

**TRANSPORTATION
OF CANADIAN WHEAT**

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The Transportation of Canadian Wheat

From the West to the Sea

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CHAPTER: I

THE WHEAT CROP OF CANADA.

The cultivation of the soil in Canada dates back to the earliest known times. When Cartier sailed up the St. Lawrence in 1535 he found that the Indians were already growing corn in cultivated patches around Hochelaga. In 1605 de Monts founded the first settlement of white men in what is now Canada at Port Royal (Annapolis, Nova Scotia), and with the white man came the cultivation of wheat, a plant unknown on the North American Continent, for the first crop ever grown in Canada was raised there in the same year.

In 1616 Champlain speaks of fine wheat grown at Quebec and Father Le Jeune in 1636 writes that barley, wheat, etc. were sown in the colony and gave good crops. Yet throughout the 17th. Century the quantity of land under cultivation increased but slowly. The French settlers did not belong to the farming class and did not understand how best to cope with the problems of soil and climate. The adventurous life and larger profits of the fur trader had more attraction for them. Men were often called to defend the settlements against the Indians or to make up expeditions to the West or

R.B. Miller

2.

against the English to the South, and the consequent uncertainty of labor was naturally bad for the crops.

After 1665 the Indian inroads diminish^{ed} and farming developed more rapidly. In 1692, 89,711 bushels of wheat was produced following^{ed} in 1695 by a crop of 129,154 bushels and in 1698 by 160,978 bushels. The most flourishing period for New France began after the Treaty of Utrecht. Between 1713 and 1730 the population rose from 19,000 to 34,000 and agriculture progressed in proportion.¹ In the ten years from 1720 to 1730 the area of land under cultivation rose from 71,000 to 148,000 arpents. In 1719 240,000 bushels of wheat were grown which increased to 733,000 bushels by 1734.¹ All this wheat was spring sown: despite the primitive methods used, the yield ran from 8 to 12 minots per arpent or 9½ to 14 bushels per acre. Experiments carried on with fall wheat by some of the better farmers had not been encouraging.

In the later years of the French regime wheat was exported to France, the export amounting in one year (1754) to as much as 80,000 bushels.

After the coming of the English and opening up of what is now Ontario by the United Empire Loyalists, the valleys of the Thames and the Richelieu were the most famous wheat fields. Lower

¹ A.D. De Celles.

² Adam Smith

Canada's maximum wheat crop was that of 1850, when 3,073,940 bushels were produced, a record which has never since been equalled.

Upper Canada began the export of wheat and of flour with its earliest settlement.

During the Fifties, the Crimean War caused the price of wheat to rise ^{that} so its cultivation became more profitable to the Canadian farmer. The American civil war in the Sixties had the same result.

In what is now Manitoba, the earliest attempts at cultivation of the soil were made by the settlers brought out to the Red River by Lord Selkirk in 1812.¹ The twenty-two men who composed the settlement immediately set about breaking the land, but as the only implement they possessed was a hoe, and as they were also ignorant of the soil and climatic conditions the first two crops, 1813 and 1814 were failures. They persevered, however, and by 1822, 235 bushels of wheat were sown. The first satisfactory crop, that of 1824, yielded 44 bushels of wheat per acre from the plow and 68 bushels after the hoe.² By 1830 the colony was in a flourishing condition, but until 1878 when the first railway reached St. Boniface, it was forced to remain an isolated community.

1. Life of Lord Selkirk

2 J. H. Giesdale D.Sc. A.: in Canada Year Book 1921

After the coming of the Canadian Pacific Railway the farmers were able to secure a market for their surplus grain and agriculture flourished apace.

In Saskatchewan and Alberta the first farming was done around the Hudson's Bay Company posts at Carlton, Prince Albert and Battleford, etc., where the factors grew vegetables, oats, wheat, etc. for their own use. Owing to lack of transportation facilities the market was purely local. Not till after the Canadian Pacific Railway ^{was} built were these provinces settled or wheat cultivated to any extent.

At Confederation, 85% of Canada's wheat crop was grown in Ontario. With the opening of the West and the bringing under cultivation of the great wheat fields of the prairies, Ontario's yield has become of less relative importance, as shown in the following tables.

Yield of Wheat.

	1910 bushels	1900 bushels	1890 bushels	1880 bushels
Canada	132,077,547	55,572,368	42,223,372	32,350,269
British Columbia	206,570	359,419	388,300	173,653
Alberta	9,060,210	797,161	94,929	50,648
Saskatchewan	66,978,996	4,306,811	1,697,480	69,007
Manatoba	34,127,498	18,353,013	16,092,220	1,033,673
Ontario	19,843,626	28,418,907	21,314,582	27,406,091
Quebec	932,459	1,968,203	1,646,882	2,019,004
New Brunswick	204,125	381,699	209,809	521,956
Nova Scotia	223,530	248,476	165,806	529,251
Prince Edwd. Island	501,533	738,679	613,364	546,986

Dominion Census, 1911.

Acreage in Wheat.¹

	1910 acres	1900 acres	1890 acres
Canada	8,864,154	4,224,542	2,701,212
British Columbia	9,492	15,967	15,156
Alberta	879,756	43,062	5,071
Saskatchewan	4,228,222	487,212	108,737
Manitoba	2,759,445	1,965,200	896,622
Ontario	870,354	1,487,633	1,430,532
Quebec	62,882	139,826	168,929
New Brunswick	13,424	26,996	17,306
Nova Scotia	12,198	16,334	14,157
Prince Edward Island	28,741	42,318	44,703

Percentage distribution of Wheat in the²
Census years 1870 - 1910 and in 1917

Wheat	N.B. & N.S.	Quebec	Ontario,	Manitoba,	Sask.	Alta.	Other Provs.	Total
1870	2.5	12.4	85.1	-	-	-	-	100%
1880	4.	6.2	84.7	3.2	-	-	1.0	100%
1890	-	3.9	50.5	38.1	4.0	-	3.5	100%
1900	-	3.5	51.5	33.0	7.8	-	4.2	100%
1910	-	-	15.0	25.8	50.7	6.9	1.6	100%
1917	0.5	1.8	5.2	16.4	56.	20.	0.1	100%

The bulk of Canada's wheat is now grown in the three

Prairie Provinces, Saskatchewan alone grew 62½% of the total crop of 1922.³

	1922	
Manitoba	60,051,000 bushels,	15%
Saskatchewan	250,167,000	" 62½%
Alberta	64,976,000	" 16½%
British Columbia	1,035,000	"
Ontario	19,893,000	" 5%
Quebec	2,286,000	" 0.6%
Nova Scotia	293,000	"
New Brunswick	396,000	"
Prince Edward Island	688,800	"

Total for Canada 399,786,800 bushels.

1. Dominion Census, 1911.
2. Canadian Year Book, 1918.
3. Dominion Bureau of Statistics.

~~and~~ Manitoba, Alberta and Saskatchewan together raised 90% of the crop. of 1922.

The final estimate of the Dominion Bureau of Statistics places Canada's 1923 wheat crop at 474,199,000 bushels, the highest yield ever recorded in Canada. The yield per acre was 21 bushels. The three prairie provinces produced 452,260,000 bushels of wheat or 95½% of the total crop. Manitoba grew 32,804,000 bushels of wheat: Saskatchewan 252,622,000¹ bushels and Alberta 166,834,000 bushels.

Areas of Field Crops in Canada.²

	1921, acres	1920, acres	1910, acres	1900, acres
Total Grains	39,203,961	36,609,661	20,980,611	12,296,690
Wheat all	20,276,076	17,835,734	8,864,514	4,224,542

The following table shows the acreage, yield per acre, total yield and total value of Canada's wheat crop during the past 12 years. It will be noticed that while the acreage increases steadily the total crop varies considerably from year to year according to the season. In 1915 for example the bumper crop of 376,303,600 bushels was produced on 12,986,400 acres, but in 1919 a crop only about half that size was taken from 19,125,968 acres. The yield per acre also varies; the record of 28.93 bushels per acre in 1915 is still unbroken and likely to remain so for some time.

1. Dominion Bureau of Statistics.
2. Canadian Census, 1921.

Wheat Yield Canada.¹

1911 - 1922

	Acres	Yield per acre	Total yield	Total value:
1911	11,100,672	20.80	230,924,000	\$148,123,000.
1912	10,996,700	20.38	224,159,000	\$139,090,000.
1913	11,015,000	21.04	231,717,000	\$156,462,000.
1914	10,293,900	15.67	161,280,000	\$196,418,000.
1915	12,986,400	28.93	376,303,600	\$312,569,000.
1916	15,369,709	17.10	262,781,000	\$344,096,400.
1917	14,755,850	15.75	233,742,850	\$433,038,600.
1918	17,353,902	11.00	189,075,350	\$381,677,700.
1919	19,125,968	10.00	193,260,400.	\$457,722,000.
1920	18,232,374	14.50	263,189.300	\$427,357,300.
1921	23,261,224	13.00	300,858,100	\$242,936,000.
1922	22,422,693	17.75	399,786,400	\$339,419,000.

The Canadian Year Book of 1918 publishes a table comparing Canada's average yield per acre with the average yield of other wheat producing countries of the world. The calculations were made over the ten year period from 1907 to 1916, except in the case of

1. Dominion Bureau of Statistics.

Canada when the years 1908 to 1917 were used. The results shown would seem to be surprising were it not remembered that the high average yield in Great Britain is due to the ^{low} price of labor and the consequent intensive cultivation of the soil. In Canada, Australia and other countries lately settled, the cheapness of land and the high price of labour lead to less intensive cultivation of wider areas.

Average yield per acre of wheat in the great grain producing countries of the world:

United Kingdom	31.82	bushels per acre.
Canada	19.25	do.
Australia	11.00	do.
New Zealand	29.29	do.
India	11.45	do.
United States	14.72	do.
Argentina	9.52	do.

The bumper crop of 1922 gave Canada the second place among the wheat producing countries of the world, as shown by the following statistics supplied by the International Institute of Agriculture.

Relative Position of Canada in Production of Wheat:

	1922	
United States	862,000,000	bushels
Canada	399,786,000	"
India	367,135,000	"

France	243,317,000 bushels.
Argentina	189,047,000 bushels.
Italy	161,643,000 bushels.
Spain	125,470,000 bushels.
Australia	107,263,000 bushels.

The same authorities calculate the world's wheat production in 1922 as 3,103,278,000 bushels. Canada's share was a little more than 1/8 of this total. 1923, with an even larger crop of 470 million bushels, assures Canada's position as a wheat producing country.

Within the British Empire the average production of wheat before the war, during the years 1909 - 1913 was as follows:¹

Pre War Average - 1909 - 1913.

United Kingdom	59,640,000 bushels
Canada	197,118,000 bushels
India	359,035,000 bushels
South Africa	6,520,000 bushels
Australia	90,500,000 bushels
New Zealand	7,070,000 bushels.
	<u>719,883,000 bushels.</u>

Canada then held second place, but since then the Canadian crop has exceeded the Indian, and Canada has earned the title of "Granary of the Empire". The figures for the past three seasons are given below:

1. International Institute of Agriculture.

Production of Wheat in the British Empire:¹

	1923		1922		1921
United Kingdom	61,000,000 bus.		65,249,000 bus.		73,795,000 bus.
Canada	470,328,000 "		399,786,000 "		300,858,000 "
India	369,263,000 "		367,135,000 "		250,356,000 "
South Africa	#		6,696,000 "		8,689,000 "
Australia	#		107,263,000 "		132,285,000 "
New Zealand	#		8,500,000 "		10,565,000 "
			<u>954,629,000</u>		<u>776,548,000</u>

Harvest to take place in December - January.

Exports of Canadian wheat and flour since Confederation show the wonderful development of this section of Canada's foreign trade.

Exports of Canadian Wheat and Flour:²

Wheat:			Wheat Flour:		
1868	2,284,702	bushels	1871	306,339	barrels
1871	1,748,977	"	1881	439,728	"
1881	2,523,673	"	1891	296,784	"
1891	2,108,216	"	1901	1,118,700	"
1901	9,739,758	"	1911	3,049,046	"
1911	45,802,115	"	1918	9,931,108	"
1918	150,392,039	"			

Her position as a producer of wheat has somewhat obscured the fact, even more significant, that Canada is now the largest single exporter of wheat in the world, having more surplus wheat for export than any other wheat growing country. For the International Grain Year ending August 1st.1923 the International Institute of Agriculture gives the following figures:

- 1. International Institute of agriculture.
- 2. Canadian Year Book, 1918.

Canada	299,000,000	Bushels of wheat and flour reduced to wheat.
United States	199,000,000	do.
Australia	50,000,000	do.
Argentina	140,000,000	do.
India	28,000,000	do.

Thus out of a total of 696,000,000 bushels exported by the leading countries, Canada exported 2/5. For the next crop year ending August 1924, Canada's contribution will likely be even greater.

The destination of Canadian wheat exported for the past three Canadian Crop years (September 1st. to August 31st.) is given by the Dominion Bureau of Statistics in the following table:

Exports of Canadian Wheat:

	1921		1922		1923
United Kingdom	29,294,612	bus.	92,498,351	bus.	166,846,960
United States	42,324,894	"	16,592,797	"	14,213,629
Belgium	14,069,843	"	4,069,245	"	5,348,388
France	5,051,461	"	1,111,752	"	3,188,274
Germany	1,832,739	"	1,219,257	"	1,185,984
Greece	4,667,639	"	3,794,535	"	4,055,703
Italy	21,048,458	"	10,298,424	"	8,197,537
Japan	-	"	2,425,915	"	2,610,012
Netherlands	6,976,125	"	2,585,885	"	4,448,610
Sweden	673,443	"	360,396	"	889,716
Other Countries	3,275,943	"	1,532,681	"	2,094,755

CHAPTER: II

CANADA'S POTENTIAL WHEAT CROP

The continued production of wheat is a matter of the utmost importance to the future of Canada. All information of a scientific character bearing on this point is of great value in determining the future attraction of capital and the development of wheat growing. At present a large amount of capital is invested in wheat lands, elevators, railways, steamships, etc. Any shrinkage in the volume of the crop would be most disastrous to these interests. The Government is yearly giving great attention to the wheat plant and the potentialities of the Canadian wheat fields.

The origin of the wheat plant is lost in antiquity. Authorities differ as to whether it sprang from one or more original species. Mr. John Percival in "The Wheat Plant" concludes that it originated from two or three wild species which through hybridisation, mutation, and the effects of selection and cultivation give the almost endless variety of forms now existent.

The cultivation of wheat was known in prehistoric times, remains of the plant having been found among the Lake dwellings of Switzerland and the mummies of Egypt.¹ It was also grown in Greece and Persia,² and in China.³

1. Encyclopedia Americana.

2. "The Wheat Plant", by John Percival, Prof. of Agriculture Botany, University College, Reading.

3. Harmsworth Encyclopedia.

The Romans introduced it into Great Britain. Through the middle ages rye was the staple food in West^{em} Europe and Britain, but with the rising standard of living, wheat took its place until today the wheat crop is the largest cereal crop of the world.

Botanically, the wheat plant belongs to the Hordeae tribe of the Graminiae or Grass family. There are four principal kinds or sub-races.

1. Common wheat (*triticum sativum vulgare*)
2. Egyptian and English wheat (*triticum sativum turgidum*)
3. Flint wheat (*triticum sativum durum*) to which the macaroni varieties belong,
4. A dwarf variety, supposed to have been the kind produced in ancient times.

Each sub-race is in turn divided into many varieties. The wheat most commonly grown¹ belongs to *triticum sativum vulgare*, although in some localities² varieties of *durum* and spelt are extensively grown.³

Like all grasses, wheat first appears above the ground as a single blade and is therefore monocotyledonous and endogenous in its development. The inflorescence or ear is a true grass spike, consisting of spikelets arranged upon a rachis. At the base of each spikelet are two boatlike glumes, within which are from two to eight florets which when fertile contain one grain or berry each.

