WHEAT STUDIES

OF THE

FOOD RESEARCH INSTITUTE

VOL. I, NO. 8 STANFORD UNIVERSITY, CALIFORNIA JULY 1925

CANADA AS A PRODUCER AND EXPORTER OF WHEAT

I. INTRODUCTION

As a wheat producer, Canada ranks with British India and above all other nations except the United States. She produces about 10 per cent of the world wheat crop—as much as Argentina and Australia combined. Wheat is far and away Canada's principal grain crop. On an average, two-thirds of her crop is exported, and wheat and flour make up nearly one-third of her total exports. As a wheat exporter, Canada rivals the United States for first place, and exports more than both Argentina and Australia combined. And she bids fair in the near future to outrank even the United States.

Canada's rise to importance as a wheat exporter has come entirely within the last thirty years, and she has attained leader's rank only within the last ten. Until 1897–98 her exports never materially exceeded 10 million bushels a year, a negligible fraction of the world's wheat trade. In the five pre-war years they averaged about 100 million bushels. In the past five years her average yearly exports have been some 230 million bushels, 32 per cent of all wheat entering into international trade. In 1923–24 they reached the huge total of 348 million bushels.

Since the war, wheat acreage, production, and exports have tended downward in the United States, and the increase of Canadian wheat crops (to 1924) has been the leading factor in maintaining exportable supplies of wheat at a high level. This high level, in turn, has constituted a major influence in keeping world prices, until the midsummer recovery of 1924, at a level generally unremunerative to producers.

The wheat crop of Canada varies enormously from year to year. To take an extreme example: in 1923 a record crop of 474 million bushels was harvested, while in 1924 the crop amounted to only 262 million bushels. Since domestic utilization is fairly constant, at 100 to 120 million bushels a year, the export surplus varies enormously. This variation tends to produce variations in wheat prices from one year to another, not only in Canada but also in the world's markets. The larger the relative importance of Canadian wheat in world trade, the stronger this tendency will become. The size of the Canadian crop and the prospective volume of exports from Canada constitute perhaps the most important single factor in the wheat markets of the world.

Canada's high position in the world's wheat trade is entirely due to the rapid development of wheat culture on the west-

ern prairies, in the provinces of Manitoba, Saskatchewan, and Alberta, principally since the beginning of the twentieth century. These provinces produce some 95 per cent of Canada's wheat crop and almost the whole of her wheat exports. The natural conditions there prevailing make possible the production of large quantities of wheat of high quality, and the main difficulties due to geographic isolation and vicissitudes of climate have been overcome by the development of transportation and the accomplishments of agricultural research. Over 20 million acres in these provinces are sown to wheat each year, and another 10 million acres of fallow land are culti-

CHART I A.—WHEAT CROPS OF LEADING PRODUCERS, AVERAGE, 1920–24*

(Million bushels)

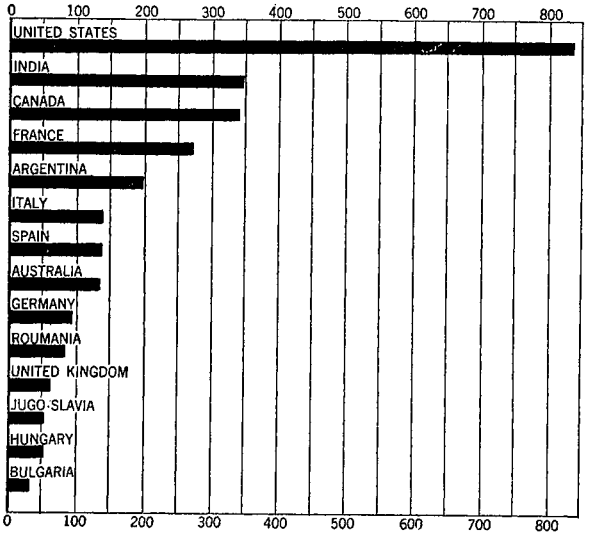


CHART I B.—NET EXPORTS OF WHEAT AND FLOUR BY FIVE LEADING EXPORTERS, 1920–25*

(Million bushels)

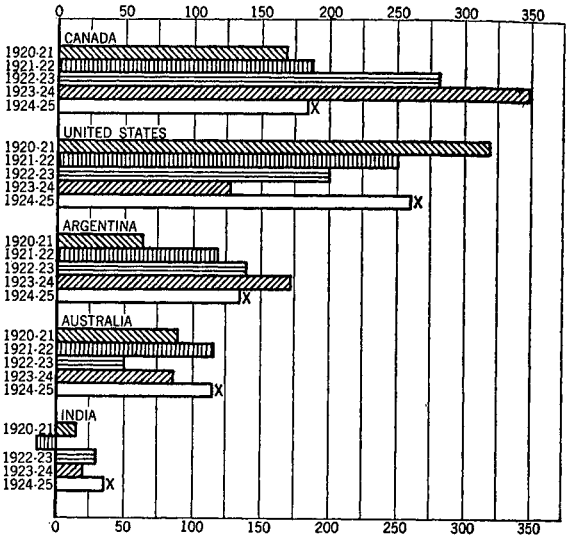


CHART I C.—WHEAT PRODUCTION IN WESTERN CANADA AND CANADIAN WHEAT AND FLOUR EXPORTS, 1898–1924*

(Million bushels)

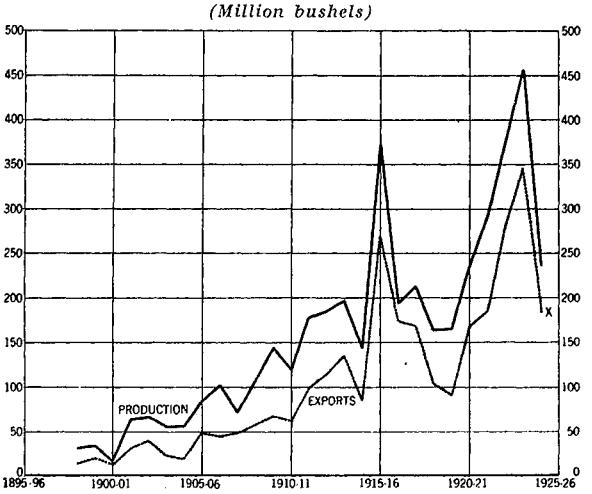
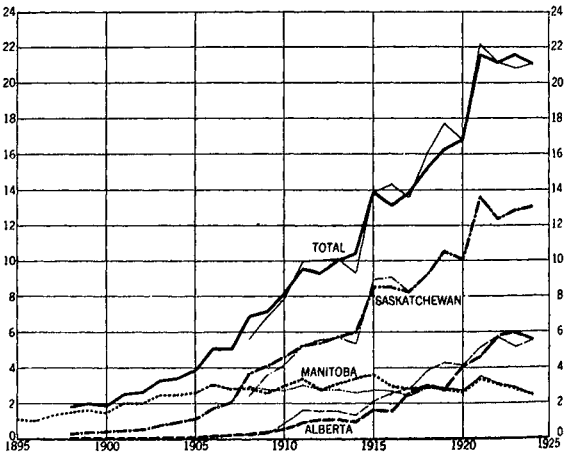


CHART I D.—WHEAT ACREAGE IN PRAIRIE PROVINCES, 1898–1924* a

(Million acres)



* Sources: *Foreign Crops and Markets;* and see Appendix Tables I, II, XIV, XVI, XVII, XXIII.
a The heavy lines show the Provincial estimates of acreage, the light lines the Dominion estimates.
X Preliminary approximation.

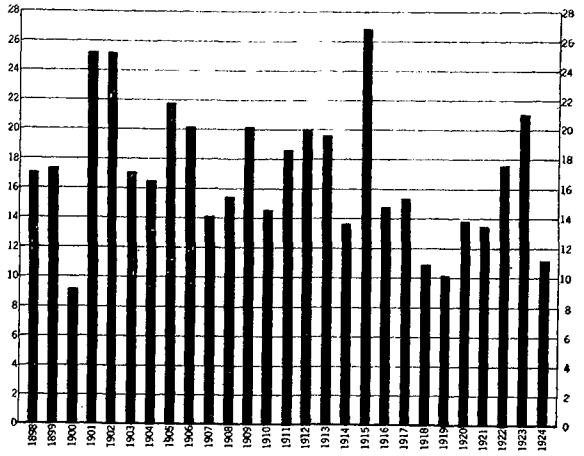
vated every summer, mainly to be sown to wheat the following spring. It is a general belief in Canada that millions of acres more are potentially available for wheat culture in the prairie provinces, and constitute the world's principal reserve of uncultivated wheat lands.

These broad facts clearly justify a study of the conditions under which Canada has achieved her present eminence as a producer and exporter of wheat. There is also a question of the future. Will the expansion continue in the next few years? If so, how far will it go, and by what way? These are questions of large concern to the world in general and to wheat farmers and the wheat trade in particular. While no clear-cut answers can be confidently given, the basis for answers can be supplied by a careful study of the rise of Canada as a producer and exporter of wheat, and of the present conditions underlying her production and exportation.

The present paper embodies the results of such a study. In particular it deals with basic physical conditions in the prairie provinces of Western Canada, with their progress in settlement, agriculture, and transportation, and with the current practices as to wheat production and marketing in Canada. It concludes with a summary of the influences bearing upon the outlook for the future.

CHART 2.—AVERAGE YIELD PER ACRE OF WHEAT IN PRAIRIE PROVINCES, 1898–1924*

(Bushels)



* Sources: See Appendix Table XIV (Provincial estimates).

II. PHYSIOGRAPHIC CONDITIONS OF WESTERN CANADA

The physiographic characteristics of Western Canada underlie its past, present, and future development as a wheat producer. They largely account for the delay in opening up the country, for the transportation problems encountered, for the choice of wheat varieties and the agricultural practices employed, and for the characteristic variations in yield from year to year.[1]

ISOLATION OF WESTERN CANADA

The tardy development of Western Canada is largely explained by its geographical position—its physical isolation, on the one hand, and the political separation of Canada and the United States on the other.

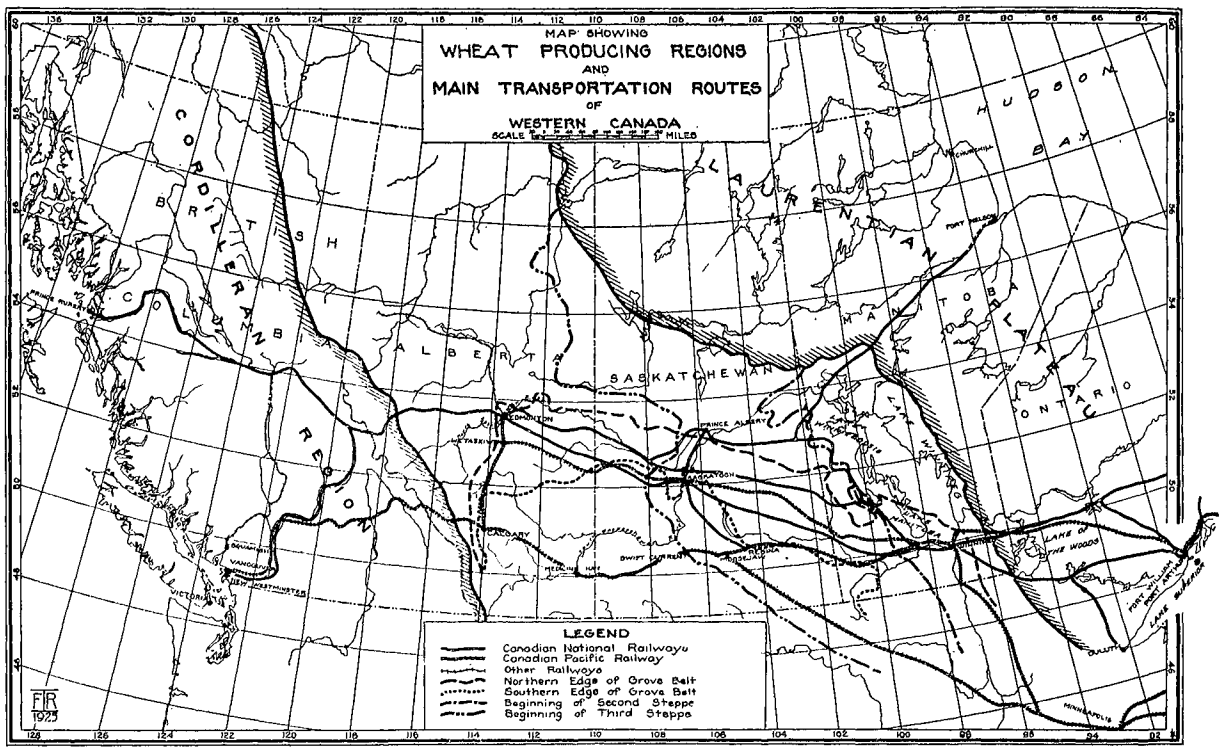
Ontario itself lies inland, far removed from the Atlantic Ocean, and between the nearest habitable districts of Ontario and Manitoba extends a wilderness of rock, wood, and water, a thousand miles across, quite unfitted for close settlement. This barrier can be avoided for the greater part of its distance by following up the waterway of the Great Lakes from Ontario to the twin port of Fort William and Port Arthur, situated on Thunder Bay, on the northwest shore of Lake Superior. Even so, there remains a journey of about four hundred miles by land across the wilderness before the plainlands suitable for agricultural settlement are reached. Again, at the western limit of these plains, the Cordilleran mountain system raises another obstacle, four or five hundred miles in width, to prevent easy communication with the Pacific Ocean and its shores.[2] The history of wheat-growing in Western Canada is in no small measure a history of the successive steps by which improvements in transpor-

[1] For general references, see Bibliographical Notes, p. 273.

[2] See map, p. 220.

tation have conquered these barriers to east and west and in particular the ones between the prairie provinces and the Atlantic.

On the southern boundary there are no formidable physical obstructions, and the Great Plains of the American West run northward into Canada. The only natural mark of separation is a watershed on the third steppe, a low ridge that can easily be crossed by man or beast. Nevertheless, the frontier between Canada and the United States is a hindrance to commerce more effective than the wilderness in the east or the mountains to the west. Climate is similar on the two sides of the border, speech and customs are the same, the same kinds of crops are raised by the same kinds of men. But political separation and national policies have restricted free movement of goods and men, have altered the development of rail and water routes, and have thus retarded and modified the progress of this great agricultural area.



From east to west the plains rise toward the Rocky Mountains in three stages, commonly termed steppes. The most easterly is the Red River Valley. The floor of this valley is about seventy-five miles in width. It lies 750 or 800 feet above sea level and is as flat as a board. Its soils are clays and silts deposited in the bed of a lake of earlier times, and are splendidly suited to the plow.

A sudden change of level occurs at the western edge of the Red River Valley, where the ground rises sharply in a continuous escarpment, with also several disconnected

Relief and Soils

The agricultural lands of Manitoba, Saskatchewan, and Alberta are a small northern portion of the "Great Plains" of North America. From east to west they are seven or eight hundred miles in length and they extend northward from the international boundary for two or three hundred miles. The comparatively level surface of these lands, the quality of their soil, the large areas of grassland, and the absence of a forest cover are advantages which combine to give opportunity for agricultural exploitation on a very extensive scale, and climatic and economic factors have so far determined that the principal product shall be wheat.

ranges of hills. This is the edge of the second steppe (see map) and beyond it lies the second steppe itself, the true "great plains" of the west, at about 1,600 feet above sea level. The general surface of these plains is gently rolling, although there rise in several places ridges and low hills. The rivers and streams run well below the level of the surrounding country in broad flat-bottomed valleys with steeply-sloping sides, so that they constitute obstacles difficult for roads and railways to cross. The soils are largely glacial in origin, and are of varied character, in general of excellent quality for agriculture.

A second escarpment, known as the Missouri Coteau, runs in a northwesterly direction from North Dakota across the southwestern portion of Saskatchewan and onward with less defined features into central and northern Alberta. This is the edge of the third steppe, and behind it there lies another stretch of prairies, at a level of 2,500 feet or more above the sea and extending to the foothills of the Rockies. This region contains the driest parts of the prairies, and in the early days of western exploration was regarded as desert. Its streams are feeble and intermittent in their flow and often drain into small salt- or fresh-water lakes without outlet. Its soils are of much more varied quality than those of the first and second steppes, and some of them are unfitted for agriculture by alkali or other evils of a dry climate. On the other hand, irrigation is possible over large areas in this region by reason of the water supplies of rivers flowing from the snow-fields of the Rocky Mountains.

Climate

The climate of Western Canada is of the "continental" type, which is characterized by a predominant summer rainfall and a wide range of temperature between summer and winter. The temperatures of wintertime are so severely low that the ground is frozen hard to a depth of several feet, and work on the land becomes impossible. The agricultural season is sharply defined in its beginning by the melting of the winter's accumulation of snow in March and April, and in its end by the freezing of the soil at the return of winter, usually in November. The first snow-covering forms as a rule only after the soil has thus been frozen hard. It does not lie thickly, and in the west and southwest it may even be removed from time to time during the winter by warm dry "Chinook" winds that descend on the prairies from the Rocky Mountains.

The precipitation (rain and snow) of the three provinces is everywhere rather low for agriculture. Only in a very few places does it average more than 19 inches, and over large parts of the settled area of Saskatchewan and Alberta it is less than 15 inches. About 60 per cent of the whole falls in the five summer months from April to August, the growing season of the crops, the two rainiest months of the year being June and July. Combined with this summer rainfall there is usually a sufficiency of warm and sunny long summer days to ripen all kinds of quickly-growing crops.

Table 1.—Precipitation in Manitoba, Saskatchewan, and Alberta*

(Inches)

Place	Elevation *(feet)*	April to August: First quartile [a]	Median	Third quartile [a]	Annual average
Manitoba					
Winnipeg	766	10.60	12.34	14.76	21.07
Minnedosa	1,675	8.06	10.69	12.29	16.92
Saskatchewan					
Qu' Appelle	2,132	10.14	11.74	14.57	18.35
Prince Albert	1,414	7.38	9.71	11.90	15.72
Alberta					
Medicine Hat	2,181	6.42	8.11	9.69	13.03
Calgary	3,437	7.68	10.47	13.83	16.12
Edmonton	2,183	9.59	10.53	15.16	17.42

* *The Temperature and Precipitation of Alberta, Saskatchewan, and Manitoba*, Meteorological Service of Canada, 1920. Based upon figures for 33 years or more, ending 1917.

[a] When the figures of a sequence are arranged in order of size, the middle of the lower half is the first quartile, the middle term of the whole sequence is the second quartile or "median," and the middle term of the upper half the third quartile. Half the terms therefore fall between first and third quartiles.

The rainfall, since it is rather low for agriculture, exerts a strong control over the size of crops, and its variations from place to place and from year to year are of great economic importance. Table 1 indicates the general character of both kinds of variations. In the main, both rainfall and snowfall are less in the western than in the east-

ern districts, being least around Medicine Hat in southeastern Alberta. This district, indeed in general all the southern portion of the third steppe, is the most liable to crop failure in years of scanty rainfall.

High latitudes, a high altitude, and a northern exposure are influences which make for cold nights during the growing season and for occasional frosts in late spring and in early fall. Such a chance frost in May or early June may set back the growing crop or may kill it outright. But the early fall frost is more widely dreaded because it may do great damage to the wheat crop by spoiling the milling qualities of the grain and the commercial baking qualities of the flour. For successful wheat-growing, therefore, it is necessary to employ varieties which are likely to ripen before the coming of the first destructive autumn frost. On the other hand, the growing of corn (maize) for its grain[1] is not often successful, except in the southern parts of the provinces, because in general no variety can come to maturity before it is killed by the first autumn frosts.

A special map of considerable interest has recently been published[2] to show the average length of the growing season (of wheat) in the agricultural districts of the three provinces. For this purpose, the average length of the growing season is defined as the number of days between the average date of seeding (of wheat) and the average date of the first autumn frost. The length of the growing season varies considerably from year to year; and even the averages may be influenced unduly by extreme variations in exceptional years. It is also doubtful whether for many places sufficient data exist to allow of the computation of reliable averages. Yet the results presented by the map are interesting and suggestive, even if not entirely conclusive. The following figures for a few places indicate broadly the variations in length of the average growing season shown by the special map:

Minnedosa, Manitoba	128 days
Winnipeg, Manitoba	145 days
Prince Albert, Saskatchewan	114 days
Qu'Appelle, Saskatchewan	130 days
Edmonton, Alberta	140 days
Calgary, Alberta	141 days

Broadly speaking, and as might be expected, the growing season for wheat is shorter in the more northerly districts and and at the higher altitudes. It is also ten days or more shorter in Saskatchewan, the principal wheat-growing province, than in Alberta or Manitoba.[3]

Vegetation

The regions in which agricultural settlement has taken place are by no means all bare grasslands, though such lands of course constitute a large part of the whole. Many of the most esteemed lands lie in the "Grove Belt" or "Park Country," where the open grassland is freely interspersed with groves of bush. The northern and southern edges of this belt are shown on the map, so that it can be followed from southern Manitoba across central Saskatchewan and Alberta as a strip of country from 50 to 125 miles wide. It constitutes a zone of transition between bald "prairie" grassland to the south and continuous bush-country to the north. Into the northern bush country and the still more northerly sub-arctic forest beyond it, general settlement has yet made but little way, so that for the present the northern outskirts of the Grove Belt mark the northern borderland of agricultural development in the Canadian West.

The general character of the vegetation is determined by rainfall and temperature. In the hottest and driest part of the prairies —the "Chinook" region on the southern portion of the third steppe — there are places where sagebrush, cactus, and other xerophytic[4] plants are found; but elsewhere on the upland the native grasses provide splendid pasture and natural hay on which beef cattle may be left to graze all the year round.

The prairie grasslands of the second steppe enjoy more rainfall and are there-

[1] Corn is grown for silage with great success.

[2] *Physical and Climatic Map of Manitoba, Saskatchewan, and Alberta,* Natural Resources Intelligence Service, preliminary edition, 1924.

[3] See also Appendix Table XXI for dates of seeding and harvesting in Saskatchewan.

[4] Plants adapted to the conditions prevailing in regions of low rainfall and high evaporation.

fore more fertile, so that here wheat growing is most firmly established at the present time. Trees and bushes are now being extensively planted and grown, and the protection they will afford to crops and stock is certain to exert a considerable influence upon the agricultural prospects of these grasslands.

The cooler climate of the Grove Belt favors the growth of bush, and this land is therefore well suited to mixed farming, the cattle ranging in the groves, the crops growing on the plowed grassland. It is no great disadvantage here, perhaps, that the growing season is rather short for the standard varieties of wheat, because the keeping of livestock requires the growing of forage crops and of coarse grains, such as oats, which are better adapted than wheat to the asperities of the climate.

III. AGRICULTURAL PRACTICES IN WESTERN CANADA

The climatic limitations of a scanty rainfall and a short growing season exert a most powerful influence upon methods of soil cultivation and the selection of suitable crops and varieties.[1] In general, the deficiencies of rainfall are felt more severely in the south and southwest, and the shortness of the growing season in the north; yet both influences are strong over the whole area of cultivation.

The Cultivation of the Soil

Because the rainfall of the growing season is often not sufficient to insure a satisfactory yield of wheat, it is necessary to employ cultural practices that will accumulate water in the soil, for the benefit of a subsequent crop, from the rain and snow which fall during other seasons. Of these practices, much the most important is the fallow, in accordance with which the ground is plowed and worked during a summer season, to be planted to a crop in the following spring. At the present time between 40 and 50 per cent of the wheat acreage of Western Canada is land that was thus fallowed the year before.[2]

Prairie farming has had to begin with the breaking of prairie sod—to destroy natural vegetation, to make a good seedbed, and to accumulate moisture for the first crop. Such breaking is best done by a shallow plowing, early in the season, so that the summer rains may soak into the soil. Sometimes an early breaking may be sown to wheat, but the risk of failure is great, and the ground is usually left bare so that the turned sod may rot. Later in the season it is worked over again, most commonly by a second deeper plowing—"backsetting"—to break up the sod into clods and kill persistent native plants. The frost of winter crumbles the clods to smaller pieces, and when the spring thaw comes some of the melted snow soaks into the newly-made soil, further increasing its store of moisture. The broken land then lies ready for its first crop of wheat.[3]

After a very small number of crops, the yields from newly-broken land decline to an unprofitable level, through the drying of the soil and the coming of weeds. When it has reached this condition, a summer-fallowing becomes necessary. Land to be left fallow during the summer is, or should be, plowed as early as possible after the stress of spring seeding is past. Afterward it must be worked over several times in the rainy season, in order to keep down weeds, which grow in abundance on fallow land, and to maintain a loose surface layer, which lets the rain pass through and shields the moisture-retaining underlayers from the heat of the sun.[4] Without these later

[1] For general references, see Bibliographical Notes, p. 273.

