 0.8	"	"

Minimum Monthly Payments—Subject to a net Minimum Monthly Payment of Seventy-Five Cents per Horse-Power of total connected load, but in no case less than One Dollar net per month per meter.

Prompt Payment Discounts—1 year contract, 10 per cent.; 3 year contract, 15 per cent.; 5 year contract, 20 per cent.

Wholesale Discounts—Apply on gross bills of over $100.00 per month.

For the first	$100.00	per month consumption			No discount
" second	100.00	"	"	excess over $100.00	10 per cent.
" third	100.00	"	"	" 200.00	20 per cent.
" fourth	100.00	"	"	" 300.00	30 per cent.
" fifth	100.00	"	"	" 400.00	40 per cent.
From $500 to	1,000.00	"	"	" 500.00	50 per cent.
Excess over	1,000.00	"	"		60 per cent.

Schedule of Rates referred to and made part of Contract dated ..... 191.....

.....

Witness Consumer.

If this agreement is for any reason terminated within the period specified in paragraph 1, the Consumer agrees to pay the City at the Office of the City Light and Power Department an amount equal to the difference between the discount allowed from commencement of service under this contract to the date of such termination and the discount which would have been allowed at the rates above specified for a contract period ending at the date of such termination. The certificate of the General Manager of the City Light and Power Department as to the amount of such difference shall be final and binding upon both parties.

In consideration of the above rate the Consumer agrees to pay the City a minimum charge of..... Dollars net each month in the event of the meter readings showing a consumption of less value.

The above minimum charge is made for a total connected load not exceeding ..... and the Consumer agrees

that if there is an increase in the total connected load, the minimum monthly bill is to be increased in proportion for the balance of the term of this contract.

The Consumer agrees to pay the City on demand..... Dollars for making connection to its distributing system.

5. The term "delivered" as used herein shall be construed as applied to power, to mean readiness and ability on the part of the City to deliver power to the Consumer at the stipulated point of delivery; and the maintenance thereat by the City of the agreed voltage and frequency shall, for the purposes of said agreement, constitute delivery of the power, whether or not the Consumer takes the same, and the obligations on the part of the Consumer to pay for such power shall exist the same as if it were actually taken.

6. The City agrees to test said meters to determine their accuracy in measuring said electric current at reasonable times on the request of the Consumer, but not oftener than once in three (3) months. The Consumer shall have a reasonable notice of such testing, so that he may be present at such tests personally or by his representative. The Consumer shall also have the right to test the said meters in order to determine their accuracy in measuring said electric current, and the City shall have due and reasonable notice of such proposed test by the Consumer, so that its representative may be present at such test. If any meter fails to record the said electric current accurately, the City shall remove the same and substitute therefor an accurate recording instrument.

If it shall be shown by tests that the measuring instruments are incorrect, proper allowances, as shown by the test to be necessary, shall be made to the party entitled thereto, but not for a longer period than thirty (30) days prior to the time such inaccuracy is proven.

The Consumer shall not open the measuring instruments, nor alter nor interfere with the City's apparatus or materials, nor permit any unauthorized persons to do so.

The City agrees (if the Consumer be not at the time in default under this contract) to furnish at the point of delivery specified in Paragraph 1 hereof, such additional electrical energy similar to that above contracted for as the Consumer may from time to time desire to take, provided the Consumer gives the City..... written notice of his desire for such additional electrical energy, and, provided further, that the City shall have the additional electrical energy free for disposal. Such additional electrical energy, if the supply thereof is begun, shall increase the minimum monthly bill in proportion.

When the demand is increased by the provisions of this paragraph, the increase shall be deemed to have taken place at the beginning of the calendar month subsequent to that in which the increase occurred, and shall be paid for accordingly.

The City will at least..... before the end of said written notice inform the Consumer whether or not it has available the additional electrical energy requested.

The Consumer agrees to use from the City under this contract all energy required to operate any additional ..... that are installed at the above premises during the term of this contract, unless advised in writing by the City that it is unable to furnish same.

8. If the Consumer, on account of unavoidable accidents, fires, floods, Dominion, Provincial or Municipal interference, or any other cause not reasonably within his control, be prevented from receiving, taking and using the electrical energy delivered by the City, the Consumer shall be entitled to a pro rata reduction in the minimum charge provided for in paragraph 4, with respect to the period of such interruption. The Consumer agrees in each case of such shut-down or interference to proceed with all reasonable diligence to put himself and his works in condition again to utilize the normal amount of electrical energy.

It is agreed that the contract is to be extended beyond its present time of final termination a time equal to the period of total suspension.

9. The City will at all times exercise due diligence in operating its plant, so as to furnish the Consumer as nearly as practicable a continuity of supply of electrical energy. In case it shall be unable to deliver the electrical energy, wholly or in part, by fire, explosion, flood, strike, natural causes or accident, Dominion, Provincial or Municipal interference, or any other cause, it shall not be liable in damages in respect of such interruption or failure of service, but it will, unless such accident amount practically to total destruction of the property, proceed with all reasonable dilgence to put itself and its works in condition to continue the supply of electrical energy. The City further agrees that during the existence of such interruption, or cessation, it will furnish to the Consumer so much electrical energy as it may be able to furnish, having regard to its own uses and the uses of its other customers, all public uses and utilities of the Municipality to be provided for first. In the event of total or partial interruption of service, the Consumer shall be entitled to a pro rata reduction in the minimum charge provided for in Paragraph 4, but such interruption shall not constitute a breach of this contract, nor shall the City be liable for damages by reason of such failure, and it shall in no case be a condition precedent to the City's right to recover hereunder, to allege, or prove that no interruption in the supply of electricity has occurred. The consumer shall save the City harmless from any and all claims of loss of damages sustained, and any or all liability from accident to any person or property whatsoever by reason of damage or injury resulting from inproperly installed or defective wiring or equipment or otherwise; and the City shall not be liable to the Consumer or to any person claiming through him or otherwise for any loss or damage to person or property caused in any manner whatsoever by high tension electric current or because of the wires being connected with the Consumer's premises, whether through failure of its appliances or otherwise.

10. Should the Consumer at any time make an assignment, or become bankrupt or insolvent, or if being a Company it shall go into liquidation or be wound up or upon any proceedings for such purpose being taken, or

be in default in the payment of sums due for electrical energy, or make default in any of the other agreements on his part herein contained, then in either of said events the City may immediately cease supplying electrical energy hereunder, and at its option may by a notice in writing mailed or delivered to the last known address of the Consumer, signed by the General Manager of the City's Light and Power Department, terminate this contract. Any other suspension of delivery shall not, however, relieve the Consumer of these obligations or interfere with the enforcement by the City of any other legal right or remedy, and no delay by the City in enforcing any of its rights hereunder shall be deemed a waiver of such rights, nor shall a waiver of the City of one of the Consumer's defaults be deemed a waiver of any other or subsequent default. In determining the right of the City to terminate this contract or to suspend delivery of electrical energy by reason of the Consumer's default in payment therefor, it is expressly agreed that the amount due at any time from the Consumer for electrical energy shall be the full amount of the bill therefor rendered by the City to the Consumer. If, however, the Consumer at any time wishes to contest the amount of any bill rendered by the City for electrical energy furnished, he may pay such bill under protest, and thereby save himself from the penalties of default hereunder, and in case it is subsequently determined by the final judgment of a court of competent jurisdiction that the bill so rendered was excessive, then the City shall refund to the Consumer the amount of such excess.

11. The Consumer will be responsible for all damages to, or loss of, the City's property located upon the Consumer's premises and used in carrying out this contract. Unless occasioned by the City's negligence, such damages shall be repaired, replaced, or made good by the City at the expense of the Consumer.

12. The City will at its own expense furnish, install and keep in repair on the Consumer's premises the necessary meters or other current measuring devices.

All meters, wires and other appliances furnished by the City shall remain the property of the City. It is agreed that all wires upon the premises of the Consumer to which the City's service will be connected, shall be so installed, changed and maintained by the Consumer that the City may carry out this contract; and shall be kept in proper condition by the Consumer; that the Consumer will give or obtain all necessary permission to enable the agents of the City to carry out this contract and to construct and maintain its service in and through all places required by the City, except public places, and to set up and maintain the necessary meters, converters and appliances as located by the City, and to enter premises at all reasonable times, so long as any of the City's property remains therein, for the purpose of keeping in repair or removing its property or inspecting its own or the Consumer's wires or apparatus, and the Consumer will not permit such access, for said purposes, to parties other than its employees or the authorized representatives of the City or persons duly authorized by law.

13. The Consumer will provide a sufficient and suitable place and space upon his premises for the installation and maintenance of the necessary transformers, switching apparatus, lightning protection, meters and other apparatus used in connection with the supply of such service by the City to the Consumer.

14. The Consumer will not install wiring, adopt or use any motor or other translating or electrical current using device to be operated by the electrical energy to be supplied hereunder, which has not been first approved and accepted by the City.

The City shall have the right of general supervision over the apparatus installed on its circuits and the manner of operation of such apparatus. The Consumer shall, at his own risk and expense, install all suitable apparatus on the Consumer's side of the main line switch for utilizing electrical energy to be supplied hereunder, such as motors, switchboards, switches, lamps, circuit breakers, wiring, safety devices and transformers (when the introduction of same is necessary, due to the use of motors designed for other voltages than specified in Paragraph 3 herein), and said installation shall be of such character as will not introduce disturbances on the City's lines, and the apparatus shall be selected and used to secure the highest practicable power factor, and shall be maintained by the Consumer at the highest practicable point of efficiency. The City shall have the right, before making connections with the circuits of the Consumer and from time to time thereafter, to make an examination of the installation, motors and apparatus of the Consumer, and may refuse to make connections or commence or continue to give service until the installation and apparatus, and operation of same, shall meet with its approval. The Consumer will not make any additions to, or changes in, his installation attached to the City's lines, without first notifying the City and receiving its approval of such changes or additions. The Consumer further agrees to abide by any reasonable regulations which may be established by the City for the operation of the apparatus connected by the Consumer to its lines.