1. In the United States, Canada, Australia, England, France, etc. See *The Wheat Plant*: John Percival, p.433 and following.
2. Spain and Portugal, Russia, and India.
3. *Encyclopedia Americana*.

each. The grains of different kinds of wheat vary considerably in size, form, and colour, but they all resemble each other in fundamental structure, being fruits with thin-walled pericarps, each containing a single seed, which consists of four parts:

- 1) The seed coat or testa:
- 2) The embryo or young plant:
- 3) The nucellar layer:

4) The endosperm or floury part, which is a thin walled parenchymatous tissue, stored with food for the nutrition of the embryo when germination commences. This endosperm-parenchyma forms 87 to 89% of the total weight of the grain, and contains the starch and gluten.¹

Ordinary white flour consists chiefly of the finely ground endosperm; the so-called milling offals consisting of the broken pieces of the pericarp or shell of the grain, the seed coat, aleuron layer and embryo.

Whether the wheat is "hard" or "soft" depends on the amount and character of the gluten in the grain, which is largely determined by the soil and climate. A short, forcing, growing season and a fertile soil tend to produce glutinous (hard) wheat, while the opposite conditions produce starchy (soft) wheat. Hard wheats usually contain over 12% gluten, of which 45 - 65% is in the form of gliadin,

1. "The Wheat Plant", John Percival.

an alcohol soluble protein. Soft wheats contain less gluten but gluten of a higher gliadin content.¹

When grown under the same conditions different varieties of wheat remain fairly constant, but when the conditions are changed the wheat grain loses its original characteristics; as, for example, when hard wheat is sown in a district where the soil and climate have hitherto produced only starchy wheats, it changes its character and in a few seasons develops a starchy grain also.

Wheat differs in composition from all other cereals in that the gluten which it contains is composed of the two proteins gliadin and glutenin. This gives wheat flour its distinctive bread-making value, for no other cereal contains a gluten that is capable of expanding and forming such a light porous loaf.

While it is possible to cultivate wheat on a variety of soils, the best crop is attained on rich alluvium and soils formed from different kinds of rock thoroughly disintegrated and mixed with vegetable mold. Good wheat soils are rich in humus, that is, in decaying vegetable matter; this, through decay, supplies nitrogen, one of the principal elements used by the wheat plant in the formation of gluten. There has been a tendency, especially in newly opened wheat lands in North America, to grow wheat exclusively for a succession of years. This naturally results in a reduced yield and

1. Encyclopedia Americana.

inferior crop, due to the loss of nitrogen from the land. Wheat does not remove a large amount of gross fertility from the soil, but exclusive wheat cultivation on virgin soil causes a rapid decay of the humus, and a consequent loss of nitrogen. Wheat grown in a good rotation of crops, on land which is fertilized, does not exhaust the soil.¹

The cultivation of wheat is simple and its adaptability to various soils and climatic conditions is superior to that of any other plant, so that today it is grown all over the world, from the Equator to beyond the Arctic circle, the only places where it is not cultivated being the lowlying regions of the Tropics.

The wheat crop is harvested in one country or another all the year round, as shown in the following table.²

January, Australia, New Zealand, Argentina, Chili.

February, India.

March, India, Upper Egypt.

April, India, Persia, Asia Minor, Lower Egypt, Mexico, Cuba.

May, Japan, China, Central Asia, Morocco, Algeria, Tunis, Texas.

June, South France, Spain, Italy, Greece, Turkey, Japan, United States, south of 40°.

July, France, Germany, Austria, Hungary, Roumania, Bulgaria, South Russia, Northern United States.

August, England, North France, Belgium, Holland, Central Russia, Canada, United States.

1. Encyclopedia Americana.

2. "The Wheat Plant."

September,	Scotland, Sweden, Norway, Canada.
October,	Northern Russia, Finland.
November,	South Africa, Argentina, Peru.
December,	Burma, Australia, Argentina.

The great wheat fields of the world lie in the temperate regions between the parallels of 30° - 60° N, and 27° - 40° S. In Europe wheat has ripened as far north as 69° 28 N. on the Lyngenfjord in West Norway, and in European Russia it is cultivated around Archangel in latitude 64° 22 N. Spring wheats mature in Alaska up to 60° N., and in Canada ripe grain has been produced up to 65° N. on the Mackenzie River. Wheat also has a wide altitudinal range in Mexico, Colombia, Ecuador, and Abyssinia cultivation is carried on at 8,000 - 10,000 feet elevation.¹

The countries producing the greatest amounts of the best wheats are those which have a cold winter and a comparatively hot summer. For the most satisfactory growth and development of the grain a cool moist growing season followed by a bright dry and warm ripening period of 6 to 8 weeks with a mean temperature of 66° F. is necessary. An annual rainfall of 20 to 30 inches is sufficient if the greater part of it falls during the growing season.

In Canada, the wheat fields lie between the Manitoba

1. "The Wheat Plant", by John Percival.

Lakes and the Rocky Mountains. The Southern limit is the Canadian and United States boundary line along latitude 49° . The Northern limit to Canadian wheat culture has been found to be most irregular. The isothermal line¹ which indicates a mean summer temperature (June, July, and August) of 57.5° F. touches the Rocky Mountains at about 52° latitude. The line is then drawn Northward in a curve to the West and North of the Peace River until it touches latitude 59° . It then continues gradually South-East until it reaches the lower end of James Bay. This shows that in the Peace River district, wheat may be grown many miles North of its Northern limit in Saskatchewan or Alberta. The potential crop of a district seems to depend more on climate than on the latitude.

The Canadian Department of Agriculture constituted in 1867² has established experimental farms and stations in every province in the Dominion. At these, extensive research work is being done in connection with breeding of wheat, soils, irrigation, etc. The wheat yield on these farms is larger than the yield in ordinary farms in the district, which shows that education of the farmer in new and better methods must be carried on all the time if the best results are to be obtained.

Early and late frosts do not seem to be dreaded so much now as in the past. The popular belief among farmers is that on

1. Meteorological Service: Map of Canada.
2. 31 Vic. Ch.53.

account of the increased settlement the climate is not so severe as it used to be. This theory is not held by scientists. The total cultivated area, even in well settled districts, is too small in proportion to the whole for any general climatic effect to be produced. Acclimatisation of wheat and the wider cultivation of hardier varieties may also render frosts less dangerous to the crop than formerly.

The results of the investigations carried on (1923-24), by the United States Tariff Commission, into the relative costs of producing wheat in the United States and in Canada, constitute a splendid advertisement for Canadian wheat lands. According to the information presented by agricultural experts to the commission,¹ the factors which combine to permit a lower cost of wheat production in Canada than in the United States are larger yields per acre, lower taxation, and lower freight rates.

A 20-year Comparison in Yields Per Acre
between Prairie Provinces and Principal
Wheat Producing States of the Union.²

1. Agricultural and Industrial Progress in Canada,
2. From the Canadian Pacific Railway. /January 1924.

Province or State	1904,1905,1906,1907,1908,1909,1910,1911,1912,1913,1914										
Manitoba	16.5	21.1	19.5	14.2	17.3	17.3	13.5	18.3	10.7	20.0	15.5
Saskatchewan	17.5	23.0	21.4	13.5	13.6	22.1	15.5	18.5	19.9	19.5	12.4
Alberta	16.6	21.5	23.1	18.3	18.8	19.0	12.7	20.8	18.2	19.6	15.3
North Dakota	11.8	14.0	13.0	10.0	11.6	13.7	5.0	8.0	18.0	10.5	11.2
South Dakota	9.0	13.7	13.4	11.2	12.8	14.1	12.8	8.0	18.0	10.5	11.2
Minnesota	12.8	13.3	10.9	13.0	12.8	16.8	16.0	10.1	15.5	16.2	10.6
Kansas	12.4	13.9	15.1	11.0	12.6	14.4	14.0	10.7	15.5	13.0	20.5
	1915,1916,1917,1918,1919,1920,1921,1922,1923										Average for 20 years:
Manitoba	26.4	11.0	14.9	16.5	14.3	14.0	11.5	19.3	12.0		16.7
Saskatchewan	25.0	16.3	14.3	10.0	8.5	11.2	14.9	20.2	21.0		16.9
Alberta	31.0	25.0	18.3	7.7	12.0	20.5	11.3	11.2	26.5		18.4
North Dakota	18.2	5.5	8.0	13.6	6.8	9.1	8.5	14.1	8.0		10.9
South Dakota	17.1	6.8	14.0	19.0	8.0	9.0	9.0	13.2	9.0		11.4
Minnesota	17.0	7.6	17.5	18.0	9.4	9.8	9.7	13.9	12.0		13.1
Kansas	12.5	12.0	12.2	14.1	13.8	15.4	12.2	12.6	13.0		13.5

In 1923 the Canadian farmer was thus able, according to ^{of the commission} their figures, to produce a bushel of wheat for 46 cents less than the American. It was shown that on an eleven year average, the

production cost per bushel of wheat in the United States was \$1.58 as against \$1.22 in Canada, and that in 1923 while it cost the United States farmer \$1.49 to produce a bushel of wheat, the Canadian farmer was able to produce the same bushel for \$1.03.

Ever since the Canadian West was opened various estimates have been put forward as to how much wheat Canada will ultimately produce. Any such calculation is much in the nature of a guess, as so many factors must be taken into account. James Mavor, Professor of Political Economy in the University of Toronto, in his report to the British Board of Trade in 1904 gives several estimates worked out by different people. Estimate I, "drawn up by two gentlemen jointly"¹ places the ultimate annual yield of wheat on the Canadian prairies as 254,375,000 bushels, which would give 169,250,000 bushels of wheat available for export. Estimate No. II "by a gentleman of equal authority and experience"² gave the total possible yield from the prairies as 357,455,000 bushels of wheat.

These estimates need no further comment when it is remembered that in the year 1923 a crop of 474,199,000 bushels of wheat was produced of which 432,260,000 bushels was grown by the Prairie Provinces.

Mr. Hugh McKellar, then Deputy Minister of Agriculture for Manitoba, made an estimate in 1902³ of what the wheat production

1. Mavor's Report, p.70 & 71.
2. Mavor's Report, p.73.
3. Mavor's Report, p.77.

of the prairies might be ten years later. His calculations showed a crop of 350,000,000 bushels for 1912. These figures were not equalled by actual production until the year 1916, when 344,096,400 bushels of wheat were grown in the whole of Canada.

In 1904, Dr. William Saunders, then Director of experimental farms, made an estimate¹ which has not yet been equalled by any Canadian wheat crop. Estimating the area in the prairie provinces suitable for cultivation at 171,000,000 acres, and supposing that one quarter of this were under crop with wheat annually, the total crop, he thought, would be 812,000,000 million bushels of wheat.

In later years, the estimates of possible wheat production grow larger.

Mr. C. P. McLennan of London, England,² in 1922 estimated that only 15% of Canada's available wheat area was at that time under crop. The acreage under cultivation is increasing rapidly year by year and he considered that in about 30 years 75% of the wheat lands will be cultivated. This would increase Canada's production of wheat to the enormous quantity of 2,000,000,000 bushels annually.

Canada's ultimate production will depend not upon the area but upon a market for the crop. Vast quantities of land are available, suitable under present conditions for wheat cultivation,

1. Mavor's Report, p.74.

2. Agricultural and Industrial Progress, September 1923.

New and hardier varieties may increase this acreage. More intensive methods of agriculture would increase the yield per acre. During the War wheat exports from Central Europe and from Russia ceased and Canadian wheat found a ready market at Liverpool. At present European wheat is again being exported and Canadian wheat has to compete against it.

CHAPTER: III

COLLECTION, STORAGE AND HANDLING
OF THE CROP.

The Canadian wheat crop is harvested usually between August 10th and September 10th, but of course the date varies according to the season and the locality. The wheat is ready to thresh within ten days from the time it is cut, if the weather conditions are favorable, and then the problem of transportation begins. The first stage is to get the grain to the nearest country elevator, for few farmers have storage facilities. The farmer usually hauls his wheat to the elevator in wagon loads averaging 60 bushels each. Arrived at the nearest railway station the most conspicuous objects in the town or village are the grain elevators, which are usually lined up in a row along the railway tracks. Competition between the elevators in each town continues to be very keen as long as there is any space vacant.

The wheat brought in by the farmer is examined by the elevator agent and a mutual understanding is arrived at between him and the farmer as to the grade of the wheat. The agent is

advised daily from his head office at Winnipeg of the prevailing prices for each grade of wheat. The price agreed on at the country elevator is based on the value of wheat in store at Fort William, minus freight and handling charges. The wagonload is then dumped into the pit at the elevator and weighed in the presence of the owner, and in exchange the farmer receives from the agent what is called a cash ticket, on which is given the farmer's name, the gross quantity of wheat, the grade and dockage, and the aggregate value of the load. The cash ticket is indeed a cheque. For example, if the net load were 60 bushels and the price \$1.00 per bushel for that grade, the farmer would receive a ticket for \$60.

In case the farmer is dissatisfied with the grading of his wheat or the price offered for it by the elevator, he can, according to the Canadian Grain Act,¹ demand that the elevator company store his grain. If the trouble is about the grade only, a sample is agreed upon by the agent and farmer and sent sealed to the Chief Grain Inspector at Winnipeg, whose decision as to the grade is final. In the interval the wheat is kept separate by the elevator agent, and the farmer, instead of getting a cash ticket, receives a storage ticket, showing the gross amount of grain which

1. 2 Geo.V c.27.

he has stored at the elevator. The storage ticket is exchanged for the cash ticket when the Chief Inspector's decision as to the grade of the wheat is received at the elevator.

Another method, also widely used by the farmers, is to arrange with an elevator company for space for a carload (usually for 12,000 - 14,000 bushels) for the shipment of wheat of a certain grade. A storage ticket is given to the farmer for each load he brings in until he has a carload at the elevator. Meanwhile, arrangements are made with the railway station agent for a car to be ready and as soon as the car is supplied and a carload of wheat is ready at the elevator, the shipment to Fort William is made. When the car is loaded, the farmer surrenders his storage tickets and, on payment of the elevator fees of 1-3/4 cents per bushel, receives the bill of lading. The bank will advance about 60% of the market value of the bill of lading in cash; or a similar advance may be obtained directly through the elevator company.

A farmer may, if a siding runs near his land, load his car directly without going through an elevator.

As space in an elevator is filled with grain the agent wires for cars to be sent by the railway company to his station. The cars used for the carriage of wheat are ordinary box cars

with the lower part of their doors closed. Grain is poured into them through the opening by a chute on the side of the elevator. When cars enough to form a train are filled, the wheat is forwarded to Fort William. All cars must pass through Winnipeg, when a sample of wheat is taken from each car and examined by Dominion Government Inspectors. Their decision as to grade is final.

The handling of great quantities of grain, such as the United States and Canada harvest every year is made possible by means of grain elevators which are equipped with adjustable machinery for unloading, loading, and storing grain, and for cleaning drying and weighing it.

During the opening up of the Canadian West 1880-1890 a number of so-called flat warehouses were built by private individuals at different points on the Canadian Pacific Railway.¹ In Minnesota and Dakota at this time the handling of the grain at railway stations was being systematised and great economies were effected through the adoption of grain elevators. The Canadian Pacific Railway, quick to see the advantages which their rivals were getting by means of the modern elevator system, encouraged the formation of elevator companies, and the building of elevators at their stations in the grain producing districts.

1. Mavor's Report, p.102

The first grain elevator in Canada was built in 1883 by the Canadian Pacific Railway at Port Arthur, where it is still in use.¹ There are now about 4,500 country elevators in the three great grain producing provinces, Manitoba, Saskatchewan, and Alberta located at between 1,600 and 1,700 points.² Some³⁰⁰ companies and individuals are financially interested to the extent of at least \$50,000,000. in providing country elevator facilities. There are also about 1921³ loading platforms owned by the railways capable of accomodating about 5,000 cars. A loading platform is a wooden structure on a siding on to which a farmer can drive his team and from which he can shovel the grain into a railway car. There are six different kinds of elevators defined in the Canadian Grain Act.⁴

1) "Country elevators" situated at railway stations and receiving grain for storage before inspection.