[2] See Appendix Table XV.

[3] The new settler in times past has often followed a different plan, plowing deeper and until much later in the season, in order to break as much ground as possible. His first crops, which might be sown on the newly-broken land, were usually oats and potatoes, for subsistence, or flax, for its seed, as a cash crop.

[4] Recent experiments at the Experimental Station of Swift Current, Saskatchewan, tend to the conclusion that, in the drier regions, at least, the loose surface "mulch" is of little or no value in checking evaporation from the soil, and that the principal advantage of early plowing and repeated cultivation lies in the destruction of weeds. (*Seasonable Hints*, Dominion Experimental Farms, March 1925.)

workings, the benefits of the first plowing are largely lost.

The summer-fallow thus gains a definite place in the grain-growers' rotation. In the drier parts of the prairies this rotation may be wheat and fallow in alternate years, but more commonly it comprises two years of wheat to one of fallow. In such cases the crop of the first year gives better and surer yields than the crop of the second year—the "stubble" crop. Where there is too much risk of loss from a second or third consecutive crop of wheat, the crop rotation is often extended by a coarse grain crop, usually oats, in the year before the fallow. In years of late spring, established rotations may be broken, and land that might otherwise have been planted to wheat will then be fallowed, or planted to oats or barley instead.

Unfortunately the summer-fallow is not without serious faults. Crops grown on fallowed land enjoy the moisture of the soil too well; the straw grows longer and weaker, the grain ripens later, and the crop may lodge in a high wind or suffer damage from an early frost. Continued for many years, summer-fallowing also lowers the quality of the soil. Soil fibre is destroyed and organic matter and nitrogen are washed out. Finally, when the soil has thus been broken down to barren dust, as the result of overcropping or overworking, it drifts away in the wind, causing loss to the lands it leaves and to those on which it settles. This evil has so far been felt principally in the south and southwest, and is likely to spread further.

Practicable alternatives for the summer-fallow are urgently required. In the more humid parts of the west, at least, it can be replaced by an intertilled crop, such as corn, potatoes, or sunflowers. The ground is well cleaned of weeds by the cultivation given to the crop,[1] and the succeeding grain crop is likely to yield as well as if it had been grown on fallowed land, or to do even better. These technical advantages are counterbalanced at the present time by the economic disadvantage that in general there is little opportunity in the west to dispose of corn, potatoes, or sunflowers to the growers' advantage. A more promising alternative, which is still in the earliest stages of trial, consists of strip cultivation. Two or three rows of seed are drilled into the soil at the ordinary interval, and strips of bare ground, two or three feet wide, are left between the seeded ground and cultivated at intervals during the growing season.

[1] Provided the cultivation is really given, which is too commonly not the case.

[2] See p. 228 for further information on rust.

The Canadian Wheat Plant

The growing of winter wheat is a very hazardous procedure in Western Canada, because the plant is so much exposed to frosts, which may attack it and kill it in the late autumn before the first snowfall; during the winter, if the snow-covering of the ground should be removed for a time; or, still more serious, during the spring, after the snow has finally melted and the plant has begun its summer growth. Winter wheats are therefore grown but little at the present time, except in a few places and by a few experimenters. Spring-wheat varieties must needs be used, even though they ripen later and thus incur risk of damage by frost at the end of the growing season.

The two principal dangers to the growing wheat crop are frost and rust, each of which can spoil the grain badly in the qualities which give it value to the miller and baker. Rust is the commoner danger of the more humid portions of the wheat belt, Manitoba and eastern Saskatchewan; while frost is a more serious danger in the more northerly districts. Both troubles are alike in that, as a rule, they menace the crop only near the end of its growing season[2] and that, though they may badly damage a crop that is nearly ripe and still rather moist, they can do little or no harm to a crop that is fully mature and properly dry. As a principal means of reducing these risks, quickly-maturing varieties are employed. Up to the present only two varieties —Red Fife and Marquis—have met this requirement and given satisfactory yields of grain of good quality. Many other varieties have been tried, some with considerable success in special circumstances, and many more are in process of trial; but none has

yet attained to the general esteem in which Red Fife and Marquis are held.

Red Fife is the descendant of a Galician wheat first grown in North America in 1842 by an Ontario farmer, David Fife. Later it passed into the American West and Northwest, where it proved its great value, and thence it was introduced on a commercial scale into Manitoba in 1882 and 1883. It is characterized by a hard grain and a reddish bran and is notable for the high quality and strength of the flour it gives. The great fault to be found with it is that it is not a sufficiently early variety. This is a special drawback when it is grown on land that has lain fallow the summer before, because, like other varieties, it then ripens more slowly. It yields a long and fairly stiff straw, which is an advantage wherever such straw can be put to use, but which also involves the dangers of lodging in bad weather and of consequent difficulties in harvesting.

These defects of Red Fife wheat in Western Canada were soon revealed, and the Dominion Experimental Farms were assigned the task of discovering some still more suitable variety. After many failures and partial successes, a satisfactory result was reached at last in 1903, with the discovery of Marquis wheat, the descendant of an early cross between Red Fife and an Indian wheat.[1] By 1911, the new variety was commercially established in the West. It has since become the recognized standard wheat of Western Canada, yielding probably nine-tenths of the total crop, and has also gained a position of high esteem in many other wheat-growing countries all over the world.

The first great merit of Marquis wheat showed itself in its early trials in the West, when it gave considerably higher yields than Red Fife grown under the same conditions. It complied with the fashions of the grain trade, which require that wheat from Western Canada shall be clothed in a red coat, and it yielded a white flour of high baking quality, fully the equal of flour from Red Fife.

[1] This variety was developed by Dr. Charles Saunders, Dominion Cerealist from 1903 to 1922.

[2] A. W. Alcock, "The Milling and Baking Qualities of the Wheats of Western Canada," *Northwestern Miller*, March 25, 1925.

The best quality of Marquis wheat as a plant is its early ripening, so that it is often ripe and safe from frost and rust before these dangers can threaten. This is of special advantage in the fallow crop. The straw is shorter and stiffer than that of Red Fife and therefore less likely to lodge, but it may be inconveniently short in dry years and dry areas. For such reasons Red Fife is still preferable to Marquis in some districts of low rainfall where the soil is light. The grain of Marquis is held tightly in the ear, so that it does not tend to shell out, as Red Fife may do, in high winds and before harvest. This tight hold calls for the use of greater power in threshing and may cause some loss in years of low yield when the threshing machine is not able to handle the scanty straw to advantage and extract all the grain. It also leads to greater loss through broken grain.

Regardless of variety, the quality of wheat varies from one part of Western Canada to another. A special map of the three provinces, based upon the analyses of a cereal chemist, shows that in general the wheat from the southern and southwestern districts contains the highest proportion of protein.[2] Associated with the high protein content is a hard vitreous grain and a flour of the best baking quality. The dry regions of the west and southwest, therefore, produce the highest qualities of Canadian wheat, although, on account of the uncertain rainfall, their output is very irregular. The more humid regions northward and eastward grow a wheat of lower protein content, which may have a piebald and starchy appearance (known in the United States as "yellow berry") and which gives a weaker flour. Yet the quality of wheat from these regions is reported to improve after some years of cultivation, and the improvement is attributed to a gradual reduction in the moisture content of the soil.

In the more northerly regions, where there is more risk of early fall frosts, which in some years do serious damage to the wheat crop, early ripening is much to be desired. This can be achieved in two ways: First, the wheat can be grown in a dryish soil, so that the earlier stages of its (vegetative) growth may be hastened and the

time of its ripening (reproductive growth) brought forward. Secondly, varieties ripening more quickly may be substituted, because Marquis, though it ripens before Red Fife, is not a sufficiently early variety to be grown without risk in the more northerly districts.

In order that the soil in which the wheat is sown shall not be too moist, some modification is made in the ordinary rotation or in farming practices. Summer-fallow is resorted to less frequently, and plowing is later or shallower. A thinly-sown pasture crop may be raised on the fallow, or a coarse grain—usually oats—may take precedence in the rotation as the first crop after the fallowing, wheat being sown the next year as a stubble crop. In either of these last two practices the principle is the same, that of making some other crop draw off any excess of moisture in the soil before the wheat is sown. The fortunes of the wheat crop will thus depend principally upon the fall of rain during its growing season. On the whole, over a number of years, the yield will be smaller than in the more southerly regions; but any such loss of yield is good insurance to be paid for earlier ripening and consequent safety from the first frost of autumn.

Several varieties of early-ripening wheat have been developed by the Dominion Experimental Farms for use in the more northerly districts. Two varieties of importance are Prelude and Ruby, which ripen about a week before Marquis, but do not yield so well. Apparently also they do not give such good flour, although on this point millers and bakers have not yet given their final verdict. Quite recently, too, the Dominion Cerealist has announced the preliminary results of tests on another new variety of wheat, named Garnet, developed by his branch of the Experimental Farms. It ripens about eleven or twelve days earlier than Marquis on the average, and under very dry conditions seems able to thrive with greater success than Marquis. It is also a good yielder. Its commercial qualities for milling and baking have not yet been definitely determined. Possibly it will replace Ruby, and may enjoy even greater success in the further course of time.

From Seedtime to Harvest

With the melting of the winter's snows in March and April, some of the water runs off the land, causing freshets and floods, and some soaks into the soil. This soaking-in is one of the important sources of soil moisture in Western Canada, and the careful farmer aims to work his land in ways that will secure its benefit to the full. When the ground has dried sufficiently, plowing and seeding can proceed, in April and May.

In the spring the wheat farmer makes his important decisions of the year. Within the limits set by his rotations and by the weather and soil conditions, he must decide how much of his land he shall put into crops, how much he shall leave fallow, and how much grassland he shall break. For the wheat land to be seeded, he must choose among plowing, cultivating by discs or harrows, and drilling his seed into the stubble of the last year's crop. The relative advantages vary with the moisture content of the soil and the prevalence of weeds, so that the choice is often a matter of great complexity.

Quality of seed has been the subject of much careful attention. Many farmers take pains to plant selected seed of uniform variety and good germination, well cleaned of weed seeds—either by selection from their own crop or by purchase from dealers or others who specialize in the production of high-grade seed. The prevalence of this practice made possible the rapid spread of Marquis wheat and may facilitate further desirable substitutions. But these sound practices are by no means universal, and the majority of farmers use their own grain for seed or buy in the neighborhood. Some clean the grain from weed seeds by a fanning mill and treat the seed with hot water, formaldehyde, or copper sulphate to destroy the spores of smut. Nevertheless, it is commonly complained that these preparations are not carried out with sufficient thoroughness and that the spread of weeds and smut is facilitated by the carelessness of farmers with respect to seed grain.

The time of seeding is a matter of great importance. If sown too soon, the seed grain may rot in the earth before germinat-

ing, or the young plant may be killed or injured by a spring frost; if sown too late, the crop will be late in ripening and may be damaged in the autumn by rust or frost. Because of its long growing period, wheat is always the first crop to be sown, usually during the second half of April and the first part of May, but earlier or later in exceptional years.[1] When seeding is held back by a late spring, less wheat will be sown, and the farmers will plant instead a larger acreage to oats or barley, more quickly-growing crops.

Some farmers harrow the growing crop in its early stages in order to remove weeds and loosen the surface, but the majority let it alone from seeding to harvest while they proceed to work their summer-fallow and make their hay. As soon as the grain is ripe, but not too ripe, it must be cut quickly, to avoid loss by shattering. The bound sheaves are set up into "stooks" (shocks), where they cure gradually, protected from damage by rain. For the harvest, thousands of harvest hands from Eastern Canada are brought in by special trains at cheap rates and distributed to the harvest districts by the railway companies and the provincial governments' employment agencies. The skilled men drive reaping and threshing machines, the unskilled handle sheaves. All are worked as hard as possible, because the crop must be harvested quickly and because the farmer finds his wage bill a heavy burden.

The header-thresher is unsuited to the climatic conditions of Western Canada, because it will operate successfully only when the grain is fully ripe. The Canadian farmer does not dare to await that stage, and therefore uses the reaper-binder instead, even though the costs of harvesting and threshing are considerably increased. Horses are generally used for reaping and for all other draft work on the farm. Only in a few operations has the tractor proved capable of offering effective competition. The principal use of mechanical power at the present time is in threshing, for which straw-burning steam engines are most commonly employed. Powerful machinery is required for this work in order to effect a thorough and profitable separation of the grain from the ear. The work is done by threshing gangs, who move from one farm to another with their equipment.

Where no use can be found for the threshed straw, it is commonly burnt in heaps where it lies. This practice, like that of the summer-fallow, leads in the end to a deterioration of soil fertility. Yet in the comparative absence of livestock on farms in Western Canada, it has been hard to discover any better alternative, because, even in a much more humid climate, the straw could not be turned back into the soil with advantage. For the future, however, it is possible that the new process for the production of artificial manure from waste straw[2] will become a recognized farming practice, wherever the farmers themselves are willing to make the manure and apply it to their land.

After the rush of harvesting is past, the next task of the farmer is to begin plowing his land for the next year's crop. Fall plowing may sometimes be less profitable than spring plowing, but it is done, nevertheless, because there is not nearly enough time to do all the necessary plowing in the following spring, and because in any case the yield on autumn-plowed land is regularly better than the yield on land upon which the seed was drilled into stubble. Some of the harvest hands usually stay behind to help in this work, which goes on until the soil freezes for the winter. No very large part of the land can thus be worked before freeze-up and the greater part must be left till the following spring.[3] During the winter, the grain-grower can do no work on his crops or his land, so that he must wait with little occupation until he can go out to his fields again and face the same problems of choice that he considered twelve months before.

Farming Difficulties

Though the normal conditions of soil and climate in Western Canada are well suited to the production of wheat of high quality, there are many hindrances to successful

[1] See Appendix Table XXI.

[2] H. B. Hutchinson and E. H. Richards, "Artificial Farmyard Manure," *Journal of the Ministry of Agriculture*, London, August 1921.

[3] Some statistics on fall and spring plowing are given in Appendix Table XV.

cultivation. Some of these are largely or wholly unpreventable, others can be in great measure overcome by the employment of proper means.

The evil of frost has already been considered, and the various expedients used to combat it by securing early ripening have been indicated. The climatic disorder of the greatest severity is probably that of a hot dry summer, in which the soil is not able to provide sufficient moisture for the needs of the plant and the grain does not fill out. In such years only fallow crops give satisfactory returns and the yields from the stubble crops are pitifully low. Since more than half the wheat must be grown as a stubble crop, the farmer cannot guard against such a mischance as this, beyond adhering carefully to the recognized principles of good husbandry.

One of the worst disasters that can befall a farmer is a hailstorm, which may damage or destroy a growing crop almost in a moment. Fortunately for the West, hailstorms are always local and are not likely to occur in many places during the summer, so that while they cause heavy loss in a few places they do not noticeably reduce the size of the western crop, and the farmer can insure himself against serious financial loss from hail.

Another set of difficulties is presented by the prevalence of weeds of all kinds. The damage done by weeds each year, in stealing soil moisture, reducing yields, and contaminating threshed grain, is estimated in millions of dollars, and is still increasing. The spread of weeds is attributed to the use of badly cleaned seed and to poor methods of farming. The most effective remedies are to be found in the development of mixed farming, improved rotations, the keeping of livestock, and better methods of working the soil. All the provincial governments have passed laws and established organizations to enforce the destruction of weeds, but the measures have not received consistent support from individuals and communities. The decline of Canadian yields over a long period of years since the earlier days of cultivation, is probably attributable in large part to the ravages of weeds. Unless some remedy is applied, it is possible that this decline will proceed still further.

Of several menacing plant diseases, rust has already been mentioned as a regular danger to wheat at the end of the growing season.[1] In years of high rainfall and little wind it is also an acute danger much earlier in the season, because it may attack the growing plant and prevent the head from forming. This of course means complete crop failure. It is, on the whole, unpreventable, but it can be countered by the use of early ripening varieties, rust-resisting varieties such as durum wheats, practices which encourage early ripening, and the destruction of certain plants, such as the barberry bush, which are hosts to the rust spores in certain stages of its life cycle. There are two principal kinds of wheat smut, loose and covered. Both can be prevented if the hot-water treatment of seed is used. In practice, however, this is a very difficult treatment which the ordinary producer is hardly able to furnish, and he employs instead the treatment by formaldehyde or copper sulphate, which gives protection against covered smut alone. On the majority of farms, therefore, there is always some risk of loss from loose smut.

Of insect pests, it is possible here merely to list a few. Caterpillars of many kinds—commonly termed cutworms—devour the growing crops. Their attacks are most common in June, but may develop at other times, according to the particular species at work. Grasshoppers constitute another pest, devouring the crop and causing serious damage in certain years. Other insects, such as the sawfly, attack the stems of wheat at the end of its growing season and cause it to fall.

Methods of protection and prevention can be employed against the majority of the insect pests. Grasshopper plagues, for example, are combated by the provincial governments acting in coöperation with the municipalities and the individual farmers. Poisoned bait is prepared and distributed in large quantity, and a serious campaign is waged, with direction from a general headquarters. In the case of other pests, how-

[1] See above, p. 224.

ever, individual or, at best, local action is the more usual practice.

In conclusion, it is perhaps well to say that the most of these troubles arise from the fact that large areas of land under cultivation by the individual farmer lie side by side with land to which little or no cultivation is given and which furnishes abundant opportunity for the growth and spread of pests. They are also a consequence of the great predominance of grain crops in the rotations, which encourages the appearance of the same trouble in the same place year after year. With closer settlement, more thorough cultivation, and better rotations, their severity may decline.

IV. THE DEVELOPMENT OF TRANSPORTATION

The isolation of Western Canada by national and political barriers held back for many years the settlement of its land and the development of its agriculture. The disadvantages of this isolation have been largely overcome by the construction of a complex and highly-organized system of transportation.[1]

To the east, a continuous waterway from the St. Lawrence River to Lake Superior has been constructed, and is now maintained and operated at public expense without charge to any vessels that use it. With the evolution of a type of boat specially constructed for navigation on the Great Lakes and specially designed for the carriage of large cargoes in bulk, the waterway has become a cheap and convenient route for commerce between East and West.

To the west, where water communications fail, railway construction has supplied the deficiency. With the aid of numerous government guarantees and subsidies in land and money, several main lines and a vast network of branches have been constructed to connect the wheat-fields of the western plains with the Great Lakes. In return for the public assistance thus given, special arrangements have been made to keep freight rates on grain and certain other staple commodities at a conspicuously low level. For this reason, and because of political separation from the United States, there has always been in Canada a strong tendency to retain all routes of transportation, both by land and water, within Canadian territory and under Canadian control.

[1] For general references, see Bibliographical Notes, p. 273.

Wheat is the principal commodity shipped from the West. In order that it may be transported in the most economical manner, it is always handled in bulk, in car or boat. For this purpose, it must first be collected in numerous track elevators at country points and thence concentrated in immense terminal elevators at lake and ocean ports. The monopolistic advantages which the large railway and elevator companies possess have led to the imposition of strong control exercised through specially appointed public authorities. Shipping, however, has thus far escaped regulation of this kind because it is still conducted under much more competitive conditions.

The Eastern Waterway in the 'Eighties

The development of transportation in the region of the Great Lakes has been going on for a hundred years or more and has been strongly influenced by ceaseless competition between Montreal and New York. A brief statement of the condition of communications in the 'eighties and of the important advances of that decade may indicate the general character of the connection between West and East at the time when the commercial movement of wheat from Western Canada began.

A 16-foot waterway was established on the four upper lakes in the early 'eighties, after the opening of a 17-foot lock at the St. Mary's Rapids, between Lake Superior and Lake Michigan. The first iron bulk freighter to navigate the Lakes was built in 1882, the first steel bulk freighter in 1886. By the enlargement of the Welland Canal, a 14-foot waterway was provided between

Lake Erie and Lake Ontario. A series of short canals 9 feet deep, on the upper St. Lawrence, connected Lake Ontario with the port of Montreal. Below Montreal a ship channel in the lower St. Lawrence, dredged to a depth of 25 feet, was opened in 1882 and deepened to 27½ feet in 1889. At this latter depth it would accommodate vessels up to 6,000 tons gross. The Erie Canal, 7 feet deep, from Buffalo to the Hudson River, connected the upper lakes by water with the port of New York.

Of the numerous railway systems in the Great Lakes region at this period, particular mention must be made of the Grand Trunk Railway, whose main line ran from Chicago through Michigan and southwestern Ontario to Toronto, Montreal, and Portland, Maine. Several branch lines of this company connected Georgian Bay, on Lake Huron, with towns on the north shore of Lake Ontario.

Early Transportation in Western Canada

During the 'seventies, after the acquisition of the Canadian Northwest by the Dominion of Canada, several well-organized means of communication were established. The "Dawson Route," by road and river, from Port Arthur to Winnipeg, provided a direct connection between Lake Superior and Manitoba; and an alternative route, easier and more popular, ran from Duluth to the Red River by rail, and down the Red River to the settlements in Manitoba by boat, railway, or stage. West of Manitoba, the only means of communication throughout the thinly populated Northwest Territories were steamboat services on the Manitoba lakes and the North Saskatchewan River, and a number of beaten prairie trails, traversed by columns of carts. Movement of heavy freight was of course impossible under these conditions.

The Building of the Canadian Pacific Railway

The first transcontinental line, the Canadian Pacific Railway, was originally undertaken, in 1871, for political reasons and as a government undertaking. At the end of ten years, little construction had been accomplished. Accordingly, in 1881, the venture was transferred to a private company, which undertook to complete the line in return for a money subsidy of $25,000,000, the grant of 25 million acres of good agricultural land in the West, the title to certain parts of the line already completed or under construction, and sundry minor privileges.

Under these terms, a branch line from Winnipeg to the Minnesota boundary, which had been opened in 1879 but had proved apparently of small commercial importance, was at once transferred to the company, and building was actively undertaken. In 1883 the line from Winnipeg to Lake Superior was opened to traffic, and over it in 1884 the first shipment of grain was made to Europe. Meanwhile, construction was pushed rapidly across the prairies. In 1883 the railhead reached Calgary. In 1885 the lines through the Rockies and through the wilderness north of Lake Superior were completed and the first train ran through from Montreal to the Pacific. Five years later a line was opened across northern Maine between Montreal and St. John, N. B. Thus, by 1890, Western Canada was provided with complete railway connection for commerce with either ocean in both summer and winter.

After the first hurried completion of the main line, the C. P. R. ceased further construction and devoted its efforts to the improvement of its roadbed and the replacement of temporary by permanent structures. Additional mileage in the West was added slowly by small companies, which built branch lines as traffic feeders and surrendered them, willingly or reluctantly, to the C. P. R. for operation. In this way a small network of lines was constructed in Manitoba, both north and south of the main lines; and in the Northwest Territories, two long branches, one from Regina to Saskatoon and Prince Albert, the other from Calgary to Edmonton, provided connections with the settlements on the North Saskatchewan River.

In Manitoba and the southeastern portion of the Territories along the line of the C. P. R. and its branches, grain growing was a common type of farming and questions of

freights and prices assumed peculiar importance. There was constant dissatisfaction with the C. P. R. for maintaining rates at what was felt to be an unduly high level, and the ill-feeling became particularly acute during the severe depression of the middle 'nineties. Settlers in the northern districts tended to develop a more self-sufficient type of mixed farming, and were not so much perturbed by high freights and low prices for grain. Types of farming in all parts of the West were influenced at this time not only by the costs of railway connection with distant consuming markets but also by a general lack of roads and bridges and the consequent difficulties of local haulage.

The Advance from 1896 to 1903

With the passing of the world-wide agricultural depression, further important developments of transportation took place. In the eastern region, a 20-foot channel for navigation on the upper lakes was opened in 1897, allowing the employment of much larger and more economical vessels. At the same time the Canadian Pacific and Grand Trunk Railways first developed the important Georgian Bay routes, over which grain is hauled by rail from a Georgian Bay port direct to Montreal. The improvement of the St. Lawrence canals was pushed to completion, and in 1901 a 14-foot waterway was opened from Lake Ontario to Montreal. Below this port, between 1899 and 1906, the ship channel was dredged to a depth of 30 feet and greatly improved, so that much larger vessels, up to 15,000 tons gross, could pass Quebec at high tide and ascend the river to Montreal.

In the western region, transportation conditions were altered to the advantage of the farmer by financial and political measures. In 1897 western agitation at last evoked the famous Crow's Nest Pass agreement between the Dominion government and the C. P. R., by which the company received a Dominion subsidy on some new construction in the West and undertook in return to lower its rates on eastward grain and grain products by 3 cents a hundred pounds and on westward commodities of importance to the settler by 10 per cent.