15. The Consumer shall at all times take and use the current from each of the three phases in such manner that the current shall be taken equally from each phase whenever possible. But, whenever it is not possible to take the current equally and the difference between any two phases is greater than ten (10) per cent. of the lesser, then the maximum load shall be computed on the assumption that the current, and therefore the electrical energy, taken from each of the phases is equal to the greatest amount actually taken from any one (1) phase.

16. The City may at any time during the term of this contract, on Sunday morning between the hours of seven (7) and twelve (12) o'clock, suspend delivery of electrical energy under this contract for the purpose of making repairs on, or improvements in, upon or around, any part of its hydraulic or generating plant or distributing system, provided, however, that the City shall in every case give the Consumer such reasonable notice as circumstances will permit.

17. This contract is to be considered renewed for a further period similar to that mentioned in paragraph 1 hereof from time to time thereafter unless a written notice to the contrary is given by either party to the other at least ninety (90) days prior to the expiration of the contract or any renewal thereof.

18. If this contract is terminated by the City by reason of the breach of the Consumer of any of the provisions hereof, or in the event of his abandoning or repudiating the same, he shall pay to the City forthwith after such t rmination, abandonment or repudiation as liquidated damages and not as penalty (first) a sum equal to the minimum charge provided for in paragraph 4 hereof for the entire unexpired term of the contract or existing extension thereof, and (second) the construction expenses incurred by the City in making connection from its electrical distributing system to and upon the premises of the Consumer; and the certificate of the aforesaid General Manager as to the total amount of such minimum charge and construction expenses shall be final and binding upon both parties.

19. .....

20. This contract shall be binding not only upon the parties, but in the case of a corporation, upon its successors and assigns, and in the case of an individual upon his heirs, executors, administrators and assigns, and all covenants herein contained are to be construed as both joint and several; and wherever the singular and masculine are used the same shall be construed as meaning the plural and the feminine or a Corporation where the context of the parties hereto so require.

In witness whereof the respective parties have executed this agreement in duplicate.

Signed, Sealed and Delivered

..... as to the execution by the City	THE CITY OF WINNIPEG By ..... General Manager City Light and Power Department.
..... as to the execution by the Consumer This.. day of ....., 191...	SIGNED ..... Consumer.

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

APPENDIX II.

STATEMENT BY THE WINNIPEG ELECTRIC RAILWAY COMPANY

DATED 1915

APPENDIX II.

STATEMENT BY WINNIPEG ELECTRIC RAILWAY COMPANY

CHRONOLOGICAL HISTORY.

The Company now known as The Winnipeg Electric Railway Company is the successor by amalgamation, purchase, or agreement, of the following companies, whose principal objects were to supply electricity for light, heat and power in and around the City of Winnipeg, in the Province of Manitoba, and to operate city, interurban and suburban lines of electric railway.

The companies now merged in The Winnipeg Electric Railway Company are the following:

Manitoba Electric and Gas Light Company—Incorporated in the year 1880 under the laws of the Province of Manitoba, with wide powers as to the sale and distribution of electric current in the Province.

Winnipeg Street Railway Company—Incorporated in the year 1882 under the laws of the Province of Manitoba with power to construct and operate street railways in the City of Winnipeg, the parishes of St. Boniface, east and west; St. Johns, St. James, and Kildonan by the force or power of animals or *such other motive power* as may be authorized by the council of said City and the Municipalities, or any of them.

Northwest Electric Company, Limited—Incorporated June, 1889, under the Manitoba Joint Stock Companies Act "for the purpose and with the object of acquiring, building, constructing, erecting, and maintaining an electric lighting . . em or systems, electric street railways, electric motors, or other electrical power . . . in the various cities, towns and villages in the Province of Manitoba."

Winnipeg Electric Street Railway Company—Incorporated by an Act of the Legislature of Manitoba in the year 1892. Authority was given to construct and operate a railway on the streets of the City and adjacent municipalities and to carry on the business of selling, licensing and disposing of electric light, heat, or power.

Winnipeg General Power Company—Incorporated in the year 1902 by Act of the Legislature of Manitoba, and was given the fullest powers for carrying on the business of electricity in the Province of Manitoba. It was specially provided that any amalgamation of the Company with existing companies *should give the amalgamation the powers of the companies absorbed.*

All of the above companies were finally amalagamated under the name of the Winnipeg Electric Railway Company in the year 1904. The chronological steps leading up to this final amalgamation were as follows:

1880—Manitoba Electric & Gas Light Co.

1882—Winnipeg Street Railway Co.
1889—North-West Electric Co.
1892—Winnipeg Electric Street Railway Co.
1894—Winnipeg Electric Street Railway Co. bought Winnipeg Street Railway Co.
1898—Winnipeg Electric Street Railway Co. bought Manitoba Electric & Gas Light Co.
1900—Winnipeg Electric Street Railway Co. bought North-West Electric Company.
1902—Winnipeg General Power Co. formed.
1904—Winnipeg General Power Company amalgamated with Winnipeg Electric Street Railway Co. under name of *Winnipeg Electric Railway Company*—the present company.
1905—Winnipeg Electric Railway Co. purchased the Suburban Rapid Transit Co.
1906—Winnipeg Electric Railway Company purchased all of the capital stock of Winnipeg, Selkirk & Lake Winnipeg Ry. Co. except a very few shares.
1911—Winnipeg River Railway Company incorporated by special Act of the Legislature of Manitoba.
1913—Winnipeg River Power Co. Ltd. granted letters patent under the Companies Act of the Dominion of Canada.

POWERS OF ABOVE FOUR SEPARATELY OPERATED COMPANIES.

The Suburban Rapid Transit Company—Incorporated by special Act of the Legislature of Manitoba, assented to March 1, 1902, Chap. 71, "For the purpose of constructing, maintain, equip, furnish, operate, alter and keep in repair an electric railway with double or single tracks, . . . from some terminal point at the western boundary of the City of Winnipeg westward on both sides of the Assiniboine river to a point at or near the village of Headingly." Power is also given to sell electricity for light, heat and power, etc. February 8th, 1904, Chap. 86, special Act passed granting further powers to build through and operate lines of railway through the rural municipalities of St. Francois Xavier and Portage la Prairie, and to or near the town of Portage la Prairie, and to or near the village of Stonewall. All of the above subject to consent of municipal councils.

Winnipeg, Selkirk and Lake Winnipeg Railway Company—Incorporated by special Act of the Legislature of Manitoba, assented to July 5, 1900. Power to construct railway northwards from Winnipeg on the west side of Red river to West Selkirk or western shore of Lake Winnipeg. Power to sell electric light, heat and power and use streets of municipalities, subject to their consent. Municipalities of Kildonan, St. Pauls, St. Andrews and Gimli, and the town of West Selkirk, effected. February 8th, 1904, Act amended by special Act, Chap. 90. Additional powers to build railway lines and other works authorized by their act of incorporation in the rural municipalities of Kildonan St. Pauls, St. Andrews, Springfield, St. Clements

Rosser, Rockwood, Assiniboia, Macdonald, and the town of St. Boniface, and the unorganized territory lying to the east of the municipalities of St. Clements, Brokenhead and Springfield.

Winnipeg River Railway Company—Incorporated by special Act of the Legislature of Manitoba, Chap. 117. Assented to March 24, 1911. Power to build a railway to operate by steam or other power from a point at or near Lac du Bonnet to a point at or near Lake Winnipeg, at the mouth of the Winnipeg river. Capital stock, $50,000.

Winnipeg River Power Company, Limited—Granted letters patent 29th October, 1913, under the Companies Act of the Dominion of Canada. Power to acquire and construct, maintain, operate and dispose of water powers and water privileges and other works for the generation of electricity . . . and generally to carry on the business of a power, heating and lighting company in all its branches. Many other necessary powers granted. Capital stock, $1,000,000.00.

See also page 102.

STATISTICAL INFORMATION.

The first street cars in Winnipeg, drawn by horses, were operated on Main street October 24, 1882.

First electric car run from Main street to River Park, July, 1891.

Winnipeg Electric Street Railway Company started construction of lines in Winnipeg in September, 1892, and operated electric cars in competition with horse cars on Main street until the Winnipeg Street Railway Co. sold out to them in 1894.

The first street cars, drawn by horses, operated on Main street from City hall to Fort Garry.

Mr. R. A. Sara, B.A.Sc., the sales manager of the City Light and Power Department, in his very comprehensive and able history of the municipal undertaking, refers to the Company as follows:

"This Company commenced operations when Winnipeg was a small town of only 1,500 inhabitants. . . The Company grew up with the City and assisted materially in the City's growth, improving its plant and equipment from time to time as necessity demanded and earnings would permit."

In 1891, when Winnipeg Street Railway Company started operating an electric car line from Main street to River Park, the power was obtained from a small steam generating plant on the Assiniboine river. This plant was enlarged from time to time. The generator that was used when Winnipeg Electric Street Railway Company took over the business of Winnipeg Street Railway Company is now used by Winnipeg Electric Railway Company to run machinery in a repair shop.

1892—The Winnipeg Electric Street Railway Company was granted "an exclusive franchise to operate electric railways in the City of Winnipeg for a period of thirty-five years from February 1, 1892, expiring February 1, 1927, when the City may assume ownership of the railway and plant

upon payment of the actual value of same, which amount shall be determined by arbitration."