2) "Public elevators" which receive grain for storage from the western inspection division after inspection.

3) "Eastern elevators", for the storage, after inspection, of eastern grown grain.

4) "Terminal elevators", which receive or ship grain at points declared to be terminal.

5). "Private terminal or hospital elevators", used for cleaning or other special treatment of rejected or damaged grain; under

1. Information kindly supplied by the Canadian Pacific Railway.

2. James Stewart, in "The Annals".

3. Canada Year Book, 1922.

4. 2 Geo.V. c27.

regulations governing sample markets all grain received into such elevators must be their own property, though the owner or owners of grain may contract for the handling or mixing of grain in such elevators.

6) "Manufacturing elevators", used or operated as part of any plant engaged in the manufacture of grain products in the western inspection division.

A small, or country elevator consists of a building or "house" with a smaller structure or cupola above it.¹ The house contains a series of deep bins in which grain of different grades is stored. In the cupola is the machinery for operating the elevator leg, the turnhead spouts and the garnerers; also the weighing and cleaning machines.

The country elevator is often built of wood, brick encased with a cupola constructed of corrugated sheet iron. Many are fireproof, with solid brick walls, steel bins, and terra cotta or sheet iron cupolas. For the larger elevators at storage points, such as Fort William and Port Arthur and Montreal, reinforced concrete construction is favored and this is becoming more used for the smaller elevators also; for the increased outlay is compensated by decreased insurance and depreciation. Protection from explosion is also obtained by having the operating machinery and the storage bins in separate fireproof buildings.

1. Encyclopedia Americana.

There are two types of grain elevating machinery.¹ In the first, the grain is carried up by buckets attached to an endless chain travelling in the leg of the elevator. The leg is divided in two, the buckets going up in one chamber and coming down empty in the other. The whole leg can be raised so as to pass over the side of a ship and lowered to reach the bottom of the hold. When the leg is adjusted, the grain is scooped up in the buckets and emptied into a receiving chamber. In the hold of the ship are men armed with large electric shovels, who guide the grain to the leg, so that the scoops can reach it. In the receiving room the grain is taken by another belt and carried to the top of the elevator to the garner. From the garner, the grain is allowed to fall through a spout into the weighing apparatus whence by machinery it is conducted, if necessary, to the cleaner, and finally to the proper storage bin.

In the pneumatic type of elevator the leg is replaced by a suction tube hanging from the end of a hollow crane-like boom which can be swung over the car or vessel to be unloaded. The tube is flexible and telescopic so that it may reach all parts of a ship's hold. By means of a powerful vacuum pump the grain is sucked up from the hold to a vacuum chamber and from there it is directed to the scales, cleaners, and bins.

1. Encyclopedia Americana.

When railway cars are to be unloaded they are run alongside the elevator so that the elevator leg is immediately above the car. The leg is lowered and men in the car shovel the grain to the scoops by which it is carried upward.

To carry grain from a ship to railway cars the elevator leg is lowered into the hold, conveyors carry the grain up to the turnhead spouts, from which it passes down to the storage bins and thence through the floor valves of the bins to the cars placed underneath them. An elevator can deliver a carload of 1,200 bushels in about three minutes.

All grain grown in Canada and shipped in carload lots or cargoes from elevators is subject to inspection and grading by the Dominion Government. As each car arrives at an inspection point it is sampled and graded by qualified samplers and inspectors appointed under the Canadian Grain Act.¹ On arrival at a terminal elevator the grain is weighed, cleaned and then binned, according to the grade given, under the direct supervision of the inspectors. When the grain is sold and ordered out of the terminal elevator in car or cargo lots it is again weighed and inspected as it must be "graded out as graded in": that is, if it was received into the terminal elevator as No. 1 then an equal quantity of grain of the same quality - No. 1 - must be shipped out. In this way the

1. 2 Geo.V: c.27.

identity of grade of exported grain is carefully preserved through every stage of its journey.

The principal inspection point for Western grain is Winnipeg; in the Eastern division, the inspection points are at Toronto and Montreal. The work is done by inspectors who are qualified by an examination held by the Board of Grain Examiners appointed by the Board of Grain Commissioners.

All grain is sold, both at home and abroad, not according to sample but only on the grade given by the Dominion Inspectors. The grading of wheat is based entirely on its physical qualities as, weight per bushel, color and plumpness. Diseases, such as smut and blemishes caused by unfavorable weather conditions are taken into account.

Under the Canada Grain Act,¹ grain is divided into five classes, viz: "No grade", "Condemned", "Rejected", "Commercial grade", and "Statutory grade".

"No grade" includes all good grain that has an excessive moisture, being tough, damp, wet or otherwise unfit for warehousing.

"Condemned grain" is all grain that is in a heating condition or is badly bin-burnt whatever grade it might otherwise be.

1. 2 Geo.V. c.27.

"Rejected grain" means all grain that is unsound, musty, dirty, smutty, or sprouted, or that contains a large admixture of other kinds of grain, seeds or weeds, or that for any other cause is unfit to be classed under any of the recognized grades.

"Commercial grade" includes grain which because of climate or other condition cannot be included in the grades provided for in the Canada Grain Act. For instance, the grain of one year may vary from that of the preceding year so that a certain proportion of it cannot be dealt with under the grades laid down in the Act and must be provided for by grades defined by the Standards Board, which is appointed under sections 48-51 of the Canada Grain Act.

Grain of the highest quality falls into the "Statutory grades" which are defined by the Grain Act. There are four statutory grades for Manitoba spring wheat, three each for Alberta red and white winter wheat, and two for Alberta mixed winter wheat. There are similar statutory definitions of the highest grades of oats, barley, rye, etc.

The statutory definitions are constant and can only be changed by Act of Parliament. The commercial grades, on the other hand, are fixed by the Standards Board and may vary from year to year with the crop.

The Canada Grain Act defines four grades of Western spring wheat:- No.1 Hard: No.1 Northern: No.2 Northern: No.3 Northern. The Standards Board has defined three additional grades:- No.4 Northern: No.5 Northern and No.6 Northern. But wheat of any of these six grades may fall under the general categories of "no grade", "condemned" and "rejected."

The adequacy of the inspection of grain at Winnipeg was a point brought up before the Royal Grain Inquiry Commission.¹ Western grain growers claim that there is possibility of injustice to the producer when an inspector takes only two seconds to each sample in determining grades. Mr. C.B. Waits, representing Eastern Canada millers, complained that grain carrying more than ^{the} 1% dockage allowed by law had been passed by the Winnipeg inspectors as straight grade with the result that Eastern buyers had received poor wheat. Also that the milling companies which have elevators on the Prairies buy the best flour-making grain themselves and ship the inferior qualities to Eastern Canada and overseas.

Mr. George Serls, Chief Government Inspector of Grain, gave evidence before the Royal Grain Commission on the question of adulteration of Canadian grain shipped to Liverpool in bond via the United States.² About 100,000,000 bushels of Canadian Grain, inspected

1. Montreal Star, February 9th.

2. Montreal Star, March 5th.

at Winnipeg and being guaranteed by Dominion Government Certificates, went to Liverpool annually through Buffalo. The British buyer bought and paid for the grain on the strength of the Canadian Government Certificate and many complaints were received when the shipment, as it reached England, was not ^{of} the quality given on the Certificate. Mr. Serls and Mr. Leslie Boyd of the Board of Grain Commissioners were sent to England to investigate the charges. In six cases, ~~the~~ samples of the grain were taken by the British buyer and each sample traced back over the United States route to the Head of the Lakes and there compared with samples taken from the original shipment. Mr. Serls testified, that after a comparison of samples there was no doubt but that the grain had been tampered with after it had passed beyond the authority of the Dominion Government.

Somewhere on the route between the lower lake ports and Liverpool a quantity of inferior American wheat had been injected into the Canadian wheat which was travelling in bond.

It is not known whether the adulteration in the United States is accidental or intentional. It is easy to pull a lever when the inspector is looking the other way and immediately the grain is diverted from its proper flow into another bin.

Any adulteration and lowering of Canadian grades is of vital importance to the reputation of Canadian wheat. If it

continues, the Dominion Government Certificate as to grade by which the adulterated grain is still covered will become useless. The possibility of such injection of inferior American soft wheat into Canadian hard wheat is a strong argument for the development of all-Canadian routes, thus obviating the shipments of Canadian grain through American ports such as is so largely the case at present. According to Mr. Serls, buyers in the United Kingdom are well satisfied with Canadian qualities and grading. The Standard samples sent from Canada compared well with the cargoes as delivered in Great Britain from Canadian ports, the only dissatisfaction being with Canadian grain shipped from American ports. For this reason the Vancouver route may be favored in the future by United Kingdom buyers, as the danger of adulteration at transshipping points is there reduced to a minimum.

Liverpool is the wheat market of the world, for Great Britain is the largest importer of grain. Prices obtained in the open market there determine the price of wheat on all grain exchanges - less, of course, the cost of transportation to Liverpool.

The most important Canadian grain market is at Winnipeg¹ which has also the distinction of being the largest actual grain market on this continent. In Chicago, Minneapolis, Duluth and

1. James Stewart, in "The Annals" of the American academy of Political and Social Science.

other United States grain markets, the market and terminal storage facilities are both in the same city, but the Winnipeg market is unique in being separate^d, by 400 miles from the terminal elevators at Fort William and Port Arthur. Thus the actual market for Canadian Grain is in Winnipeg, while the point of delivery on contracts, that is, the point at which prices are based, is at the Head of the Lakes.

Wheat is a world commodity, grown, exported and import^d, by many countries. Its price, therefore, is influenced by many conditions. If, for example, the European grain crop is light, more will have to be imported by Europe, and if the surplus to be exported from the United States, Canada, etc. remains only at an average amount, the price of wheat will tend to rise. On the other hand, a good crop, both in Europe and in the exporting countries, would tend to depress values.

The wheat crop is harvested in different countries in different months all through the year, as shown in the table in Chap. II. The wheat supply of the world is subject to daily changes in weather conditions. A frost in Canada or a drought in Australia or Argentina may vary the world's supply considerably.

The principal Canadian exchanges are, of course, in constant communication by telegraph with each other and with the American exchanges: so that satisfactory or unsatisfactory conditions in

one grain growing district are quickly reflected in the quotations on all the exchanges.

The available ocean tonnage also affects the price of the export wheat: for if held for shipment in a seaboard elevator, interest, storage, and insurance on the wheat must be paid by the shipper, who also runs the risk of losing the right market.

The Winnipeg grain exporting firms usually have offices either in Montreal or New York to facilitate the arrangements for ocean transportation. The offices at seaboard ports report any fluctuations in tonnage rates so that the grain may be exported when the cheapest freight rates prevail. The Winnipeg offices secure the grain in store at Fort William and Port Arthur from the elevator and general grain gathering agencies, procure the tonnage by lake or rail or both, and forward the grain to the seaboard ports which look after all the business of transportation to Liverpool.¹

Each agent of an elevator company at a country elevator, sends a daily report to his head office at Winnipeg, as to how much wheat or other grain he has purchased. The elevator companies, not wishing to take the risk of a rise or fall in the market, protect themselves by "hedging", that is, by selling wheat for future delivery. When deliveries at country elevators begin in September,

1. James Stewart in "The Annals".

the various elevator companies probably expect to be able to deliver at Fort William and Port Arthur during October at the latest. To protect themselves from possible decline in the market before October, these companies sell to grain exporters, millers, and speculators the October option on the morning after the wheat is bought at the country elevators. The option price, of course, relates to the highest grade of wheat, No. 1 Northern, in store at Fort William and Port Arthur.

The exporters have quotations daily from their correspondents in importing countries, indicating values there and the prices paid for corresponding grades No. 1, 2, or 3 Northern c.i.f. (cost, insurance, freight) at United Kingdom and European ports. If the quotations are in line after allowing for such factors as ocean freight, insurance, inland transportation by lake or rail or lake and rail to the seaboard, together with interest, insurance, as well as shrinkage or loss in transit, the exporters then purchase the October option or any other "future" which best suits the fulfilment of the price indicated or specified by the importing traders. The purchase of a future may be made through the representative of a Canadian miller, who may be buying with the prospect of selling his product to the Canadian consumer, either direct or through the baker in the form of bread.¹

1. James Stewart in "The Annals".

The Montreal daily papers publish every day the latest quotations on the Winnipeg and other exchanges for cash grains and for futures. The quotations are given in the following form: '

Winnipeg Grain Exchange: February 29th, 1924.

Fluctuations in grain today were:

	Open	High	Low	Close
Wheat:				
May	\$1.03-3/8	\$1.03-3/8	\$1.02-3/8	\$1.02-3/8
July	1.05	1.05	1.04	1.04
October	1.01-1/2	1.01-1/2	1.00-3/4	1.00-3/4

Cash prices closed:

Wheat: No. 1 Northern, 99-1/8c; No. 2 Northern, 96-1/8c; No. 3 Northern, 91-3/8c; No. 4, 86-7/8c; No. 5, 81-1/8c; No. 6, 75-3/8c; feed, 70-3/8c; track, 99-5/8c.

Chicago Grain Exchange: February 29th, 1924.

Future prices:

	Open	High	Low	Close.
Wheat:				
May	\$1.11-1/2	\$1.11	\$1.10	\$1.10
July	1.10-3/4	1.11-1/8	1.10-1/8	1.10-1/4
Sept.	1.11	1.11-3/8	1.10-3/8	1.10-1/2

Cash prices:-

Wheat: No. 2 hard, \$1.12 to \$1.15-3/4; No. 3 hard, \$1.09-3/4 to \$1.12

' Montreal Gazette: March 1st, 1924.

Whether or not hedging and future sales and purchases are beneficial to the grain producer and stimulating to the grain growing industry, was a question which was brought up before the Royal Grain Commission which is at present (spring of 1924) investigating conditions in the Canadian West. Opponents of the practice and especially Mr. Aaron Sapiro of Chicago who recently visited the West, claim that option dealing is a form of pure speculation and the worst curse to the farmer, except the curse of dumping his crop on the market at harvest. Mr. A. B. Clark, professor of Economics at the University of Manitoba, in testifying before the Commission in Winnipeg, took the opposite viewpoint. He asserted that fall selling was not dumping in the economic sense: that the farmer by hedging, could and does, protect himself and gets for his grain in the fall any advance that may have accrued to him by holding and selling in the spring.

Montreal Gazette, March 7th.

CHAPTER: IV

GROWTH OF TRANSPORTATION ROUTES IN CANADA.

Canada is a land of many rivers.

The first inhabitants of North America, the Indians, found the network of rivers stretching over the entire Continent ideal transportation routes. A portage past rapids, or from one river to another was an easy matter when the craft, a birch bark canoe, could be carried by one man. When the French settlers first arrived in what we now call Canada, they adopted the Indian mode of travel. Settlements grew up along the banks of the St. Lawrence, and fur trading posts were established at Tadousac, Quebec, Three Rivers and Montreal.

As trade between the settlements increased during the Seventeenth Century, the light flat bottomed bateau succeeded the canoe in carrying goods down the St. Lawrence from Quebec to Montreal.

The French did little to improve the rivers for navigation. A few stones were pulled out of the Richelieu and the Sulpicians began work on the Little Ste. Pierre River on the island

of Montreal. The contractor went bankrupt, and as the French Government was also in too great financial difficulties to send any help, the work was never completed. Indeed there was little need for improvements. Below Montreal the St. Lawrence was navigable by the largest ocean vessels of the time. South and West of Montreal there was then no settlement. The cargoes of furs brought down the river from what is now Ontario were easily carried in canoes.

After the cession of Canada to the English, the military interests insisted on better means of communication along the St. Lawrence, as part of the defence of the new colonies. In 1779¹ the first canals were begun past the Cascades Rapids, where later the Beauharnois and Soulanges Canals were built.