In Manitoba, the humble beginnings of a new transcontinental system appeared in 1897 with the opening of a small colonization line, built by two railway contractors, Mackenzie and Mann. Other small lines were gradually added, and by 1902 the two projectors had built up a strong competitor to the C. P. R., the Canadian Northern Railway, with branches in all parts of Manitoba and a main line of its own to Port Arthur. The provincial government of Manitoba greatly encouraged and assisted this competitive system[1] and as a result procured from both lines in 1902 and 1903 a further reduction in grain rates of 2, 3, or 4 cents a hundred pounds from all shipping points in the West.

New Main Lines in the West

The original scheme of the Canadian Pacific Railway contemplated a line running north and west through the fertile valley of the North Saskatchewan River to Edmonton and crossing the Rockies by the easy Yellowhead Pass. In 1881 the company changed this location, partly for financial reasons and partly because enthusiastic reports had led it to take a highly favorable view of the agricultural prospects of the southwestern grasslands, the cattle district of southern Alberta. Accordingly it diverted its route through these drier lands, crossing the mountains by two more difficult passes through the Rockies and the Selkirks.

For more than twenty years thereafter, the better agricultural lands to the north were served only by the two long branch lines from Regina and Calgary, until at last the new advance of settlement from 1897 onward showed clearly that the time had come for the provision of a new main line between Winnipeg and Edmonton. Although one main line would probably have sufficed to serve this region, three were

[1] The Manitoba government, in 1888, had guaranteed securities of the Northern Pacific and Manitoba Railway for the construction of branch lines in Manitoba in return for the privilege of fixing rates. It thus secured a reduction of rates to Duluth and compelled the C. P. R. to reduce rates from competitive points to Fort William. In 1901 the lines constructed in accordance with this agreement were transferred to the Canadian Northern Railway, and the earlier agreement was renewed, with final consequences as described above.

constructed, one by each of the three big Canadian systems. Each of the two newer lines also planned to repeat the success of the C. P. R. and incorporate its prairie line in a larger system between Atlantic and Pacific ports.

The Canadian Northern was first in the field. The ambitions of its owners were made known in 1902, and their line between Winnipeg and Edmonton was opened in 1905. Construction was largely financed by bond issues guaranteed by the Dominion and provincial governments, and was further aided by land grants previously made to abandoned railway projects whose charters it acquired.

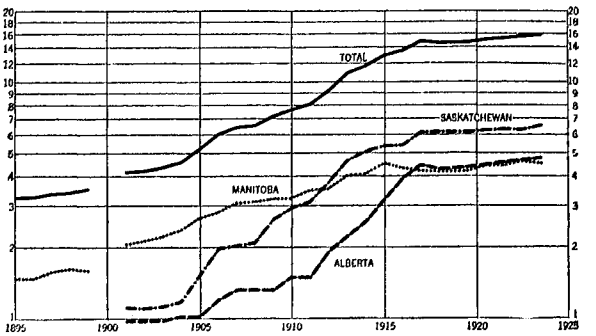
Between 1902 and 1909 the Canadian Pacific slowly built a long tributary line through Saskatoon to Wetaskiwin, a town near the northern end of the Calgary-Edmonton line. The work was carried through quietly without governmental assistance. It was most probably constructed to main-line standards, and there can be but little doubt that it was intended to secure a competitive hold on the territory of the Grand Trunk Pacific project.

The most ambitious venture was that of the Grand Trunk Railway, which had operated hitherto in Eastern Canada alone. In 1902 and 1903, in close conjunction with the Dominion government, plans were made to construct a new transcontinental all-Canadian line of first-class standards. Construction of the line west of Winnipeg, known as the Grand Trunk Pacific, began in 1905, and the line was completed to Edmonton by 1910. To the east of Winnipeg, another part of the project, a third line to Fort William and Port Arthur, was completed and opened in the same year. The eastern half of the transcontinental line was constructed by the Dominion government at its own expense, and the western half by the company with the aid of liberal Dominion loans and guarantees. Apparently little thought was given to the fact that the Dominion government was guaranteeing the securities of two competitive lines, running near one another through all their traffic-producing territory.

The construction of these main lines was naturally accompanied by the building of branches. Hence railway mileage in the prairie provinces rose by leaps and bounds, from 4,200 miles in 1902 to 11,700 in 1914. (See Chart 3.) Vast areas of vacant land were thus opened up for settlement and agriculture. The new lines not only gave the western producer access to distant markets, but also, during their construction, provided a strong and profitable local demand for his produce and for the labor of himself and his teams.

CHART 3.—RAILWAY MILEAGE IN PRAIRIE PROVINCES, 1895–1923*

(Thousand miles. Logarithmic vertical scale)



* Sources: See Appendix Table XIX.

NOTE.—Vertical lines are drawn at June 30. For years after 1918, data refer to December 31, and are so plotted.

The growing volume of wheat for export compelled improvements in the rail and water connections between the upper lakes and the port of Montreal. Accordingly, between 1908 and 1912, the Canadian Pacific and the Grand Trunk constructed new and improved ports and elevators on the Georgian Bay, and the Dominion government constructed an elevator at Port Colborne at the upper end of the Welland Canal.[1] Tolls on the Welland and St. Lawrence Canals, which included a through rate of 10 cents a ton on grain, were abolished, in 1903.

CONTROL OF RAILWAY RATES

Before 1902 control over Canadian railway rates was slight and ineffectual. The Railways Committee of the Privy Council in theory possessed complete authority, but seldom or never exercised it. Rates oscil-

[1] See below, p. 256.

lated at times in accordance with the competitive zeal of the various companies, and important reductions were secured by political bargains such as the Crow's Nest Pass agreement. A special commissioner carefully examined the whole question of regulation and reported in 1902 in favor of the creation of a Board of Railway Commissioners. Such a Board was accordingly established and appointed in 1904, and has continued in authority ever since.

The Board of Railway Commissioners was given great powers of investigation and of regulating railway rates and traffic conditions. On several occasions it has conducted far-reaching examinations into the general character of Canadian rate structures. Its findings of fact are accepted as final in Canadian courts of law, but in matters of regulation its decisions may be reviewed by the Governor-General in Council (the Cabinet of the day) and by courts of law, and it is not allowed to modify rates established by special statutory authority.

The Board has decided many points of great importance to Western Canada. Nevertheless, in cases involving the transportation of grain or some other basic commodity, an appeal has often been made to the Cabinet or to Parliament, with the consequence that political rather than economic interests have influenced the final decision. The decisions of the Board, therefore, have not yet resulted in a unified, impartial rate structure for the whole of Canada.

The Railways of Western Canada After 1914

The expansion of railway mileage in the prairie provinces, which continued till 1917, considerably exceeded the needs of the time. The newer lines fell into difficulties because they could not secure sufficient traffic to earn a revenue on their long stretches of main line through uninhabited regions supplying little or no traffic. These lines found themselves compelled to operate on a scale of low freight rates and, especially after 1914, at steadily increasing costs of operation. The fact that the Canadian Pacific was able to continue profitable operation, even under these conditions, was used as an argument to prevent until 1917 any general increase of freight rates. Though sustained for a time by further governmental advances, in the end the newer lines all fell into the hands of the Dominion itself.

Thus between 1917 and 1922, a new railway system, the Canadian National, owned by the Dominion government, was built up in Canada out of the Canadian Northern, the Grand Trunk, the Grand Trunk Pacific, and existing government lines. Since many parts of the system had been designed as competitive lines, the task of coördinating their operation was one of great difficulty, and the process of unification is still incomplete. Earnings have been small, and the Dominion government has been compelled to contribute from 50 to 70 million dollars a year for operation and for the payment of interest on the securities it had guaranteed.

The problem of railway rates is therefore one of great difficulty at the present time, because the Canadian Pacific, which is a well coördinated system, has managed to thrive on rates which cause heavy loss to the Canadian National and a heavy burden on Dominion finances. The general principle apparently followed of late is that of maintaining rates which will allow the C. P. R. to operate at a profit, even though on certain competitive routes advantages of location and construction would permit the C. N. R. to concede a lower rate. Recent judicial decisions have seriously disorganized this rate structure, however, and it has now (June 1925) been placed in the hands of the Board of Railway Commissioners for a thorough revision.

The rates on grain and its products have a recent history of their own. Strongly against the will of the West, they were raised several times between 1918 and 1921 till they stood nearly 50 per cent above the levels fixed by the Crow's Nest Pass agreement. In 1922, however, the West was strong enough to secure from Parliament their reduction once more to that level. The West is so strongly attached to these low rates, fixed by statute, that the recent instructions given to the Board include a special restriction that they shall not consider any alteration in the Crow's Nest Pass grain rates. There the matter rests.

V. THE DEVELOPMENT OF MARKETING ORGANIZATION

The practice of grading and bulk-handling wheat shipments, long before established in the United States, was brought into Western Canada after the building of the Canadian Pacific Railway, in the early days of commercial wheat-growing.[1] This method of handling requires small elevators at numerous country points, big elevators at lake and ocean ports, and, in consequence, heavy investments in fixed capital. The movement of wheat, also, has encouraged the growth of a large grain market at Winnipeg, the point through which the bulk of the commercial crop must pass.

As in the United States, elevators were erected in Western Canada in sufficient number to bring them into competition with one another, so that elevator operation usually proved profitable only when the management undertook not only the handling but also the merchandising of grain. The most efficient commercial organization for such a business had already been discovered in the United States to be the "line elevator company," operating a number of track elevators, at country points, through salaried employees, who purchased farmers' grain for the company, and a selling organization on the central market to dispose of all its purchases. Companies of this kind soon established themselves in Western Canada.

Although the local elevator operators and their companies were competing with one another, they developed trade practices which kept the farmers very much at a disadvantage. The railway service gave its support to the elevator men, because of the greater efficiency of their elevators in grain loading, and in general refused to accept grain for shipment which had not been loaded through an elevator. In the face of such a combination the farmers were at first entirely helpless, and the history of subsequent marketing organization is largely a record of their endeavors to gain commercial equality by legal guarantees and to control the grain trade to their advantage, partly by governmental regulation and partly by coöperative organization and action.

Commercial Regulation Before 1900

Grading of wheat from Western Canada, a prerequisite of bulk-handling, was instituted in Canada some time between 1874 and 1886, and was performed by qualified inspectors, appointed by commercial bodies under legal restrictions intended to secure impartiality. The standards of inspection were broadly defined by statute, and more precisely by public boards. In 1889 a Western Standards Board was established, to authorize statutory grades for western wheat; and in 1891 it was given the further right to establish commercial grades from year to year for grain which failed to comply with the standards specified by statute. At this time, wheat from the West was inspected only when it reached Fort William or Port Arthur.[2]

The first large crop of Western Canada was the crop of 1887, about 14 million bushels. This big crop encouraged the founding of the Winnipeg Grain and Produce Exchange in that year, a second and successful attempt at the creation of a grain market in Winnipeg. (An earlier attempt in the "boom" year, 1883, had failed.) The large amounts of grain to be shipped caused the farmers great difficulties in loading, so that they held up grain cars at country points and checked the movement of the crop. Probably as a consequence of this delay, the Canadian Pacific Railway gave a general undertaking in that year that wherever elevators of an approved standard were available, it would receive grain for shipment only from such elevators, provided they gave proper service in storing and shipping. In consequence of this offer, the number of country elevators considerably increased, and continued to increase during the following years. The elevators were usually owned and operated by small companies, which built short chains through

[1] For general references on this section, see Bibliographical Notes, pp. 273, 274.

[2] The account given in the earlier parts of this section on Commercial Regulation is admittedly tentative and incomplete.

neighboring country points. Other elevators were owned and operated singly by millers, farmers, and grain dealers. In the course of the 'nineties, small-scale operation declined and the control of the elevator system was largely concentrated in the hands of a few large companies.

There can be little doubt that the majority of the farmers suffered from this concentration, because the elevator companies, at least until 1898, enjoyed the wholehearted support of the railway. Thus the elevator companies were able to hold down the purchase price of wheat and to defeat the farmer on questions of grade, weight, and dockage. Complaints against the elevator system constituted one of the western grievances which aroused the attention of politicians after the new expansion of wheat-growing had begun. In 1899, as one step to reform, the point of inspection was transferred to Winnipeg and the inspectors of grain were made public officials. The same year further protests led the Dominion government to appoint a Royal Commission to investigate the alleged abuses. Many particular charges were substantiated, and the recommendations of the Commission resulted in the Manitoba Grain Act of 1900, a Dominion statute. In general the act established the system of regulation employed in Minnesota and North Dakota, which in turn was based upon the procedures of other states. It established the office of Warehouse Commissioner, with wide powers of regulation over the grain trade in the West, and gave many safeguards to the farmers upon weights, grades, dockage, and loading. Thus the act itself and its amendments in later years greatly weakened the purchasing and loading "monopoly" of the elevator system.

Government Regulation and Farmers' Coöperation, 1900–17

The summer of 1901 produced another record crop of more than 60 million bushels, heralding the appearance of Western Canada as an important contributor to the world's supplies. The conditions of 1887 were paralleled. The Winnipeg Grain and Produce Exchange established a futures trading market, which has been maintained without great interruption since that time. The size of the crop caused another grain blockade, due principally in this case to shortage of rolling stock on the railways. Increase of elevators and railway equipment followed during the next few years. Seeking a remedy of their own, the farmers themselves established the first successful farmers' coöperative associations in Western Canada. Of all consequences of the big crop of 1901, this was probably much the most important, because from that year onward the steady pressure of the farmers' movement enforced the development of the present system of public regulation of the grain trade, more highly organized in Canada than in any other country.

Prior to 1902 all the terminal elevators at Fort William and Port Arthur had been owned and operated by the Canadian Pacific Railway. In that year the Canadian Northern Railway built a terminal elevator and leased it to a commercial company. A further change took place in 1904, when the first terminal elevators were erected by elevator companies to be operated in conjunction with their own line elevators established at country points. Later the Canadian Pacific Railway gradually withdrew from the elevator business and leased its properties to commercial companies.

For the first few years of their existence, the farmers' associations undertook only the enforcement of their statutory rights at shipping points, but in course of time dissatisfaction with the prices offered for the lower grades led them to consider also the marketing of their members' grain. Accordingly in 1906 they formed the "Grain Growers' Grain Company," with a seat on the Winnipeg Grain Exchange, for dealings in that year's crop. There followed two years of offensive and defensive conflict with the Winnipeg Grain Exchange and its members, nearly fatal to all the antagonists engaged, until the questions at issue were settled by the authoritative intervention of the Manitoba government. Further hostilities broke out in 1909 and 1910, but were more easily concluded.

The farmers' movement then turned its attention to the elevator business, and in 1907 gave its support to proposals that the

provincial governments should take over the operation of all elevators at country points in their own territory and that the Dominion government should take over the operation of the terminal elevators. The Manitoba government yielded to political pressure, and in 1910 set up a line of government-owned elevators, as a competitor of the commercial lines in the province. Saskatchewan, more cautiously, made investigation and decided instead to establish a coöperative elevator company generously supported by loans from the provincial government. The Manitoba system proved a failure and was leased in 1912 to the Grain Growers' Grain Company. On the other hand, the Saskatchewan Coöperative Elevator Company, Ltd., proved highly successful and was reproduced in 1913 in the Alberta Farmers' Coöperative Elevator Company, Ltd. Later, in 1917, the Manitoba and Alberta coöperatives united to form the United Grain Growers, Ltd.

The characteristic policy of these coöperatives has always been to secure for the individual farmer the best price for his grain under the prevailing market conditions, leaving him to decide for himself the time and the manner of disposal. Under the resulting system, if he wishes to sell his grain on delivery at the country elevator, the company will pay the best price it can; if, on the other hand, he prefers to send it to Winnipeg for sale on commission, the company will make special efforts to secure the delivery of his grain in that market, and will act as his shipping and selling agent. As purchasers of grain in large quantities, these companies are also large sellers, in both the domestic and the export market.

The project for Dominion ownership and operation of terminal elevators encountered more serious opposition. In the end a partial satisfaction of the farmers' desires was obtained in 1912 by the passage of the Canada Grain Act, which replaced the old Manitoba Grain Act of 1900 and all its amendments. The central feature of the new act was the creation of a Board of Grain Commissioners, with three members, who replaced the Warehouse Commissioner and were given larger powers of control over the weighing and inspection of grain and over the whole of the grain trade in eastern and western Canada. They were also empowered to erect and operate terminal elevators at ports and elsewhere.

Acting under these powers, the Board at once proceeded to erect an elevator at Port Arthur in order to give a trial to the principle of government ownership. Soon after, it also undertook the construction of interior terminal elevators for grain storage at Saskatoon, Moose Jaw, and Calgary, and a port elevator at Vancouver. By the end of 1915 this chain of elevators was completed. It has given good service in years when low-grade crops required conditioning before shipment and at times when the movement of the crop is obstructed; but it has not proved sufficiently important to justify by itself the existence of the Board of Grain Commissioners.

The principal and most valuable service that the Board has rendered to Canada is the continual exercise of its great powers of supervision and control, which it has consistently employed to facilitate trade and transport as much as possible to the benefit of all concerned. An important instance of a change sanctioned by its experience is the gradual development of *private* terminal elevators at the head of the Lakes.[1] In these and similar developments, the regulations established from time to time by the Council of the Winnipeg Grain Exchange have also played an important part.

Wartime Control, 1917–20

The crops of 1917 and 1918 were marketed under government control. A Board of Grain Supervisors, composed of leading grain traders and representatives of the farmers and the Dominion government, fixed purchase prices and organized the collection and movement of the crop in Canada, while the disposal of the exportable surplus was performed by the Wheat Export Company, the Canadian representative of the British Royal Commission on Wheat Supplies, which directed supplies of wheat to all the European allies. This well-knit machinery operated effectively during

[1] See below, p. 254.

the war but loosened after the close of hostilities in 1918.

In the spring of 1919 the problem of marketing the coming Canadian crop became a matter of serious concern, because all the European importing countries were purchasing through national organizations and the United States was selling its wheat through the United States Grain Corporation. As a solution, the Canadian Wheat Board was established by the Dominion government and given extensive powers. In particular it could take delivery of wheat in Canada at any point, paying on delivery a price fixed by itself and issuing participation certificates for a share in future profits from the marketing of the whole crop; and it was authorized to control the trade in wheat in the home market and for export, as well as the export trade in flour. Largely on account of the efforts of the chairman, Mr. James Stewart of Winnipeg, the enterprise was a great success. The wheat was purchased at a "spot" price[1] of $2.15 a bushel, and a profit of 48 cents a bushel was subsequently distributed on the participation certificates. It was calculated that the Canadian farmer realized, on an average, 25 cents a bushel more than the United States farmer, and that the Canadian consumer paid 1½ cents less a pound for his bread.[2]

The Movement Toward Wheat Pools

The success of this compulsory "pool" of wheat evoked from the farmers' movement a strong demand for its continuance. Three alternatives were proposed—a compulsory pool, a voluntary pool without contracts, and a voluntary pool with five-year contracts. The Dominion government refused to legislate for a compulsory nation-wide pool, but passed an act through Parliament in 1922, to permit the reëstablishment of the Canadian Wheat Board for one year as a trading corporation only, without compulsory powers, as soon as any two or more provinces should have passed concurrent legislation. Both Alberta and Saskatchewan promptly passed such acts, which gave compulsory powers to the Board for its operations in those two provinces. Manitoba, however, rejected a similar measure, and thus defeated the whole project, because no leading member of the grain trade would undertake to market the crops of Saskatchewan and Alberta under prevailing conditions without possessing similar control over the Manitoba crop.

In the end the advocates of pooling accepted the situation for what it was worth and proceeded to organize voluntary pools instead, by which the producers contracted to deliver all their wheat (except that reserved for seed and for feed[3]) to the provincial pool, for a period of five years. The project made headway in the summer of 1923, but only in Alberta was a pool organized in time to gain control of any part of the crop. This Alberta pool disposed of 35 million bushels of wheat for its members, apparently much to their satisfaction. In 1924 similar pools were organized in Saskatchewan and Manitoba, and the three provincial pools have at their disposal the crop from 11 million acres—about 7½ million acres in Saskatchewan, and probably about 3 million acres in Alberta.[4] The three pools have combined to market their wheat through a single agency, the Canadian Co-operative Wheat Producers, Ltd. This latter organization has so far conducted its operations very quietly and little information has been made public concerning its marketing position, policies, and practice. It has disposed of some of its wheat through well-established commercial channels, but has also initiated the policy of direct sales to large purchasers abroad. The very existence of the pools has aroused the strong dislike of the grain trade, and their practice of paying better prices for large deliveries than for small has partially alienated the established farmers' coöperatives, which seek to secure the best possible current price for all producers, large or small. For these and other reasons a final verdict as to the success of the new venture cannot yet be given.

[1] See below, p. 253.

[2] *Chairman's Report*, Canadian Wheat Board, Winnipeg, Manitoba.

[3] In addition to seed and feed reserved for use on the farm, pool members are entitled to obtain permits for the sale of wheat for seed or feed.

[4] In January 1925 a membership of 91,291 was reported for the three pools.

VI. PROGRESS OF SETTLEMENT AND WHEAT PRODUCTION

The progress of Western Canada as a wheat producer has been made possible by the physical advantages of the country, important applications of agricultural research, a generous land policy, and an enormous development of transportation and marketing facilities. It has been alternately favored and discouraged by economic influences, affecting prices of agricultural products, the coming of immigrants, and the availability of new capital. It is now possible to sketch the growth of settlement and wheat production, under the combined influence of these factors, from their early stages to the present time.[1]

Historical Periods

Three broad periods can be distinguished. The foundations of future expansion were laid in the pioneering period, from 1870 to 1896, which opened with the purchase of Western Canada in 1869–70 by the newly-established Dominion from its earlier owners, the Hudson's Bay Company.[2] As in the United States at the same time, a closer political consolidation during the 'sixties was promptly followed by a westward expansion over the arable grasslands beyond the Mississippi and the Great Lakes. The principal events of this period in Canada were the adoption of the free land policy in the West (1871), the building of the Canadian Pacific Railway (1879–85), the grants of government land to this company and others, and the establishment of the Dominion Experimental Farms (1886). This period ended in the middle 'nineties with several years of adverse conditions, due to world-wide depression in agriculture and industry, accompanied by low wheat prices and difficulties in obtaining capital for extension either of transportation facilities or of agriculture.

In the second period, extending from 1897 to 1914, there was vast and rapid development, terminated by the beginnings of depression. This was, on the whole, a period of rising prices, of agricultural prosperity unchecked by the trade depression of 1907–08, of fairly ready availability of capital, and of large immigration. It was initiated by two years of high wheat prices. It was marked by improvements in water transportation, by a tremendous expansion of railway mileage, and by a corresponding growth of grain elevator capacity. Expansion was carried too far, and a period of lower wheat prices, in 1911–13, brought a reaction, which might have been prolonged but for the outbreak of war in Europe.

From 1914 to 1920 expansion and prosperity were revived, owing to the tremendous demand for Canadian wheat during and immediately after the war. The development was hampered by war conditions, which led to the almost complete cessation of immigration from Europe, the drain of men into war service or industrial activities, and the difficulty of obtaining new capital for agriculture and transportation. Yields per acre declined notably after 1915. Finally, with the post-war deflation of prices and with relative overproduction of wheat, this period closed in severe agricultural depression, which continued from 1921 to 1924.

Statistical Evidence

The progress of Western Canada is indicated by the curves on Chart 4, which show, so far as statistical evidence is available, the growth of population, of wheat acreage, production, and export, of immigration and land settlement, and of railway mileage and elevator facilities. The underlying data are given, in greater detail, in the Appendix. These curves are plotted on a logarithmic scale to emphasize rates of change rather than absolute magnitudes.