The Winnipeg Electric Street Railway Company's franchise was subject to the rights of the Winnipeg Street Railway Company, and the two systems —one operating partly by electricity and partly by horses (the Winnipeg Street Railway Company) and the other operating by electricity—the Winnipeg Electric Street Railway Company, continued to operate in competition in the City of Winnipeg, in some cases the lines paralleling one another, on Main street for instance. During the time the two systems were operated a rate war ensued, and on February 4, 1894, the Winnipeg Electric Street Railway Company sold 50 tickets for $1.00.

After considerable litigation, carried to the Privy Council, the Privy Council gave a decision in March, 1894, that the Winnipeg Street Railway Company did not have an exclusive franchise, and in that year The Winnipeg Electric Street Railway Company purchased the rights of the horse car company—Winnipeg Street Railway Company—and horse cars disappeared from the streets.

The population of Winnipeg has grown by leaps and bounds. According to assessment records:

1891	24,068
1901	44,778
1911	151,958
1915 (est.)	210,000

The Winnipeg Electric Street Railway Company in June, 1893, was granted the right by the City of St. Boniface for a period of forty years to operate street cars in St. Boniface (at the expiration of that period the town may take over the Company's plant in the town), and at a subsequent date the Company were granted the privilege of selling electric light and power in the town, for the same period of time. Population of City of St. Boniface according to Canada Census records was as follows:

1891	1,553
1901	2,019
1911	7,483

and although more recent figures are not available, we believe the population has considerably increased since 1911.

The following is a record of the passengers carried on Winnipeg Electric Railway Company's lines:

1900	3,002,538
1905	13,081,249
1910	31,369,421
1914	58,489,987

In 1900, only 16 miles of track were in operation, as against 108 in 1914. In 1900 the Company operated 36 single truck cars, as against approximately 350 in 1915. In addition to above there is approximately 60 miles of subur-

ban track now in operation. In 1900, there were approximately 16,000 16-c.p. lamps in operation in Winnipeg. In 1915 it is estimated that there are from 600,000 to 800,000 16-c.p. lamps in use.

It will readily be seen from the foregoing figures that the growth of the demands made on the Company's steam plant for power was very rapid, and it was evident to the Company that the increasing number of manufacturing industries would require cheap power to ensure their continued success. Realizing that power obtained from a water power plant would be cheaper than that obtained from steam plants in the City of Winnipeg, the Winnipeg General Power Company, formed in the year 1902, made investigations as to the possibilities of obtaining power from the Winnipeg river, and came to the conclusion that that source would give a large saving on the cost of fuel power.

1903—The construction of a hydro-electric plant to give about 30,000 horse-power on the Pinawa Channel near Lac du Bonnet was commenced by Winnipeg General Power Company.

1904—Winnipeg General Power Company amalgamated with Winnipeg Electric Street Railway Company under the name of Winnipeg Electric Railway Company, and work on the power plant was continued by the new company.

1906—June 9, 1906, first transmission of power from new plant supplied to Winnipeg. Steady service started June 11, 1906. Power has been supplied practically continuously from this plant ever since.

1907—Hydro-electric plant at Pinawa completed at a cost of approximately $3,055,000 and the necessary transmission lines and sub-stations were built. The initial capacity of the plant was 30,000 horse-power.

The immediate result of the introduction of hydro-electric power in Winnipeg was a reduction in the price of electric light from 20 cents per kilowatt to 10 cents per kilowatt and the base rate for power was reduced from 12½ cents per kilowatt to 6 cents per kilowatt.

SUMMARY RE POWER.

	Horse-Power
Hydro-electric horse-power installed	30,630
Power available at minimum flow	28,200
Peak load of the year (est.)	34,200
Total hydro-electric power available in the City	22,500
Steam Power Station No. 1, Mill street	16,000
Steam power Station No. 2, Assiniboine Avenue	6,000
Total power now available in City	44,500

TRANSMISSION.

The 3-phase, 60-cycle, 2,300-volt current delivered by the generators is transformed up to 66,000 volts for transmission to Winnipeg over a double circuit steel tower transmission line. The length of transmission line is 65 miles.

DISTRIBUTION.

The power so transmitted is delivered to sub-stations and distributed in the cities of Winnipeg and St. Boniface, the towns of Transcona, Stony Mountain and Stonewall, the rural municipalities of Fort Garry, Assiniboia, East Kildonan, West Kildonan, St. Andrews, St. Vital, St. Pauls, Roekwood, and is supplied in bulk to the West Selkirk municipal plant. Negotiations with other municipalities in the Province of Manitoba are now pending.

STREET RAILWAYS.

The Winnipeg Electric Railway Company owns and operates 108.426 miles of single track street railway lines in the cities of Winnipeg and St. Boniface and immediate vicinity. They also control and operate the Suburban Rapid Transit Company's railway, which serves the municipality of Assiniboia, and has a mileage of 21.021 miles, and the Winnipeg Selkirk and Lake Winnipeg Railway Company, which has a mileage of 39.405 miles, and serves the towns of Stonewall and Selkirk and the village of Stony Mountain, as well as a number of well-settled municipalities along its route.

The various suburban lines have been a great factor in building up the district around the cities of Winnipeg and St. Boniface and making the City markets available to the suburban residents, farmers and market gardeners.

Under local improvement by-laws in the City of Winnipeg alone, Winnipeg Electric Railway Company is charged with a total of $1,523,602.93 for paving charges to date.

During the year 1914 the amount paid by Winnipeg Electric Railway Company in cash to the City of Winnipeg for taxes, paving charges, percentage of gross earnings (5 per cent.) and car license, was $288,352.44. In addition to this the Company paid Municipal and Government taxes amounting to $4,376.55, making a grand total of $292,728.99.

In the City of Winnipeg alone, Winnipeg Electric Railway Company carries approximately 600 civic employees free every day. The pay-rolls of the Winnipeg Electric Railway Company and subsidiary companies, excluding the gas industry, for 1914 amounted to $1,432,500, and the Company paid for materials and supplies $1,206,379.73 during the same period. The greater portion of this sum was spent in the City of Winnipeg in connection with industries largely dependent on power from the Winnipeg river.

STATEMENT SHOWING DECREASE IN ELECTRIC LIGHT AND POWER PLANTS IN THE CITY OF WINNIPEG.

Prior to June, 1906, electric light was sold in the City of Winnipeg at 20 cents per kilowatt hour and power at $12\frac{1}{2}$ cents per kilowatt hour, with discounts for prompt payment.

In June, 1906, when power from the water power plant at Pinawa was introduced the rates were cut practically in half, and electric light was sold at 10 cents per kilowatt hour and power at 6 cents, with discounts for prompt payment.

September, 1911, the rates were again reduced to $7\frac{1}{2}$ cents for electric lighting and 3 cents base rate for power.

December 5, 1911, rates reduced to present rates—$3\frac{1}{3}$ for electric light, with 10 per cent. discount for payment within 10 days from date of bill. Power is now sold by the Company for commercial and other purposes at from half a cent to three cents per kilowatt hour.

STATEMENT SHOWING CAPITAL INVESTED IN INDUSTRIES OWNED BY WINNIPEG ELECTRIC RAILWAY COMPANY AND CONTROLLED BY IT, EXCLUDING THE GAS UNDERTAKING

as at December 31, 1914.

Winnipeg Electric Railway Company, Railway, Power and Light Depts	$18,475,439.99
Suburban Rapid Transit Company, do	551,418.27
Winnipeg, Selkirk and Lake Winnipeg Railway Company	1,559,116.01
Total	$20,585,974.27

Note—Winnipeg River Power Company, Limited, and Winnipeg River Railway Company, have been financed by Winnipeg Electric Railway Company, which holds their stock.

On account of the overlapping of expenditures on the Street Railway and Light and Power Department it is not possible to separate the above with any accuracy.

The following estimate of expenditures on light and power supply is approximate only:

General—

Preliminary expenses, purchase of Company's office buildings and general	$ 2,940,228
Hydro-electric plant	4,125,862
Steam plants and battery	1,589,116
Distribution System	2,133,576
	$10,788,782

Winnipeg Electric Railway Company, meters, connected load, etc.—

Extracts from return made to the Department of Inland Revenue April 6, 1915

Power meters in use	833
Lighting meters in use	15,107

Approximate connected load—	
Incandescent lamps	12,825 kilowatts
Arc lamps	345 kilowatts
Motors	23,788 kilowatts
Approximate number of—	
Incandescent lamps	247,093
Arc lamps	532
Motors connected	31,882
Approximate total yearly output	99,000,000 kilowatt hours
Connected load of street railways, 332 cars, motors	48,990 horse-power
Connected load of street railways, 332 cars, light	600 horse-power

STATEMENT SHOWING NUMBER OF EMPLOYEES OF WINNIPEG ELECTRIC RAILWAY COMPANY, SUBURBAN RAPID TRANSIT COMPANY, AND WINNIPEG, SELKIRK AND LAKE WINNIPEG RAILWAY COMPANY AS AT JULY, 1914, EXCLUDING GAS INDUSTRY.

Winnipeg Electric Railway Company—		
Car sheds	162	
Park and zoo	7	
Power house	14	
New steam plant	24	
Construction	6	
Track	185	
Electric Light and power shop	78	
Substations	40	
Transmission line	6	
Metermen	11	
Pinawa power plant	35	
Office staff	72	
Stores	7	
Conductors	481	
Motormen	477	
Inspectors	30	
Switchmen	12	
		1,647
Winnipeg, Selkirk and Lake Winnipeg Railway Company—		
General	89	
Construction	103	
		192
Suburban Rapid Transit Company	27	27
Grand total		1,866

The above includes all employees in the Light and Power Department, but owing to the overlapping of duties it cannot be subdivided with any accuracy.