The Settlement of Upper Canada by the United Empire Loyalists added the commercial voice to the military demand for better means of transportation. It was also hoped that improvement of the St. Lawrence would give Canada a share in the carrying trade between the Western and Eastern States. The Erie Barge Canal begun in 1817 was looked upon as an attempt to divert traffic from its natural channel - the St. Lawrence river. The result was the hastening of the construction of a canal past the Lachine rapids.

1. Shipping and Canals: M.J. Patton.

which was opened in 1824. The Welland canal, partially opened in 1829, and completed in 1832, was built to avoid the necessity of portaging all freight around Niagara Falls, a most laborious business.

Lt.Col.Phillpotts, who reported to Lord Durham on the canal navigation of the two provinces, recommended the enlargement of all canals between Lake Erie and tidewater. After the Union of the Provinces work on the canals went ahead rapidly. The Welland canal was enlarged in 1841, and the Lachine canal in 1843. The Beauharnois canal opened in 1845, the Cornwall canal was completed in 1843, the Williamsburg canal in 1847. Thus the whole of Canada's present canal system, except the Sault Ste.Marie canal, (opened in 1895) was completed. Since then the only work has been the enlargement of existing canals, to meet the requirements of larger vessels and increased traffic.

Highways were of late development in Canada, for in winter the roads were over the frozen rivers and in summer all traffic was by water. At the end of the 18th century construction began. Yonge Street¹ (open in 1794) and Dundas Street were built in Upper Canada under the direction of Governor Simcoe. By 1800 there was a good coach road between Montreal and Quebec. In 1816 the road from Montreal to Kingston was open and a year later from Kingston to Toronto. Though well built, the roads were not kept in repair and

1. Life of John Graves Sincoe.

travel over them was slow^w and extremely uncomfortable.

Great interest was taken in Canada in the beginning of railways in England and the relative merits of canals and railways was discussed with much animation. It was thought probable at first, that railways in Canada would be obliged to stop during the winter on account of the snow, though a suggestion was made that the rails might be raised 3 feet from the ground, thus avoiding drifts.

The first railway opened in Canada was the Champlain and St. Lawrence, which ran from Laprairie to St. Johns. Although chartered in 1832¹ work was not begun until 1835 and the year following the railway was opened with horse drawn cars running over wooden rails with a strap of iron on the top. In 1837 steam locomotives were used for the first time, but iron rails were not laid down until ten years later.

In Upper Canada the immigration from Great Britain after 1825 gave a great stimulus to railway schemes in that Province. Their first Charter was granted to the Coburg Railway in 1832, the same year as the Charter of St. Lawrence and Champlain in Lower Canada. Upper Canada was very lavish in chartering, for before 1837 no less than three Charters² had been granted for parallel

1. 2 Wm. IV c 58 (1832).

2. 4 Wm. IV c 28: 4 Wm. IV c 29.

lines between Lake Huron and Lake Ontario. But the charters were not followed by railway construction; the Government offered grants, but this was not enough to attract capital. The constitutional difficulties which culminated in the Rebellion of 1837, the falling off in immigration and the financial crisis in both the United States and Canada were all discouraging to railway enterprise.

With the Union of the Provinces, an improvement was hoped for, but the forties proved to be a hard period for Canada. Great Britain abandoned her policy of protection which greatly upset Canadian trade.

The Canadian milling industry had grown up under the Canada Corn Bill of 1843¹ which gave Canadian grain and flour a preference in British markets. This measure was designed to divert the grain of the United States to Canadian waterways, and indeed much United States grain was milled in Canada to get the benefit of the preference. All this was, of course, swept away when Great Britain adopted Free Trade.

In 1845 the granting of bonding privileges by the United States drew more traffic away from Canada to the Southern routes. Ocean rates from New York were cheaper than the Montreal rates, but a more important reason was that in the States the railway had already taken the place of the slow canal.

1. 6 Vic. c 31 Canada (1843): 6 & 7 Vic. c 29: Gt. Britain.

While the United States had a comprehensive scheme of railways, there was as yet none in Canada. The lines built were short and for local traffic only. The Lachine railway, taking the place of the stage from Lachine to Montreal was begun in 1846 and opened in 1847. The St. Lawrence and Industry¹ ran from the St. Lawrence river to Joliette. In Ontario the Erie and Ontario, the only railway, was in 1848 a horse drawn train car from Queenston to Chippewa.

Portland had for some time been anxious to secure rail connection with Montreal. John A. Poor, an enthusiast on railways fired the ambition of the State, and in 1836 Maine granted a Charter to the Atlantic and St. Lawrence to run from Portland as far as the Canadian boundary. As long as Montreal enjoyed British preference, the merchants were indifferent to the proposed Portland route. But as the preference vanished, the propaganda of Poor and the Complaints of the farmers in the Eastern Townships combined to secure in 1845 the charter of the St. Lawrence and Atlantic,² which was to connect at the border with the Atlantic and St. Lawrence. In December 1848 the railway was open from Montreal to St. Hyacinthe.

Railway construction received Government help from Francis Hincks, who saw that transportation facilities were necessary before settlement could be increased and that the difficulties in the way

1. 10 & 11 Vic. c. 64 (1848)

2. 8 Vic. c. 25 (1865)

of railway construction were too great to be borne altogether by private capital. In 1849 by the Guarantee Act¹ the Government guaranteed interest of 6% on a sum not exceeding 1/2 the bonded debt of a railway over 75 miles long, one half of which had been constructed. Any payments of interest by the Government were to be secured by a first charge after the lien of the bondholders. No dividends were to be paid while any part of the principal on which interest had been guaranteed was outstanding until the repayment of such principal had been secured by the establishment of a sinking fund. Two years later this act was limited in scope to the Great Western, and St. Lawrence and Atlantic and the Northern, so that too great a strain might not be put upon public credit.

Hincks also was responsible for the creation of the Municipal Loan Fund 1852² by which the credit of various municipalities was used to raise money for railway construction. In Upper Canada especially taxation for railway building was

1. 12 Vic. c 84: 12 Vic. c29, 1849.
2. 16 Vic. cc 138, 213, 22

considered a very profitable form of investment and many towns borrowed so heavily that they could not meet their obligations. Although the Canadian Government declared that it was not responsible, it made advances to allow the fund to meet the interest due to the bondholders, and finally in 1859 the fund was closed the Government had to assume £3,000,000 of obligations outstanding against it. Lower Canada, of a more cautious temperament, did not invest in railways to nearly the same extent as Upper Canada.

The Grand Trunk Railway was Chartered in 1852¹ and 1853. The prospectus was issued in London written in terms of glowing enthusiasm; the working expenses of the road were to be 40%, the profit 11-1/2%. The plan called for 1212 miles of railway from Sarnia to Toronto, to Montreal, to Richmond, Portland, Quebec, and Trois Pistoles. The total capital was £9,500,000. From this were to be deducted sums spent already on the Quebec and Richmond and St. Lawrence and

1. 16 Vic. cc 37, 38 & 39.

Atlantic Railways; also shares and debentures set aside for the shareholders of these lines and for the bondholders of the Northern Railway. £7,246,000 were left for issue.

The construction of the Grand Trunk Railway was to be of the best - not scamped as the Great Western had been. Nevertheless as first built, the Grand trunk Railway road was rough and full of sharp curves in spite of reckless expenditure. The road was continually in financial difficulties and the Government had to come to its aid repeatedly.¹ The completion of the line failed to improve conditions. In 1862² the Company was reorganized and its bond issues converted into preferred stocks. Connections to Chicago enabled the Grand Trunk Railway to bid more effectively for through traffic. In 1884 it absorbed the Great Western Railway which strengthened its position for the time being.

The ambitious scheme of an intercolonial railway was first

1. 18 Vic. c 174 (1855): 19-20 Vic. c111 (1857):
20 Vic. c 11 (1857), etc.
2. 25 Vic. c 54,

discussed at St. Andrews, New Brunswick, in 1828. The proposed line was to run from St. Andrews to Quebec and would thus provide a means of communication in winter when the St. Lawrence river was closed. Resolutions were passed in favor of the project by the Legislatures of both New Brunswick and Nova Scotia. The scheme was of such magnitude that an appeal was made to the Imperial Government for Imperial aid. A grant of £10,000 was made in 1836 to cover the cost of a systematic survey. Unfortunately the political discontent which was then rife in Lower Canada caused the railway to be looked upon with scant favour. The dispute over the Maine boundary was also disturbing as the proposed route lay within the disputed territory.

The Rebellion in the Canadas, however, showed the need of transportation facilities for the defence of the colonies. Lord Durham also strongly recommended an intercolonial railway on political as well as commercial grounds.

The St. Andrews and Quebec route was succeeded by a proposal for a line from Halifax to Quebec. In 1847 Major Robinson, an Imperial officer, surveyed the route which for political reasons ran as far as possible from the United States boundary. Negotiations for Imperial aid continued but as the commercial future

of the road was extremely doubtful, arrangements were difficult.

The situation was complicated by the European and North American project which intended to link up Nova Scotia and New Brunswick with Portland, Maine. This line was looked upon with suspicion as an attempt to draw the British colonies into the United States. Nova Scotia and New Brunswick began construction on their sections of this line, but public men had not given up the idea of an intercolonial railway. Joseph Howe went to England to get help and apparently had succeeded, but owing to misunderstanding over the route chosen, the negotiations fell through in 1852. The dream was not given up and in 1857 John A. MacDonald and John Rose elicited help from the Home Government. The final result was that the Intercolonial Railway was made part of the Confederation terms.¹

Work was begun in 1869. The Dominion Government took over the sections of railway which had previously been built by the Governments of ~~the~~ Nova Scotia and New Brunswick, and in 1876 the whole line was complete.² *The route followed was that recommended by Maj. Robinson* The Intercolonial Railway has never paid as a commercial railway but it was built primarily for military and political reasons.

Immediately after Confederation Canada purchased the lands of the Hudson's Bay Company and established the Province of Manitoba² The Red River Rebellion of 1869-70 brought home to Canada the need

1. 30 Vic. c 3, Sec X:145.

2. 33 Vic. c 3. (1870).

for adequate transportation facilities between the Eastern provinces and the new territory in the West.

In 1871¹ when British Columbia joined the Federation, one of the conditions² was that a transcontinental railway should be built within ten years to link this province up with the others in the East. The rapid expansion Westward of the United States caused Canadian statesmen to fear that the Canadian prairies would become settled by Americans and finally be joined to the United States. The disputes over the Canada - United States boundaries added to their apprehensions. The building of American railroads in the West made it clear that unless Canada built a line on her side of the boundary Canadian trade would go by way of St. Paul, Minneapolis, and Chicago. Practical as well as political reasons thus urged the immediate construction of a railway into the Canadian West. The railway which was built gave tangible evidence of the union of British North America, held for Canada the territories between Manitoba and the Rocky Mountains, opened up an immense territory for colonization and checked the drift to American cities.

The history of the Pacific Railway between 1870 - 1880 is a record of rivalry between competing contractors, competing policies of construction and unsuccessful attempts to carry the work forward. The Liberal Party, then in opposition, criticized the project as likely to burden the Eastern provinces with undue taxation. They recommended² the building only of links between the navigable

1. Order-in-Council, May 1871.

2. House of Commons Debates: Mr. Mackenzie's Speech 1876.

waterways until the West had developed sufficiently to provide traffic enough for a through line of railway. The Conservative Government pressed forward with the scheme and two companies were incorporated.¹ The Pacific scandal over the elections of 1872 brought defeat to the Conservatives and the Liberals had an opportunity to build the line as they thought it should be done. Their policy of utilising the water stretches to give a combined water and rail system between the East^{ern} and West^{ern} provinces met with little success. British Columbia protested at the breach of agreement. No Company would undertake the contract for the line from Winnipeg to Lake Superior, one of the important links. The Pembina Branch South from Winnipeg was finished in 1878 and gave an all rail route from Winnipeg to Montreal via St. Paul and Chicago.

On the return of the Conservatives in 1879 a series of resolutions was passed reaffirming their original plan of building a line from East to West without delay. For a short time they were compelled to continue their predecessors policy of Government construction. In December 1880 after lengthy negotiations the Government submitted to Parliament a contract with the Canadian Pacific Railway Company to build a road from Lake Nipissing to the Pacific Coast. The contract was ratified² early in the following year. The terms of the agreement were very good for the new

1. The Canadian Pacific Railway, 35 Vic. c 73: The Inter-oceanic Railway 35 Vic. c 72 (1872).
2. 44 Vic. c 1 (1881).

company; the Government gave them the sections of the road already completed or under construction, a money grant of \$25,000,000 and a land subsidy of 25,000,000 acres of land. An important clause shut off any competition from United States railroads by providing that for twenty years no line of railway should be permitted to be constructed in the Canadian West South of the Canadian Pacific Railway within fifteen miles of the United States boundary. Other privileges which the Canadian Pacific Railway was given were the freedom from taxation, and the remission of customs on construction supplies.

The construction of the road was undertaken with such celerity that in 1885 the last spike was driven and in the following year, 1886, the first train ran from Montreal to Vancouver.

While constructing the main line in the West, the promoters of the company were busy securing control of desirable connections in Eastern Canada. In 1883 the Canadian Pacific Railway obtained extensions to Montreal and to Brockville. It leased the Ontario and Quebec Railway and in 1885 absorbed the North Shore Railway, thus gaining access to Quebec City. In 1887 a short line from Montreal to St. John, New Brunswick, was authorized. Arrangements were made in the United States with the St. Paul, Minneapolis and Sault Ste. Marie and with the Duluth, South Shore and Atlantic Railways bringing these important lines within the influence of the Company.

Development and extensions have thus continued unabated from the beginning to the present time.

The Grand Trunk Railway regarded the Eastern expansion of the Canadian Pacific Railway with jealous surprise, although the opposition of the older railway did not retard the growth of its rival. The Grand Trunk Railway was forced to watch the development of a powerful rival which competed with it in Ontario and had a reserve of strength in the increasing traffic on its Western lines. The Grand Trunk Railway began to see what an opportunity they had lost in refusing to accept the contract to build a Pacific railway: the Liberal Party understood how much they had underestimated the possibilities of the Canadian West. When, therefore, the extraordinarily rapid development of the prairies at the beginning of this century began to tax the facilities of the Canadian Pacific Railway, the project of a second transcontinental line was conceived.

The scheme was endorsed as likely to promote further development of the Canadian West. In many parts of the West there was considerable feeling that the Canadian Pacific Railway was charging too high freight rates and it was felt that the competition of an independent line would improve rates. It was also urged that if another line were not built much traffic would be lost to Canada by being carried over American railways.

The project necessitated an agreement between the Grand Trunk Railway and the Dominion Government¹. This provided that the road was to consist of two sections from Moncton, New Brunswick to Winnipeg, 1,800 miles, and from Winnipeg to the Pacific, 1,756 miles. The Eastern division, called the National Transcontinental, was to be constructed by the Government of Canada and leased for fifty years to the Grand Trunk Pacific Railway for operation. The Western division, the Grand Trunk Pacific, was to be built by that company under a bond guarantee of 3/4 of the cost of construction. This was limited to a cost not exceeding \$13,000 per mile. Under an implement clause, the Government agreed to make up the difference between the amount realised in certain bonds and their par value. In the case of the mountain division the Government further agreed to pay the bond interest for seven years.

The expenditure on both sections of the railway far exceeded the estimated costs. In November, 1913, the Eastern division was completed, but was never taken over by the Grand Trunk Pacific. The strain of financing the Western line was too great for the Grand Trunk Railway. In 1915 they suggested to the Prime Minister of Canada that the Dominion Government should take over the Grand Trunk Pacific.