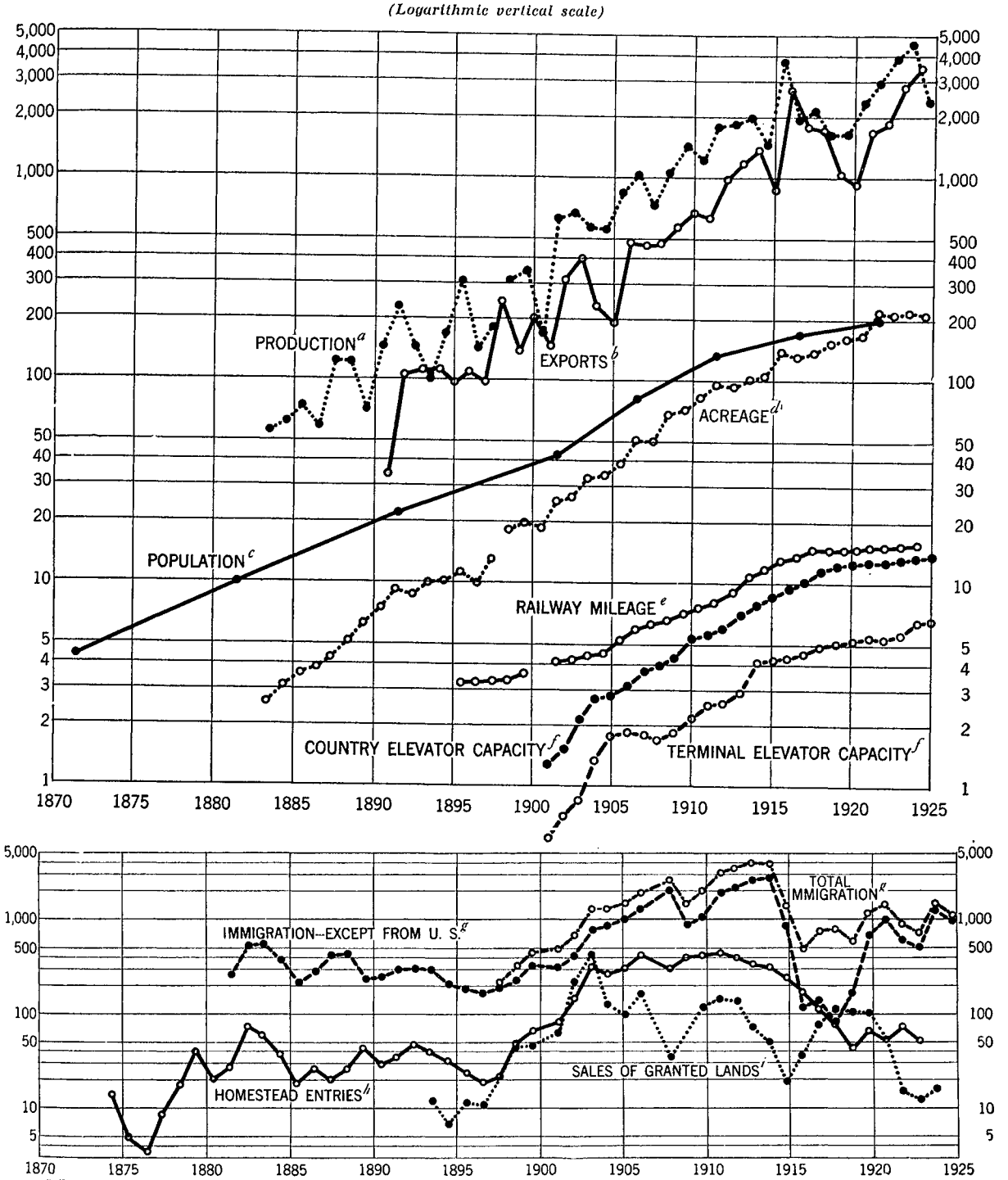
Certain facts stand out impressively. In the first place, there is the striking upward trend in population; even more in wheat acreage, production, and export; and, for the half of the period for which figures are

[1] For general references, see Bibliographical Notes, p. 274.

[2] From 1670 on, the plains of Western Canada between the Laurentian Plateau and the Rocky Mountains had been held in sovereign possession by the Hudson's Bay Company, for the benefit of its fur trade.

CHART 4.—STATISTICAL EVIDENCE OF GROWTH OF WESTERN CANADA*

(Logarithmic vertical scale)



* Sources: See Appendix Tables IV, VI, VIII, IX, XIII, XIV, XIX, XX, XXIII.

NOTE.—Vertical lines are drawn at June 30.

On the logarithmic vertical scale, equal distances upward, anywhere on the scale, indicate identical *percentage* increases; similarly equal distances downward indicate identical *percentage* decreases. Changes in absolute figures can be read roughly from the scale designations, but only relative changes are reflected graphically. This scale has peculiar virtues for such a chart as this, since it makes possible graphic comparisons of rates of increase and decrease in series which are expressed in different units and magnitudes, and between periods in which, for any one series, the magnitudes differ widely.

a Wheat: Manitoba, 1883–97; Prairie Provinces, 1898–1924. Unit: *100,000 bushels.*

b Canadian exports of wheat and flour. Unit: *100,000 bushels.*

c Prairie Provinces. Unit: *10,000.*

d Manitoba, 1883–97; Prairie Provinces, 1898–1924. Unit: *100,000 acres.*

e Prairie Provinces. Unit: *1,000 miles.*

f Unit: *10,000,000 bushels.*

g Unit: *100.*

h Prairie Provinces. Unit: *100.*

i Prairie Provinces. Unit: *10,000 acres.*

available, in railway mileage and elevator capacity. The advance from 1897 to 1914 is especially marked in every line.

In the second place, there is the pronounced influence of the agricultural depressions of the 1890's and 1920's, and of the recent war. This influence is most obvious in the curves of immigration, homestead entries, and land sales; but close observation shows the slackened rate of population growth in the 'nineties and during and since the war, the reduced rate of increase of wheat acreage in the 'nineties and since 1921, the poor wheat crops from 1916 to 1919, and the check to expansion of railway mileage after 1917, in terminal elevators after 1914, and in country elevators after 1919.

The effect of lesser economic movements is also discernible, in the advance in the late 'seventies and early 'eighties, checked in 1883–84; the moderate recovery of the later 'eighties; the check in 1903–04; and the reactions of 1907–08 and 1912–14. These influences are seen most clearly in land sales, homestead entries, and immigration, where the cumulative element is absent, but in part also in the railway mileage curve.[1]

Public Land Policies

The settlement of Western Canada has been immensely facilitated by the adoption of a generous land policy. When, in 1870, the newly-created Dominion of Canada acquired title to the lands of the Hudson's Bay Company, it sought to encourage a rapid and extensive settlement, in step with that which was then being organized in the states of the western Mississippi Valley. The Dominion government undertook a settlement survey, adopting in 1871 the rectangular system of land division in vogue in the United States,[2] and the same practice of granting land practically without charge in return for occupation and cultivation.[3] Despite numerous changes in regulations, especially during the first twenty years, these two cardinal points of the homestead policy have remained unchanged.

The duties required of homestead entrants have varied only within narrow limits. At the present time they run thus for agricultural homesteading: Any person who is the sole head of a family, or any male who has attained the age of 18 years and is a British subject, is entitled to obtain entry for a homestead of 160 acres on payment of a fee of ten dollars. The entrant must reside in a habitable house on his homestead for at least six months in each year during a term of three years. If, however, he already owns a farm in the vicinity, he may reside there instead. He must work the land each year and must seed a reasonable proportion of it in two of these years. Before he can obtain title to the homestead, he must have broken at least thirty acres of land, of which twenty must be cropped. Where the land is not suited to cultivation, the keeping of livestock may be substituted for the cropping of the land.

New settlers were not confined to crown lands. On yielding its sovereignty in the West, the Hudson's Bay Company received a grant of one-twentieth of the lands it had surrendered — altogether about 7 million acres. In compliance with this condition, section 8 and three-fourths of section 26 (in every fifth township the whole section) were set aside as Hudson's Bay Company lands. Similarly sections 11 and 29 in each township were reserved by the Dominion as endowments for education, and are known as "school lands." In 1879 the remaining sections of odd numbers were reserved for grants to railways to be constructed in the West. This policy was discontinued in 1894, when practically all such

[1] See also Chart 3, p. 232, for railway mileage plotted on a more open scale.

[2] The whole area to be settled was divided up, as nearly as possible, into a large number of 6-mile squares, called "townships," with sides running east and west, north and south. Each township was divided into thirty-six smaller squares one mile each way, called "sections." Each section was further divided into four equal squares half a mile on each side, termed "quarter-sections." The areas of "township," "section," and "quarter-section" are thus 23,040 acres, 640 acres, and 160 acres, respectively. The quarter-section has become the standard unit of farm area.

[3] Large areas of crown land have been disposed of by preëmption and sale. Whenever and wherever preemption has been allowed, the entrant for a homestead has enjoyed the right to reserve an adjacent quarter-section for subsequent purchase. Crown lands have also been regularly sold, sometimes as homesteads to those who preferred not to earn their title by occupation and cultivation.

land in the areas then surveyed had been allotted to one company or another. These granted lands could be purchased by settlers at low prices and on easy terms.

The Pioneer Period, 1870–96

The first homestead entries were made in 1872. The first new settlers came principally from Eastern Canada, bringing livestock, and settled in the grove belt of Manitoba, where they found streams and shelter for their cattle, and wood for buildings and fuel. The first settlers in the open prairie were Mennonites of German descent, who came first in 1873–74 from their earlier colonies in Southern Russia. Accustomed to life in a treeless land, they dug wells, built houses of turf, burned straw for fuel, and thus proved that the prairies were habitable.[1]

Chiefly because of transportation difficulties, however, comparatively few settlers moved into Western Canada before the construction of the Canadian Pacific in the early 'eighties. Homestead entries indeed increased, after the depression of the 'seventies, from less than 400 in 1875–76 to over 4,000 in 1878–79. But the census of 1881 showed a total population of only about 100,000 in the whole of Manitoba and the Northwest Territories, and a considerable proportion of these were Indians and half-breeds.

In the early 'eighties, however, a land boom developed as the railway connection with the Lakes was being completed. No inducement was needed to attract farmers from Eastern Canada, and settlers from many other lands were attracted by organized propaganda and immigration agencies. In the two years ending October 31, 1883, there were 13,546 homestead entries—nearly as many as in the eight preceding years; and in the three years 1882–84, some 350,000 immigrants entered Canada and 125,000 people moved into Western Canada for temporary work or permanent settlement.[2]

The expansion proved prematurely rapid. World wheat prices declined radically in 1883–84, and remained fairly steadily on this lower level until a further pronounced decline in 1891–94. The business depression that followed the crisis of 1883 doubtless exerted some unfavorable influence. A half-breed rebellion on the North Saskatchewan River in 1885 and apprehensions of danger from Indians probably deterred some intending settlers from penetrating the Northwest Territories. Much more influential was the fact that wheat varieties and agricultural methods suited to Western Canada had not been developed, so that the settlers lost their crops by droughts, early frosts, prairie fires, and plagues of grasshoppers and gophers. Red Fife wheat was not widely distributed until 1882 and 1883, when the C. P. R. brought in several carloads of seed from Minnesota. Largely as a result of the agricultural difficulties, the Dominion Experimental Farms were established in 1886, with promptly beneficial results; but the results of their experiments in farm practice, in particular the technique of the summer-fallow,[3] only gradually secured general application. For such reasons, hopes of rapid settlement were disappointed, the land boom collapsed, many settlers abandoned their claims, immigration to Canada declined, and the homestead entries ran on a lower level until 1889.

There are numerous indications that the depression of the middle 'eighties was severe. The growth of population, in Manitoba at least, was relatively slower between 1886 and 1896 than before or after.[4] Nevertheless, settlement proceeded to such an extent that by 1891 the population of Western Canada was more than double that of 1881, and the increase was largely in the white, as distinct from the Indian and half-breed, population. The number of farmers trebled, rising from 10,000 to over 30,000. The Manitoba wheat area rose from 261,000 acres in 1883 to 917,000 in 1891; and high yields in 1887 and 1891 brought crops of 12 and 23 million bushels, respectively, each of them a handsome record in its turn.

[1] At the same time, another band of Mennonites introduced into Kansas, from their former fields in the Crimea, the famous "Turkey Red" wheat, the first winter wheat to be grown with notable success in Kansas.

[2] See Appendix Tables V, VI; and Appendix 4, *House of Commons Journal*, 1887.

[3] Worked out at the station at Indian Head, by its superintendent, Angus McKay.

[4] See Appendix Table IV.

Along the line of the C. P. R. and its branches, principally in Manitoba, grain-growing was the common type of farming. Settlers on the treeless prairie largely depended on the railway for supplies of coal and lumber. They also frequently encountered difficulties of water supply. Mixed farming developed in the remoter grove belt along the North Saskatchewan River. Cattle ranches flourished in the drier grasslands of southern Alberta.

The severe decline in world wheat prices of 1891–94 (not in any way attributable to production in Western Canada), and the world-wide depression of industry, trade, and agriculture which characterized the middle 'nineties, held back development for some years. Immigration fell to small proportions. Many settlers abandoned their farms. New entrants were few, land purchases were but small, capital was difficult to procure, and little progress was made in railway construction. Those who had made some progress toward mixed farming and derived part of their income from livestock passed through these trying times much more easily than those who depended on grain-growing alone. Manitoba's wheat acreage increased but little from 1891 to 1896, and the acreage farther west was still very small. Favorable weather conditions were responsible for a record crop of 32 million bushels in Manitoba in 1895; but in spite of improved world prices, it sold on about as low a level as that of 1893.

Despite the gloom in which this early period closed, foundations for future expansion had been soundly laid. A transportation and marketing system was developed, though by no means fully extended. Basic agricultural practices had been established. A wheat of high quality, fairly well adapted to conditions in Western Canada, was widely cultivated, and had gained securely the esteem of the English market.

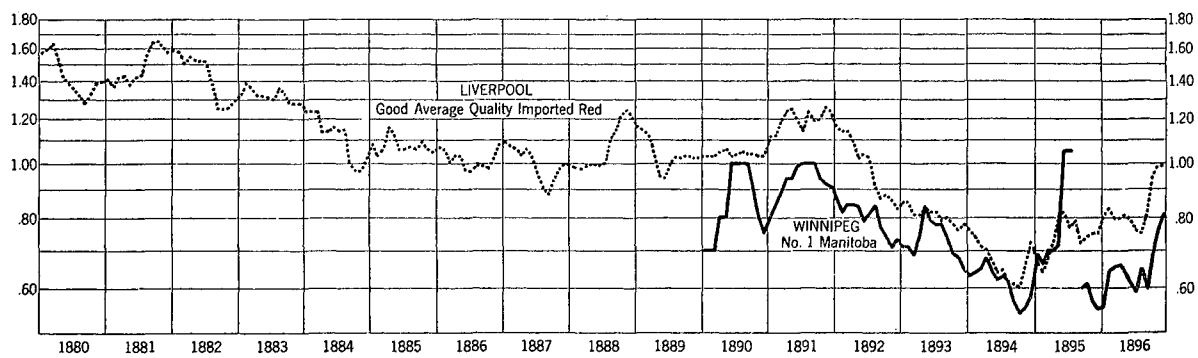
Rapid Advance, 1897–1914

With the passing of the agricultural and business depression, the situation radically changed. Two short world crops of wheat, in 1896 and 1897, caused a notable recovery of wheat prices. Lower freight rates were secured by the Crow's Nest Pass agreement of 1897, and improvements in waterways reduced export costs. Hence the farmers gained even more than is suggested by the recovery in world wheat prices. With the revival of confidence, capital for investment became more freely available. The trend of commodity prices, which had been downward since the 'seventies, turned upward about 1896, thus favoring capital borrowers as the previous decline in prices had injured them.

The years 1897–1903 witnessed a most striking advance. Homestead entries rose from 1,857 in 1896 to 31,383 in 1902–03. Land sales by grantee companies rose from 108,000 acres in 1896 to 4,229,000 in 1902–03.

Chart 5.—Wheat Prices at Liverpool and Winnipeg, Monthly, 1880–96*

(Cents per bushel. Logarithmic vertical scale)



* Sources: Canadian Department of Labour, *Wholesale Prices*, 1890–1910, p. 65; U. S. Department of Agriculture, *Yearbook, 1923*, p. 630.

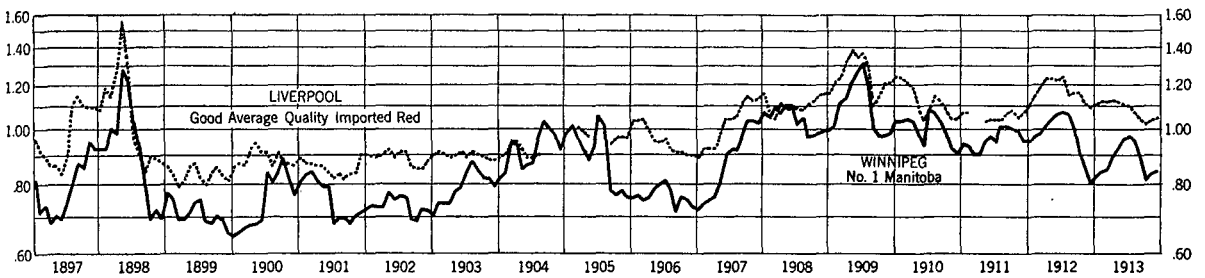
Immigrants increased from about 17,000 in 1896 to 128,400 in 1902–03. Wheat acreage rose from little more than a million acres in 1896 to more than three million in 1903. A splendid yield in 1901 brought a crop of 63 million bushels, which caused serious congestion in the transportation system, and presented Canada to the world as an important factor in the international wheat market. The large crop of 1901 and the increasing acreage of subsequent years were followed by a notable increase in elevator capacity, both at country points and at the head of the Lakes.[1]

possible the extension of wheat cultivation into areas where Red Fife could not be grown with profit. Its excellent yields and high milling quality commended it to growers and millers alike.

Owing chiefly to the recovery of the late 'nineties, the population of Western Canada increased by 200,000 in the decade 1891–1901; but because of the long depression, the increase was at a lower rate than in the preceding or the following decade. Between 1901 and 1906 the population nearly doubled, increasing by about 400,000. In the decade 1901–11 it more than trebled,

CHART 6.—WHEAT PRICES AT LIVERPOOL AND WINNIPEG, MONTHLY, 1897–1913*

(Cents per bushel. Logarithmic vertical scale)



* Sources: See Chart 5, p. 242.

This first rapid advance was followed by a longer period of persistent expansion, despite the fact that wheat prices ruled on a lower level than that of 1897–98. Railway construction, already under way, led to a rapid increase in railway mileage from 1904 to 1913.[2] Homestead entries remained above 30,000 a year. Immigration continued to increase. Wheat acreage, production, and export rose by leaps and bounds. In 1906 a record crop of over 100 million bushels was harvested from about 5 million acres. In 1911 to 1913 three excellent crops of 180 to 200 million bushels were harvested from an area of about 10 million acres. Exports rose accordingly and averaged 116 million bushels a year from these three crops.

In the latter part of this period, Marquis wheat, first commercially grown in 1906, began largely to supersede Red Fife. Because of its shorter growing season, it made

increasing by 900,000. The occupied farm area rose from 15,412,000 acres in 1901 to 57,642,000 in 1911, and the improved area from 5,593,000 acres to 22,970,000.[3]

This tremendous growth, while due in part to natural increase of population and in part to migration from Eastern Canada, was greatly influenced by the huge tide of immigration. The Liberal Party, after its accession to power in 1896, enlarged and improved the old immigration service, sent agents abroad, and began the practice of advertising the free lands of Canada in the newspapers of the United States and, later, of Great Britain. The exhaustion of the free lands in the United States turned to Canada a stream of experienced farmers of the pioneer type. A movement from Central and Eastern Europe began in 1896 with the entry of Galician peasants. An important British movement began after the end of the South African war. These movements from overseas were due not merely to the wide publicity given to the attractions of

[1] See Chart 4, p. 239, and Appendix Tables XIV, XX.
[2] See Chart 3, p. 232.
[3] See Appendix Tables IV, XII.

Canada by government and railway immigration service, but also, like the movement to the United States in the same period, to the strenuous competition of ocean shipping companies for the immigrant traffic.

From less than 22,000 in 1897, the annual inflow rose, with only a brief check in 1903–04 and a temporary recession during the depression of 1908–09, to a peak of over 400,000 in 1912–13. Despite emigration to the United States and return of immigrants to Europe, the net inflow contributed heavily to the increase in Canada's population from 5,371,000 in 1901 to 7,207,000 in 1911. While by no means all of the newcomers proceeded to Western Canada, a large proportion entered with this avowed intention.[1] Others, who had declared an intention of proceeding to Eastern Canada, went later on to the West. It is significant that whereas in 1901, as shown by Appendix Table V, two-thirds of the population of Western Canada was of Canadian birth, in 1911 nearly half of the larger population, in all some 647,000 people, were reported born abroad.

The general success of the wheat growers, even including some who were ignorant or careless of sound farming practice, unfortunately brought mixed farming into disrepute. The reduction of freight rates on grain, together with inadequate local markets for livestock and dairy products, encouraged wheat-growing and discouraged the breeding and feeding of cattle. This proved especially unfortunate when wheat prices declined.

The years 1904–09 were noteworthy for increases in land values, in consequence of the extension of the railway net and the rush of settlers into the West. This is clearly indicated by the price of land sold by railway companies and other grantees (Appendix Table IX). For several years prior to 1904 the average price of such lands had ranged from $3.00 to $3.50 an acre. In the next few years it rose rapidly until in 1909–13 it ranged from $13.00 to $14.00 an acre. These of course were prices of unimproved lands. Land in farms rose in price also, though in lesser degree. There was considerable speculation in lands, often with borrowed money, which intensified the natural tendency to increasing land values.

The development of towns and cities in the West accompanied the agricultural expansion, as railway centers developed and as mercantile and other business developed to serve the agricultural population. Railway construction and operation required large forces, and created a demand for local produce. The construction of public works of all kinds by provincial and local governments, often in grandiose style, the erection of private buildings in cities and towns, and the expenditures of later settlers in developing their holdings, all helped to maintain strong local markets for the produce of the established farmers. The air of prosperity attracted still more newcomers. Provinces and municipalities ran heavily into debt, and farmers and townsmen incurred heavy obligations, to which they were encouraged by the eagerness of those who had land or goods to sell or money to lend.

The expansion was overdone, the land boom broke, and a period of moderate depression followed. Wheat prices, after rising materially from 1906 to 1909, declined sharply in 1910, and tended downward until 1914, though in 1912 they recovered temporarily. Although even the low level of 1913 was slightly higher than the average from 1899 to 1906 and excellent yields in 1911–13 partially offset the decline in price per bushel, costs had risen to such an extent that the growers' profits were seriously diminished.[2]

Moreover, by 1909 the bulk of the best agricultural land with access to railways had been taken up, high prices were asked for lands available by purchase, and later comers had to seek more remote or less favorable lands. Much of the settlement of the dry lands on the third steppe occurred after 1909. The decline in wheat prices reacted heavily upon farmers who had mortgaged their lands or had instalments of the purchase price to meet. Consequently, land sales and homestead entries declined after 1910–11. Cancellations of

[1] See tables in *Annual Reports of the Department of the Interior*, particularly that of 1915.

[2] Cf. *Report of the Grain Markets Commission of Saskatchewan*, 1914, p. 22.

entries (because of failure to perform the prescribed duties) increased out of proportion to new entries, and, in the four years ending March 31, 1914, were nearly half as numerous as new entries. This unprecedented proportion bears witness to the difficulties homesteaders were experiencing in maintaining themselves on their lands. Wheat acreage increased but little from 1911 to 1914. While immigration continued to a high point in 1913–14, a smaller proportion of the newcomers declared an intention to proceed to Western Canada.

The War and Post-War Years, 1914–24

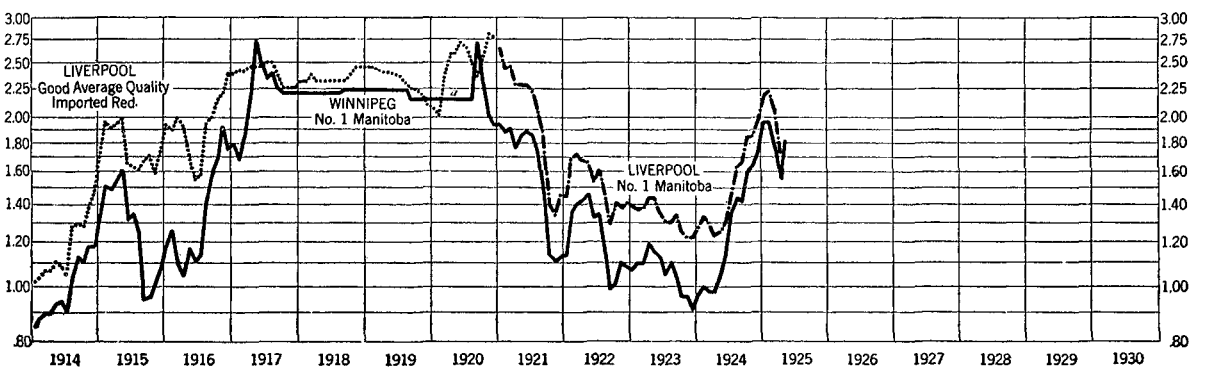
Under any ordinary circumstances, the poor yield of the 1914 wheat crop would have intensified the agricultural depression; but the outbreak of war modified all prevailing conditions and tendencies, and brought into being a host of new and conflicting influences.