WINNIPEG ELECTRIC RAILWAY COMPANY HYDRO-ELECTRIC PLANT.

Location—The hydraulic works and generating station are located on the Pinawa or Lee channel, some 25 miles long, near Lac du Bonnet, on the Winnipeg river, 65 miles east of Winnipeg, and about 7 miles east of the terminus of the Canadian Pacific Railway branch line at Lac du Bonnet.

Hydraulic Works—In order to secure ample water in the Pinawa channel it has been improved and enlarged and the main channel of the Winnipeg river has been dammed a short distance below the mouth of the Pinawa channel by a rock and cement dam. This dam, 40 feet high at mid-stream, consists of 1,332 feet of concrete capped rock fill across the main channel, connected with the banks on either side by concrete spillways, making a total length of 1,650 feet. The water in the Pinawa channel flows to a control dam capable of returning the whole or part of the flow to the main river.

There are also two weir dams of timber crib type across secondary channels.

The head varies from 35 to 41 feet, the normal head being considered to be 39 feet.

Power—The continuous power available is about 28,200 horse-power on the turbine shafts.

Generating Plant—The plant now installed consists of 5 units of 44,144 horse-power each and 4 units of 2,400 horse-power each, or a total of 30,230 horse-power on the turbine shafts, and two exciters of 200 horse-power each.

Total Hydro-Electric Horse-Power Installed—

9 main units	30,230
2 exciters	400
	30,630 horse-power

STATEMENT SHOWING INCREASE IN STEAM PLANTS IN WINNIPEG AND STORAGE BATTERY PLANT AT MILL STREET.

Prior to the year 1906, when hydro-electric power was first used in Winnipeg, all electric light and power was supplied from a steam plant on Assiniboine avenue in Winnipeg, owned by Winnipeg Electric Street Railway Company. This plant then had a capacity of about 5,000 brake horse-power.

In the year 1910 the capacity of the Assiniboine avenue power house was increased by 1,000 horse-power.

In the year 1911 an auxiliary steam plant of 12,000 horse-power capacity was constructed at Mill street, adjoining the Company's main sub-station, and was put in operation.

Adjoining the Mill street sub-station, in the year 1913, the Company built a storage battery house 41x194 feet and installed a 5,000 ampere hour storage battery.

At the present time, March, 1915, the Mill street station is capable of producing 16,000 horse-power from steam and the Assiniboine avenue plant approximately 6,000 horse-power.

At certain seasons of the year, under exceptional weather conditions especially, all of the Company's steam power and the storage battery plant is in use and operated to capacity.

These plants at Mill street were originally intended to be stand-by plants to ensure a continuous and reliable supply of current in case of an accident at the hydro-electric station.

WINNIPEG RIVER POWER COMPANY, LIMITED.

(See also page 95.)

Under the charter of the Winnipeg River Power Company Limited, the Winnipeg Electric Railway Company is making arrangements to develop a large water power at Grand du Bonnet falls on Winnipeg river, and has already spent considerable money to that end.

Under the provisi n of the charter of the Winnipeg River Railway Company, a railway been constructed from Lac du Bonnet to the site, about 14 miles.

Winnipeg River Power Company has acquired a great deal of land and intends to proceed with the development as soon as financial conditions improve so that it is possible to do so. The project will cost approximately $6,000,000.00.

The Winnipeg River Power Company and the Winnipeg River Railway Company possess no assets other than sites, licenses and leases of land, and will be financed by Winnipeg Electric Railway Company, which will hold the stock.

The issued capital stock of Winnipeg Electric Railway Company at the present time is $9,000,000.00, and there are approximately 400 shareholders.

Authority to guarantee bonds of the above companies was granted to Winnipeg Electric Railway Company at the 1915 session of the Manitoba Legislature.

Pages 119 to 211 and Appendix II of Water Resources Paper No. 3 a publication of the Dominion Water Power Branch on the Winnipeg River Power and Storage Investigations, gives full particulars of the du Bonnet Falls site.

The report sets out that the Du Bonnet Falls site is located about 64 miles om Winnipeg, and that the proposed scheme of development will ultimately concentrate a head of 56 feet made up of the Grand and Little du Bonnet falls and the greater portion of the White Mud falls.

The particulars and estimates given are summed up in Table 36.

Table 36.—General Particulars re Du Bonnet Power Site.

Development.	Flow in C.F.S.	Head in Feet.	24-hour Horse-Power at 75 Per Cent. Efficiency.	Estimated Cost.	
				Per Horse-Power.	Total.
Initial	12,000	46	47,000	$77 19	$3,628,000
Intermediate	20,000	46	78,700	66 69	5,235,000
Ultimate	20,000	56	95,500	68 60	6,551,000

The extra head for the ultimate development would be obtained by the removal of the White Mud falls.

GENERAL REMARKS.

Depending upon a continuous and reliable supply of cheap power from Winnipeg river, manufacturers have expended hundreds of thousands of dollars in Winnipeg and immediate vicinity, and any curtailment of water in the Winnipeg river would seriously affect these industries and prove a great source of loss to the City of Winnipeg and surrounding districts.

For instance, at the present time Winnipeg Electric Railway is supplying power from its hydro-electric plant to Ogilvie Flour Mills, which has a capacity of 3,000 barrels of flour and 500 barrels of rolled oats per day, to the Western Canada Flour Mills, which have a capacity of 5,200 barrels of flour per day, and to the Canada Cement Company, which has a capacity at its mill of 4,000 barrels of cement per day. Any interference with the continuous supply of current to these industries will throw a large number of men out of work and seriously affect many trades entirely dependent upon their products. A large number of small manufacturers also depend entirely on hydro-electric power in their business, and any increase in the cost of producing power would practically put these men out of business, as cheap power at the present time is one of the principal factors in their success.

Large blocks of power are also furnished by the Company to the Canadian Pacific Railway Company and the Canadian Northern Railway Company for the operation of their various roundhouses and shops, and to the Government of Manitoba for the agricultural college and other provincial buildings.

Strictly speaking, there is not a citizen in Greater Winnipeg who has not benefited since this Company first introduced hydro-electric power into Winnipeg and paved the way for rate reductions and made profitable manufacturing plants possible.

The demand is constantly increasing, and the Company's available supply of power is already spoken for. Every year sees an extension of the Company's lines into new territory, requiring additional power, and new plants opening up.

The Company is confident that in the very near future there will be a demand for all the available power that can be developed, and have taken steps to increase its supply by securing an additional site at Grand du Bonnet falls and commencing the construction of a plant to develop approximately 100,000 horse-power.

(Signed) W. PHILLIPS,
Manager.

Winnipeg, July 31, 1915.

WINNIPEG ELECTRIC RAILWAY COMPANY
WINNIPEG, CANADA

Tariff for Electric Light and Power.

April, 1915.

Electric Light—Domestic.

$3\frac{1}{3}$ cents per kilowatt hour, subject to following discounts on accounts paid within 10 days of date of bill:

On bills up to	$20.00	10 per cent.
" from	$20.00 to $50.00	20 "
" over	$50.00	30 "

Electric Light—Commercial.

$3\frac{1}{3}$ cents per kilowatt hour, subject to following discounts on accounts paid within 10 days of date of bill:

On bills up to	$25.00	20 per cent.
" from	$25.00 to $50.00	25 "
" over	$50.00	30 "

Electric Heating and Cooking—

3 cents straight per kilowatt hour, subject to following discounts on accounts paid within 10 days of date of bill:

On bills up to	$5.00	10 per cent.
" over	$5.00	25 "

Electric Power—

3 cents straight per kilowatt hour, subject to following discounts for payment within 10 days of date of bill:

On bills up to	$ 25.00	10 per cent.
" from	$ 25.00 to $ 50.00	15 "
" "	$ 50.00 to $ 100.00	20 "
" "	$ 100.00 to $ 200.00	25 "
" "	$ 200.00 to $ 300.00	30 "
" "	$ 300.00 to $ 400.00	40 "
" "	$ 400.00 to $ 500.00	50 "

Annual Report

OF THE

Winnipeg Electric Railway Company

FOR THE FISCAL YEAR
ENDED THIRTY-FIRST
DECEMBER, NINETEEN-
FOURTEEN

Submitted at the Twenty-second Annual Meeting
held on the Tenth day of February
Nineteen-fifteen

Directors:

SIR WM. MACKENZIE - - President
A. M. NANTON - - - Viee-President
F. MORTON MORSE - - Sec.-Treasurer

Sir W. C. Van Horne

Sir D. D. Mann D. B. Hanna G. V. Hastings

Hugh Sutherland R. J. Maekenzie

Manager:
WILFORD PHILLIPS

Report of the President and Directors

For the year ending December 31, 1914.

To the Shareholders:

Your Directors beg to submit a statement of the operations of your properties for the year ended December 31, 1914.

Revenue.

The gross earnings from all sources amounted to $4,101,302.48 in comparison with $4,078,694.75 for the previous year.

Expenses.

The expenses of operation, including maintenance, repairs and renewals, amounted to $2,416,208.93 against $2,252,606.77 for the previous year, an increase of $163,602.16.

Net Earnings.

The net earnings from operation therefore amounted to $1,685,093.55. Of this amount the fixed charges, including 5 per cent. on gross earnings payable to the City of Winnipeg, interest on the funded debt and other fixed charges, absorbed $690,482.43, leaving a surplus for the year of $994,611.12, to be added to the balance brought forward from the previous year of $901,697.99, making together $1,896,309.11.

The usual quarterly dividends, at the rate of 12 per cent. per annum, were paid by your Directors, amounting to $1,080,000.00, leaving a balance at the credit of Profit and Loss Account of $816,309.11.