The third transcontinental line, the Canadian Northern,

1. 3 Edward VII (1903) c 122.

began as an amalgamation to take over a couple of small railways in Manitoba in 1898.¹ Under the direction of two ambitious railway men, Messrs Mackenzie and Mann, the company leased several other short lines in Manitoba and formed the nucleus of a system.² In 1902 power was obtained to build Eastward to Ottawa and Montreal and Westward by Edmonton and the Skeena River to the Pacific Coast.³ Thus the Grand Trunk Railway was developing Westward and building into the rich and rapidly developing agricultural areas of the West while at the same time the Canadian Northern Railway was securing outlets in the East. A fusion of these interests would have been the logical conclusion, but unfortunately this did not take place. The Grand Trunk Railway obtained the financial support of the Canadian Government by agreeing to a national transcontinental line to Canadian maritime ports. Although for the first ten years of the history of the Canadian Northern Railway construction work centered in Western Canada, yet the desire to build Eastward was never relinquished. Control of certain lines in Eastern Canada was obtained. In 1911 guarantees were secured from the Dominion Government⁴ for a bond issue to enable a connecting link to be built between Montreal and Port Arthur. Construction continued until the Canadian Northern Railway extended from Quebec to Vancouver, and reached Duluth, Toronto, Ottawa and Montreal, and covered the

1. 62 - 63 Vic. c 57 (1900).
2. 1 Edward VII c 52 (1901).
3. 2 Edward VII c 50 (1902).
4. 1 - 2 Geo. V c 6.

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prairie provinces with a large number of branches. The finances of the company became weaker and weaker. In 1914 a bond issue of \$45,000,000 at 4% was guaranteed and at the Session of 1916 it received a loan of \$15,000,000.

The financial difficulties resulting from the construction of the two later transcontinental lines led the Dominion Government to appoint in July 1916 a Royal Commission to inquire into railways and transportation in Canada. The result of this was that the Grand Trunk Railway with the Grand Trunk Pacific and Canadian Northern Railways were taken over by the Dominion Government and with the Intercolonial Railway were operated as the Canadian National Railways.

CHAPTER: V

THE RAILWAY COMMISSION.

The Governments of the Colonies in British North America were more concerned, in the early days, with the construction of railways than with the control of railway rates. It soon became evident that the railways were likely to take advantage of their monopoly to charge unduly high tariffs on freight.

The Government of Canada has today four possible different means of control over railway rates.

The oldest method of control by the Common Law was derived from English experience. The first railways incorporated were by analogy considered to be of the same nature as turnpikes and canals; a kind of road over which anyone might carry his own goods in his own conveyance. As the proprietors of the road became more and more, and at last exclusively, the operating carriers, common law methods of relief were open to shippers who felt that they were being imposed upon. In Canada this method has never been widely used and is now obsolete. In Upper Canada the early railway charters¹ left the power of determining rates to the President and

1. ^{4 Wm.} ~~R-2m.~~ IV c 28: 4 Wm. IV c 29.

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Directors, thus following the English custom and accepting the English view of competing carriers using the same line.

Control of rates through clauses in the charter was early exercised by the Legislature of Lower Canada, when in 1832 it granted the charter for the first railway in what is now the Dominion of Canada - The Champlain and St. Lawrence.¹ A maximum rate was fixed for both passenger and freight service between the terminals, St. Johns and Laprairie. Another clause of the charter provided that for every 1% increase of dividend over 12% there should be a 5% reduction in tolls the following year: and that this might be accomplished, an annual return was to be sent to the Legislature showing the result of operations for the year.

New Brunswick, in the first charter granted to the St. Andrews and Quebec Railway², limited the extravagant ambitions of the shareholders by decreeing that if after ten years the Legislature considered the rates excessive, it might reduce them so that profits should not exceed 25%.

Limitations of rates on the basis of dividends was criticized in Lower Canada as likely to discourage the investment of capital in desirable enterprises. Restrictions in later charters were not so rigid. In the Charter of the St. Lawrence and Industry Railway³, tolls ~~are~~^{were} to be ordained by by-law without giving

1. 2 Wm. IV c 58.
2. 6 Wm. IV c 31 (1836).
3. 10 & 11 Vic. c 64 (1848).

privileges or undue advantages: there are no provisions for automatic reduction, but a tax is to be levied in case the profits exceed 24%.

A more modern instance is the charter of the Canadian Pacific Railway,² which provides for a reduction of rates if the net earning of capital exceed 10%.

Charter control of railway rates has, however, been of little importance in Canada, as the maximum rate set before control became effective has been too high. Class rates and even commodity rates might press with severity upon the shipper before the earnings of the Company would amount to 10% or 15%.

In 1851 when the first general railway act was passed¹, statutory control began to be exercised. The aim of the act was to "consolidate in one act certain provisions usually inserted in acts authorizing the making of railways". In respect to tolls it provided that they were to be fixed by by-law and there was to be no "undue advantage, privilege, or monopoly afforded to any person or class of persons." All tolls before being levied were to be approved by the Governor-in-Council. Revisions and consolidations of the Railway Act left these clauses practically untouched until 1888, when the Royal Commission on Railways carried out an extensive investigation

1. 14 & 15 Vic. c 51.

2. 44 Vic., cap 1 (1881)

of railway policy and practice and methods of railway control. The Commission recommended the creation of an independent "tribunal"¹ to deal with rates and "generally to regulate the system of railway management in its relation to the commerce of the country". The Railway Committee of the Privy Council were given wider powers and constituted the new tribunal.

Criticism and complaints of the railways and their rates continued, especially in Western Canada, and the result after various commissions and investigations was the establishment of the present Board of Railway Commissioners by the Railway Act of 1903.² The Board as it now exists consists of six Commissioners, appointed for ten years and capable of being reappointed unless disqualified by age. The Chief Commissioner must be a Judge of a Superior Court or an advocate or barrister of ten years standing. The Board may hold sittings elsewhere than at Ottawa and may hold more than one sitting at the same time. A large staff of experts enables the Board to carry on the work of inspection and control. The Board has power³ to inquire into, hear, and determine any complaints arising out of a failure to fulfil the requirements of the Railway Act "or any special act or regulation made thereunder by the Governor-in-Council, the Minister, the Board, or any

1. Report of the Royal Commission on Railways (1888).
2. 3 Edward VII c 58.
3. Ibid., sections 10 ff.

64.
inspecting engineer." It inherits all the powers of the Railway Commission in the Privy Council, and has, in regard to attendance, the production of documents and the enforcement of orders, all the powers of a Superior Court. The appointment of a receiver does not oust its jurisdiction. It may act upon its own motion, may review its own orders: it is a Court of Record, and as such its findings are authoritative as to fact. For the purpose of the act it has full jurisdiction "to hear and determine all matters whether of law or fact" and its "decisions are reviewable only by the Governor-in-Council, and in certain cases by the Supreme Court of Canada." In addition to these extensive powers, the Board received in 1908¹ a limited jurisdiction as to agreements.

The powers of the Board as exercised includes the supervision of the initial location of lines, sidings, and switchings, with inspection by one of the Board's engineers before they are open for traffic: an inspecting engineer may forbid the operation of a line until alterations, substitutions, or repairs are made thereon.

The regulations for safety and convenience of operation, include the general requirement that every railway shall use modern equipment and efficient apparatus, and the Board has the authority to determine when the apparatus is efficient.

1. 7 - 8 Edward VII c 61 section 26A.

The powers of the Board in matters of freight classification, tariffs and tolls are set forth in 47 sections of the Act.¹ The Board has complete authority over freight classification.

Tariffs are divided into three classes: the standard freight tariff, special freight tariffs and competitive tariffs. All these must be filed and approved by the Board. Joint tariffs are to be filed by the initial company and the other companies affected must notify the Board of concurrence. In case of agreements concerning carriage by water, between Canadian ports with railway connections, commodities shall be deemed to be carried by a continuous route. When there is a failure of two or more companies to agree to a joint tariff, for what the Board considers "a reasonable practicable route", the Board may by order determine the route, fix the tolls and apportion the same among the companies interested. Joint tariffs for international traffic must also be submitted to the Board for approval and authorization.

The Board does not originate rates, but may indicate in a given instance what would be a reasonable charge. In cases of complaints about rates, the onus of their reasonableness lies upon the railway.

1. 7 - 8 Edward VII c 61 sections 314 ff.

CHAPTER: VIPRESENT GRAIN ROUTES AND RATES.

From the Wheat fields in the prairie provinces wheat may be sent Eastward to Fort William and Port Arthur at the Head of the Lakes; or it may move Westward, Canadian wheat having recently found a new point of export in the Port of Vancouver.

Vancouver, described as the "finest great harbour that indents the coast of British Columbia" opens off the Strait of Georgia into Burrard Inlet a few miles north-east of the mouth of the Fraser River. By act of Parliament of May 1913¹, the Harbour of Vancouver was placed under the jurisdiction of a harbour commission of three members, the act being a copy of the Montreal Harbour Commissioners act.

The opening of the Panama Canal made possible shipments to Eurpoe via the Pacific - Panama route. The ocean voyage is, of course, long and the grain has to pass through the tropics. On account of this, it was at first feared that the shipments would be inclined to sprout during the journey, but it has since been proved by experience that the wheat arrives at its destination in good condition. There is every reason to believe that exports to Europe via this route will increase considerably every year.

1. 3-4 Geo.V c.55

The growing consumption of wheat in the Orient and their consequent enlarging imports of Canadian wheat and flour are giving an added impetus to the development of grain handling facilities at Vancouver. So also is the growing trade ^{with} ~~the~~ South America. All these markets promise to expand. Another advantage which the Pacific Port has over its Eastern competitors, is that while they are blocked with ice during the winter season, Vancouver can ship grain all the year round.

1921 marks the beginning of the export of wheat from Vancouver and in the crop year 1921-22 7,837,171 bushels were shipped. The following year, 1922-23, 17,829,687 bushels of wheat were exported of which 10,506,635 bushels were sent to the United Kingdom, and the remaining 7,323,052 bushels to other countries.¹

The Harbour Commissioners of Vancouver are fully alive to the future possibilities of their port. Elevator expansion is going on rapidly. The Government's elevator is being increased to a total capacity of 808,000 bushels,² and a new elevator is being constructed to hold 2,000,000 bushels,² which it is expected will be ready for the 1924 crop. By that time it is hoped that the total storage accommodation of the port will have reached 5,000,000 bushels.

In a short time Vancouver expects to be shipping from

1. Agricultural Gazette of Canada.

2. Agricultural and Industrial Progress in Canada.

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100,000,000 to 150,000,000 bushels of grain per year, as it is claimed that lack of storage space alone has hampered the growth of the traffic.

A certain part of the grain growing section of Canada appears to be tributary to the Port of Vancouver: the crop of most of the Province of Alberta and of some sections of Western Saskatchewan seems to flow naturally to the Pacific.¹

A factor in developing the export grain trade of Vancouver is the securing of differential rail rates from these wheat growing regions over the mountains to tide-water.

Present rates to Vancouver per 100 pounds of export wheat in carload lots from various points in the West are:²

From	rate
Edmonton, Alberta	22 $\frac{1}{2}$
Calgary "	22 $\frac{1}{2}$
St. Paul "	25
Battleford, Saskatchewan	28 $\frac{1}{2}$
Loverna "	28

When the movement of grain on this route is established and these rates are stabilized, a sort of watershed will become defined, from one side of which it will be cheaper to ship grain via the Pacific and from the other side via the Eastern ports.

Some people fear that the development of Vancouver as

1. Report of Harbour of Montreal, 1922.
2. C.N.Rys. (W.L.) Tariff 135-C.

an export point for Canadian grain will have an adverse effect on the shipments from the Port of Montreal. The Harbour Commissioners of Montreal have no such apprehensions. The area from which the St. Lawrence - Montreal route derives its traffic is so extensive that the problem of this port will be to keep the facilities for grain export equal to the demands made on them.

If the wheat is shipped Eastward, the first stage of the journey is by rail from the country elevators to Fort William and Port Arthur. From Winnipeg to Fort William, 420 miles, wheat for export is forwarded in carload lots for 14 cents per 100 lbs.¹ Here the Canadian shipper has the advantage over the American who ships from the United States grain fields to Duluth. From Leeds, North Dakota to Duluth, a distance of 417 miles, the rate is 20½ cents per 100 lbs. of export wheat.² For longer hauls the Canadian has a still greater advantage. Wheat may be sent from Calgary to Fort William, 1243 miles, for 26 cents per 100 lbs.³ The rate for a corresponding distance in the United States from Rexford, Montana, to Duluth, 1254 miles, is 51½ cents per 100 lbs. of wheat⁴ - almost 100% higher.

The following table gives rates on export wheat (carload lots) from various important points in the Canadian wheat fields

1. C.N.Rys. (W.L.) Tariff 183 B.
2. Figures supplied by the Canadian Pacific Railway.
3. Canadian Pacific Railway Tariff.
4. Figures supplied by the Canadian Pacific Railway.

to Fort William and Port Arthur: also rates over American roads to Duluth from points in the American wheat fields corresponding in distance. The advantage of the Canadian shipper can be seen at a glance.

	<u>Miles</u>	<u>Rate per 100 lbs. of wheat</u>	<u>U.S. Rates per 100 lbs. of wheat for cor- responding distances.</u>
Winnipeg to Ft. Wm. ¹	420	14 cents	20 cents
Portage La Prairie "	475	15 "	23 "
Carberry to Ft. Wm.	525	16 "	23½ "
Brandon do.	553	16 "	26½ "
Verden do.	600	16 "	27 "
Broadview do.	684	18 "	31 "
Yorkton do.	699	19 "	31 "
Wolseley do.	715	19 "	32 "
Regina do.	776	20 "	35 "
Moose Jaw " do.	818	20 "	36 "
Swift Current do.	929	22 "	39½ "
Maple Creek do.	1,013	23 "	43 "
Medicin Hat do.	1,076	24 "	45½ "
Grassy Lake do.	1,125	25 "	46½ "
Bassano do.	1,165	25 "	48 "
Lethbridge do.	1,177	--	48 "
Calgary do.	1,243	26 "	51½ "

When in the terminal elevators at the Head of the Lakes grain may be sold to a number of different markets. It may be sold to Liverpool; it may find a market in the United States, or it may be bought by millers in Eastern Canada. When stored in the elevators at Fort William and Port Arthur grain may proceed to its ultimate destination by either the United States or Canadian Channels, by water

1. Figures kindly furnished by the Canadian Pacific Railway Offices.

routes or by rail or by a lake-and-rail routes. For these reasons the Fort William route is likely to remain more popular than the Vancouver route. Grain at Vancouver has not yet got the choice of such a variety of markets, though this may grow as exports to the Orient and South America increase. The Hudson Bay route would be under a great disadvantage as grain at Fort Nelson could only be shipped to the Liverpool market. The offers of American and Eastern Canada millers would be lost to the grain shipper whose wheat was routed via the Hudson Bay.

Canadian railroads and steamship companies have received much criticism from the public for allowing Canadian grain to be shipped, to a great extent, via the United States. Unfortunately a railroad cannot dictate to its customers where their goods are to be shipped. The railway only exists to carry commodities where their owner wishes them to be sent. The Canadian National Railway has a splendid grain route in the Transcontinental from Winnipeg to Quebec; but grain shippers prefer to send their wheat to Fort William and Port Arthur.

The number of routes by which Canadian grain may reach the sea from Fort William and Port Arthur is shown below:

1. To Europe direct by water.

2. By water to Quebec.
3. By water direct to Montreal.
4. By water to Montreal via Port Stanley or Port Colborne.
5. By water to:

Depot Harbour
 Port McNicoll
 Tiffin
 Midland
 Goderich
 Port Edward and thence from any one of these

Bay Ports by rail to Montreal or Portland or St. John.

6. By water to:

Detroit
 Toledo
 Cleveland
 Fairport
 Erie
 Buffalo, and thence from any one of these Ports

on Lake Erie by rail to Boston, New York, Philadelphia or Baltimore.