In the first place, it raised wheat prices so that the poor crop of 1914 was probably more remunerative than the good crop of 1913.[1] Excellent world crops in 1915 temporarily reversed the upward movement of wheat prices, but Canadian farmers, thanks largely to exceptionally favorable weather conditions, planted a record area of over 13 million acres and harvested a record crop of 370 million bushels. The yield was nearly 27 bushels an acre, the highest ever yet attained by Western Canada. Its estimated farm value was 325 million dollars, more than double that of any previous crop; since production costs had not yet risen greatly, this meant a large net return and great prosperity for the wheat grower. During the later stages of the war, nearness to Europe gave Canada and the United States a great advantage in marketing their wheat, and wheat prices rose by strides to much higher levels, until for the crop of 1918 a price of $2.24 a bushel was guaranteed to the growers.

In the second place, the war greatly affected Canada's supply of farmers and farm labor. It abruptly checked the influx of immigrants from Europe, and recalled to military service many of those who had come over in recent years. Large numbers of Canadians enlisted, and others took up munitions work. Hence the number of established farmers was probably somewhat reduced, and the ordinary supply of farm labor, permanent and temporary, greatly declined. Pressing requirements at critical seasons were only inadequately met by organizing the labor of boys, townsmen, and new homesteaders. Homestead entries declined steadily, from a high point of 44,000 in 1910–11 to 32,000 in 1913–14 and to 4,000 in 1918–19, and cancellations reached even

Chart 7.—Wheat Prices at Liverpool and Winnipeg, Monthly, 1914–25*

(Cents per bushel. Logarithmic vertical scale)



* Sources: U. S. Department of Agriculture, *Yearbook, 1923*, p. 630; Winnipeg Grain Exchange, *Annual Report, 1924*, pp. 35–49, supplemented by *Grain Trade News;* International Institute Crop Reports.

Note.—Liverpool prices are converted to Canadian money at current exchange rates.

a As stated in the text, the guaranteed price was $2.15, but 48 cents additional was later paid to holders of participation certificates, making the actual return $2.63.

[1] See Appendix Table XVIII.

higher proportions than in 1911–14. Agricultural operations were severely hampered by the shortage of labor, and costs of cultivation and harvesting rose considerably. Despite the stimulus of high wheat prices, these conditions restricted the expansion of wheat acreage; it increased only from 13,867,000 acres in 1915 to 17,750,000 acres in 1919, principally in western Saskatchewan and Alberta,[1] the regions of most recent settlement.

Sound farming methods were frequently sacrificed in the effort to maintain wheat acreage. Summer-fallowing was reduced, and wheat was often sown in ground that had been but poorly prepared. The earlier tendencies to improvement in farming methods and the development of mixed farming were thus set back, in favor of the older inferior practices of pioneer grain-growing. For this reason, and because conditions of weather were on the whole unfavorable, the wheat crops from 1916 to 1919 were poor in yield and high in cost. The great rise in price provided ample compensation and enabled many farmers to purchase additional land,[2] even at higher prices; but the Canadian wheat farmer did not again enjoy the prosperity which followed the crop of 1915, and much of his apparent prosperity was fictitious.

In the first two years after the war the labor shortage was relieved by the return of men released from the armies and by the resumption of immigration from Europe. Sales of railway lands continued on a high level and at good prices. Homestead entries increased but little because the best homestead lands were reserved for returned soldiers. There was, however, no land boom in Western Canada, and no advance in farm land prices comparable to that which then occurred in parts of the United States, probably because of four disappointing harvests in succession and a shortage of investment capital.

[1] Dominion figures. The provincial estimate of Alberta is much lower and leads to a total of 16,315,000 acres. See Appendix Tables XVII, XIV.

[2] See Chart 4, p. 239, and Appendix Table IX, for yearly sales of granted lands.

[3] From 544 million dollars in 1914 to 3,042 million in 1920. Interest charges rose at the same time from 12.9 millions to 107.5. See *Canada Year Book*, 1921, *et seq.*

The crop of 1919 was marketed by the Canadian Wheat Board, greatly to the advantage of the growers, with a final return of $2.63 a bushel. After the operations of the Board had ceased, fortune turned against the farmer in the autumn of 1920, with a tremendous decline in the price of wheat, due primarily to world conditions which affected prices in general as well as wheat prices in particular. At first the farmers refused to believe that the decline in wheat price was anything more than temporary, and many of them held back wheat of the new crop. With abundant agricultural labor and favorable weather conditions, a campaign to "Plant More Wheat" led to a large increase in 1921, partly in the hope of better prices or of offsetting reduced price per bushel by larger crops. Thanks to increased yields, each of the four crops from 1920 to 1923 was larger than its predecessor. Partly under the influence of these large supplies, prices continued to decline, until in 1923–24 they stood but little above pre-war levels. Since costs of production, though also declining, remained much above pre-war costs, acute agricultural depression resulted; but because Canadian yields rose during these years, the depression was probably felt less keenly by farmers in Canada than by those in the United States.

The depression was intensified by the burden of public and private debt. The Dominion debt had greatly expanded during the war,[3] and provincial and municipal indebtedness had also increased. These debts involved an increase in the tax burden. The farmers themselves had only too often found in the day of prosperity fresh opportunities for entering into debt. Even if they had been free from such loads of public and private debt, the price at which they sold their grain would hardly have paid the prime costs of growing it, so that with fixed charges included they were in a bad way indeed.

Many farmers abandoned their land, particularly in the drier districts where crop failures had been most frequent, and sought industrial employment in Canada or the United States. In consequence of the depression, immigration declined after 1921,

until industrial improvement took place in 1923–24 in advance of agricultural recovery. Homestead entries remained on an exceptionally low level, and cancellations of entries exceeded new entries. Land sales fell to a very low figure, and the average price of unimproved lands declined materially. Wheat acreage not only ceased to expand, but even declined slightly from 1921 to 1924. Nevertheless, the period of depression had the good effect of encouraging sounder methods of farming and a more stable, permanent type of settlement.

The period of depression apparently ended in 1924 with a marked recovery of wheat prices, due chiefly to reduced world supplies coupled with some increase in world demand. The short Canadian crop of 1924 helped to make the world shortage, and the rise of prices was such that the 1924 crop of 262 million bushels had a slightly higher estimated farm value than the crop of 474 millions the year before. The costs of planting the 1924 crop were lower, and naturally the costs of harvesting also, so that this short crop was probably more profitable to the growers than any of its immediate predecessors. With this recent good fortune, and the prospect of a large crop and a satisfactory price in 1925, there is reason to believe that the severe agricultural depression is ended.

VII. SOME ECONOMIC ASPECTS OF FARMING

The larger part of the more accessible farm lands of Western Canada passed into settlers' hands between 1897 and 1914, much of it indeed between 1901 and 1911. Large portions of it could be obtained as homestead land at the price of labor, and much of it could be purchased at a low price from companies with land grants. Opportunity to obtain virgin farming land of high quality on such easy terms was widely advertised in order to attract settlers. Many of those who came were men of very limited means, without much knowledge of farming in general or of the particular requirements of Western Canada. They came partly with the expectation of gaining wealth in a few years from the profits on a few large crops from virgin soil, and partly in the hope that the further progress of settlement would steadily raise the value of the land on which they settled.

In order that their labor might become effective on the land they occupied, it was necessary that credit should be freely available to them from the very beginning. This was indeed most freely supplied during the years of most rapid advance, and not always to the settlers' benefit. In general, the funds supplied to the West at this time created strong local markets for produce. This increased the prosperity of the West at that time and attracted new settlers. The value of farm lands rose, and thus became a basis for the supply of further credit. So the round continued, until most of the good land within the railway belt had been occupied. This result was accompanied by a fall in the price of wheat, which brought depression upon the producers. Credit facilities greatly tightened, and foreclosures on farm mortgages became sufficiently numerous to cause alarm.

It is now pertinent to pass in review certain economic aspects of present-day farming in Western Canada, as it has developed under the historical conditions described. In particular, consideration must be given to the disposition of land, the size of farms, the credit situation, and the sources of farm income.[1]

Land Disposition to 1921

Up to 1921 some 200 million acres of land had been surveyed in the prairie provinces. The disposition of these lands, shown in greater detail in Appendix Tables VII and X, may be summarized as follows, in millions of acres:

Area surveyed		200.3
Available for entry	25.7	
Forest reserves, etc.	28.9	
Road allowances, Indian reserves, timber and grazing leases, etc.	25.9	
Total unallotted		80.5

[1] For general references, see Bibliographical Notes, pp. 274, 275.

Hudson's Bay Co. grants	6.6	
Railway grants	31.9	
School lands	9.3	
Special grants	16.8	
Under homestead	54.1	
Irrigation system sales	1.1	
Total allotted in private ownership		119.8
Improved land in farms	44.8	
Unimproved land in farms	43.1	
Total in farms		87.9
In private ownership not in farms		31.8

Thus out of a total of 88 million acres in farms, some 54 million had been acquired under homestead and 34 million by purchase from government grantees. The improved land in farms amounted to nearly 45 million acres. Of this area approximately 22 million acres were planted to wheat, and another 10 million acres were in summer-fallow,[1] in preparation for wheat. Accordingly the total area devoted to wheat culture amounted to more than two-thirds of the improved farm land. There remained available for homestead entry some 26 million acres, and in private hands not in farms some 32 million acres, a total of 58 million acres potentially available for expanding the present farm area.

Size of Farms

The subject of the size of farms and its relation to agriculture can best be studied in connection with the census reports of 1911 and 1916, particularly the latter. Table 2 indicates the distribution of farms in Western Canada in broad size-groups according to these censuses. Half the farms of Western Canada lay in the class between 101 and 200 acres, and there can be little doubt that practically all in this class were a quarter-section in size. Larger farms of many sizes from a half-section upward were to be found in the West. A rough computation gives an average area for this group of about three quarter-sections, but this figure has no special significance as a typical size for that time.

[1] See Appendix Table XV for figures of summer-fallow acreage.

The figures for 1916, shown in Table 3, supply information on many points which were not brought out in the earlier reports and concerning which no further census data are yet available.

Table 2.—Farm Holdings in Manitoba, Saskatchewan, and Alberta, 1911 and 1916*

Size-groups	Number of farms in group		Percentage of total	
	1911	1916	1911	1916
100 acres and under	12,784	8,610	6.3	3.9
101–200 acres	100,679	94,388	49.5	43.2
201 acres and over	90,011	115,565	44.2	52.9
Total	203,474	218,563	100.0	100.0

* *Fifth Census of Canada*, 1911, Vol. IV (Agriculture); *Census of the Prairie Provinces*, 1916.

When these figures are compared with those of 1911, the first point of interest to be observed is that the number of quarter-section farms—roughly the 101–200-acre group—declined from 101,000 in 1911 to 94,000 in 1916, from 49.5 per cent of the total to 43.2 per cent. During the same period, the number of larger farms increased from 90,000 to 116,000, from 44.2 per cent to 52.9 per cent.

Table 3.—Farm Holdings in Manitoba, Saskatchewan, and Alberta, 1916*

Size-group	Number of farms in group	Area of land in group (million acres)		Average size of farm (acres)	
		Total	Improved	Total	Improved
100 acres and under	8,610	0.36	0.15	42	17
101–200 acres	94,388	15.05	5.27	159	56
201–320 acres	68,908	21.65	11.27	314	164
321–480 acres	21,836	10.03	5.87	459	269
481–640 acres	13,348	8.36	4.91	627	368
641 acres and over	11,473	17.85	6.86	1,555	598
Total	218,563	73.30	34.33	335	157

* *Census of Prairie Provinces*, 1916.

There can be but little doubt that the quarter-section farm is the typical land-holding of the newly-established settlers and that the substantial decline of its numbers between 1911 and 1916 was due to the falling off in settlement after 1911, the enlistment of settlers after the outbreak of

the war, and the enlargement of existing farms. Farms of a half-section and over are the farms of men who have been in the country for a term of years and have had time and opportunity to acquire additional land. A comparison of total and improved areas helps to confirm this opinion, because the fraction of improved land is much lower in the quarter-section farms—about one-third—than in the farms of a half to a whole section, where it stands at more than a half.

This tendency to enlargement of farms was made possible by the existence of large supplies of land at low prices, which could be bought and sold light-heartedly. The seller could always count on being able to purchase other land if he wanted it, and the purchaser could easily obtain credit facilities to finance the transaction. The motives for such an enlargement of farms are variously stated. Western opinion considered that the supply of labor and capital required to work a quarter-section of land was practically sufficient for a farm two or three times as big, and that the settler was acting in his own best interests in seeking to gain a larger holding and a greater production from his capital and labor. Less favorable opinion, on the other hand, has attributed the desire for expansion to a speculative land-hunger on the part of the farmers, and considers that they have commonly acquired for themselves more land than they can profitably farm. There is room for both of these views to exist, and justice in both of them.

The figures so far published for 1921 do not allow of any exact comparisons with 1916 or any adequate statement of tendencies in recent years. The number of quarter-section farms was 95,000 in 1921, almost exactly the same as in 1916, but in 1921 only 37.2 per cent of the total number. The number of farms of larger size had risen still further to 151,000, 58.9 per cent of the total. Until further details are published, the significance of these figures cannot be properly estimated, but they suggest that the tendencies prevailing between 1911 and 1916 have continued to operate.

The statistics of 1916 stand by themselves in showing the existence of a number of large farms, a section or more in area, and an average size of nearly two-and-a-half sections. The importance of such large farms can be judged from the fact that they occupied nearly a quarter of the farmland area of the West, but beyond this little can be said with certainty. Some of the large holdings are cattle ranches, some are probably family holdings, and others large individual holdings. Others again are large grain farms owned by commercial organizations and operated by managers and hired workers. This last class of large farms is now reported to be disappearing by division into smaller farms of quarter- or half-section size for transfer to independent farmers.

Mortgages and Credits

The census returns of 1921 state that four-fifths of western farms are owned by their occupiers. This statement takes no account, however, of the extent to which the farms have been placed under mortgage by their owners, and of other kindred modifications of ownership. In many cases land has been purchased from companies with land grants or from private owners, under some scheme of amortization payments. Such terms vary at the present time from a seven-year scheme with the Hudson's Bay Company to thirty-five years with the Canadian Pacific Railway. Apart from such instalment-purchase schemes, mortgages are commonly taken by mortgage investment companies. They are drawn for a term of five years, and as a rule make no provision for gradual repayment, the farmer merely facing the alternatives of repayment or renewal at the end of the five-year term.

Since 1917, each of the provincial governments has also established a farm-mortgage system, including a thirty-years' amortization plan. The Alberta system has never been put into effect, through difficulties in borrowing money to lend to the farmers. Manitoba and Saskatchewan have each lent about eight million dollars. The total volume of farm mortgages, though not determined, is much greater than this, so that the provincial systems have not worked any important change in the situation. The question of Dominion support

to the provinces, for further extension of these long-time credit schemes, is still under consideration.

Short-time credits are of course available to farmers from banks on an ordinary commercial basis, and credits are also freely given by implement dealers, storekeepers, and other traders. Credits of this kind are usually arranged to expire a little after harvest time. Thus they put the farmer under pressure to haul his crop to a local elevator and sell it at the earliest possible moment, even though his autumn plowing may be impeded.

These forms of credit are probably adequate to finance the raising of the wheat crop year by year, though at heavy cost to the farmers. For the raising of livestock, credit is still but little available. Saskatchewan and Alberta have established systems for cattle loans. Manitoba and Alberta have also legalized the formation of coöperative credit societies to facilitate short-term borrowings for general farming purposes. The extent and the success of these schemes are matters on which opinions must be allowed to differ.

During the years of high prices from 1916 to 1920, a large number of farmers used the time of prosperity to incur fresh debts on land and property rather than to pay off their old debts, with the result that the ensuing fall of agricultural prices from 1920 to 1924 involved them in terrible difficulties. To protect them from pressing demands by their creditors, who were themselves in serious straits, the provincial governments undertook the work of debt adjustment. The mortgage companies, the principal mortgagees, also introduced the practice of crop-share-leases, making the farmer-owners into tenants for the time being. In either case the purpose was the same—that of preventing distraint upon the farmer's land for his debts and of maintaining him on his farm in the hope of better times to come. Many farmers abandoned their land during the depression, and there can be but little doubt that by these means many more who would have done so were rescued from the worst of their difficulties and carried through to the time of recovery.

Farming Income

In years of prosperity the chief hopes of the farmer have been for big profits on his grain crops and a steady rise in the value of his land. In times of depression his crops have scarcely paid their way, and he has been compelled to rely for subsistence largely on the produce of his farm and to seek cash for current expenses by means which he would at other times have neglected.

The position of the farmer during the last few years has been rendered particularly difficult by reason of his debts and the high costs of labor and commodities. The payments of labor for plowing, harvesting, and threshing, and the cost of seed, had necessarily to precede all other expenditures, and when they had been discharged, the balance that remained was entirely insufficient both to make payments on land and debts and to provide for family maintenance.

One of the consequences of the decline in the value of cash crops has been a widespread tendency to seek income from livestock. Farmers have taken beef cattle for winter-grazing, to be disposed of in the spring. Quite generally, they have given much greater attention to milk and its products. At the present time about four-fifths of the farmers own milch cows, and the average holding in this region is four or five cows to a farm.

The animals are cared for and milked by family labor. The milk is passed through a cream separator and the cream is shipped by rail, often for long distances, to some large central creamery. The skim milk is used on the farms or wasted. Great efforts have been made by the Dominion and provincial governments to obtain a supply of high-grade cream from the farms and to produce a first-class butter for the market. The results may be seen in a great increase of butter production in Western Canada.[1]

The payments for cream have been an important source of family income during

[1] Butter production of Manitoba, Saskatchewan, and Alberta has been as follows:

1910	6 million pounds	1920	26 million pounds
1915	17 million pounds	1923	39 million pounds

the depression, because of their fairly regular distribution through the year, because they are the result of family labor, and because they cannot be so easily attached by creditors. These advantages have probably given cream payments a value considerably in excess of the mere money total involved. Whether they will be sought so eagerly in the future as in the past it is not possible to say. In spite of these small holdings of cattle, which involve only a minor diversification, the western farm is still predominantly a grain-growing farm, in both organization and equipment. The development of grain-farming has already involved the producers heavily in debt, and a general development of diversified farming would make heavy additions to their load.

VIII. CANADIAN WHEAT MOVEMENT FROM FARM TO MARKET

With this background of the development to transportation, marketing, settlement, and wheat-growing in Western Canada, it is possible to trace the flow of Canadian wheat from farm to mill or to seaboard, and to describe briefly the various agencies that affect its transport and marketing at the present time.[1]

Part of the wheat is kept on the farm or in the district—high-grade wheat for seed, low-grade wheat for feed; but some of the seed wheat is bought from seed specialists, and some of the feed wheat is marketed at points distant from the farm. Seed wheat and feed wheat constitute only a modest fraction of a crop, and the great bulk of the wheat is shipped to market.

Bulk handling is characteristic of the whole process. From the threshing machine to the flour mill or to the foreign market, the grain is moved and stored in the loose, and, wherever possible, advantage is taken of the facility with which it will "load by gravity."[2] While this involves heavy investment in elaborate equipment, it makes for extreme economy in operation.

From Farm to Country Elevator

Few Canadian farmers have farm granaries sufficient to store considerable quantities of wheat. This is due to several causes. The erection of granaries requires capital, and the variation in crops is so great from year to year that storage space sufficient for the larger crops would involve burdensome capital charges. The labor supply is more abundant at harvest time than later. The condition of the roads in winter interferes with economical hauling. In the spring all efforts must be concentrated upon cultivating and seeding. Moreover, the farmer needs the cash for his crop in the fall to pay off his harvest labor and his other debts. Accordingly, the threshed grain, often full of weed seeds,[3] is commonly run direct from the thresher into farm carts or wagons, hauled at once to the nearest railway station, and delivered to a track elevator there.

At Country Elevators

Practically all country stations in the wheat areas are provided with one or more track elevators. For the year 1924–25, some 4,200 such elevators, with an aggregate capacity of 138 million bushels, were licensed for operation in the prairie provinces.[4] For the most part these elevators are owned in series by commercial elevator companies, milling companies, and farmers' coöperative companies. Each elevator contains a number of bins, nine or more, which hold in all from 20 thousand to 50 thousand bushels. Each elevator is equipped with scales for weighing the farmer's grain, with machinery for loading it into the bins, and with a spout for discharging it into freight cars on the siding. The country elevators are licensed yearly by the Board of Grain Commissioners, and each operator must

[1] For general references, see Bibliographical Notes, p. 275.

[2] The "angle of repose" of wheat is 45°. To avoid clogging in spouts through which it is run, wheat should be arranged to flow, if possible, at a much steeper angle than this.

[3] Threshing and shipment are usually so much hurried that there is no time for cleaning grain on the farm—clearly the best place. The country elevator is equally unable to undertake the task, and the mixture of grain and weed seeds must go, as a rule, to a terminal elevator before it can be cleaned.

[4] See Appendix Table XX.

give a bond to the Board, as protection to the farmers with whom he deals.

The farmers' wheat is roughly graded at the track elevator. Only the more obvious distinctions of variety, weight per bushel, color, and cleanliness are here considered, and other important commercial characteristics, such as protein content, are disregarded. An elaborate system of grades has been developed and incorporated in the Canada Grain Act (1912). For example, the highest grade, No. 1 Manitoba Northern "shall be sound and well-cleaned, weighing not less than 60 pounds to the bushel, and shall be composed of at least 60 per cent of hard Red Fife or Marquis, and must be free from amber or red durum and rye." It is so important to the farmers that these grades shall be properly respected, that they are enforced by a body of inspectors who are paid servants of the Dominion government and work under the control of the Board of Grain Commissioners alone.

The farmer who offers his grain for sale at a track elevator may endeavor to come to terms with its operator on the questions of grade, cleanliness (dockage), and price. If they agree, the farmer is paid for the weight he delivers, and the elevator man runs the grain into the bin of the grade assigned to it. Even if they do not agree, the grain may still be purchased: The elevator man runs it into a bin marked for the grade he assumes it to have. At the same time he must agree to pay the current price for the grade that may be finally given to it by an official inspector. This decision is obtained on the basis of a sample taken from the delivery and sent to the Inspection Office at Winnipeg.

The farmer who does not wish to sell his grain at once may use the local elevator for storage and shipment only, and the operator is compelled by law to supply him with storage space at established charges, so long as there is room in his bins. In this case, again, the farmer may accept the operator's grade and dockage, or he may seek instead the decision of the Grain Inspector at Winnipeg. Not all farmers or elevator operators are experts on legal grades and the regulations of the Canada Grain Act, and hence in many cases the procedures here described are only very loosely followed. It is a common complaint against the local elevator men that they grade too high, in order to please their customers, and that they make too big a deduction for dockage as an offset.

If the farmer wishes to retain ownership of his grain until it reaches the big market points, he may obtain storage for it in a special bin in a local elevator, if such a bin is available, or he may load it directly into a freight car without passing it through an elevator. To give opportunities for direct loading of this kind, the railway companies are required to provide cars and a suitable loading platform at any station where a sufficient demand is made. But not many farmers can bring in enough grain to fill a freight car, which holds 1,000 to 1,200 bushels or more.

Shipment to Market Centers

Country elevators are not used for prolonged storage of grain. Their profits on handling depend upon the amount of grain which passes through them in the season—usually two or three times their capacity. The sellers also desire to get their grain down to the head of the Lakes before December, in time to be shipped out before navigation closes. From September to December, therefore, the railways are under tremendous pressure to move as much grain as possible.[1] Even distribution of grain cars among shippers is enforced by law, to prevent unfair discrimination by the railways in favor of the elevators. In times when the supply of cars is short, each shipper, large or small, elevator man or farmer, must await his turn for a car and can receive only one car at a time. In preparation for their heavy task, the railway companies begin as early as March to get their rolling stock ready, and gradually move it into the West for distribution there. For the 1923 crop, the C. P. R. thus collected 36,000 cars which had been prepared for grain, and the C. N. R. 40,000; these cars

[1] As shown by Appendix Table XXVII, an average for the four crop years from 1920–21 to 1923–24, shows that 150,000 cars of wheat were loaded in Western Canada in the four months of September to December, 70 per cent of the loadings for the average crop year.

carried on an average three or four loads of grain each from country points to the head of the Lakes. Because of the legal pressure to provide grain transportation, the railway companies at times refuse to allow their grain cars to go outside of Canada, lest they lose control of them at critical periods.

Inspection

The stream of freight trains runs mostly to Winnipeg, thence to the twin port of Fort William and Port Arthur, on the shores of Thunder Bay at the head of Lake Superior. Winnipeg is the point of inspection for grain shipped eastward to the Lakes, either Calgary or Edmonton for grain to Vancouver. A new point of inspection is now being established at Moose Jaw, to give Saskatchewan farmers the benefit of a prompt inspection and the opportunity to direct their cars eastward or westward as they see fit. Other inspection points of this kind in central positions may also soon be established if the experiment at Moose Jaw proves a success.