The properties of the Company have been fully maintained from Revenue throughout the year. The increase in the Operating Expenses, which occurred principally in the Railway Department, is attributable

partly to expenditure introduced in conformity with the requirements of the Public Utility Commissioner, and partly to the annual increase in the graduated scale of wages applicable to senior service employees.

Expenditures on Capital Account.

To meet the growing requirements of the community, the undernoted new construction and improvements and betterments to the properties of the Company and Subsidiary Companies were carried out, in accordance with the policy in regard to extensions approved by the Directors, entailing an expenditure of $1,308,545.00.

Roadbed and Track.

About seven and one-half miles of track have been laid in the City of Winnipeg as follows: 4.192 miles with 80 lb. rails with concrete foundation and asphalt pavement; 3.33 miles of surface track with gravel ballast, which includes an extension through the Municipality of Fort Garry to the Village of St. Norbert.

A branch line was constructed from Middlechurch on the line of the Winnipeg, Selkirk and Lake Winnipeg Railway, a subsidiary line of your Company, to the Town of Stonewall in the Municipality of Rockwood, a distance of eighteen miles, and a fast electric car service has been established between Winnipeg and Stonewall. This has increased the mileage of the Winnipeg, Selkirk and Lake Winnipeg line to forty miles. Stonewall is a thriving town in a prosperous district and it is hoped that the traffic over this line will meet the expectation of your Directors.

Rolling Stock.

Twenty large double truck closed motor cars, 46 feet long with wide vestibules, equipped with air brakes and other modern appliances, were constructed in the Company's Winnipeg Shops.

Practically all of the Company's double truck closed single end cars have been converted to comply with operating conditions under the pay-as-you-enter system. The rear vestibules have been equipped with safety doors at the steps, which are operated by the conductor. By this means it is hoped that accidents will be largely diminished.

To provide for the foregoing Capital Expenditures, your Directors arranged the sale of additional 4½ per cent. consolidated debenture stock, the proceeds of which amounted to $879,468.59, and of Treasury Notes $500,000.00, in all $1,379,468.59.

WINNIPEG ELECTRIC RAILWAY COMPANY

Distribution System.

In extension of the Company's electric lighting and power distribution system, there were erected 1,008 additional poles and 71,903 pounds of wire. During the year 1914 our light and power earnings in the City of Winnipeg have been more than maintained and in addition your Directors have made contracts for street lighting with the City of St. Boniface, the Town of Stonewall, the Municipality of Rockwood and the Municipality of Assiniboia.

During the year the Company has laid down 24,318 feet of gas mains on the streets of Winnipeg in extension of its gas distribution system, and has laid 930 new gas services to private residences and other buildings, requiring 55,600 feet of gas service pipe, and has also installed 2,744 additional gas meters.

WILLIAM MACKENZIE,
President.

Auditors' Report

To the President and Shareholders,
Winnipeg Electric Railway Company,
Winnipeg.

Gentlemen:—

We beg to report that we have audited the Books and Accounts of your Company and of its subsidiary Companies, viz., Winnipeg, Selkirk and Lake Winnipeg Railway Company, and the Suburban Rapid Transit Company, for the year ended 31st December, 1914.

A continuous check has been made throughout the year of Receipts, and Expenditures have been duly vouched. All our requirements as Auditors have been complied with.

We have examined the accompanying Statements, viz.:

Balance Sheet
Revenue and Expenditure Account
Profit and Loss Account
Capital Account

of the Winnipeg Electric Railway Company, and

Balance Sheet
Revenue and Expenditure Account
Profit and Loss Account

of the Suburban Rapid Transit Company, and of the Winnipeg, Selkirk and Lake Winnipeg Railway Company, and in our opinion a true and correct view of the Companies' affairs is exhibited thereby, according to the best of our information and as shown by the books of the Companies.

(Signed) W. A. Henderson & Co.,
Chartered Accountants.

Winnipeg, February 20th, 1915.

Winnipeg Electric Railway Company

STATISTICAL STATEMENT

YEARS 1910-1914

	1914	1913	1912	1911	1910
GROSS RECEIPTS **Increase 1914 over 1913—.55%**	$4,101,302.48 **22,607.73**	$4,078,694.75	$3,765,384.06	$3,829,749.67	$3,284,341.83
OPERATING EXPENSES **Increase 1914 over 1913—7.26%**	2,416,208.93 **163,602.16**	2,252,606.77	2,004,147.92	1,900,967.67	1,654,833.60
OPERATING EXPENSES PER CENT. OF EARNINGS	58.91	55.23	53.23	49.64	50.39
NETT EARNINGS **Decrease 1914 over 1913—7.72%**	1,685,093.55 **140,994.43**	1,826,087.98	1,761,236.14	1,928,782.00	1,629,508.23
PASSENGERS CARRIED **Decrease 1914 over 1913**	58,489,987 **1,073,770**	59,563,757	51,106,017	40,281,245	31,369,421
TRANSFERS	**20,277,197**	15,039,016	11,858,213	10,012,084	8,003,038

Correct, (Sgd.) F. MORTON MORSE,
Secretary-Treasurer.

Winnipeg Electric Railway Company

BALANCE SHEET — 31st DECEMBER, 1914

ASSETS

COST OF PROPERTY:		
Street Railway, Buildings, Plant and Equipment Electric Lighting, Plant and Equipment Electric Power, Plant and Equipment Gas, Buildings, Plant and Equipment		$21,315,173.61
SUBSIDIARY COMPANIES		1,527,771.05
FLOATING ASSETS:		
Stores on Hand	$236,234.54	
Accounts Receivable	459,121.70	
Conductors' Working Fund	12,942.85	
Cash on Hand	13,722.16	
		722,021.25
		$23,564,965.91

LIABILITIES

CAPITAL:		
Common Stock	$9,000,000.00	
Debenture Stock 4½% Perpetual, £900,000	4,380,000.00	
		$13,380,000.00
BONDS 5%:		
Payable 1st January, 1927	$1,000,000.00	
Payable 1st January, 1935	4,000,000.00	
		5,000,000.00
CURRENT:		
Bills Payable	$ 950,000.00	
Bank of Montreal	1,210,024.72	
Accounts Payable	366,320.37	
Dividend (Paid 2nd Jan., 1915)	270,000.00	
Wages for December	58,689.95	
City Percentage and Car License due 1st February, 1915	122,486.90	
		2,977,521.94
SUNDRY:		
Accrued Interest on Debenture Stock	$ 50,424.00	
Unredeemed Tickets	10,658.17	
Suspense Account	330,052.69	
		391,134.86
RESERVE		1,000,000.00
SURPLUS, as per Profit and Loss Account		816,309.11
		$23,564,965.91

CONTINGENT LIABILITY

SUBURBAN RAPID TRANSIT CO.'S BONDS	$500,000.00
WINNIPEG, SELKIRK AND LAKE WINNIPEG CO.'S BONDS	400,000.00
INTEREST AND PRINCIPAL GUARANTEED	$900,000.00

Certified Correct,
(Sgd.) W. A. HENDERSON & CO.,
Chartered Accountants.

Winnipeg Electric Railway Company

REVENUE AND EXPENDITURE FOR YEAR 1914

GROSS EARNINGS	$4,101,302.48	
OPERATING EXPENDITURE	2,416,208.93	
OPERATING SURPLUS		$1,685,093.55
FIXED CHARGES:		
Debenture and Bond Interest	$499,732.53	
City Percentage and Car Licence	122,486.90	
Taxes, Insurance, etc.	118,263.00	
		690,482.43
NETT SURPLUS FOR YEAR		$994,611.12

PROFIT AND LOSS ACCOUNT

CREDITS

BALANCE FROM LAST YEAR	$901,697.99	
NETT SURPLUS FOR 1914	994,611.12	
		$1,896,309.11

DEBIT

QUARTERLY DIVIDENDS FOR 1914	$1,080,000.00	
BALANCE CARRIED TO BALANCE SHEET	816,309.11	
		$1,896,309.11

CAPITAL STOCK

AUTHORIZED CAPITAL STOCK	$10,000,000.00
SUBSCRIBED AND PAID IN	9,000,000.00

Correct, (Sgd.) F. MORTON MORSE,
Secretary.

Winnipeg, Selkirk and Lake Winnipeg Railway

Directors:

F. MORTON MORSE - - - President
D. H. LAIRD - - - - Vice-President
G. A. HENSON - - - - - Secretary

A. M. Nanton Hugh Sutherland J. H. Munson
L. J. Loader G. V. Hastings

Manager:
WILFORD PHILLIPS

Winnipeg, Selkirk and Lake Winnipeg Railway Company

BALANCE SHEET FOR YEAR ENDING 31st DECEMBER, 1914

ASSETS		
COST OF PROPERTY		$1,559,116.01
STORES		1,274.21
CASH:		
Bank of Montreal	$1,765.94	
Cash on Hand	1,622.45	
		3,388.39
AGENTS' BALANCES:		
Winnipeg	$ 219.82	
Selkirk	44.00	
Stonewall	25.00	
Stony Mountain	20.00	
		308.82
ACCOUNTS RECEIVABLE		1,646.64
		$1,565,734.07

LIABILITIES	
CAPITAL STOCK	$ 111,500.00
BONDS	400,000.00
ACCOUNTS PAYABLE	908,167.68
SUSPENSE	85,146.56
	$1,504,814.24
SURPLUS AS PER PROFIT AND LOSS ACCOUNT	60,919.83
	$1,565,734.07

BONDS AND INTEREST GUARANTEED BY WINNIPEG ELECTRIC RAILWAY COMPANY

Certified Correct, (Sgd.) W. A. HENDERSON & CO.,
Chartered Accountants.