7. By water or rail to Duluth Superior whence it is shipped down the lakes by any of the above mentioned routes.

8. By water to Chicago.
9. All rail to Montreal.
10. All rail to St. John.
11. All rail to Portland.

Shipments of grain by vessel and all rail route from Fort William and Port Arthur for the crop years ended August 31st 1920 and 1921:¹

WHEAT:					
			<u>1919-20</u>	<u>1920-21</u>	
Vessels	Rail	Total	Vessels	Rail	Total
80,860,185	12,028,918	92,889,102	123,121,254	17,897,997	141,019,251
TOTAL GRAIN:					
106,145,084	22,342,611	128,487,696	178,117,021	26,142,525	204,256,548

This statement shows the quantities of wheat shipped by vessels from Fort William and Port Arthur during the season of navigation 1923, according to the ports of destination.²

<u>To Canadian Ports</u>	<u>Wheat Bushels.</u>
Depot Harbour	2,070,160
Goderich	12,923,295
Midland	14,059,784
Montreal	6,060,676
Port Colborne	45,368,950
Port McNicoll	19,745,226
Port Stanley	405,670
Quebec	494,507
Tiffin	18,058,924

Total to Canadian Ports 1923, 119,187,192 bushels.
 Total to Canadian Ports 1922 96,729,810 bushels.
 To Europe Direct, 196,300 bushels.

1. Canada Year Book 1921.
 2. Report of the Montreal Board of Trade, 1923.

<u>To United States Ports</u> ¹	<u>Wheat bushels.</u>
Buffalo	100,540,988
Chicago	198,762
Cleveland	278,555
Detroit	564,861
Duluth-Superior	1,773,677
Erie	9,261,954
Fairport	2,082,556
Port Huron	651,159
Toledo	9,841,665
Total to United States Ports 1923	125,194,177 bushels
Total to United States Ports 1922	128,651,648 bushels.
Grand Total 1923	244,577,669
1922	225,381,458

It is not possible to cite with accuracy the rates on export wheat shipped by water from Fort William. They are not under Government control as are rail rates. The rate for water carriage varies from day to day during the season according to the amount of grain to be shipped and the demand for space on a vessel. The statement may be made that the rate on wheat for export from Fort William to Montreal ranges from 5 to 11 cents per 100 lbs.² During the season of 1923 63,497,696 bushels of wheat arrived at Montreal by water.¹

The water rate to Georgian Bay ports is (May 1924) about 7½ cents per 100 lbs. of export wheat.³ Although as a rule the

1. Report of Montreal Board of Trade, 1923.
2. Information supplied by the Canadian Pacific Railway.
3. Figures and information supplied by R.W. Oliver, Esq. Member of the Montreal Corn Exchange.

rates from Fort William to Buffalo by water are a shade less than to the Bay Ports, on the latter route the boat has to pay the charges of transfer from the boat into the elevator; whereas, on the Buffalo route the shipper pays the charges, which makes the rates on the two routes about equal.¹

Grain is shipped from the Georgian Bay Ports by rail. The rate to Montreal is 14.34 cents per 100 lbs. of export wheat.²

Montreal received 36,314,170 bushels of wheat by rail³ during the year 1923.

Or, if the Port of Montreal is closed, the grain may continue by rail to Portland. The rate on carload lots of export wheat from Georgian Bay Ports to Portland is 15.17 cents per 100 lbs.⁴ The amount of Canadian grain exported through Portland is comparatively small:

1918	20,755,240 bushels.
1919	14,873,522 bushels.
1920	9,967,733 bushels.
1921	12,184,027 bushels.

These figures are for the calendar years.⁵

Most of Canada's wheat is shipped by water from Fort William or Port Arthur as far as Buffalo, New York, at the foot of Lake Erie and is there diverted to rail routes. The rate by water from Fort William to Buffalo averages 6.2 to 6.66 cents per 100 lbs., but the boat does not pay the unloading charges into

1. Figures and information supplied by R.W.Oliver, Esq., Member of the Montreal Corn Exchange.
2. C.N.Rys., Tariff CK-7.
3. Report of the Montreal Board of Trade 1923.
4. R.W.Oliver, Esq.
5. Debates of the House of Commons March 26th, 1924.

the elevator at Buffalo, which amounts to one cent a bushel.¹ From Buffalo the grain may be shipped to any of several Atlantic ports. The rate on export wheat per 100 lbs. from Buffalo to Boston or New York is 15.17 cents,² to Philadelphia and Baltimore the rate is 14.67 cents.²

During the winter months when shipments from Montreal are impossible because of ice conditions, grain is exported from St. John, New Brunswick. The season for shipments is about four months - December 15th. to April 15th - and the amount exported is comparatively small. The Canadian Pacific Railway gives the following figures for exports of wheat during their fiscal year, April 1st. to March 31st:

1921-22 6,474,839 bushels.

1922-23 6,604,898 bushels.

The rate from Fort Will^{iam} to St. John for carload lots of export wheat is 35½ cents per 100 lbs.³ From Georgian Bay ports the rate is 15.17³ cents per 100 lbs. - the same rate as from Georgian Bay ports to Portland.

Ocean rates on grain exported from ports on this continent to Europe vary according to the season. The rates on shipments from Montreal are regulated by the rates which the Steamship companies

1. Information and rates from R.W. Oliver, Esq.

2. Trunk Line Tariff I.C.C. A.104.

3. Figures supplied by the Canadian Pacific Railway.

are asking to carry grain out of Philadelphia, New York, and Boston. Present asking rates, on shipments of wheat from Montreal May 1924 are:¹

To Manchester	3/6	per quarter ²
To Hull	4/-	do.
To London	3/-	do.
To Liverpool	3/3	do.

The present rate on shipments to Liverpool from New York Boston, Philadelphia and Baltimore is 2/6 per quarter of wheat.

From Vancouver to Liverpool the present rate is 32/6¹ per ton of 2,240 lbs. of wheat, which works out at 7/- per quarter of 480 lbs.

Grain exporters always try to ship their grain before navigation on the lakes closes because the freight carriage by water is cheaper than by the all rail route. Owing to the enormous quantities which must be shipped, and the limited number of vessels on the Lakes to carry it, a certain amount of grain is caught by winter every year and must be held over in elevators or vessels until navigation opens again in the following spring.

Stocks of wheat in Canada March 31st 1918, 1919, 1920 1921 and 1922.

1. Information kindly supplied by R.W.Oliver, Esq.
2. A quarter of wheat is 480 lbs.

Wheat in	March 31st. 1918	1919	1920	1921 ¹
Elevators	20,525,213	69,983,064	30,622,398	35,802,263
Flour Mills	4,802,236	5,390,066	5,575,253	3,635,818
Transit by rail	20,021,179	10,854,840	6,271,697	7,119,983
Farmers' Hands	<u>31,684,700</u>	<u>37,315,000</u>	<u>34,837,000</u>	<u>48,919,000</u>
	77,023,328	118,542,970	77,306,348	95,477,163

Wheat in	March 31st, 1922.
Elevators	<u>58,338,581</u>
Flour Mills	4,000,000
Transit by rail	10,998,505
Farmers' Hands	<u>41,649,000</u>
	114,986,086

Of the 1923 crop, it is estimated² that 60,000,000 bushels of grain is stored at Fort William and Port Arthur, 10,000,000 bushels on wheels and en route to Vancouver, and approximately 150,000,000 bushels held at rural points, and interior elevators.

With the present facilities for transportation, the crop of the previous year is not entirely exported before the new crop comes to the market. The Canadian crop year extends from September 1st. to August 31st. In 1918 the total Canadian wheat crop was 189,075,000 bushels. At the end of that crop year (August 31st. 1919) 2,149,000 bushels or 1.14% of the crop^{was} still in the hands of the farmers. The wheat production of the summer of 1919 was 193,260,000 bushels, of which 1.10% of 2,122,000 bushels was still in the farmers hands on August 31st, 1920. In the next crop year

1. Canadian Year Book, 1921.
2. Montreal Daily Star, April 17th.

1920-21 the farmers held 0.81% of the wheat crop on August 31st.

1921, only 2,144,000 bushels out of a total of 263,189,000 bushels.

Besides the wheat which the farmers hold over from one season to the next, a certain amount is to be found in elevators, vessels, freight cars, etc. The following table shows the stocks of wheat in Canada at the close of crop years 1919, 1920 and 1921.

Stocks of Wheat in Canada at the close of the
Crop years 1919, 1920 and 1921¹

Quantities in	<u>August 31st,</u> <u>1919, Bushels</u>	<u>August 31st,</u> <u>1920 Bushels</u>	<u>August 31st,</u> <u>1921 Bushels.</u>
Farmers' hands	2,149,000	2,122,300	2,144,400
Country Elevators in West	762,362	980,000	1,566,689
Terminal Elevators	433,920	1,603,811	2,367,181
Public Elevators	2,108,884	4,316,527	874,045
Eastern Elevators	-	30,007	23,260
Flour Mills	-	237,780	719,624
Transit by Rail	-	-	6,031,889
Total:	<u>5,454,166</u>	<u>9,290,425</u>	<u>13,727,088</u>

1. Canadian Year Book, 1921.

CHAPTER: VII

THE PORT OF MONTREAL.

Montreal's unique situation gives this port great natural advantages as a point of interchange between inland and ocean traffic. Sixteen hundred miles of inland water traffic terminates at the foot of the Lachine Rapids in the Harbour of Montreal.

Ocean navigation on the St. Lawrence begins at Montreal, 857 nautical miles from the Atlantic by way of Belle Isle, or 967 miles via Cape Race. The distance from Liverpool to Montreal is slightly less than to other Atlantic ports on the United States coast.

		<u>Distance to Liverpool</u>	<u>Montreal Advantage.</u>
Montreal	(nautical miles)	2,972	-
New York	"	3,056	84
Philadelphia	"	3,199	227
Baltimore	"	3,355	383

From Montreal steamers run direct to practically every port in the world. This port is also Canada's great railway centre, for trunk lines stretch out in every direction from this point, while three transcontinental lines reach ocean navigation at its harbour.

The climate is the worst enemy of the Port of Montreal, the navigation season opening about April 20th. and closing about December 1st. But despite this handicap, Montreal in 1921 and 1922 shipped more grain in seven months than New York shipped in a full year.¹ During the season, weather conditions on the River St. Lawrence are very good, fogs being rare in the contracted part of the river extending from Murray Bay to Montreal. The channel is well buoyed and lighted.

The first step toward the improvement of the port of Montreal for ocean vessels was taken in 1824 when a commission was appointed to report on the state of the Harbour.² The result was the passing in 1830³ of the Statute entitled "An Act for the Improvement of the Harbour of Montreal."³ The work was entrusted to three Commissioners appointed under this Statute for six years.

The Commission was apparently appointed for that special work alone but was continued by acts passed from time to time

1. Figures issued by M.P. Fennel, Jr.
2. Chronology of Montreal.
3. 10-11 Geo. IV c28.

as the scope of the work widened. The Commissioners were appointed during the pleasure of the Crown and till 1855 there were only three: the number was then increased to five, and in 1873 to nine. At present there are again three commissioners appointed by the Crown.

The river with its lights, buoys, pilots, etc. formerly under the Trinity Board of Quebec was by ordinance¹ of the Special Council (1839-40) placed under the care of a newly constituted Trinity Board of Montreal, in whose charge it remained until 1873 when the Trinity Board of Montreal was dissolved² and its duties assigned to the Harbour Commissioners.

The water of the St. Lawrence is very clear. Below Montreal, where the river widens into Lake St. Peter, such slight sediment, as the river carries, is deposited. The depth here was only 10 feet in 1850 when dredging was begun. By 1888 the depth was increased to $27\frac{1}{2}$ feet at ordinary low water. The debt incurred by the Harbour Commissioners of Montreal in the dredging of this channel - about 50 miles long - was taken over (1888) by the Dominion Government who recognized the importance of the St. Lawrence as a National route: at the same time the waterway was opened free to the shipping of the World. In 1899 the Canadian

1. 2 Vic. cap. 19

2. 36 Vic. cap. 61

Government undertook to deepen the ship channel and in 1907 a 30 foot depth was completed between Quebec and Montreal.¹

In 1909 the Board of Harbour Commissioners prepared an elaborate and extensive plan of development which with its component facilities was intended to make provision for the ensuing 25 years.² As item after item was completed, the commerce which had been beginning to flow through the port in 1909 increased steadily year by year. In 1921 Montreal was called upon to handle a volume of commerce very much in excess of that prevailing in any previous year. Because of the fact that the scheme of development had been completed within eleven instead of twenty-five years, as originally planned, the facilities of the port were just sufficient to meet the demands made on them.

The total cost of the port of Montreal has been \$34,000,000 and the result of this expenditure as represented at the end of the year 1922 is as follows:²

One hundred steamship berths from 350-1000 feet in length with a depth of water 20-35 feet. Thirty-five of these steamship berths are at modern concrete wharves built in the past few years.

Two large modern fireproof elevators with conveyor systems to eighteen steamship berths at which nine vessels can be loaded

1. Port of Montreal: Stephens & Cowie.

2. Report of the Montreal Harbour Commissioners 1922.

with grain at one time.

Twenty-four permanent fireproof transit sheds.

Modern cold storage warehouse.

Fifty-eight miles of Harbour railway tracks.

Complete and valuable construction and repair plants.

About Two hundred acres of land situated in the most valuable position, industrially, in Montreal; all reclaimed.

The extent of the wharves and piers at the end of the season is as follows:

30 ft.depth and over at O.L.W.	26,927 linear feet, or 5.0998 miles.
25 ft. to 30 ft.depth "	15,090 linear feet, or 2.8579 miles.
Total Deep Draft	42,017 linear feet, or 7.9577 miles.
20 ft.depth and under "	1,398 linear feet, or 0.2647 miles.
Total Wharfage at end of 1922	43,415 linear feet, or 8.2224 miles. ¹

The capacity of the elevators at Montreal was at the end of 1922 as follows:

Elevator No.1	4,000,000 bushels
Elevator No.2	2,662,000 "
Elevator B	2,150,000 "

1. Report of Harbour Commissioners of Montreal 1922.

A new elevator is being constructed at Tarte Pier which will have an ultimate capacity of 10,000,000 bushels.

The following table shows the grain exports of Montreal during the year 1921 as compared with other large grain exporting ports of North America.¹

Grain Exports, 1921.

Montreal	138,453,980	Bushels.
Galveston	94,173,049	"
New York	84,698,581	"
New Orleans	55,314,808	"
Philadelphia	46,769,286	"
Portland, Me.	13,859,040	"
St. John, N.B.	10,638,339	"
Boston	5,078,617	"
Newport News	485,118	"

The unusually large amount shipped from Montreal in this season was attributed to the discount on Canadian funds which then existed, and which attracted United States exporters to the St. Lawrence route. Predictions were made at the time that this record was "only a flash in the pan" etc.

In the following year, 1922, Montreal exceeded the previous year's record by exporting 17,000,000 bushels more, or a total of 155,033,817 bushels.

In that year, 1922, Montreal still led all other North American ports.¹

1. Information kindly supplied by Montreal Harbour Commissioners.

Grain Exports, 1922.

Montreal	155,033,817	Bushels
New York	127,488,000	"
Baltimore	88,521,000	"
New Orleans	62,994,000	"
Philadelphia	60,237,000	"
Portland, Me.	19,444,000	"
Galveston	17,646,000	"
St. John, N.B.	15,373,048	"
Vancouver	14,397,590	"
Boston	13,398,000	"

The grain traffic through Montreal in that season was to some extent due to the Pennsylvania coal strike, which tied up United States railways: the rate of exchange also worked in favour of the Canadian port.

In 1923 however no coal strike existed while the difference between Canadian and American exchange was very slight, showing that the exports from Montreal are not due to either of these causes but to the efficiency of the port. The exports from January 1st. to November 1st. are as follows:¹

Exports of Grain from U.S. and Canadian
Ports to November, 1923.

Montreal	104,375,023	Bushels.
New York	77,769,000	"
Baltimore	39,233,000	"
Philadelphia	29,465,000	"
New Orleans	18,977,000	"
Galveston, Tex.	10,349,000	"
Boston	5,915,000	"
Norfolk	3,422,000	"
Port Arthur, Tex.	1,409,000	"
Newport News	144,000	"

1. Information kindly supplied by the Montreal Harbour Commissioners.

Figures for the complete season of 1923 place Montreal's total grain exports at 120,107,990 Bushels.