At the inspection point, employees of the Inspection Service open the grain cars, take samples, and send the samples at once to the Inspection Office for official grading. Grain is bought and sold in the Winnipeg Grain Exchange on the basis of the grade assigned to it by the official inspection certificate. If an elevator company's agent has been overgrading at a purchasing point, his mistakes will be corrected by the Inspection Office, with consequent loss to his employer.

During the three busiest months of the year, September, October, and November, more than 2,000 cars a day may thus be examined at Winnipeg. The first grain to arrive comes in over the C. P. R. from the southern districts, where it has ripened earliest, and a few weeks later over the C. N. R. also, from the more northerly districts. Grain from the eastern districts naturally arrives earlier than grain from the western. When the sample has been taken, the car concerned is usually run to one of the big terminal elevators at Fort William or Port Arthur, where its cargo is unloaded, weighed under official supervision, and run into the bin for the grade assigned to it by the inspection.

At the Head of the Lakes

Winnipeg on the one hand and Fort William and Port Arthur on the other, are essentially two halves of the same grain market. Winnipeg is the assembling and inspecting point, partly for historical reasons, partly because of its nearness to the producer and the consequent ease of communication with him. It is also the center of trading activities. Fort William and Port Arthur stand some four hundred miles nearer to the ultimate destination of the wheat, at the head of five different transportation routes to eastern lake and ocean ports. They are therefore a most suitable place for grain storage on the largest scale, so that "wheat" in Winnipeg usually means wheat that has been graded at Winnipeg and weighed into store in elevators at Fort William or Port Arthur. This is termed "spot wheat" and its price the "spot price."

Storage capacity is offered at Fort William and Port Arthur by terminal elevators with an aggregate capacity now about 64 million bushels.[1] Until 1920 practically all storage and handling was performed by the public terminal elevators alone, but since that time, under practices sanctioned by the Board of Grain Commissioners in 1917,[2] a large part of the business has been performed by elevators operating under a private terminal license. Partly by new construction and partly by the conversion of public elevators, there has been of late a rapid increase of private terminals, both in number and capacity. Though still well below the public terminal elevators in capacity, in the crop year 1923–24 they took the lead for the first time over the public terminals and handled more than half the shipments down the Lakes. Their share of the trade may still further increase in the near future.

The differences of the two types of elevator are legal and commercial. The public terminal elevator is licensed for storage only, and its registered legal owners may

[1] See Appendix Table XX.

[2] *Report of Royal Grain Inquiry Commission, 1925*, pp. 77–80.

not buy or sell wheat as a trading concern. All grain entering and leaving the elevator is officially weighed and inspected, so that it may run to the same weights and grades in and out. A public elevator is not allowed to mix grain of different grades. It may, however, dry or clean grain on the owner's order. For all services that it renders—handling, storing, drying, cleaning, and so on—it must work under a tariff of charges established by the Board of Grain Commissioners. The private terminal elevator is not subjected to this close control. The owners of such an elevator may buy and sell grain on their own account, and may also store it for other owners. Grain going in and out of the elevator is officially weighed and inspected, but its movement within the elevator is not controlled. The private terminal elevator may therefore mix grain of different grades, in order to improve the average grade of its holding. Warehouse certificates of the public terminal elevators are guaranteed, both for weight and grade, by the Board of Grain Commissioners; those of the private terminal elevators are officially guaranteed for weight alone, and the guarantee of grade is given by the Winnipeg Grain Exchange.

At the present time (1924–25) there are eleven public terminal elevators with a combined capacity of 42 million bushels, and sixteen (principal) private terminal elevators with a combined capacity of 22 million bushels. The performance of these elevators can be judged from the record for the largest, the Northland elevator at Fort William. It contains 450 bins and will hold 7½ million bushels of wheat. It has unloaded 314 grain cars—300 or 400 thousand bushels—in twenty hours, and it can discharge its stored wheat into lake boats through eight spouts at the rate of 100 thousand bushels an hour.[1]

Before the close of navigation, grain is moved through these elevators as fast as possible, so that very little of it is held for more than the fifteen days of free storage. At this time, therefore, handling power is much more important than storage capacity. After the close of navigation, however, the case is altered, and storage capacity becomes more important. Grain is brought in by rail from the West for storage, but little is moved eastward by rail except on urgent demand. Shippers prefer to accumulate stocks at the head of the Lakes in preparation for the reopening of navigation in the spring, when another but smaller rush to market ensues.

Western grain moving east receives its final inspection for grade on leaving the elevator at Fort William and Port Arthur, and thenceforward is always handled in Canada with identity preserved, so that a cargo of Canadian wheat arriving in Europe from a Canadian port can be traced back over all stages of its journey to a terminal elevator at the head of the Lakes. (In the Canadian grain trade, the word "terminal" is applied to all elevators where final inspection takes place, and to them alone.)

Organization of the Grain Trade

Among sellers and middlemen in the market formed by the Winnipeg Grain Exchange and the terminal elevators at Fort William and Port Arthur, big organizations predominate, having several functions concentrated under a single control. These organizations may be elevator companies, milling companies, or farmers' coöperative organizations,—in all numbering about a hundred. Whatever the nature of the company, its commercial organization is very much the same. It operates a line of elevators at country points in the West, where it will buy grain from farmers on its own account or will store and ship grain for farmers who wish to retain ownership. For this latter grain it will expect to act as commission agent in the Grain Exchange. It will also buy and sell grain that does not pass through its elevators, either for commission or on private account. At the head of the Lakes it may maintain close connections with a public or private terminal elevator or both, perhaps owning a private elevator outright and a public elevator indirectly. At this point its interests usually cease. It may maintain commercial departments to

[1] *Daily Times-Journal*, Fort William, Ontario, December 13, 1924.

handle shipments of grain across the Lakes and exports of grain to Europe, but more commonly it leaves these tasks to others.

In addition to the elevator companies, there are a number of small cash grain commission merchants. These men handle on an average about 25 million bushels a year, for farmers who prefer to make independent shipments and sales.

On the buyers' side of the market, integration has not been carried so far. The three principal types of purchasers are the miller,[1] the lake shipper, and the exporter. Continual fluctuations in lake freight rates make moving of grain across the lakes to eastern storage points a specialized business. The shipper undertakes this business and delivers wheat in the east to the order of millers and exporters. Many millers in Eastern Canada buy their wheat from shippers. Many exporters prefer to operate on the seaboard in close contact with ocean shipping, and therefore choose to buy grain from lake shippers and "fobbers."[2] Others, however, both millers and exporters, prefer to go west for their grain and buy it on the Winnipeg Grain Exchange or even at country points. No divisions of function or territory are rigidly observed in the Canadian grain trade.

The Winnipeg Market

Winnipeg is the largest cash wheat market in the world and the only market in Canada for future trading in grains. Its opportunities for future trading are largely used by grain dealers, Canadian, American, and British, for the purpose of hedging; and Winnipeg is increasing in importance as a speculative market. Elevator companies which have purchased wheat at country points at once sell for cash in Winnipeg a contract for future delivery in some month in or near which they expect to receive the grain in the central market. Likewise exporters and shippers who have sold wheat for future delivery in Europe or Eastern Canada and millers who have made contracts for future delivery of flour, protect themselves against changes in the cash price by buying contracts in Winnipeg for future delivery. The months for future delivery are October, November, December, May, and July, the three months before navigation closes on the Great Lakes and the St. Lawrence, the first month of its reopening, and the last month before the new harvest.

The purchaser of "spot" wheat does not acquire a particular lot of grain of well-defined characteristics, but only warehouse receipts that give title to the necessary weight and grade of grain in store at the terminal elevators. He must accept from these elevators any delivery of grain whose weight and grade are approved by the official inspectors. Since definitions of grade are not precise, differing qualities of grain may be found within the same grade. On the whole, however, the public terminal elevators, which do storage business only and are forbidden to mix grain of different grades, deliver what may be called the average quality of the grade. To maintain uniformity of standards, the private terminal elevators, which mix grades, are required to deliver also the average quality of the grade.

Winnipeg prices for "spot" wheat are therefore always prices for the average quality of the grade, because this is what the purchaser will expect to receive; but for wheat that has not yet lost its identity in a terminal elevator a rather better price may sometimes be obtained. Two classes of purchasers, the millers and the private terminal operators, are always in the market for wheat of superior quality for grinding or mixing and will buy carloads on a sample basis at premiums ranging from ¼ cent to several cents a bushel. More than 50 million bushels of wheat thus changed hands in 1923–24.[3]

[1] Millers who operate country elevator lines, of course, purchase through that channel much of the wheat they grind.

[2] Merchants who make a practice of selling wheat f.o.b. to exporters.

[3] Private terminal elevators may take their own samples of grain sent to them for *storage* and select carloads suitable for their mixing, without the owners' knowledge, subsequently paying the ordinary market price for it or delivering grain of average quality against the warehouse receipts. This is regarded as an undesirable trade practice, since this unofficial sampling is said to enable them to escape the payment of premiums, with consequent injustice to the seller. *Report of Royal Grain Inquiry Commission, 1925*, especially pp. 84, 100–102.

Shipment to Eastern Seaboard

From the head of the Lakes to the eastern seaboard there are five principal routes.

(1) The most important and best established eastward route from Fort William and Port Arthur is the Great Lakes waterway to Buffalo. Between 80 and 100 million bushels of Canadian wheat are usually shipped this way each year. Most of the total goes on to the seaboard; the remainder is milled in Buffalo, for consumption or in bond for export. Other United States ports on Lake Erie receive much smaller consignments of Canadian wheat from the head of the Lakes. Grain from Buffalo for export is carried by rail to New York, Philadelphia, Baltimore, and Boston, in that order of importance. The new Buffalo-Albany barge canal to the Hudson River and New York, is an alternative route, but it is still in poor condition and does not carry much grain. It is strongly influential, however, in controlling railway rates.

(2) The next route in order of importance, and one that is being more and more utilized, is the all-water route to Montreal. Wheat usually makes this journey in two stages. It is carried from the head of the Lakes to Port Colborne, on Lake Erie, by lake steamers with a draft of 20 feet and a cargo capacity of 300 to 500 thousand bushels of wheat. These boats cannot, however, complete the passage to Montreal through the Welland Canal and the canals of the upper St. Lawrence, which are only 14 feet deep. The grain is therefore unloaded at Port Colborne into a transfer elevator owned and operated by the Dominion government, and is reloaded into smaller boats up to 90 thousand bushels capacity, which carry it down to Montreal. Up to 40 or 45 million bushels of Canadian wheat are thus handled, and another 6 million bushels or so are carried in small boats by continuous voyage from the head of the Lakes to Montreal. Another 10 to 15 million bushels of wheat do not go through the canal, but are unloaded into a big flour mill at Port Colborne or are distributed to the smaller inland mills of Ontario. At times also wheat is sent through the canals from Buffalo to Montreal.

(3) A third route from the head of the Lakes runs into Georgian Bay, on Lake Huron, where there are situated half-a-dozen ports for unloading grain. In the course of time, however, all but two have been practically eliminated from the competition. The survivors are Port McNicoll and Midland-Tiffin, served by the C. P. R. and the C. N. R., respectively. They are both situated on the most easterly inlet of the Bay. Each port handles from 15 to 20 million bushels of Canadian wheat a year, the greater part of which is carried by rail to Montreal. The remainder goes to Canadian and United States ports on the seaboard, or is taken by mills in Eastern Canada.

(4) On the long straight southeastern shore of Lake Huron, a single opening at a river mouth has given opportunity for the development of a grain port at Goderich and for a fourth route from the head of the Lakes. This port is served by both the C. P. R. and the C. N. R. and handles 10 to 15 million bushels of wheat a year, largely for the supply of mills in the peninsula of southwestern Ontario.

(5) In contrast to the water routes, which together carry 200 or 300 million bushels of Canadian wheat a year, the shipments by rail from Fort William and Port Arthur are very small, amounting to only 10 or 20 million bushels a year. The quantities of grain shipped direct from west to east by rail, without passing through a terminal elevator, are smaller still, being only an odd million bushels or so a year. Another route, equally unimportant, consists of a rail haul to Duluth and thence water carriage eastward.

The Great Lakes Traffic

The movement of grain on the Great Lakes is complicated by the navigation laws of Canada and the United States and by the competition of alternative cargoes. Traffic between Canadian ports is restricted to Canadian boats, and traffic between United States ports to United States boats. Traffic between a Canadian and a United States port is, however, open to the shipping of all countries.

The commodity that chiefly competes with grain in the lake traffic is iron ore, which is moved from big mines around Lake Superior to ports on the south shore of Lake Erie and thence by rail to the coalfields, smelters, and foundries of Pennsylvania and Ohio. This ore provides about two-thirds of the total tonnage of lake cargoes—40 to 60 million tons by weight. The traffic is highly and efficiently organized and the largest lake freighters, 600 feet in length and carrying 12 to 15 thousand tons of ore at a time, are engaged in the service.

Though Canadian boats are excluded from this traffic, it exerts a very powerful influence on the Canadian grain trade. In the first place, the improvement of the waterway of the upper lakes must be attributed mainly to the need for the cheapest possible transportation of iron ore. In the second, the economical design of the lake freighter has been evolved in the same service. These boats are all bulk carriers, whatever their cargo may be. Each is simply a continuous hold or series of holds, with navigating quarters forward and machinery aft. They have no loading and unloading equipment of their own, and are entirely dependent upon the elaborate handling appliances installed in ore docks, coal docks, or grain elevators at the ports they use. Presumably because they are excluded from the ore trade, Canadian boats of this type are in general considerably smaller than United States boats.

A third influence of the ore trade is that there is always an enormous reserve of tonnage on the Lakes that can undertake to carry Canadian grain from the head of the Lakes to Buffalo at any time when the demand arises and freight rates on grain increase. This regularly occurs at the opening of navigation, when special efforts are made to hurry shipments through to Europe. At the end of the season, frost causes the ore movement to cease before the close of navigation, and the United States ore boats again step into the Canadian grain trade for one or two final trips. Because of the Canadian navigation laws, because the port of Montreal opens later and closes earlier than does navigation on the upper lakes, and because it offers the quickest route to Europe, these first and last movements are directed to Buffalo.

A final relationship between the grain traffic and other traffic is found in the return cargo of lake shipping—coal, which is brought up from Pennsylvania and West Virginia to Lake Erie ports and is carried westward by grain boats and by some of the ore carriers. Even boats that have carried grain to ports on Georgian Bay may make a passage to Lake Erie in ballast to obtain a return cargo of coal for carriage to the head of the Lakes.

Eastern Grain Ports

All the eastern grain ports possess grain elevators with considerable storage capacity and equipment for unloading lake boats and for loading grain. Recent figures are given in Table 4. The storage capacity of all these lake ports is increased during the period of closed navigation by "storage afloat." Lake boats and barges bring down a last cargo of grain from the head of the Lakes and tie up at an elevator for the winter. At some time during the winter, the cargoes are unloaded into the elevator to be shipped eastward by rail when desired. Up to 10 million bushels of wheat may thus be stored at the Canadian lake ports, and 10 to 20 million bushels at Buffalo.

Table 4.—Number and Capacity of Elevators at Leading Eastern Lake Ports, 1924–25*

Port	Number	Capacity *(million bushels)*
Buffalo (1925)[a]	13	21.9
Montreal (1924–25)	4	12.26
Port McNicoll (1924–25)	1	4.2
Midland	1	3.0
Tiffin	2	5.5
Goderich	2	1.6
Port Colborne	2	3.5

* Grain Elevator Committee of Montreal, unpublished report, 1922, supplemented by information from Buffalo Chamber of Commerce; also Board of Grain Commissioners, list of licensed elevators, 1924–25.

[a] Number of elevators regularly engaged in export business. The total number of elevators in Buffalo in January 1925 was 27, with a capacity of 31.5 million bushels (Buffalo Chamber of Commerce).

In these eastern elevators and elevators at ocean ports, fobbers and exporters ac-

cumulate their stocks for shipment to Europe. Buffalo is the best place for storage, because grain can be shipped thence by rail to Boston, New York, Philadelphia, or Baltimore, or by water to Montreal, as shipping conditions at the moment dictate. Montreal offers ocean port storage for seven months of the year and inland storage for the other five. Behind Montreal and Buffalo stands a second line of storage at the Georgian Bay ports, from which grain may be shipped to Montreal or its winter outlets, or to United States ports on the seaboard. Port Colborne elevators, on the other hand, ship grain to Montreal only by the water route during open navigation, and by rail they supply only local mills.

Montreal, though it is open for only seven months of the year, has recently become the leading ocean grain port of North America. It has three distinct movements of grain. Some American export wheat, harvested in the hard winter wheat states of Kansas and Nebraska in June and July, is moved to Chicago, and thence shipped to Montreal by the Georgian Bay or the Welland Canal route. This movement is at its height from July to September and is accompanied by a similar large export movement of other grains, principally rye and corn. Next comes the major movement of the Canadian crop. Finally, when the port of Montreal is closed by ice, grain in store at its elevators and on Georgian Bay must be hauled eastward by rail to open ports on the Atlantic. These ports are St. John, N.B., served by the C. P. R., and Portland, Me., served by the C. N. R. (formerly the Grand Trunk).

Atlantic Ocean Shipment

The last stage of the export grain movement is shipment across the ocean. Because of the large number of liners plying regularly across the Atlantic, a great part of the grain is carried in these vessels. The remainder is carried largely by tramp steamers, chartered for a particular voyage. It is the custom of liners which have gained a partial cargo of freight of higher grade to offer the remainder of their space to grain exporters at any rate—an "open" or "berth" rate—that will fill their holds and avoid the necessity for taking in ballast.[1] For this reason, and because tramps can compete with liners for the carriage of grain, ocean rates on grain are omitted from the control of the North Atlantic Conference of steamship lines. Until the spring of 1924, flour rates were regularly fixed by the Conference, but since then they have passed into the category of berth rates, and are current merely from day to day.

Shipping conditions determine the degree to which each ocean port is used, within the limits of its physical capacity. Montreal and New York have been rivals for first place. New York is the principal port for liner shipments because of the number of lines running from that port and because facilities for tramp shipments are unsatisfactory there. Montreal has been served extensively both by liners and by tramps, although as a tramp port it suffers under the handicap of deficiency in inward cargoes and high rates of insurance in the St. Lawrence in the last half of the navigation season.[2] At the other American ports—notably Portland, Boston, Philadelphia, and Baltimore, particularly the last-named—extensive port facilities and ample shipping provide important outlets both for Canadian and American grain.

The Westward Route

While the bulk of the grain of Western Canada moves eastward, a westward movement through Vancouver has grown to considerable proportions in recent years. This route was impracticable before the opening of the Panama Canal in August 1914, and during the war it had little opportunity to develop because the scarcity of shipping necessitated concentration on the shorter shipping routes. Since the war, however, shipping has been more freely available, and the chief difficulties with which Vancouver must now contend are a lack of inward cargoes and the competition of exporters in the Pacific ports of the United States for outward cargo space.

[1] In Montreal, at least, the rates are fixed by a port committee of the shipping companies, which meets every day.

[2] Within the last year or so, coal has been shipped to Montreal from England. This traffic may tend to increase its importance as a tramp port.

Grain shipped to Vancouver from the prairie provinces is inspected at Calgary or Edmonton and unloaded into harbor elevators at Vancouver. Vancouver thus benefits from the advantages of a through haul by rail from the country shipping point to salt water. On the other hand, it suffers from the fact that, while eastward railway rates to the Great Lakes are kept at a low level by the Crow's Nest Pass agreement, the difficulties of westward haulage through the mountains have been made the reason for a much higher mileage rate to Vancouver. The territory which Vancouver serves varies considerably with the season of the year. In midsummer, while grain movement is small and shipping rates on the Great Lakes are low, it can attract grain only from Alberta; but in autumn, winter, and spring, when lake freights are higher or lake navigation is suspended, its territory increases and it receives grain not only from Alberta but also from western Saskatchewan.

Vancouver Harbor has been greatly improved by new construction during the last few years, and it now possesses port elevators with a storage capacity of nearly 7 million bushels. Several grain-exporting firms, Canadian and European, maintain offices in the city, and a grain exchange for cash trading has recently been opened to facilitate their trade.

In the crop year 1921–22, Vancouver exported only 8 million bushels of wheat; the next year, it exported 18 million; and in the crop year 1923–24, when Alberta enjoyed a record crop, 54 million bushels of wheat were exported; but with a much smaller crop in Alberta in 1924, the exports of the crop year 1924–25 fell off again to about 24 million bushels. The bulk of the shipments have so far been made to Europe, chiefly Great Britain, through the Panama Canal, and a much smaller proportion to China and Japan.

Vancouver serves those parts of the West which yield wheat of the best quality and highest protein content and, so far, a cleaner wheat, so that its shipments have fetched a higher price in the British market than shipments of wheat from the eastern prairies through Atlantic ports.

The movement of wheat through Vancouver will vary in close accord with the Alberta wheat crop, which is highly variable from one year to another, and to some extent also with the requirements of the Oriental market. Its future, therefore, will principally depend upon the development of wheat-growing in Alberta, in particular upon the development of the districts round about Edmonton and eastward, and also upon the progress of wheat-growing in the Peace River district.

Costs of Shipping and Marketing

In conclusion it is desirable to present a general view of the costs involved in getting wheat from Western Canada to market. On this point the Dominion Bureau of Statistics has recently made some careful estimates. For the navigation season of 1923, as shown by Table 5, freight charges from Saskatoon,

Table 5.—Estimated Average Freight Charges per Bushel of Wheat from Saskatoon to Liverpool, 1923*

(Cents)

1923	Saskatoon to head of lakes —rail	Head of lakes to Georgian Bay—water	Georgian Bay to Montreal —rail	Montreal to Liverpool—water	Total
May	14.4	4.10	8.6	6.9	34.0
June	14.4	3.71	8.6	6.8	33.5
July	14.4	2.86	8.6	7.4	33.3
Aug.	14.4	2.99	8.6	7.4	33.4
Sept.	14.4	3.54	8.6	7.2	33.7
Oct.	14.4	4.39	8.6	8.8	36.2
Nov.	14.4	3.82	8.6	10.3	37.1
Average	14.4	4.02	8.6	8.0	35.0

* *Monthly Bulletin of Agricultural Statistics*, October 1924, p. 303.

Saskatchewan (a typical central point in Western Canada), to Liverpool, amounted to 35 cents a bushel. Of this amount, 14.4 cents represented railway haul to Fort William, 4.02 cents was the average charge for water haul to Georgian Bay ports, 8.6 cents the railway charge thence to Montreal, and 8 cents the average ocean freight charge to Liverpool. It will be noted that the railway charges were constant, while the lake freight rates were at a minimum in midsummer, and the ocean freight rates were

much higher in October and November, the heaviest shipping season.

A more detailed estimate of total charges for shipping wheat from a typical central point in Western Canada to Liverpool, by an all-water route through Port Colborne and Montreal, based on rates for 1922-23 with wheat at an insured value of $1.40 per bushel, led to a total of 40 cents a bushel, distributed as follows:[1]

Freight by rail	15.00	cents
Freight by inland waters	8.29	"
Ocean freight	6.21	"
Commissions, fees, interest, etc.	8.70	"
Insurance	1.53	"
Total	39.73	cents

From Northern Pacific ports to Liverpool, ocean freight rates are two or three times those from Atlantic ports, but they vary less during the year. In the season 1923-24, for example, they were usually around 22 or 23 cents a bushel.[2] In the same season railway freight rates to Vancouver for export wheat ranged from 22½ cents per 100 pounds from Calgary and Edmonton, Alberta, to around 30 cents from points in Saskatchewan,[3] or from 13½ to 18 cents a bushel. Since from most of these points the freight charges eastward are higher than from Saskatoon, the competitive possibilities of the westward route are apparent, particularly at times when lake and Atlantic rates are high or the grain must be held in elevators beyond the period of free storage.

IX. CANADIAN WHEAT IN THE WORLD MARKETS[4]

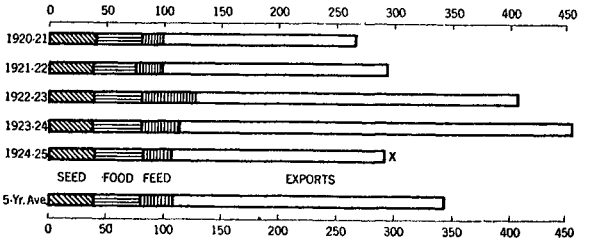
Volume of Exports

Roughly two-thirds of Canada's wheat production, on the average, is exported. Official estimates of the disposition of the Canadian crops of the past five years show that roughly 40 million bushels are milled for domestic consumption; seed requirements are nearly as large; and a variable quantity averaging about 30 million bushels a year is wasted or is fed to livestock.[5] Deducting, therefore, some 110 million bushels for domestic requirements, a variable balance, which has averaged about 230 million bushels a year in the past five years, has been exported as wheat or flour.