Winnipeg, Selkirk and Lake Winnipeg Railway Company

REVENUE AND EXPENDITURE

GROSS EARNINGS FOR YEAR	$136,665.45	
GROSS EXPENSES FOR YEAR	72,884.06	
NETT EARNINGS FOR YEAR		$63,781.39
FIXED CHARGES:		
Interest on Bonds	$20,000.00	
Taxes, etc.	31,067.26	
		51,067.26
SURPLUS FOR YEAR		$12,714.13

PROFIT AND LOSS ACCOUNT

BALANCE AT CREDIT 31st DECEMBER, 1913	$48,205.70
NETT EARNINGS AS PER REVENUE ACCOUNT	12,714.13
BALANCE AT CREDIT 31st DECEMBER, 1914	$60,919.83

Correct,

(Sgd.) F. MORTON MORSE,
Secretary-Treasurer.

Suburban Rapid Transit Company

Directors:

A. M. NANTON - - - - President

F. MORTON MORSE - - - Secretary

D. B. Hanna Hugh Sutherland G. V. Hastings

Manager:
WILFORD PHILLIPS

Suburban Rapid Transit Company

BALANCE SHEET FOR YEAR ENDING 31st DECEMBER, 1914

ASSETS		
COST OF PROPERTY		$551,418.27
CASH:		
Bank of Montreal	$23,039.70	
Cash on Hand	170.16	
		23,209.86
WINNIPEG ELECTRIC RAILWAY COMPANY LOAN		34,000 80
ACCOUNTS RECEIVABLE		7,840.58
		$616,469.51
BALANCE AS PER PROFIT AND LOSS ACCOUNT		74,391.16
		$690,860.67

LIABILITIES	
CAPITAL STOCK	$100,000.00
BONDS	500,000.00
ACCOUNTS PAYABLE	86,135.98
TICKET ACCOUNT	340.50
SUSPENSE	4,384.19
	$690,860.67

BONDS AND INTEREST GUARANTEED BY WINNIPEG ELECTRIC RAILWAY COMPANY

Certified Correct,
(Sgd.) W. A. HENDERSON & CO.,
Chartered Accountants.

Suburban Rapid Transit Company

REVENUE AND EXPENDITURE

GROSS EARNINGS FOR YEAR	$84,927.78	
GROSS EXPENSES FOR YEAR	64,688.21	
NETT EARNINGS FOR YEAR		$20,239.57
FIXED CHARGES:		
Interest on Bonds	$25,000.00	
Taxes, etc.	2,459.61	
		27,459.61
DEFICIT FOR YEAR		$ 7,220.04

PROFIT AND LOSS ACCOUNT

BALANCE AT DEBIT 31st DECEMBER, 1913	$67,171.12
DEFICIT FOR YEAR	7,220.04
BALANCE AT DEBIT 31st DECEMBER, 1914	$74,391.16

Correct,

(Sgd.) F. MORTON MORSE,
Secretary-Treasurer.


Headingly
HEADINGL
ST. CHARLES
Rifle Range
ST. JAMES
Deer Lodge
St James P.O.
C.N.R.
PEMBINA HIGHWAY
FT. ROUGE
C.N.R. Shops
St. Boniface
St. Mary's
St. Mary's Road
St. Agnes
C.P.R.
Assiniboine River
Seine River


WINNIPEG ELECTRIC RAILWAY CO.
WINNIPEG ELECTRIC RY. CO. 108-426 MILES
WINNIPEG, SELKIRK & LAKE WINNIPEG 39-405 MILES
SUBURBAN RAPID TRANSIT 21-021 MILES
TOTAL 168-852 MILES OF TRACK
STONEWALL
Stony Mountain
C. P. R.
C. N. R.
C. P. R. Shops
STONEWALL BRANCH, WINNIPEG SELKIRK & LAKE WINNIPEG RAILWAY
Seven Oaks
Middle Church
Parkdale
Victoria Park
St. Andrews
St. Andrews North
Lower Fort Garry
SELKIRK
ST. PAUL'S
ST. ANDREWS
ST. CLEMENTS
KILDONAN
MAIN ROAD
LAKE ST. WINNIPEG
ROAD
RIVER ROAD

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

APPENDIX III.

STATEMENT RE
THE TOWN OF KENORA, ONT.

DATED 1915

APPENDIX III.

KENORA MUNICIPAL POWER PLANT—HISTORY, INVESTMENT AND PARTICULARS OF PLANT.

HISTORY.

The town of Kenora, formerly called Rat Portage, is situated between Winnipeg and Fort William on the main line of the Canadian Pacific Railway and at the northerly end of the Lake of the Woods. It is about 293 miles west of Fort William and 126 miles east of Winnipeg. The population is at present about 6,500.

1892—Messrs. McCrosson and Rideout obtained a lease from the Hudson's Bay Company and put in a small power development on the east shore. Later the lease for this power was transferred to the Citizens' Telephone and Electric Power Company of Rat Portage.

1902—By Act of the Legislature of the Province of Ontario, 2 Edward VII, Chap. 62, passed in 1902, the town of Kenora was authorized to purchase the power, plant and works of the Citizens' Telephone and Electric Light Company, which it subsequently did.

1904—In order to enable a sufficient development of the power, the town took steps, by way of exporpriation proceedings authorized by an Act of the Legislature of the Province of Ontario, passed in 1903, to acquire a sufficient area of land on both sides of the stream to construct the necessary dam and power works.

1905—The town obtained from the Government of the Province of Ontario a lease, dated December 19 of that year, of the bed of the stream and the water power thereon.

1907—Supply commenced February 9, from the initial installation of three 900-brake horse-power units; total, 2,700 horse-power.

The town required at this time about 750 horse-power for lighting streets and residences, for small motors and for waterworks pumping. It also contracted with the Maple Leaf Flour Mills Company to supply 1,000 horse-power at $10 per horse-power year, the Company to have the right, under certain conditions, to increase its demand to 2,000 horse-power. This low price was made for the purpose of attracting industries.

1910—Expropriation proceedings were concluded and resulted in substantial awards to the companies owning the land. See further details under "Financial Investment."

1912—The total load had increased to 2,840 horse-power, and a contract was let for another 900 horse-power unit, bringing up the total capacity to 3,600 horse-power.

FINANCIAL INVESTMENT.

As previously stated, in 1904 the town took steps to expropriate the necessary land for its hydro-electric development and commenced con-

struction. This led to arbitration proceedings, the value of the land being claimed, not as wild land, but as a hydro-electric site. The matter was finally settled in 1910 by the arbitrators awarding $45,000 to the Hudson's Bay Company as the value of 10 acres of land on the east side of the stream and $35,000 to the Keewatin Power Company as the value of one acre of land on the west side of the stream. The decision granted costs to the companies and interest on the amount of the awards since 1904.

The total cost of land and water rights, including cost of acquiring the water rights, cost of land as per arbitration proceedings, cost of the actions and interest on the awards for about six years totalled up to $141,000.

In the meantime the town had proceeded with the development of the water power to meet the urgent needs of the citizens for light and power and to operate certain manufacturing industries within the town.

The debentures issued and the capital expenditure are shown in Tables 37, 38 and 39.

Table 37.—Capital Expenditure on Kenora Municipal Power Plant to March 31, 1915.

	Hydraulic Works and Power Plant.	Sub-Stations and Distributing System.	Total Cost.	Cost per Horse-Power Installed.
Original Installation— Commenced supply February, 1907. Capacity, 2,700 brake horse-power.				
Construction cost, interest and engineering	$367,447	$49,113	.....	.....
Land, water rights and legal expenses	140,957	.....	.....	.....
Discount and expenses on debentures	22,236	1,167	.....	.....
	$530,640	$50,280	$580,920	$215
Extensions to March 31, 1915— One 900-brake horse-power unit.				
Construction cost, interest and engineering	$22,145	$16,534	.....	.....
Discount and expenses on debentures	1,250	500	.....	.....
	$23,395	$17,034	$40,429	.....
Total brake horse-power installed March, 1915, 3,600. *Grand Totals*	$554,035	$67,314	$621,349	$173

Includes cost of buying out the Citizens' Telephone and Electric Power Co., $43,333.
Ultimate capacity designed for 5,800 horse-power.

Table 38.—Debenture Table re Kenora Municipal Power Plant.

	No. of By-law.	Purpose.	Amount.	Period in Years.	Interest.	Issued at Per Cent.	Net Amount Realized.	Issued in
Sept. 10, 1906	388	Works and Plant	$200,000	30	5½	95	$190,000	Toronto
Jan. 15, 1907	396	Works and Plant	100,000	30	5½	95	95,000	Toronto
Oct. 14, 1907	420	Works and Plant	75,000	30	5½	97.5 & 100	73,705	Toronto
July 18, 1910	481	Works and Plant	125,092	30	5	95 25	119,151	Toronto
May 27, 1912	520	Works and Plant	25,000	30	6	95	23,750	Toledo
		Totals	$525,092	...	...	... ...	$501,606	... ...
June 9, 1902	325	Distribution	33,333	30	4 5	97 & 97.5	$32,166	Toronto
May 27, 1912	520	Distribution	10,000	30	6	95	9,500	Toledo
		Totals	$53,333	...	...	...	$51,666	... ...
		Grand totals	$578,425	... ...	...	...	$553,272	... ...

(Average discount and expenses on debentures, 4.35 per cent.)

Table 39.—General Particulars re Kenora Municipal Power Plant.

	1908.	1912.	1913.	1914.
Capital expended, including loss on debentures				$ 621,349
Capacity in horse-power	2,700	3,600	3,600	3,600
Peak load in horse power	1,750	2,840		2,680
Total output in kilowatt hours			8,543,200	6,977,910
Number of consumers		1,000		1,050
Number of employees			13	12
Total payroll			$10,481	$10,842
Gross receipts		$66,282	69,263	70,198
Rates Charged—				
Power, per horse-power year				$10 to $50
Light, per kilowatt hour				10 cents
Heating, per kilowatt hour				3 cents

PARTICULARS OF PLANT.