These figures show a considerable decrease for exports from Montreal. Mr. Fennel then General Manager of the Port of Montreal explained this by the fact that the exports from the whole American continent were less during that year due to a smaller demand in Europe and to competition from other grain producing regions, especially Russia and India. Mr. Fennel said "We have every reason to be satisfied with our share of the grain exported from the North American Continent."¹

Not all the grain exported from Montreal is grown in Canada. A certain amount of American grain is shipped from Duluth, down the Lakes by either all water or lake-and-water routes, and exported from Montreal. This is a curious anomaly. While most of the Canadian wheat crop is being exported from American seaports, yet some American shippers find the Canadian grain route more economical.

Grain Handled through the Port of Montreal.²

	1921	1922	1923
American Grain	75,559,664 Bus.	76,858,946 Bus.	33,704,531 Bus.
Canadian Grain	62,894,316 "	78,063,737 Bus.	86,403,459 Bus.
	<u>138,453,980 Bus.</u>	<u>154,922,683 Bus.</u>	<u>120,107,990 Bus.</u>

1. Montreal Gazette, November 15th, 1923.

2. Figures kindly supplied by the Montreal Harbour Commissioners.

Figures for grain shipments from the Port of Montreal include the exports of wheat, oats, peas, barley, rye, and buckwheat. The shipments of wheat are greater than the shipments for any other one grain.

Quantities of flour and wheat received at and shipped from Montreal during a period of forty years² are given as follows.

<u>FLOUR</u>		<u>WHEAT</u>	
Receipts Barrels	Shipments Barrels	Receipts Bushels	Shipments Bushels
1883 1,012,706	776,242	608,911	5,008,167
1893 809,591	984,395	8,257,087	7,098,151
1903 1,313,497	2,174,607	19,546,739	16,055,004
1913 1,094,426	1,386,583	41,105,231	33,715,007
1914 2,491,655	2,190,889	70,119,614	61,552,123
1915 1,442,688	1,655,526	44,450,263	34,202,957
1916 3,795,999	4,098,160	58,382,190	34,719,348
1917 1,413,486	4,976,611	33,662,466	35,702,080
1918 4,546,016	6,045,393	36,359,093	24,041,526
1919 5,564,669	6,172,138	43,834,199	33,915,158
1920 1,754,624	2,326,713	45,554,675	44,120,713
1921 2,319,089	2,745,324	61,040,506	50,111,641
1922 3,223,179	4,365,783	91,621,859	83,675,805
1923 3,144,181	4,606,451	99,811,766	88,599,660.

Grain Handled by the Port of Montreal.¹

	1921	1922	1923
Received by water	61,333,529 Bus.	86,062,273 Bus.	74,631,578 Bus.
Received by rail	<u>77,120,451 "</u> 138,452,980 Bus.	<u>68,860,410 "</u> 154,922,683 Bus.	<u>45,476,412 "</u> 120,107,990 Bus.

1. Figures kindly supplied by the Montreal Board of Harbour Commissioners.

2. Report of the Montreal Board of Trade, 1923.

An organization which adds greatly to the efficiency of the Port of Montreal is the Grain Clearance Board.¹ During September 1921 the harbour facilities for the handling of bulk grain for export were being hard pressed to keep up with the traffic: enormous quantities were constantly arriving by rail and water from the West to be transhipped to ocean steamers.

A meeting to consider how the traffic could be better handled was called at Ottawa by the Minister of Marine and Fisheries, and the Minister of Railways and Canals, which was attended by representatives of the Montreal Harbour Commission, railroad and shipping interests, and grain exporters. It was decided to form a Committee of Four to take over direct control of the whole situation. The Committee began work immediately and built up the efficient machine now known as the Grain Clearance Board. Its effects were felt within a few weeks of its origin, when the whole movement of grain through Montreal went forward at a swifter pace than ever before.

In 1922 it soon became apparent that Montreal would be called upon to handle at least the amount of grain commerce as in the preceding year, and accordingly on April 4th the Grain Clearance

1. Report of the Montreal Harbour Commissioners, 1922.

Board was again appointed.

The Board has for its main object the accumulation and dispensation of accurate and up-to-date information in connection with the export grain movement through the Port of Montreal. Information under the following headings is kept written up daily and posted at the office of the Board so as to be available at a glance:

1. Stocks of grain in the Montreal Elevators, showing grades, etc.
2. Records of Lake vessels en route from Port Colborne to Montreal.
3. List of the large vessels waiting at Port Colborne to be Unloaded.
4. List of vessels en route from Fort William to Bay Ports and Montreal.
5. Shipments by rail from the Grand Trunk Railway Bay Ports, Depot Harbour, Tiffin, Goderich and Montreal.
6. Similar information in regard to the Canadian Pacific Railway Bay Ports, Port McNicoll and Goderich.
7. List of Tramp steamers chartered to load at Montreal.
8. Tramp steamers coming up the St. Lawrence.
9. Record of each day's receipts and deliveries of grain by The Harbour Commissioners Elevators and Grand Trunk Elevator B.
10. Record of the total quantity of grain handled to date, including receipts and shipments for the whole Port.
11. List of Tramp steamers in the order in which they are to receive grain: i.e. The order in which certificates are issued by the Port Warden of each steamer's readiness to take grain.

With so much knowledge of the whole grain situation at its command, the Grain Clearance Board is in a position to formulate ideas of policy and to recommend to the Harbour Commission new rules to add to the general efficiency of the Port of Montreal. For example, they recommended the increase of rates on grain in storage at Montreal elevators after September 20th, so that the accomodation might be available for transfer grain during the busy autumn season: the Harbour Commissioners acted on their advice. Again, in May 1922 complaints were received that certain vessels in port refused to take grain after 6 p.m. although their grain was in the elevator waiting to be delivered to them, and their refusal seriously delayed the operation of the elevators: the reason given by the ships for this stand was that they would not pay the elevator over-time charge. The Harbour Commissioners, on the advice of the Grain Clearance Board, passed a resolution " That vessels taking grain must continue to do so until 11 o'clock at night, and in case any vessel refused to conform to this rule the Harbour Master is authorized to remove such vessel from the berth occupied by her."¹

It will be seen from the above examples that the work of the Grain Clearance Board is in close co-operation with the Harbour

1. Report of Montreal Harbour Commissioners, 1922.

Commissioners. The information and influence of the Board have also been availed of by grain brokers, ocean and lake shipping men and the railroads.

Canada has a relatively small population whose consuming power is in inverse ratio to its producing power, so that a great disparity exists between the volume of traffic into and the volume of traffic out of the country. The cost of transportation from the interior of Canada to the markets abroad can be lowered through the development of inbound cargo traffic. One of the proposals to effect this, by attracting more inbound cargoes to the St. Lawrence route, is the creation of a Free Zone at Montreal. At the Convention of the American Association of Port Authorities at Toronto, in September 1922, the President of the Montreal Harbour Commission, Dr. McDougald, spoke of the suggested Free Zone as follows:¹

"In proportion to the development of this movement (viz, of cargoes inward) will be our ability to reduce carrying charges to our producers. A constant increase of cargoes inland, by the St. Lawrence, over and above the demands of our own import trade, is urgently needed in order to stabilize chartering and rates, and to induce a constant movement of full cargo freighters throughout the whole period of navigation. What it is believed would develop and

1. Report of Montreal Harbour Commissioners, 1922.

greatly promote such a movement would be the creation of a free zone, or district, in the Harbour of Montreal to which goods, wares and merchandize from overseas might be consigned in bulk to be warehoused and broken up or fabricated, in whole or in part, either with or without Canadian raw materials: or otherwise made ready for re-consignment or transshipment to their ultimate market, whether here in Canada or in the United States. Under such system, Canadian Customs duties would be imposed only upon merchandise entered for Canadian consumption."

Copenhagen is the best example of a free port operating under modern conditions. This city is situated on the narrow waterway which commands the entrance to the Baltic Sea. The free port was created in 1894 when the construction of the Kiel Canal threatened to divert all Baltic trade. Since then, the port of Copenhagen has been entirely reconstructed on the most modern lines and has developed into a great clearing house and re-export centre.¹

The situation of Montreal as a possible free port is better than that of Copenhagen, for from Montreal distribution can be made by either rail or water routes into a third of the continent. Within 12 hours by rail an aggregate population of not less than

1. Report of Montreal Harbour Commissioners, 1922.

15,000,000 may be served from this point. The distance from any port in Northern Europe to Montreal is less than to any Atlantic port. Montreal would become the hub of the wheel of distribution over North America.¹

The creation of a Free Zone would increase greatly the trade and commerce of the Port, since the expansion in the number of inbound cargoes and the consequent increase in the number of freighters reaching the Port would result in more bottoms available for the ever increasing grain exports. Every ship coming to the port would be assured of a return cargo.¹

1. Report of the Montreal Harbour Commissioners, 1922.

CHAPTER: VIIIPROPOSED TRANSPORTATION ROUTES.

1. The Georgian Bay Ship Canal:

The proposed Georgian Bay Ship Canal would provide a new all-Canadian Waterway from Georgian Bay by the French River, Lake Nipissing and the Ottawa River to the St. Lawrence. The Government of United Canada procured engineers reports on the project in 1858, and again in 1860, but the development of the railways during the years following Confederation lessened the demand for the new canal. With the increased settlement of Western Canada, and the consequent ever enlarging grain crop, the scheme was again brought to public notice as a method of solving the transportation problem. In 1904 the Dominion Parliament granted \$250,000 for a detailed survey of the proposed waterway. The Board of Engineers in charge of the survey submitted their report in 1908. By the route followed, the distance from French River Village of the Georgian Bay to Montreal Harbour was 440 miles. Their plans called for 28 miles of canal excavation, 66 miles of channel dredging and 346 miles of river and lake: with 27 locks of a minimum length of 650 feet with 65 feet clear width

and 22 feet clear depth, the lift ranging from 5 feet to 50 feet: and with a minimum water supply in the summit basin capable of being increased which would permit of 20 lockages a day throughout a season of 210 days. The time taken by a lake freight boat of 12 mile maximum speed, without delays at locks or in meeting other boats, from French River Harbour to Montreal was estimated at 70 hours.¹ The cost of such a waterway, which it was thought could be built in 10 years, was estimated originally at \$100,000,000. with an annual maintenance charge of \$900,000; on account of the rising cost of materials the capital outlay was later estimated at \$150,000,000.²

In 1914 a Royal Commission was issued for a report on the "commercial feasibility and national advantages of such a canal" and to consider many of the transportation problems of Canada. Among the questions to be considered were; the competition of the waterway with the railways and the subsequent effect on the railways; the probable volume of traffic on the new waterway; the length of the navigation season; the traffic of the Great Lakes, including rates; the effect on the North-West etc. etc.³

All these questions need a great deal of study before conclusions of any value can be reached. For this reason the Commission issued, from time to time, Interim reports on such of the

1. Report of the Board of Engineers, 1908.
2. Debates of The House of Commons, May 18th, 1918.
3. Canadian Sessional Papers No. 193, 1916.

economic considerations as had been studied. The first Interim Report issued in 1916¹ covered traffic on the Great Lakes, the routing of wheat etc.; Subsequent Reports issued in 1918² gave a comparative study of the United States and Canadian markets and Transatlantic passenger and freight traffic steamship subsidies. The inquiry was suspended and no further reports have been issued.

The advantage in distance between Lake ports and Liverpool which the proposed Georgian Bay Canal has over the present St. Lawrence Route is shown in the following tables:³

PROPOSED CANADIAN ROUTE:

Via Great Lakes, Georgian Bay Ship Canal and Montreal.

	Distance to <u>Montreal</u>	Distance Montreal to Liverpool via <u>Belle Isle</u>	Total Distance
Ft. Wm. To Liverpool	934	3,189	4,123
Duluth to "	1,056	3,189	4,245
Milwaukee to "	906	3,189	4,095
Chicago to "	972	3,189	4,161

PRESENT CANADIAN ROUTE:

Via Great Lakes, Welland & River St. Lawrence Canals & Montreal.

Ft. Wm. to Liverpool	1,216	3,189	4,405
Duluth to "	1,338	3,189	4,527
Milwaukee to "	1,176	3,189	4,365
Chicago to "	1,242	3,189	4,431

1. Canadian Sessional Papers No. 193, 1916
2. " " " No. 141, 1918 and
No. 142, 1918
3. Engineers' Report 1908, p318.

Advantage of the Georgian Bay Route:

Ft. Wm. to Liverpool	282 miles.
Duluth to "	282 miles.
Milwaukee to "	270 miles.
Chicago to "	270 miles.

The great argument in favour of the Georgian Bay Canal is that no international waters are affected, the route running through Canadian territory from French River Village right down to Montreal, and thence down the St. Lawrence to the ocean. There would therefore, be no danger of misunderstanding and disagreement with the United States, such as might occur over the St. Lawrence Deep Waterway. For this reason, the Georgian Bay Canal is being advocated today by opponents of the St. Lawrence Deep Waterway.

2. The Hudson Bay Route.

Hudson Bay, the great inland sea which lies in the middle of the Dominion of Canada is 900 miles from North to South, and 500 to 600 miles broad. The Hudson Strait by which it is connected with the Atlantic Ocean is a passage 500 miles long and from 45 to 100 miles wide with deep water, and few islands and pronounced shore

lines furnishing good harbours on both sides. Due to the actions of the tides, which in places are very high (30 - 40 feet), and very strong (6 to 7 miles per hour), the Strait never freezes over but is the scene of many ice collections which come down from the Arctic Ocean through Fox Channel and to a lesser extent from Baffin Bay.¹

The Hudson Bay Company has made use of the Strait and the Bay as a means of access to the Canadian North-West and, for 250 years, have used this route in connection with their fur trade.

It is natural therefore, that the people of the Canadian North-West should look to Hudson Bay as a possible route for their exports to Europe. Proposals for a railway to connect the western wheat fields with tide water on the Bay began in the earliest years of the settlement of Manitoba. During the nineties, the demands assumed the form of an agitation among the farmers, who began to think that the Canadian Pacific Railway was robbing them by its freight rates on grain. Fort Churchill, where there is a natural harbour, and Port Nelson, were each suggested as a suitable terminal. Surveys of possible routes were made by the Dominion Government and in 1911 construction was begun.

The Hudson Bay Railway which connects at The Pas with the Canadian National Railway branch from the Winnipeg and Prince Albert

1. The Hudson Bay: Issued 1923 by the Department of the Interior.

line is now (1924) completed for 332 miles North-East from The Pas to its second crossing of the Nelson River at Kettle Rapids, where a bridge has been built.¹ All this part of the road is reported to be in bad condition from lack of care. The rails were removed during the war, and much work would have to be done to make it fit for traffic. Ninety-two miles of additional construction are still necessary before the road will be completed.

An announcement that the Canadian National Railway had been authorized to proceed with the work of construction on the Hudson Bay Railway this (1924) summer was made by Hon. Geo. P. Graham, Minister of Railways in the House of Commons on March 14th, 1924.²

On March 26th³ the Minister of Railways in replying to questions in the House of Commons stated that the Government had already spent approximately \$14,500,000 on the Hudson Bay Railway and \$6,255,000² on a terminal at Port Nelson, or a total of \$20,750,000. According to the estimates of the Department of Railways and Canals another \$5,000,000. will be necessary to carry the steel to tidewater and a further \$20,538,000² will be required to be spent on the artificial harbour and elevators at Port Nelson before it will be ready to ship grain. This makes a grand total of approximately

1. "The Hudson Bay Railway Belt": issued by the Department of the Interior.

2. House of Commons debates, March 14th 1924.

3 " " " " March 26th 1924

\$25,538,000 (in addition to the \$20,750,000 already expended) which must be spent before the Hudson Bay line can be tried out commercially.