During this 5-year period, the average exports from the United States have been approximately the same. Together the two countries have contributed almost two-thirds of the wheat entering into international trade.[6] As it happens, however, variations in individual years in the two countries have been largely compensating, so that the combined net exports have varied only within narrow limits, from about 440 to about 490 million bushels. This is due partly to the facts that Canada exports spring wheat while the United States exports chiefly winter wheat and that a favorable year for winter wheat often happens to coincide with an unfavorable year for spring wheat. It is partly due, however, to the fact that the domestic disappearance of wheat in the United States varies from year to year by much larger amounts than it does in Canada.[7] Hence when Canada has a large

Chart 8.—Disposition of Canadian Wheat Crops, 1920–24*

(Million bushels)



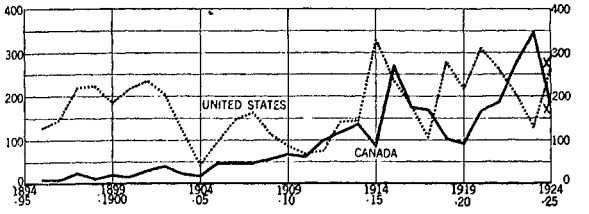
* Sources: See Wheat Studies, December 1924, p. 53, and April 1925, p. 170.
X Preliminary approximation.

[1] Details are given in *Monthly Bulletin of Agricultural Statistics*, October 1924, p. 304.
[2] Data of International Institute of Agriculture.
[3] *Report on the Grain Trade of Canada, 1924*, p. 157.
[4] For general references, see Bibliographical Notes, p. 275.
[5] See Chart 8, and Wheat Studies, December 1924, p. 53, and May 1925, p. 170. Part of the waste, of course, is "dockage," consisting of broken grain, weed seeds, and foreign material, all of which is included in the estimate of the farm crop.
[6] See Appendix Table II, and Chart 1 above, p. 218.
[7] See Wheat Studies, December 1924, p. 53.

export surplus, prices tend to be depressed to such a level as to restrict American export and to divert wheat in the United States to animal consumption; whereas, when Canada has less for export, America can profitably export more. A material decline in exports from the United States would, therefore, have considerable significance for Canada.[1]

CHART 9.—EXPORTS OF WHEAT AND FLOUR FROM CANADA AND THE UNITED STATES, 1897–1924*

(Million bushels)



* Sources: U. S. Department of Commerce, *Monthly Summary of Foreign and Domestic Commerce;* and see Appendix Table XXIII.

NOTE.—U. S. figures are net exports; Canadian figures are total domestic exports.

X Preliminary approximation.

This tendency toward constancy of the aggregate exports from the two leading exporters mitigates the effect on world prices proceeding from the variability in Canada's wheat exports. If, as seems to be the case, the trend of United States exports is downward[2] and the trend of Canada's exports is still upward, this compensating tendency is likely to be weakened before many years. Since both Australia and Argentina export, on the average, about two-thirds of their crops, and since Russian exports seem unlikely to vary inversely with Canadian exports, the indications are that as Canada's relative importance in wheat export trade increases, world export surpluses will be increasingly variable, with consequent influences upon world wheat prices.

[1] In one respect Canada gains by large grain exports from the United States. The handling of grain through the lower lakes and Montreal is cheapened because the same equipment may be used to handle American grain at certain seasons and Canadian grain at others. See above, p. 258.

[2] See WHEAT STUDIES, March 1925.

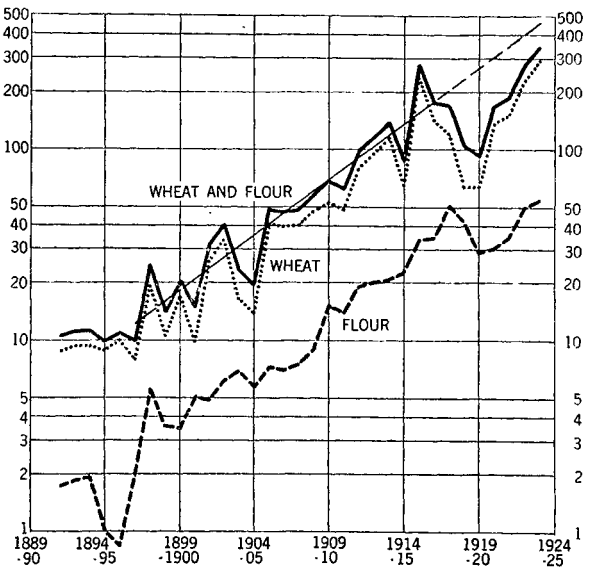
[3] See also Chart 1, p. 218, and Chart 4, p. 239, for comparison with production.

TREND OF EXPORTS

It is only since 1897–98 that Canada has been consistently important as a wheat exporter. Prior to 1892, exports never reached 10 million bushels a year, and originated largely in Ontario. In the six years ending June 30, 1897, they amounted to about 10 million bushels a year; and thereafter, until 1918, a marked upward trend was in evidence. Chart 9, above, represents this growth on a natural scale, in comparison with net exports from the United States. Chart 10 represents the same movement on a logarithmic scale, in order to bring out the rate of growth.[3] Other curves show separately the export of flour and the export of wheat as grain. A line of trend for the total exports, for the years 1896–97 to 1916–17, is added. While there was considerable variation from year to year, this trend was upward at an average rate of 14.3 per cent per annum. Flour exports increased at approximately the same rate as total wheat exports.

CHART 10.—CANADIAN EXPORTS OF WHEAT AND FLOUR, 1891–1924*

(Million bushels. Logarithmic vertical scale)



* Sources: See Appendix Table XXIII.

NOTE.—The equation of the line showing the trend of exports of wheat and flour, 1896–97 to 1916–17, is $\log_{10} y = .0584x + 1.0222$, taking 1895–96 as the zero year.

This striking upward trend was broken in

1918–19, chiefly in consequence of two poor crops in 1918 and 1919. In the four succeeding years exports increased from this level, but even the exceptionally high figure for 1923–24 did not approach the extension of the previous line of trend. Exports for the current year are far below it.

There are no grounds for expecting Canada's exports in the future to show an upward trend as pronounced as that of 1920–24 or that of 1897–1918. The most that can be said is that a period of remunerative prices bids fair to cause some increase in Canadian acreage and production, an increase which will normally result in rising exports over the next few years, and that variations from year to year are likely to be more impressive than the upward trend.[1]

Quality

The expansion of Canadian wheat production has been promoted by the popularity of the wheat in foreign markets. This is due to inherent qualities. It is characteristically hard, of high protein-content; and even in the lower grades these qualities go far to offset other defects. It yields a strong white flour, which absorbs water freely, forms a strong, elastic dough, and yields more loaves to the barrel than weaker flours do. The resulting loaf is large and shapely ("bold"), with crust of good bloom and a crumb of good texture and good keeping qualities. Since the bulk of west European wheat is soft, and much of the wheat exported from the United States, Argentina, and Australia is either soft or semi-hard, Canadian flour, or Canadian wheat for its flour, is widely in demand for blending with weaker flours. These qualities, which were early appreciated by British millers, are now so extensively recognized that large quantities of Canadian wheat can be regularly absorbed in the British market.

[1] See further, below, Section X.

[2] The Canadian government now exchanges records with the United States government. Thus the statistical difficulties occasioned by transit shipments are being largely overcome.

Canada's Wheat Export Markets

Statistics of destinations of exports and of sources of imports are notoriously unreliable, partly because of shipments for orders, partly because the immediate source or destination is often different from the original or ultimate one. Here the situation is complicated by the fact that much Canadian wheat is exported through the United States, and its destination is not determined until after it leaves Canada.[2] Thus British statistics of wheat imports from Canada differ greatly from Canadian statistics of wheat exports to Great Britain. The statements below are based on Canadian data summarized in Appendix Table XXIV, which are sufficiently reliable for a broad view.

Great Britain has always been by all odds the leading customer for Canadian wheat. Until about 1912 she was the only important customer, taking about 90 per cent of Canada's wheat and flour exports. Particularly after Canada's three good crops of 1911–13, however, there was an expansion of other markets, doubtless attributable in part to the decline in price during those years. Thus the United States imported heavily in 1913–14. Countries of Northern Europe became considerable purchasers, for in these countries, as in Great Britain, bakers find Canadian flour of great value for blending with other flours to give strength to the mixtures. The Orient took appreciable quantities in 1913–14. And the flour exports, to a great variety of countries, increased notably in volume.

During the war, the market for Canadian wheat was further broadened, especially after the crops of 1915 and 1916. Exports of wheat and flour to France and Italy increased greatly, partly because of the decline of Russian exports, and partly because shipping difficulties affected exports from the southern hemisphere. Shipments to the United States became large, after the small American crops of 1916 and 1917, but fell to small proportions after Canada's poor crops of 1918 and 1919. Even so, in the five years ending March 31, 1919, nearly 80 per cent of

Canada's wheat and flour exports went to Great Britain.

After 1920, with large Canadian crops and low grain prices, the broadening of the market continued as exports rose. Most of the increase in exports, in fact, went to other countries than Great Britain, so that, on the average, in the five years ending March 31, 1925, only about 60 per cent of Canada's exports went to Great Britain. Under the stimulus of low wheat prices and short rice crops, the Orient took substantial quantities from the crops of 1921, 1922, and 1923.

The British market remains the mainstay of the Canadian exporter, and its relative importance has latterly increased. Russian competition will probably be felt most on the Continent, and United States and Argentine competition in Southern Europe. United States flour competes with Canadian in many markets. Oriental markets can hardly be counted upon for large orders except at low prices, because their demand for wheat is highly elastic. Since, however, Canada already exports as much wheat, on the average, as Great Britain imports, increases in Canadian exports must go in considerable measure to markets which are, on the whole, less exacting in their standards for wheat imports. Accordingly, unless the demand for the special qualities of Canadian wheats can be cultivated still more broadly, these wheats will have to meet competitive wheats simply on the basis of price and weight.

Imports into the United States

The United States affords only a limited market for the wheat of Western Canada. This is due to three related factors—the large production of wheat in the United States, the political separation of the two areas, and the tariff policies of the two countries. The northwestern states of Minnesota, North Dakota, South Dakota, and Montana yearly produce 150–250 million bushels of hard red spring wheat, practically identical in quality with that of Western Canada. Another group of states in the Middle West produces between 200 and 300 million bushels a year of hard red winter wheat, the commercial qualities of which are equal, on the whole, to those of the hard spring wheat. Exports of these two kinds of United States wheat, as grain or flour, are large, and they have been strong competitors with Canadian wheat and flour in many parts of the world. Had there been no political separation, undoubtedly there would have been a different development of transportation routes, and, with no tariff between the two areas, much more Canadian wheat would doubtless have been consumed in the United States. Nevertheless, since both countries have usually had surplus wheat for export, the aggregate net export from the two areas might not have been greatly different if the boundary line had not existed.

During most of the period of Canada's rise to eminence as a wheat exporter, the United States has maintained a substantial tariff on wheat and flour. The rates imposed by the different acts or proclamations are shown in Table 6.

Table 6. — U. S. Tariff Duties Effective on Canadian Wheat and Flour, 1883–1925*

Date effective	Wheat duty	Flour duty
July 1, 1883	20 cts. per bu.	20% ad val.
Oct. 1, 1890	25 " " "	25% " "
Aug. 28, 1894	20% ad val.	20% " "
July 24, 1897	25 cts. per bu.	25% " "
Aug. 5, 1909	25 " " "	25% " "
Mar. 1, 1914	10 " " "	45 cts. per bbl.
Apr. 17, 1917	None	None
May 27, 1921	35 cts. per bu.	20% ad val.
Sept. 21, 1922	30 " " "	78 cts. per 100 lbs.
Apr. 6, 1924	42 " " "	104 " " " "

* U. S. Tariff Commission, *Agricultural Staples and the Tariff*, 1920, pp. 18–19; and legislative acts.

Before the war these duties, while not prohibitive, were sufficient to prevent much Canadian wheat from entering the American market. The largest annual imports, in the years ending June 30, 1905 and 1912, following poor crops of spring wheat in the United States, were somewhat over 3 million bushels.[1] Such imports were high

[1] Data for United States imports from Canada are based on United States statistics.

quality or premium wheats in special demand for blending purposes. During the whole of this period very much larger quantities of United States wheat were exported.

The Underwood Tariff of 1913 offered reciprocal free trade in wheat and flour, but since Canada enforced a duty, the United States tariff carried a duty of 10 cents a bushel on wheat and 45 cents a barrel on flour. This was a small barrier, particularly with rising wheat prices. In 1915–16, despite a record United States crop, the imports exceeded 7 million bushels. The next year, with a poor United States crop, they reached nearly 25 millions. After the United States entered the war, on April 17, 1917, Canada joined in making wheat and flour reciprocally free of duty, and United States imports rose to 27 million bushels in 1917–18. Imports were small in the two following years because of the relative sizes of the crops. In 1920–21 they rose to 57 million bushels. Since in these years the United States was also a heavy exporter, the Canadian wheat then displaced, bushel for bushel, United States wheat which was sent abroad.

The emergency tariff act of May 27, 1921, reëstablished wheat and flour duties at high figures, but carried with it provisions whereby Canadian wheat could be imported practically duty-free for milling in bond in this country for export. These rates were lowered slightly in September 1922, but in April 1924, under the flexible provision of the tariff act, the President raised the rates from 30 to 42 cents a bushel on wheat and from 78 cents to $1.04 per hundred pounds on flour, but lowered the duty on mill feed from 15 to 7½ per cent ad valorem.[1]

Even after May 1921, large quantities of Canadian wheat were imported—in 1921–22 over 17 million bushels, in 1922–23 nearly 20 millions, in 1923–24 nearly 28 millions. Of these, substantial amounts were imported in bond; but in 1923–24, after an excellent Canadian crop and a poor United States crop, some 13 million bushels, largely premium wheats, were imported over the tariff for consumption. In 1924–25, when crop conditions were reversed, little Canadian wheat was imported, and almost all of that for milling in bond.

If the United States tariff is maintained at such high figures, little Canadian wheat may be expected to enter the United States for domestic use except in years of small crops of spring wheat or of spring wheat and hard winter wheat combined. But so long as the practice of admitting Canadian wheat duty free for milling in bond is maintained, imports for this purpose may be expected to continue large except when, as in 1924, Canada has a poor crop and the United States an excellent one—unless indeed Canada imposes a threatened countervailing export duty.

If the tariff should be materially reduced, large quantities of Canadian wheat would find their natural markets in eastern milling centers, and larger quantities of United States wheat, particularly in the southwest, would be exported instead of moving north and east for domestic milling.

Canada's Export Flour Trade

The flour exports of Canada, like the trade in wheat as grain, have grown rapidly. The 5-year pre-war average exports were less than 4 million barrels. Exports increased greatly in the first years of the war, fell off after 1918, and recovered after 1921. In the crop year 1923–24 the flour exports were about 12 million barrels, the equivalent of about 54 million bushels of wheat.[2] This is considerably more than Canada's domestic consumption of flour, which, as already mentioned, is around 40 million bushels.

The character of this export trade is much the same as in the case of the United States.[3] There are the same three basic characteristics—wheats of high quality, a milling capacity in excess of domestic requirements, and a home market that will utilize only high-grade flours. Consequently, there are the same three kinds of export. The first is an export of high-grade flours, which are esteemed in temperate climates for their baking quality and in tropical climates for their keeping quality. The

[1] The result was an increase in imports of mill feed, from 125,556 tons in the last year under the old duty (April 1, 1923, to April 1, 1924,) to 257,264 tons in the following year, largely into the northeastern states.

[2] See Appendix Table XXIV, and Chart 10, p. 261.

[3] See WHEAT STUDIES, March 1925, pp. 127 ff.

second is an export of average flours which are ground in order to keep the mills at work after domestic needs have been supplied. The third is a nexport of low-grade flours, which appear as a by-product of the manufacture of better flour for domestic use, and which are sold to foreign markets where cheapness is the controlling consideration. Differences between the flour trade in the United States and Canada also exist, because Canadian mills are much more largely dependent upon the export trade and because they do not possess such good markets for their mill feed. The Canadian millers also complain that they are hampered by high transportation costs on wheat from western farms to eastern mills and on flour from the mills to the European market, and by the Dominion tariff on milling machinery and containers. Neither does the Canadian wheat tariff accord the privilege of milling in bond, which is of importance to American millers.

The seasonal character of the Canadian grain movement imposes itself strongly upon the mills and their markets. Appendix Table XXVI indicates the monthly variations in wheat grindings in the past five years. In October and November the mills work at their hardest. Their rated capacity in 1924 was about 130,000 barrels a day, or from 3½ to 4 million barrels a month.[1] Even in the busiest months of the year, however, their actual performance comes to only two-thirds or so of this nominal capacity, and during the summer months it falls to a third or a quarter.[2] This seasonal variation affects milling both for domestic consumption and for export. The climatic factor also operates in yet another way by creating a seasonal demand for mill feed during the winter, when pasture is not available for livestock. Nevertheless the number of livestock in Canada is not sufficient to consume all the mill feed that Canadian mills produce, so that a portion of it is sold irregularly in the United States for what it will bring.

The great expansion of the Canadian flour trade has taken place in a period when European millers were affected by low European crops and disorganized trade conditions. Germany, which before the war was a large net exporter of flour, has been a net importer since the war. Flour exports from Hungary and Roumania have been much reduced. Italy has only recently regained her flour markets abroad. In the first three years after the war, Great Britain's net imports of flour were abnormally large. Moreover, both the United States and Australia have substantially expanded their flour exports since pre-war days.[3] In the Oriental market, there has been a notable development of milling capacity in port cities. With the return to more stable equilibrium in Europe, and the passing of conditions which have militated against tariffs on foodstuffs, the European demand for import flour is likely to decline, and Canadian millers must meet competition not merely from wheat exporters but from wheat-importing countries.

On the other hand, Canadian flour enjoys an advantage in European markets over flour produced there from Canadian wheat, from the fact that it reaches the importing country in a "mature" state, ready for use by the baker. The advantage of this to the Canadian miller is often equivalent to a difference of several cents a bushel in the purchase price of the wheat.

Seasonal Flow of Exports

There is a pronounced seasonal variation in Canadian wheat exports as well as in the internal movement of Canadian wheat.[4] The heavy movement from the farms begins in September, reaches a peak in October, and is largely completed in December. The receipts at the head of the Lakes follow shortly, also with a peak in October. Exports, however, first attain large volume in October, and are at their height in November and December. From January through April, exports are small because of the closing of navigation on the Great Lakes and the St. Lawrence. In this period the

[1] The official statistics on this point have been severely criticised for including a number of small obsolete mills which have now gone practically out of business. *Northwestern Miller*, June 10, 1925, p. 1066.

[2] At the time of writing, it is reported (*Canadian Milling and Grain Journal*, June 1925) that all the flour mills in Western Canada are closed down, for both domestic and export trade.

[3] See Wheat Studies, December 1924, p. 55.

[4] See Chart 11, p. 266, and Appendix Table XXVII.

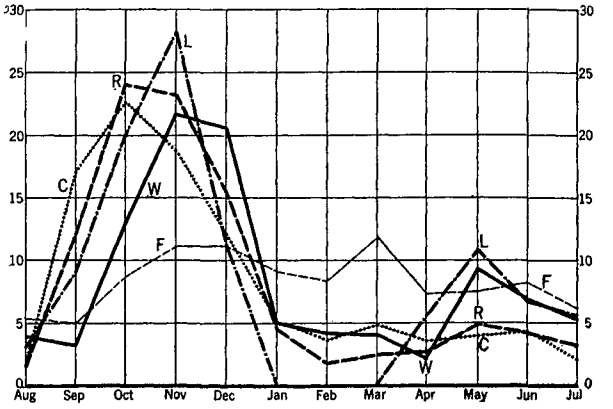
eastward grain movement is made by rail haulage from the stores accumulated at Montreal, Buffalo, and Georgian Bay ports to open seaports on the Atlantic coast; and the westward movement through Vancouver increases. In May and June, after navigation has been resumed, there is an increase in the eastward movement, though it is much smaller than in November and December. Canadian exports in July are usually larger than in August or September (when United States wheat is moving through Montreal most freely) or in the season of closed navigation. The flour export is much less irregular than the export of wheat grain, but shows roughly the same high and low months with a single important exception. In every one of the four years covered by Chart 11, flour exports in March were higher even than in November and December. The greater regularity of the flour export is due to the fact that flour can bear the higher costs of rail shipment. The high export in March perhaps anticipates the greater demand by bakers for strong flour during the summer months. On the average, about 50 per cent of Canada's wheat and flour exports leave the country in the last three months of the calendar year.

The flow of Canadian wheat into the import markets abroad is much less irregular than the export from Canada. Much of the wheat which leaves Canada in October, November, and December is exported through the United States, and leaves American ports some weeks after it leaves the Canadian border. Hence foreign imports of Canadian wheat are not so heavy in November, December, and January, and are heavier in February, March, and April, than would be suggested by the monthly variations in Canadian export statistics.

The seasonal variation in exports has important bearings on wheat prices. On the whole, wheat prices in Canada are at a seasonal minimum in October and November, and Canadian wheat prices in Liverpool are at a seasonal minimum in these months. During the winter months the margin between Canadian wheat prices in Liverpool and in Canada is increased, because of heavier shipping costs. In the spring, as this margin declines, prices in Canada tend to be higher, reaching their seasonal maximum before United States winter wheat comes to market in July, or later if this crop is small. Liverpool prices of Canadian wheat reach a seasonal maximum at the same time. British millers' offers for Canadian wheat are doubtless influenced by the rate at which they grind it and the costs of holding it in store for grinding. There can be but little doubt that their rate of grinding from month to month is considerably more uniform than the rate of shipment across the Atlantic.

CHART 11.—SEASONAL VARIATIONS IN CANADIAN WHEAT MOVEMENTS*

(Monthly percentages of annual averages, 1920–21 to 1923–24)



* Sources: See Appendix Table XXVI.
C — Cars loaded in Western Canada.
R — Receipts at Fort William and Port Arthur.
L — Lake shipments from Fort William and Port Arthur.
W — Wheat exports.
F — Flour exports.

X. THE FUTURE OF CANADIAN WHEAT PRODUCTION AND EXPORT

Canada's future as a wheat producer and exporter cannot be forecast with confidence or precision: scientific, technological, economic, and political factors are too numerous and complex. Nevertheless, the foregoing analysis justifies a reasoned consideration of the outlook in connection with Canadian wheat for at least the next few years.

The Price of Wheat

A powerful influence will be exerted by the world price of wheat. From 1921 to 1924 Canada's wheat acreage declined slightly, primarily because of the depressing influence of low wheat prices. This year, in spite of distinctly higher prices for the 1924 crop and hopes of good prices for the 1925 crop, acreage has not increased much, if at all. Past experience has shown, however, that the acreage planted in any given year is materially influenced by weather conditions affecting fall plowing and spring seeding and cultivation, and that after a prolonged period of low prices (as in the 'nineties) more than one year of good prices is necessary to remove the depressing influences. There seems no doubt that a second year of good prices would set in motion forces making for substantial increases in Canada's wheat acreage.[1] If past experience is a safe guide, such an increase of acreage is likely to persist for several seasons, even if prices should again decline.

The future of world wheat prices is especially difficult to forecast because of uncertainty concerning Russia as a wheat exporter. The growth in Canada's export since 1914 has largely replaced Russia's pre-war contributions to the world market. The United States wheat exports seem likely to decline. India seems unlikely to be of increasing importance as a wheat exporter. No rapid increase in exports from Argentina and Australia can be anticipated. Recovery of wheat production in southeastern Europe bids fair to be slow. But Soviet Russia has large potentialities for production, and is under great economic pressure to export heavily of wheat and rye in order to pay for essential imports, even though the Russian people are ill-fed. Russian acreage has been increasing since the economic collapse following the Revolution. Conditions for agricultural production are not highly favorable but, on the whole, are improving. Recovery is showing itself first in an increase of exports of dairy produce, which compete strongly with similar Canadian exports. Railway transportation, though unsatisfactory, is not proving a serious handicap. The return of Russia as an important exporter of wheat seems only a matter of years, and in any of the next few years favorable weather conditions may result in considerable Russian exports.

The prospect of increasing competition from Russia may well be taken into account in any tendency to expand Canadian wheat acreage, since large quantities of Russian grain of customary quality on the world market might seriously depress Canadian prices. On the other hand, there has been since the war a considerable expansion in wheat consumption from the low level to which it dropped during the war. Further increases are in prospect, as Europe recovers her financial and economic equilibrium. While in part these will be met by increased production in Europe itself, a persistent demand for import wheat must be anticipated. Especially if United States exports decline, there may well be a remunerative market for larger exports from Canada and Russia.