Location—At the north end of the Lake of the Woods there are two outlets to Winnnipeg river, known as the east and west outlets. The Kenora municipal plant is situated on the eastern outlet, within the town limits.

Plant—The turbines are designed to work under a head of 17 to 23 feet and to give full output at 17 feet.

There are now installed four pairs of turbines, each pair rated at 900-brake horse-power with 580 cubic feet per second and 17 feet head. These are direct connected to four 3-phase 2,200-volt 60-cycle generators. There are also two exciter units of 175 kilowatts. Total horse-power installed about 4,120.

Ultimate Capacity—In addition to the above plant there are headworks and bays constructed for two additional similar units. This will bring the total capacity up to 5,800 horse-power, which at 80 per cent. efficiency and 17 feet head, will require a flow of 3,750 second feet.

Hereunder are appended statements relating to the cost of the water-works and telephone systems, and to the tariff for electric power and light.

TOWN OF KENORA.

Waterworks.

Cost of pumping station	$ 43,370	
Cost of distribution system	193,764	
		$237,134
Horse-power installed		200
Employees		10
Total wages		$ 8,184
Revenue, 1914		26,413

Telephone System.

Cost of system, including purchase of Company	$ 34,175
Horse-power used	85
Employees	8
Total wages	$ 5,910
(Part wages charge to line work on lighting system)	
Revenue, 1914	11,855

TOWN OF KENORA.

TARIFF FOR ELECTRIC POWER AND LIGHT. BY-LAW 574.

YEARLY BASE RATE FOR POWER.

Horse-power of motors or peak load	1 to 3.	4 to 10.	11 to 25.	26 to 50.	51 to 100.	101 up.
Flat Rates—Per horse-power year. Based on installed horse-power or maximum demand	$50 00	$48 00	$45 00	$43 00	$41 00	$40 00
Differential Rates—Fixed charge per year, per horse-power installed or per horse-power of maximum demand	$15 00	$14 40	$13 80	$13 20	$12 60	$12 00
Meter rate per kilowatt hour of consumption	3.5 cts.	3.0 cts.	2.5 cts.	2.0 cts.	1.5 cts.	1.25 cts.

Customers shall be classified under classes and rates as follows—

Class A—24 hours' unrestricted use	90 per cent. of the base rate.
Class B—24 hours' restricted use	85 " " "
Class C—10 hours' unrestricted use	70 " " "
Class D—10 hours' restricted use	55 " " "

The above per cents of base rates apply only to the flat rate and fixed charge rate and not to meter rate per kilowatt hour of consumption.

The restricted hour shall be as follows—

October	15 to October	31	5.30 p.m. to 6.30 p.m.
November	1 to November	30	5.00 p.m. to 6.30 p.m.
December	1 to January	15	4.30 p.m. to 6.30 p.m.
January	16 to February	15	5.00 p.m. to 6.30 p.m.
February	16 to March	1	5.30 p.m. to 6.30 p.m.

A discount of 10 per cent. on the whole bill will be allowed for payment within 10 days from date of bill. All flat rates and fixed charges shall be payable monthly in advance.

Special Rates as Follows—

Moving picture machines	$20 per month net.
Fans, 8 to 20 inches	$1.50 to $4.50 per month.
Heating appliances	3 cents per kilowatt hour.

CORPORATION OF THE TOWN OF KENORA,

(Signed) G. C. Hay,
Clerk and Treasurer.

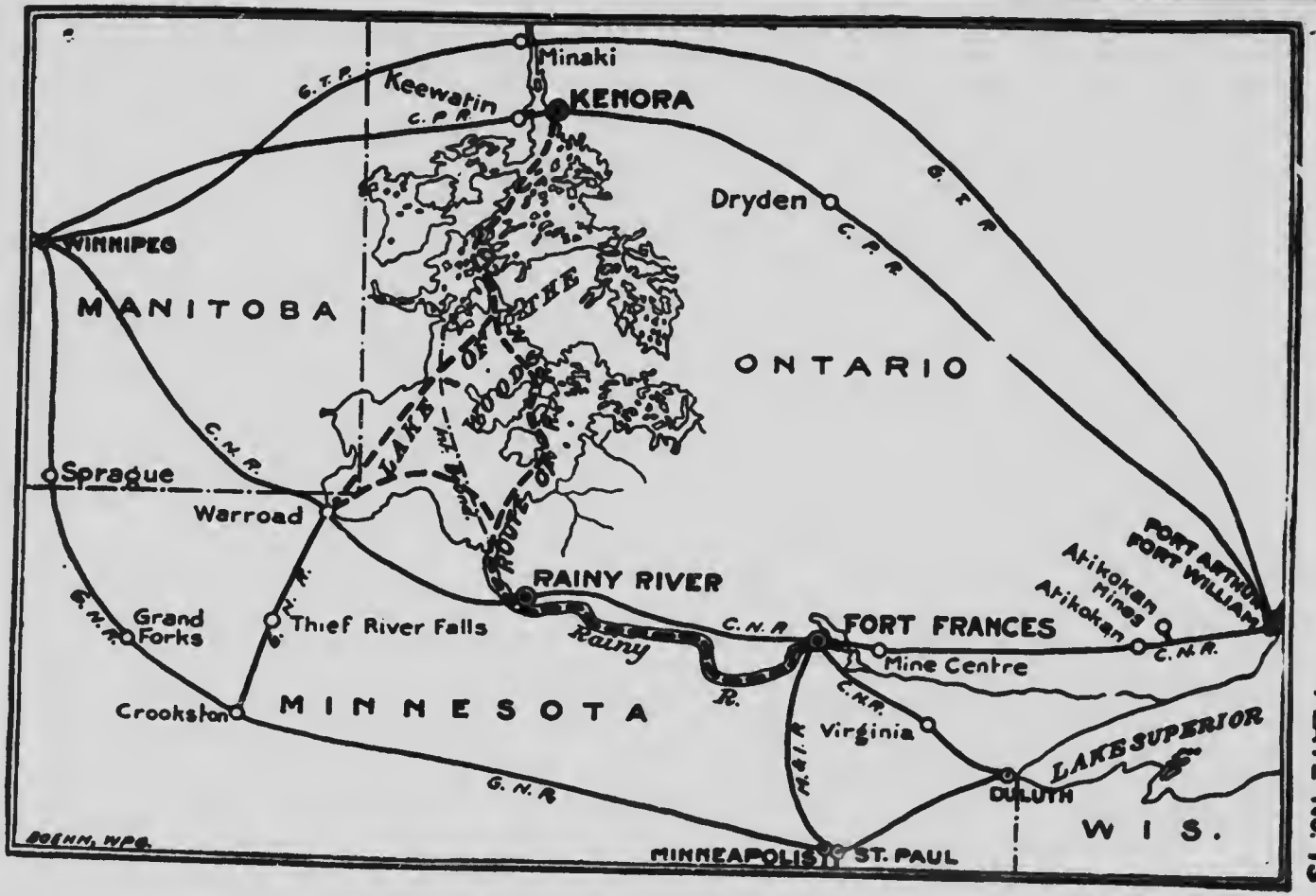

Minaki
G. T. P.
Keewatin
C. P. R.
KENORA
Dryden
G. T. P.
C. P. R.
WINNIPEG
MANITOBA
ONTARIO
LAKE OF THE WOODS
C. N. R.
Sprague
Warroad
RAINY RIVER
FORT ARTHUR
FORT WILLIAM
Atikokan Mines
Atikokan
C. N. R.
FORT FRANCES
C. N. R.
Mine Centre
Rainy R.
Grand Forks
G. N. R.
Thief River Falls
Crookston
MINNESOTA
C. N. R.
Virginia
M. & I. R.
LAKE SUPERIOR
DULUTH
WIS.
G. N. R.
MINNEAPOLIS
ST. PAUL
BOEHM, WPG.

PLATE No. 13

REPORT

ON

THE INTERESTS DEPENDENT

ON

WINNIPEG RIVER POWER

WITH SPECIAL REFERENCE TO

THE CAPITAL INVESTED AND THE LABOUR EMPLOYED

APPENDIX IV.

STATEMENT BY THE LAKE OF THE WOODS MILLING CO. KEEWATIN, ONT.

DATED 1915

APPENDIX IV.

STATEMENT OF THE LAKE OF THE WOODS MILLING COMPANY

The head office of this Company is in Montreal. It owns and operates mills at Keewatin and Portage la Prairie, and one hundred elevators throughout Manitoba and the Northwest.

The president and managing director is Mr. Frank S. Meighen, of Montreal, and the general manager is Mr. Wm. A. Matheson, of Winnipeg.

The total paid up capital of the Company is—

Common stock	$2,100,000
Preferred	1,500,000
Bonds	900,000

The Keewatin Flour Mills Company's bonds, $750,000, 6 per cent. first mortgage gold, dated September 1, 1906, and due September 1, 1916, are unconditionally guaranteed by the Lake of the Woods Milling Company.

Total capital actually in use for these mills, including bonds and loans, $5,800,000.

As the Keewatin Flour Mills are the only portion of the Company's property dependent on Winnipeg river power, they are the only portion dealt with below. They consist of Mills "A" and "C", located on artificial outlets from the lake to Winnipeg river near the town of Keewatin, about 2½ miles west of the eastern outlet.

Mill "A."

This development was made by the Company in 1887. The plant then consisted of two 60-inch "New American" turbines, 323 horse-power at 18-foot head, and 378 horse-power at 20-foot head each, and one 22-inch "New American" turbine, 95 horse-power at 20-foot head. Total rated capacity, 851 horse-power.