The proposed minimum expenditure of \$26,788,000 on the Port Nelson terminal will allow that port to accommodate ten 7,000 ton ships and includes the construction of a grain elevator of 4,000,000 bushels capacity.¹ This seems a large sum to pay for such limited facilities. The Harbour of Montreal has only cost \$34,000,000 (1922), has up-to-date equipment, and provides space for more than 100 ships.²

If the difficulties of navigation on Hudson Bay are too great to allow regular shipments, ^fThe Hudson Bay Railway itself would be of little use in the export of grain.

Ships arriving in the early summer have to contend with ice packs carried by wind and currents from Fox Channel³ into Hudson Straits. In September, snowstorms are encountered, while the long hours of darkness in autumn render navigation more dangerous. Serious magnetic disturbances of the compass must also be expected.

With aids to navigation, lighthouses, wireless, special pilots, etc. such as are now available on the St. Lawrence route, the navigation of the Hudson Strait and the Hudson Bay would be, of course, much less hazardous.

1. House of Commons Debates March 26th, 1924.
2. Report of The Montreal Harbour Commission, 1922.
3. "Hudson Bay": Department of Interior.

The first serious attempts of the Canadian Government to investigate Hudson Bay and to obtain scientific and practical information were made in 1884, 1885 and 1886 under Commander A.R. Gordon. Since then other expeditions have been sent out, and much information of Hudson Bay itself and the country on its shores, particularly around Nelson and Churchill, has been obtained. In 1923 a pamphlet was issued by the Natural Resources Intelligence Branch of the Department of the Interior which contained a synopsis of all the important available information compiled from reports of the various exploratory parties etc.

This report contains a resume of the opinions of 27 men, mariners, scientists, government officials, explorers, and traders who have all had personal experience of travel in those Northern waters. Their opinions as to the probable date of the opening of navigation on Hudson Bay varied from June 15th to August 1st: the closing date varied from September 15th to November 30th. The length of the probable season varied from 12 - 22 weeks.

The question of the length and season of open navigation on Hudson Bay, is one which seriously affects the problem of how much grain the route could carry. The Canadian wheat crop is harvested from August 10th to September 10th. If the navigation on Hudson Bay

were closed in September or October, there would not be much time allowed to carry the grain from the farmer to the harbour. Much of the crop would have to be stored in terminal elevators until the following summer, the while the owner stood the depreciation, interest and storage charges.

Captain Anderson, who was in command of expeditions from 1911- 1914, estimates the open season as extending from July 15th to November 15th. An elevator of only two million bushels capacity if filled with "last year's crop" would provide cargoes for ships during the first month of each season. If the new crop first reached Port Nelson on August 20th, a steady flow of 500,000 bushels per day until November 15th., would result in the port handling two million bushels of the old crop and approximately forty-three million bushels¹ of the new. These figures are, of course, pure estimates and perhaps too high.

The Hudson Bay route does not provide a navigation season coinciding entirely with the movement of the crop, yet neither does the St. Lawrence route, which, nevertheless, ships much grain.

Boats of all sizes and descriptions, from small sailing craft to modern ocean freighters, have been entering and leaving

1. Mr. F. W. Cowie.

Hudson Bay by the Hudson Strait for 300 years. In 1914, 38 recorded passages were made through the channel without serious accident. Testimony given before the Special Committee of the Senate 1919, as to the type of boat most suitable for use on the route, indicated that such ships should be under 5,000 ton dead-weight capacity - preferably 3,000 tons with a draft of 17 feet. Captain Bernier, the Arctic explorer and navigator thought that the size of boat was not important if the design were correct: the vertical sides of the lake freighter are to be avoided, and special reinforcements to withstand the ice are necessary in the bows. A 3,000 ton vessel is considered to carry about 100,000 bushels of wheat.

The insurance rates on vessels on this route will doubtless be high, at any rate until sufficient statistics are available to convince the insurance companies that the risks are not abnormal. Government boats operating on this route in 1914 were asked to pay 11% on a voyage as a premium. Lighthouses and other aids to navigation would, of course, bring down the rates.

Although nothing can definitely be known as to the effect which the Hudson's Bay Railway, and the consequent opening of the Hudson Bay Route, will have on the transportation of Canadian wheat

to Liverpool, until actual experience of shipments can be obtained, yet the Hudson's Bay Route has an advantage in miles over the present Routes. From Nelson to Liverpool is 2,966 miles:¹ from Churchill to Liverpool is 2,946 miles. Montreal to Liverpool via Belle Isle is shorter being only 2,767 miles, but the Hudson's Bay Route has the advantage over the Montreal - Cabot Straits Route, which is 3,097 miles.

The estimated advantages in distance between Liverpool and various important points in the wheat growing areas of Canada are given as follows: ²

Régina,	1,050
Calgary,	1,150
Saskatoon,	1,175
Prince Albert,	1,300
Melford,	1,300
Edmonton,	1,250

In addition to the advantages in distance, the Hudson's Bay Route requires only ~~two~~ ^{one} handling of grain, viz: the transfer from car to ship at Port Nelson, while the rail and water route to Montreal necessitates three handlings at Port Arthur, Depot Harbour or Midland and Montreal.

1. "Hudson Bay": Department of the Interior.

2. *Ibid.*

Those who advocate the Hudson's Bay Railway point to the possibilities of the country which it will open up as well as its value in transportation of grain. Very little settlement has been made along the line as yet, so that experience in agriculture in those districts is not very great: such results as have been obtained are not promising. Evidence of a variety of minerals is found. The forests are thin and scattered, the only lumbering industry being at The Pas. Fisheries so far have not been successful. Mr. L. C. Nesham who was assistant engineer on the work at Port Nelson and therefore speaks with experience, is of the opinion that the Railway will stand or fall as a grain route, since the surrounding country offers no freight at all.¹

Whether or not it would pay to run boats specially constructed and reinforced and able to carry only a comparatively small cargo of wheat from Hudson Bay ports during a short season, in the face of great navigation difficulties and high insurance rates, is a questionable point. During the long closed season, these boats, if not idle, would be transferred to other routes where they would come into competition with ships of greater carrying capacity.

Return cargoes from Liverpool to Port Nelson would be necessary to any commercial project, and the present population of

1. Montreal Star, April 4th. 1924

2,000,000 people scattered between Winnipeg and the Rockies and already served by the Canadian transcontinental railways does not yet provide a market for European exports.

Modern engineers may find answers to many of the problems of rendering navigable this outlet, but the fact remains that its geographical position, with attendant climatic conditions, will leave a wide margin for disaster.

Unfortunately for the settlement of the problem, it carries with it serious sectional difficulties of a political character. The commercial interests of eastern Canada have little to gain and perhaps much to lose, if the road is put into successful operation. Hence they are inclined to decry the whole project. The population in the Western Canada, on the other hand, feel that the completion of the road at the general expense of the Dominion may bring them great gain and cannot bring any loss.

3. The Proposed St. Lawrence Deep Waterway.

The St. Lawrence Deep Waterways project proposes to make it possible for ocean ships to sail up the St. Lawrence and the Great Lakes, to receive their cargoes for Europe at the Head of the Lakes.

The improvements necessary to effect this include the enlargement of all the canals between Montreal and the foot of Lake Ontario. From the upper end of Lake Ontario, the new Welland canal at present under construction by Canada, would give access to Lake Erie; whence, via Lake Huron and the Sault Ste. Marie Canal ocean vessels would reach the Head of the Lakes. Chicago, Duluth, Fort William, Toronto and all the cities on the Lakes would thus become ocean ports.

The proposed improvements include the development of hydro-electric power along the St. Lawrence.

The question of the St. Lawrence Deep Waterway was referred to the International Joint Commission¹ by agreement of the Governments of Canada and the United States. The Commission appointed engineers to take charge of the survey.

Their report to the Commission estimated² the total cost of the improvements on the St. Lawrence between Montreal and Lake Ontario at \$252,728,200, which includes the cost of developing 1,464,000 h.p.

Their plans showed 9 locks, 33 miles of canal with a depth of 25 feet capable of being increased to 30 feet at a later date without interference with navigation, and at an estimated cost of \$17,986,180. The total annual cost of operation, maintenance and

1. Appointed under the Treaty of January 11th, 1909.

2. Engineers' Report: Waterway Commission.

depreciation of all the works was estimated by the engineers at \$2,562,000. of which \$1,457,000 is for the operation etc. of the power plants. All the figures in the Engineers report are based on the assumption that no water will be diverted at Chicago. As it was uncertain what diversion will be permitted, the engineers felt that they could not properly assume any figure for it. They reported that nearly all the potential power in the river amounting to approximately 4,100,000 h.p. could be developed as coördinate parts of the schemes for the improvement of navigation. They did not consider the simultaneous development of such a vast quantity of power to be a sound economic procedure, as a market to take this output is not now in existence and could not be expected to spring into being at once.

The International Joint Commission¹ reported unanimously to the United States and Canadian Governments on January 6th, 1922. Their report was ~~thus~~ an elaborate document but their conclusions may be briefly summarized.²

They found that of the various alternative routes from the interior to the seaboard, none offered advantages comparable with those of the natural route of the St. Lawrence. "Without considering

1. Appointed under the Treaty of January 11th, 1909.
2. Canadian Annual Review.

the probability of new traffic created by the opening of a water route to the seaboard, there exists today between the region economically tributary to the Great Lakes and overseas ports, as well as between the same region and the Atlantic and Pacific seabords, a volume of inbound and outbound trade that might reasonably be expected to seek this route, sufficient to justify the expense involved in its improvement." The Commission considered that because of the wider areas and population served " the benefits derived will at first accrue in much larger measure to American than Canadian interests." They reported that experience had demonstrated not only the tremendous importance of water communication to the foreign commerce of any country, but also the manifest advantages of linking up rail and water routes.

The International Joint Commission recommended¹ that the Governments of the United States and Canada enter into an arrangement by way of treaty for the scheme of improvement of the St. Lawrence River. They advised that such improvements be based upon the report of the engineering board, although further investigations were necessary.

The cost of the canal as estimated by the engineers in their report is \$252,000,000. These figures are based, of course, only on

1. Canadian Sessional Papers No. 39a 1922.

the preliminary survey and it is possible that further investigation of the work to be done may raise the estimated cost. After the construction is begun, the costs might conceivably be increased by unforeseen difficulties. The New York State Barge Canal estimated at \$55,000,000, cost in the end over \$125,000,000, Indeed it would be remarkable occurrence if a canal were to be built at its estimated cost.

Canada's share of the original estimate ^{of} \$252,000,000 would be \$126,000,000, to which must be added the capital liability attaching to the present St. Lawrence system, which is approximately \$100,000,000; also the cost of the new Welland Canal now under construction, probably another \$100,000,000. Thus the total capital sum would amount to \$326,000,000. The interest on this would not be less than \$16,000,000. which with the cost of maintenance as estimated by the engineers at \$2,500,000. would result in a total of \$18,500,000 annually.

Much public interest is evident both in Canada and the United States over the proposed St. Lawrence Waterway. Many Canadian and American organizations have reported themselves to be in favour of the scheme. Others, not so numerous, but very influential, have put themselves on record as against it. Those in favour, in general,

are the cities and power companies, etc. of the Upper Lakes, the Ontario Hydro Electric, the Boards of Trade and the Chambers of Commerce of Toronto, Fort William, Hamilton, etc.¹ and of American cities on the Great Lakes. The opposition comes from the Montreal Harbour Commissioners and the Quebec Harbour Commissioners, who feel that their prestige as Atlantic ports is threatened. Shipping interests of New York State and other Atlantic ports, the Boards of Trade and Chambers of Commerce of Eastern and Atlantic Cities are also in opposition.

A channel 25 feet deep at low water in the St. Lawrence between Montreal and Lake Ontario would allow most of the vessels engaged in trans-Atlantic trade with United States and Canadian ports, and practically all the ships engaged in coast-wise trade, to sail right up the St. Lawrence and the Great Lakes to Duluth and Fort William. If a ship could load a grain cargo for Liverpool at the Head of the Lakes the cost and delay of transshipment would be obviated. The question is, whether it would be economical to run an expensive high powered ocean ship on inland water. Toronto and other lake ports, ambitious to become sea-ports, expect that all transatlantic ships will immediately desert Montreal for harbours further inland. Montreal shipping men and engineers doubt this.

1. Canadian Annual Review 1922.

Sea going ships must earn on their large initial cost; long drawn out voyages in restricted waters would result in financial loss. It is therefore obvious that ^{the} more lightly built and cheaper lake craft though useless at sea, can carry the grain more economically on the Lakes. The ice and fog and the consequent high insurance rates on the slow inland voyage, with all its delays at locks etc., would also be a deterrent to ocean shipping on the Great Lakes.

Mr. F. W. Cowie, formerly engineer of the Montreal Harbour Commission, recognizing the financial difficulties, draws attention to another hindrance to through voyages. Lake ships are constructed with very large rudders which makes it possible to steer them easily into narrow canals, but at sea, the rougher waves would knock off such rudders. Ocean ships, besides being of heavier construction and having more powerful engines are equipped with small rudders, which can stand the waves, but on this account when entering a harbour, tugs have to be used to steer them. This process, if they attempted to enter a lock, would be cumbersome and expensive. Mr. Cowie, who favors the improvement of the St. Lawrence route, expects that the grain will be brought in 10,000 ton lake-type vessels from the Head of the Lakes to Montreal and there transhipped to Atlantic

ships.

Opponents of the St. Lawrence Deep Waterway also claim that as there is at present small demand in the West for goods imported from Europe, vessels proceeding to Lake ports for a cargo of grain would have little freight on the voyage westward. The answer to this is, of course, that as the population of the West increases inland cargoes will also grow and the St. Lawrence route become less and less a one way traffic route.

The St. Lawrence Deep Waterway would provide a transportation route primarily for wheat: other commodities will be merely incidental. In the transportation of wheat, as it is today, speed is an essential factor, the aim being to get as much as possible of the crop out of the West before navigation on the Lakes closes. The owners of the wheat have engaged to deliver it abroad at a certain date and are willing to pay a slightly higher rate to get it off their hands quickly and on its way to the foreign market. To obviate possible delays on the St. Lawrence canals the route preferred is that by water to Buffalo and thence by rail to some Atlantic port.

Under present conditions, traffic on the Lachine Canal is held up by accident for days or weeks every season. Vessels get out of control and break down the guard gates of a lock gate. If

these canals were enlarged, the grain could be carried down to Montreal in larger cargoes - 30,000 tons at a time instead of 3,000 tons. But the larger the vessel which can be used on a canal route, the greater will be the risk of accident and damage. Navigators report that with a strong cross-wind blowing a vessel cannot enter a lock, as the lateral pressure of the wind is greater than the propelling power which the Captain dares to use in restricted water. The ship must therefore wait until the storm subsides.

The international boundary line between the United States and Canada cuts into the River St. Lawrence near Cornwall, about 60 miles above Montreal. Between Montreal and Cornwall the St. Lawrence is wholly in the Dominion of Canada. From Cornwall to Lake Ontario, 122 miles, the river is international in character. By the treaty of Versailles, 1783, the boundary line between the United States and Canada was fixed as the middle of the mainstream of the river, and the river in the international portion was defined as being free and equal to the commerce of each nation. By the Treaty of Washington, 1871 the navigation of the whole of the St. Lawrence to Montreal was agreed to be equal even in that portion of the river which is wholly within Canada. It will therefore be seen that no undertaking of any improvement in connection with the River St. Lawrence can be carried

out without a joint agreement of the two countries. It is also apparent that if one of the countries objects the other one cannot impose on it the construction of the St. Lawrence Waterway, or the development of the Hydro-Electric Power.

The International character of the proposed waterway is, quite apart from the economical issues involved, causing much discussion in Canada.

It is feared that if Canada entered into partnership with the United States in this undertaking, that Canadian rights of navigation and electric power would suffer. The United States being so much greater than Canada, in commercial and economic strength, might deprive the weaker partner of its share in the management of the enterprise and ultimately obtain complete control of the project.

Canadians do not want to run the risk of endangering the amicable relations existing between their country and the United States.

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