In 1896 the plant was temporarily closed for addition of further machinery. Two 66-inch "New American" turbines, 414 horse-power at 18-foot head and 485 horse-power at 20-foot head each, were installed in place of one of the 60-inch turbines. The power plant then consisted of four "New American" turbines, two 485 horse-power each at 20-foot head, one 378 horse-power at 20-foot head, and one 95 horse-power at 20-foot head, making the total rated capacity 1,443 horse-power.

In the year 1905 an additional power house was erected and two units 33-inch duplex horizontal turbines, special high speed design, made by William Kennedy & Son, Owen Sound, Ont., and one 33-inch single horizontal turbine, special design, were installed. Turbines are direct-connected

to electric generator, speed 220 r.p.m., each unit developing 332 horse-power under 18-foot head, or 360 horse-power under 20-foot head. Total, 720 horse-power. Single horizontal turbine is direct connected to 1,000 gallons per minute triplex fire pump, speed 172 r.p.m., developing 150 horse-power under 18-foot head, or 180 horse-power under 20-foot head. Total, 900 horse-power.

In 1912 three of the large "New American" turbines were removed and two pairs of 60-inch horizontal turbines, made by the J. M. Voyth Company, of Heidenheim, Germany, connected on one shaft, developing 2,000 horse-power under 18-foot head, or 2,400 horse-power under 24-foot head, were installed. This power is transmitted by rope drive to the mill, making the total horse-power, including 22-inch "New American" turbine at mill "A," 3,395 horse-power, which at 80 per cent. efficiency, would require 1,870 second feet. The capacity of the mill is 5,000 barrels per day.

Mill "C."

The first steps to develop power at this site were taken by McAuley in 1881 and a sawmill was operated till 1893. The flume was closed till 1899 and was operated from then till 1900 by the Gold Mining and Reduction Company. In 1905 the Keewatin Flour Milling Company acquired the property, and in 1906 it came under the control of the Lake of the Woods Milling Company. In 1907 Mill "C" was started and has been in continuous operation since that date.

The head is 20 feet. The power plant consists of two 900 horse-power turbines, and one of 600 horse-power. Total, 2,400 horse-power.

The total rated capacity is therefore 2,400 horse-power, which at 80 per cent. efficiency would require 1,320 second feet.

The capacity of this mill is 6,000 barrels per twenty-four hour day.

It will be noted that Mill "C" has the larger output but the smaller installed capacity of power plant. This is due in the first place to the milling machinery in Mill "C" being of the latest and most improved type and secondly to the fact that the electric energy generated in Mill "A" is used to operate elevators in both mills and also to operate the barrel and stave factories.

General Particulars.

Total Capital actually in use for these mills, including bonds and loans, $5,800,000.00.

Number of Persons dependent on the industry at Keewatin, including manager, superintendent and office staff, 350. Eastern and western managers, also office staffs and employees, not included.

Total Annual Payroll at Keewatin is $225,860.00, which does not include salaries paid at Winnipeg and Montreal.

Gross Value of product at mills per annum, $14,491,308.00

The Peak Loads on each mill was during September, 1914. The record of water used can be obtained from the Manitoba Hydro Survey.

The Stage of Water in the Lake of the Woods in the years 1910 and 1911 was unusually low, the gauge reading for October 18, 1911, being at the extremely low stage of 95.0. During this period we were badly handicapped for power, having a head of only fifteen feet. Could not operate the mills at more than half their usual capacity. On this account were forced to temporarily lay off a number of our employees, which was a great hardship to them, and a financial loss to the town. We are satisfied that it would be absolutely impossible to operate the mills here to advantage under a lower head than 20 feet, which we have at present.

We operate a cooperage plant in connection with flour mills at Keewatin, which consists of barrel factory, stave mill, and heading mill, employing approximately eighty-five men manufacturing yearly an average of 6,000,000 staves, 250,000 sets heading, 200,000 large and 50,000 small barrels used for flour shipped to the Maritime provinces. Value of barrels, $110,000; wages paid yearly, $45,000.00.

(Signed) W. A. MATHESON,
General Manager.

Winnipeg, July 31, 1915.

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CLASSIFIED LIST OF REPORTS

The Reports published by the Dominion Water Power Branch with the exception of the Annual Reports, have been called Water Resources Papers, and have been numbered 1, 2, etc.

Annual Reports previous to 1915 are included with the Annual Report of the Department of the Interior, and can be secured from the Secretary of the Department.

Annual Report for 1912-13, published 1914. Out of print.

Annual Report for 1913-14, published 1915.

Annual Report for 1914-15, published 1916.

Annual Report for 1915-16, published 1917.

WATER RESOURCES PAPER No. 1.—Report of the Railway Belt Hydrometric Survey for 1911-13, by P. A. Carson, B.A., D.L.S., Chief Engineer. Published 1914.

WATER RESOURCES PAPER No. 2.—Report on Bow River Power and Storage Investigations (Bow river west of Calgary), by M. C. Hendry, A.M. Can. Soc. C.E., Chief Engineer in charge of surveys. Published 1914.

WATER RESOURCES PAPER No. 3.—Report on Power and Storage Investigations, Winnipeg river, by J. T. Johnston, A.M. Can. Soc. C.E., Chief Hydraulic Engineer, Dominion Water Power Branch. Published 1915.

WATER RESOURCES PAPER No. 4.—Report of the Manitoba Hydrometric Survey to end of year 1914, by M. C. Hendry, A.M. Can. Soc. C.E., Chief Engineer. Published 1915.

WATER RESOURCES PAPER No. 5.—Preliminary Report on the Pasquia Reclamation Project, by T. H. Dunn, C.E., O.L.S., M.Can. Soc. C.E., Chief Engineer in charge of Reclamation Survey. Published 1914. Out of print.

WATER RESOURCES PAPER No. 6.—Report on cost of various sources of power for pumping in connection with the South Saskatchewan Water Supply Diversion Project, by H. E. M. Kensit, M.I.E.E. and M. Am. Inst. E. E., M. Can. Soc. C.E. Published 1914. Out of print.

WATER RESOURCES PAPER No. 7.—Report on the Manitoba Water Powers, by D. L. McLean, S. S. Scovil, and J. T. Johnston, compiled for the Manitoba Public Utilities Commission. Published 1914.

WATER RESOURCES PAPER No. 8.—Report of the British Columbia Hydrometric Survey for 1913, by R. G. Swan, A.M. Can. Soc. C.E., Chief Engineer. Published 1915.

WATER RESOURCES PAPER No. 9.—Report on Red River Navigation Surveys, by S. S. Scovil, B.Sc., Assistant Chief Engineer of Manitoba Hydrometric Survey. In course of preparation.

WATER RESOURCES PAPER No. 10.—General Guide for Compilation of Water Power Reports of Dominion Water Power Branch, prepared by J. T. Johnston, A.M. Can. Soc. C.E., Chief Hydraulic Engineer. Published 1915. Limited edition.

WATER RESOURCES PAPER No. 11.—Final Report on the Pasquia Reclamation Project, by T. H. Dunn, C.E., O.L.S. M. Can. Soc. C.E., Chief Engineer in charge of Reclamation Survey. Published 1915.

WATER RESOURCES PAPER No. 12.—Report on Small Water Powers in Western Canada, and discussion of sources of power for the Farm, by A. M. Beale, A.M. Can. Soc. C.E. Published 1915.

WATER RESOURCES PAPER No. 13.—Report on the Coquitlam-Buntzen Hydro-Electric Development, by G. R. G. Conway, M. Inst. C.E., M. Can. Soc. C.E., Chief Engineer of the British Columbia Electric Railway Company, Limited. Published 1915.

WATER RESOURCES PAPER No. 14.—Report of the British Columbia Hydrometric Survey for 1914, by R. G. Swan, A.M. Can. Soc. C.E., Chief Engineer. Published 1915.

WATER RESOURCES PAPER No. 15.—Report on the Water Powers of Alberta and Saskatchewan by C. H. Attwood, O.L.S., A.M. Can. Soc. C.E., Chief Eogineer Alberta and Saskatchewan Power Surveys. In course of preparation.

WATER RESOURCES PAPER No. 16.—Water Powers of Canada. A series of five pamphlets in one volume covering the water power situation in Canada prepared for distribution at the Panama-Pacific Exposition, San Francisco, 1915, by G. R. G. Conway, Consulting Engineer, Toronto; Percival H. Mitchell, E.E., Consulting Engineer, Toronto; H. G. Acres, Hydraulic Engineer, Hydro-Electric Power Commission, Ontario; F. T. Kaelin, Asst. Chief Engineer, Shawenegan Power Co., Montreal, Quebec; K. H. Smith, Engineer, Nova Scotia Water Power Commission, Halifax, N.S. Published 1915.

WATER RESOURCES PAPER No. 17.—Canadian Hydraulic Power Development and Electric Power in Canadian Industry, by Charles H. Mitchell, C.E., Consulting Engineer to Dominion Water Power Branch. Published 1915.

WATER RESOURCES PAPER No. 18.—Report of the British Columbia Hydrometric Survey for 1915, by R. G. Swan, A.M. Can. Soc. C.E., Chief Engineer. Published 1917.

WATER RESOURCES PAPER No. 19.—Report of the Manitoba Hydrometric Survey for 1915, by M. C. Hendry, A.M. Can. Soc. C.E., Chief Engineer. Published 1917.

WATER RESOURCES PAPER No. 20.—Report on the Interests Dependent on Winnipeg River Power, with special reference to the Capital Invested and the Labour Employed, by H. E. M. Kensit, M.I.E.E., M.Am. Inst. E.E., M. Can. Soc. C.E. Published 1917.

For Classified List of Reports of the Dominion Water Power Branch see inside back cover.