On the whole, it is reasonable to assume that the low level of wheat prices of 1922–24 will not soon return for any prolonged period, though it may in single years, and that this obstacle to Canada's expansion will be removed if it is not replaced by a moderate stimulus. It is worth recalling that the great expansion of Canadian wheat acreage before the war, from 1900 to 1913, took place when wheat prices were, for the most part, on a moderate level.

Potential Wheat Acreage

Numerous estimates of Canada's potential wheat acreage have been made. Already the Canadian wheat area is larger than was predicted by several observers in years past. Thus Sir William Crookes, in his admonitory presidential address to the British Association in 1898, endorsed predictions that the acreage might expand to 6 million acres by 1910, and to 12 million by 1923.[2] On the other hand, the acreage is still far short of that suggested by other

[1] The crop bulletin of the C. N. R., dated June 1925, speaks of a considerable advance in new breaking in Alberta.

[2] Sir William Crookes, *The Wheat Problem*, London, 1899 and 1917.

experts.[1] Dr. O. E. Baker, of the United States Department of Agriculture, recently estimated Canada's potential wheat area at 80 million acres, yielding an average of 17 bushels per acre, a potential crop of 1,360 million bushels—probably by far the highest serious estimate yet made.[2] Such estimates have a certain interest, particularly to those concerned with food as a factor limiting the growth of population, but they afford little basis for judgment concerning the next few years. For this purpose one must examine the practical possibilities of early expansion.

Including land in summer-fallow, which is largely seeded to wheat in the following year, over 31 million acres of land in the prairie provinces are now annually devoted to wheat, in addition to about a million acres in other Canadian provinces. The future extension of wheat acreage may take place (1) in new farms by extending cultivation to the north of the present area, (2) in new farms by the occupation of unoccupied or unimproved land within the present settled regions, (3) in existing farms by bringing into cultivation unimproved land, or (4) in existing farms by devoting to wheat some of the improved land which has not been seeded to wheat in recent years because of unremunerative wheat prices.

North of the present settled regions there is a large area of government land available for homesteading. The expansion northward is limited by three main factors. The land is largely bush land, which is expensive to clear. It is largely outside the present railway net and can be utilized only as new lines are extended to reach it. It is, on the whole, land with a more rigorous climate and a shorter growing season, which can be used for wheat with greater risk and with less advantage unless new wheat varieties adapted to it are developed. None of these barriers is insuperable, provided a higher level of wheat prices obtains in the next few years; but combined they present so great difficulties that no rapid extension of settlement can be expected. The railway problem, in particular, is unlike that which has prevailed for many years: after the main transcontinental lines were constructed, the railways were mainly concerned with building feeders to supply traffic; whereas the new development would call for more substantial extensions, of uncertain promise, which the established lines are hardly in a financial position to construct.

There is, indeed, in the Peace River district of northwestern Alberta, an area of more open country already connected by a long leased line to the main system of the C. P. R., and to this district settlers are encouraged to resort.[3] Some official reports indicate that large areas are excellently adapted to wheat-growing, but reports of this kind may perhaps be over-optimistic. Certainly, unfavorable reports by official investigators have not been given adequate publicity. Whatever its future, this district cannot add greatly to the Canadian wheat crop in the next few years.

In the present broad area of settlement, the government lands have been almost wholly taken up, but much of the land is still unoccupied. At present all authorities agree in advising immigrants and other settlers with sufficient capital that they stand a better chance of success by purchasing land in the region already settled than by taking up homesteads in the less favored districts where it is still available. There is at the present time in the West an area of about 32 million acres of unoccupied land in private ownership, of which from 20 to 25 million acres are commonly said to lie within fifteen miles of a railway. Much of this land lies in districts which settlers have hitherto avoided and is presumably regarded as more or less unsuited to wheat-growing. Probably not much more than 10 or at most 15 million acres of privately-owned, unoccupied land is now to be regarded as suitable for wheat-growing and within convenient reach of a railway.

The settlement of these unoccupied lands depends upon one or more of three factors, —the development of new varieties of

[1] See James Mavor, *Report to the Board of Trade on the Northwest of Canada*, Cd. 2628, 1905, for five detailed estimates by various authorities.

[2] O. E. Baker, "The Potential Supply of Wheat," *Economic Geography*, Worcester, Mass., March 1925.

[3] F. H. Kitto, *The Peace River; Its Resources and Opportunities*, Natural Resources Intelligence Service, 1922.

wheat, the building of roads, and a level of wheat prices which may tempt the application of labor and capital to these lands recently considered to be below the margin of profitable cultivation. In any event, the occupation of such lands is not likely to progress rapidly.

It is therefore reasonable to assert that expansion of wheat acreage during the next few years will occur chiefly in the land now in farms. Of a farm area of 88 million acres in the prairie provinces, 32 million acres are classed as "unimproved, in natural pasture."[1] While much of this land is unsuitable for wheat-growing or will continue to be required as pasture for livestock, there are still many opportunities for the expansion of wheat acreage by breaking new ground in grain-growing farms. The new breakings of the last few years, estimated at roughly a million acres a year,[2] have not caused any advance in the yearly estimates of acreage in wheat, presumably because of low wheat prices. If, however, wheat prices should remain on a more remunerative level, expansion here, some of it fairly rapid, will supply the principal additions to Canada's wheat acreage for several years to come.

Diversification

Opposed to the expansion of wheat-growing is the tendency toward mixed farming. The last few years have emphatically shown the financial insecurity of concentration on wheat. It leads further to the evils of weeds, soil drifting, and soil exhaustion, with attendant declines in yield, increase in farming costs, or both. Well-developed methods of mixed farming would remedy these ills and bring larger yields per acre.

There is a strong impulse toward expansion of animal husbandry in the prairie provinces. Several factors retard it. The farmer is under strong pressure to raise cash crops, like wheat, in order to meet his taxes, interest, and often instalments on his mortgage or the purchase price of his land. The American tariff, ocean freight rates, and British regulations seriously restrict his markets for livestock and animal products. Prices of livestock have been depressed, and the farmer has been in a poor position to obtain additional capital for the purchase of livestock and for equipping his farm to care for it. The maintenance of Canadian railway rates on grain and grain products at a low level, by means of the Crow's Nest Pass agreement, serves as an indirect subsidy to grain-growing at the expense of more diversified farming.[3] Accordingly the tendency toward diversification has not made rapid headway, although in Manitoba it has been influential in preventing any material expansion in wheat acreage for many years.

With the passing of the agricultural depression, certain of these obstacles will be of less importance. In the past, however, the movement toward mixed farming in Western Canada has always been most closely associated with the decline of prosperity and the existence of depression, and grain-growing has revived when recovery came. At the present time, when no such large incursion of fresh settlers who *must* grow wheat is to be expected, the results may be different; and for the next ten years or more, the development of a better-balanced system of agriculture seems probable. On the whole, increased diversification is not likely to exert a decisive influence on Canada's *wheat* production in the next few years. If it progresses, a favorable effect on yield per acre may offset the consequences of a restricted acreage.

Further increase in the agricultural production of Western Canada, either from crops or livestock, must depend largely upon the character of the farmers themselves. There are probably many backward settlers and communities in the West, whose methods of farming are of little profit to themselves and do positive harm to their neighbors. Much has been done in the past and is now being done by the provincial governments to spread a knowledge of sound farming methods throughout their territories. Though their projects have enjoyed great success, there still remains a

[1] *Sixth Census of Canada*, 1921; *Census of Agriculture*, Bulletin No. 11.

[2] See Appendix Table XV.

[3] On this point, see a speech by the Hon. L. McMeans (Manitoba) in the Dominion Senate, June 9, 1925.

strong need for further work in very difficult places.

Tariff Influences

Canadian wheat production is materially influenced by the tariff policies of Canada and the United States. The Canadian protective tariff doubtless tends to raise the cost of many articles the farmer needs to buy, whether they are imported over the tariff or produced at higher cost in Canada. But this influence is common to all Canadian producers, and probably does not operate to the peculiar disadvantage of the wheat grower.[1]

The United States tariff on wheat largely prevents access of Canadian wheat to a neighboring market, and enables certain United States producers to raise wheat when they could not profitably do so otherwise. The high United States tariff operates strongly in certain years, such as 1923–24, when the United States has a poor crop of high-grade wheat and Canada an excellent harvest;[2] and also in certain seasons of every year, when the close of navigation renders expensive the export of Canadian wheat. The Canadian tariff on flour restricts the import of United States flour. Undoubtedly the two tariffs prevent the reaping of the full advantage of economies in wheat production, transportation, and milling, by both countries. Nevertheless, the average costs of raising spring wheat in the two countries are not widely different,[3] and so long as both Canada and the United States are exporters of representative wheats, neither world prices nor Canadian prices are greatly affected by this tariff.

On the other hand, the American tariff on livestock and dairy products, which could be marketed from Canada much more easily in the United States than abroad, tends to check the expansion of this element in Canadian farming. In this way it tends to promote concentration upon staples easily marketed abroad, notably wheat. This influence of the tariff is, and may be expected to remain in the near future, stronger in promoting than in restricting wheat cultivation.

Influences Favoring Expansion of Acreage

A study of the trends of wheat acreage in the prairie provinces shows that, if past tendencies continue, the acreage in Manitoba is more likely to decline than to increase, and in Saskatchewan and Alberta the rate of increase will be lower in the future than in the past. In these two latter provinces, with a remunerative level of wheat prices, a variety of influences favorable to expansion of wheat acreage are likely to be called into play.

The railways are interested in the expansion of wheat-growing, for a threefold reason. They still have some land to sell; they seek additional grain traffic; and they stand to gain from expansion of towns and cities in Western Canada. Hence they are selling lands to settlers on terms of easy payments. This influence has not been strong in recent years, but is likely to be felt anew if wheat prices remain at a remunerative level.

Canada emerged from the war with a heavy burden of debt, the interest charges on which necessitate much heavier taxation than before the war. Such charges doubtless bear heavily upon Canadian producers, but in no special degree upon wheat growers directly. The existence of this debt leads the Dominion government to seek to expand the productive population of the country, so that the burden may be more easily borne. A vigorous campaign for immigration and settlement, with strong emphasis on wheat-growing as an opportunity for the settler, has been undertaken.

[1] A statement of western opinion may be quoted here: " . . . the farmers of Western Canada, and the western townspeople who are dependent on them for their livelihood, see the prices of the varied goods which modern industrial economy compels them to buy enhanced by tariff duties. They see indications that the profits of those who own the factories are also enhanced. They see the products of these factories sold abroad, when competition compels, at lower prices than they themselves can buy them. And they smart under a sense of injustice. Forced to accept for their own products prices fixed by competition in the open markets of the world, they are compelled to buy for their own needs at prices increased by deliberate legislative action." A. E. Darby, Director of Economic Research for the Canadian Council of Agriculture, "The Western Viewpoint on the Tariff," *The Listening Post*, Montreal, March 1925.

[2] See Wheat Studies, December 1924, pp. 37, 42.

[3] See Wheat Studies, May 1925.

Whether or not this campaign will prove successful, it is not yet possible to say.

These considerations may also influence the Dominion government in important policies affecting transportation facilities. A new canal (the Welland Ship Canal) is now being constructed by the Dominion government and will probably be completed in 1929. The largest freighters on the upper Lakes will then be able to descend to Lake Ontario. An international joint Board of Engineers is also considering at the present time the principal technical problems involved in the construction of a similar deep waterway down the upper St. Lawrence, from Lake Ontario to Montreal.[1] It is confidently asserted that this waterway, when completed, will reduce by several cents per bushel the cost of shipping wheat from Western Canada to the eastern seaboard and will thus tend to reduce the margin between the Liverpool price and the Winnipeg price or the farmers' price.[2] While negotiations are not yet concluded, and in any event some years would be required for construction, a favorable decision on this proposal might well stimulate wheat-growing in Western Canada in advance of the completion of the waterway.[3]

In general, Canada's development is not likely to be seriously restricted by lack of capital. Her credit, both public and private, is excellent, and she enjoys ready access to the American capital market. There is clear prospect of a considerable surplus in the United States for investment abroad, from which Canada can borrow to supplement her domestic resources, on far better terms than most other foreign countries.

Canada herself has the population resources adequate for much new settlement. Even before the war the growth of population in the prairie provinces was due far more to natural increase and to migration from Eastern Canada than to immigration from the United States and Europe. During the war this was even more distinctly true, because European immigration was checked, and some immigrants returned to fight. Since the war, by reason of agricultural and industrial depression in Canada, immigration has been only about a third or a fourth of its pre-war volume, and there has been considerable emigration to the United States.[4] Canada still warmly welcomes the immigrant, and once the depression is clearly past, she may receive a larger accession of population from abroad.[5] Nevertheless, it is hardly to be expected that the tide of settlement will again flow so strongly as it did from 1903 to 1912. Good land is no longer available in abundance for occupation on easy terms. Prices of railway lands are over 15 dollars an acre for poorer lands than were selling for less than 4 dollars an acre before 1904, so that the newcomer must either possess more capital in the beginning or face a much longer period of indebtedness than in the days of cheaper land before the war.

Variations in Crops

Marked variations in Canada's wheat production and export may be expected to continue. Her wheat is predominantly spring wheat. The acreage planted depends to a considerable extent upon the weather, more land, for instance, being sown to wheat in an early spring. Where a single crop enjoys the predominance of spring wheat in Western Canada, the yield per acre is especially prone to variation, under the influence of summer rainfall, temperature and sunshine, weeds, insects, plant dis-

[1] Instructions to the Joint Board of Engineers on the St. Lawrence Waterway, issued by the governments of Canada and the United States, April 23, 1925. *Engineering News-Record*, New York, April 30, 1925.

[2] It is not certain that the completion of this improved waterway will cause any reduction in rates of transportation. Even if it does, it still remains uncertain whether such reduction will repay the governments of the two countries, either directly or indirectly, for the heavy expenditures involved.

[3] Another favorite project of the West—the completion of the railway from Le Pas, Manitoba, to a port on Hudson's Bay and the development of a shipping route to Europe through Hudson Strait—is regarded much less favorably by the rest of Canada. It does not seem likely to be opened up in the near future, and, even if it is, the chances of its success at the present time appear to be but small.

[4] Unfortunately it is impossible to determine the extent of this emigration. The United States statistics of immigration from Canada are believed to understate the movement, and Canada does not compile emigration statistics.

[5] If immigration were greatly restricted, it is possible that many thousands of Canadians now domiciled in the United States would be drawn back to Canada during the next few years.

eases, weather conditions before and during harvest, and the onset of frosts at the end of the growing season. The farther wheat acreage is extended beyond its present limits, for whatever reason, the stronger this tendency to variation in yield is likely to become, as the risks to wheat-growing become steadily more intense.

Conclusion

In short, Canada has large potentialities for increase in wheat acreage. Expansion of wheat acreage will be favored by railway interests and governmental policies, by the expansion of population through natural increase and immigration, and by the availability of capital. Expansion will probably be stimulated by a level of wheat prices even lower than that which prevailed in 1924–25, and once made, increases are not likely to be reversed. It will be moderated by the prospect of the return of Russia as an important competitor in the world's markets and by the fact that the new lands available for wheat culture are on the whole less favorable than those previously devoted to wheat. The average yield of wheat in the next few years is not likely to reach the high levels of pre-war days, and may decline still more unless diversified farming develops and maintains yields by good methods, at the expense of larger acreage. Canada's wheat crops and wheat exports will continue to fluctuate greatly from year to year. On the average, both may be expected to increase over the next few years, but it is doubtful whether Canada's average exports will increase in the next ten years by more than 100 million bushels over the average of 1920–24. In view of the probable expansion of European requirements, and of the downward trend of American exports, and even in the light of a probable increase in Russian exports, such increase is far from momentous.

APPENDIX

BIBLIOGRAPHICAL NOTES

The following references specify the principal works which have been consulted in the course of this study. They do not, however, represent a comprehensive bibliography of the economic development of Western Canada.

Physiographic Conditions

Relief and Soils. The original work of investigation has been performed by the various official surveys of the Dominion of Canada, and the most authoritative statements of their results are probably to be found in the publications of the Geological Survey. Convenient summaries are available in many issues of the *Canada Year Book.* A valuable atlas of Canada was published by the Department of the Interior in 1915, and numerous maps more recently issued by the Natural Resources Intelligence Service supplement the information it contains.

Climate. The most important publications of which use has here been made are: (1) A. J. Connor, *The Temperature and Precipitation of Alberta, Saskatchewan, and Manitoba,* Dominion Meteorological Service, 1920 (maps separate); (2) articles by Sir Frederick Stupart (Director of the Dominion Meteorological Service) and tables in various issues of the *Canada Year Book;* (3) *Physical and Climatic Map of Manitoba, Saskatchewan, and Alberta* (showing average rainfall and average length of growing season), Natural Resources Intelligence Service, 1924 (preliminary edition).

Vegetation. The maps of the *Dominion Atlas,* 1915, and the Natural Resources Intelligence Service have been used as references in this section, comparisons being made with the large-scale maps of the Dominion Topographical Survey, new series (so far as published). An article by the late Mr. J. M. Macoun, "The Flora of Canada," in the *Canada Year Book* for 1922–23, gives an authoritative statement concerning the types and distribution of vegetation in Canada. The information given by these authorities has been supplemented on special points from other sources and by personal observation.

Agricultural Practices

The three authoritative works on agriculture in Western Canada are: (1) Seager Wheeler, *Profitable Grain Growing,* 1919; (2) John Bracken, *Crop Production in Western Canada,* 1920; (3) John Bracken, *Dry Farming in Western Canada,* 1921—all published by the *Grain Growers' Guide, Ltd.,* Winnipeg. Numerous bulletins and reports published by the Dominion and Provincial Departments of Agriculture and the Provincial Colleges of Agriculture supplement this information in many ways and upon many important points. A. H. R. Buller, *Essays on Wheat,* New York, 1919, gives a detailed history of wheat varieties in Western Canada.

The Transportation of Wheat

Two brief histories—O. D. Skelton, *The Railway Builders* (Chronicles of Canada, XXXII), Toronto, 1916, and S. J. McLean, "National Highways Overland," *Canada and Its Provinces,* X, Toronto, 1914—give general summaries of the building of Canadian railways but pay little attention to the relation between transportation and production. The same criticism applies to H. A. Innis, *A History of the Canadian Pacific Railway,* London and Toronto, 1923, which is written primarily from the investor's standpoint. Unlike the other two books, it contains many references. The history of Canadian waterways has been written by M. J. Patton,—"Shipping and Canals," *Canada and Its Provinces,* X, Toronto, 1914.

Official sources of information are to be found in the yearly reports of the Departments of Railways and Canals, Public Works, and Marine and Fisheries, and of the Board of Railway Commissioners. Yearly reports, *Railway Statistics* and *Canal Statistics,* are published by the Department of Railways and Canals. Special reports run thus:

Royal Commission on Railways, 1888. (Dominion Sessional Papers, No. 8A, 1888.)

Railway Rates Commission, 1895. (*Ibid.,* No. 39, 1895.)

Reports upon Railway Commissions, S. J. McLean, 1899 and 1902. (*Ibid.,* No. 20a, 1902.)

Royal Commission on Transportation, 1903. (*Ibid.,* No. 19a, 1906.)

Royal Commission on Railways and Transportation, 1916. (*Ibid.,* No. 20g, 1917.)

The history of the Great Lakes waterway and its adjuncts must be traced through United States and State of New York publications, of which much the most important are the Annual Reports of the Chief of Engineers, U. S. Army.

Other sources that have been consulted where available are the reports of railway companies and the periodical literature of the subject. *Poor's Manual of Railroads,* New York, yearly since 1868–69, and *The Canadian Annual Review,* Toronto, yearly since 1902, give much information of value.

The references given in the following section also contain many facts of importance upon the subject of transportation.

The Marketing of Wheat

This subject can be followed most easily through the reports of several successive Royal Commissions, as follows:

Royal Commission on the Shipment and Transportation of Grain, 1900. (Dominion Sessional Papers, Nos. 81 and 81b, 1900.)

Royal Commission on the Grain Trade of Canada, 1906. (*Ibid.,* No. 59, 1908.)

Elevator Commission, Province of Saskatchewan, 1910.

Grain Markets Commission, Province of Saskatchewan, 1914.

Royal Grain Inquiry Commission, 1924. (Dominion Sessional Papers, No. 35, 1925.)

The three statutes, "General Inspection Act, 1874," "Manitoba Grain Act, 1900," and "Canada Grain Act, 1912," should be read in combination with these reports.

The earlier reports of the Board of Grain Commissioners, which have been published yearly since 1912, also give valuable information. From 1902 to 1916, a yearly return—"Grain Statistics of Canada"—was published in the report of the Department of Trade and Commerce. Since 1918, a similar *Report on the Grain Trade of Canada* has been published yearly by the Dominion Bureau of Statistics in collaboration with the Board of Grain Commissioners.

From the commercial point of view, the history of the Winnipeg Grain Exchange is briefly given in the *Report on the Winnipeg Grain Exchange,* 1921, which was prepared for an abortive Royal Commission of that year. Likewise, the history of the terminal elevators is given, with some apparent inconsistencies of no great importance, in *The Canadian Lake Public Terminal Elevators,* 1918, prepared and published by the public terminal elevator companies at Fort William and Port Arthur.

The story is given much more fully, and from the farmers' standpoint, in Hopkins Moorhouse, *Deep Furrows,* Indianapolis, 1918. L. A. Wood, in his *History of Farmers' Movements in Canada,* Toronto, 1924, draws upon *Deep Furrows* in certain places, and tells the whole story in a masterly manner. The Institute has not had an opportunity to consult *Agricultural Coöperation in Western Canada* by W. A. Macintosh, (Queen's University Studies, II), Toronto, 1924.

Historical studies have also been written by D. A. MacGibbon, "Grain Legislation Affecting Western Canada," *Journal of Political Economy,* XX, 1912; Edward Porritt, "Canada's National Grain Route," *Political Science Quarterly,* XXXIII, 1918; and W. C. Clark, *The Country Elevator in the Canadian West,* Bulletin No. 20, Department of Economics, Queen's University, Kingston, Ont., July 1916.

Three studies which describe the condition of the grain trade as it existed before the development of the wheat pools are: C. B. Piper, *Principles of the Grain Trade of Western Canada,* Winnipeg, 1917; A. H. R. Buller, *Essays on Wheat,* New York, 1919; and Theodore Hammatt, *Marketing Canadian Wheat,* United States Department of Commerce (Trade Information Bulletin No. 251), 1924.

The history of the wheat pools can be followed through the *Chairman's Report of the Canadian Wheat Board,* 1921; a *Report on Wheat Marketing,* by James Stewart and F. W. Riddell, Province of Saskatchewan, 1921; the *Canadian Annual Review;* the Dominion and provincial statutes; and current periodical literature. It has been summarized briefly in an article by C. R. Fay, "The Canadian Wheat Pools," in the *Economic Journal,* XXXV, March 1925.

Progress of Settlement and Wheat Production

The political history of Western Canada has been described in a number of works, but the history of settlement has received even less attention than the history of transportation. The best sources of information consulted in the preparation of this study were the Dominion Sessional Papers, which contain the yearly reports of Dominion Land Agents, Dominion Immigration Agents, Dominion Land Surveyors, and the Commissioner and Superintendents of the Royal Northwest Mounted Police. All these reports are to be found in the reports of the Department of the Interior, with the exceptions that the reports of the Dominion Immigration Agents were included, until 1892, in the reports of the Department of Agriculture and the reports of the Royal Northwest Mounted Police were printed as separate papers from 1887 onward. A long and most interesting account of early conditions is contained in John Macoun, *Manitoba and the Great Northwest,* London, 1883.

The progress of settlement and agriculture during the period of rapid advance, 1897–1914, can be followed in three studies by Professor James Mavor (University of Toronto):

(1) *Report to the Board of Trade on the North West of Canada, with special reference to Wheat Production for Export* [Cd. 2628], London, 1905; (2) "Agricultural Development in the North West of Canada, 1905 until 1909," in *Report of the Seventy-Ninth Meeting of the British Association for the Advancement of Science, Winnipeg, 1909,* London, 1910; (3) Chapter VI of the *Oxford Survey of the British Empire,* IV *(America),* Oxford, 1914. Many instructive comments on developments during this period are to be found in the pages of *The Economist,* London.

A good record of the period after 1914 is to be found in the publications of the Canadian Bank of Commerce, *Annual Reports,* 1914–19, and *Year Books,* 1920–24.

Economic Aspects of Farming

The reports of the Department of the Interior give information on the methods and extent of disposition of land, and successive census reports present statistics on land utilization.

The subject of agricultural indebtedness before 1914 is carefully considered in the *Report of the Agricultural Credit Commission of the Province of Saskatchewan,* 1913. The situation since the war has been reviewed by J. B. Morman in *Farm*

Credits in the United States and Canada, New York, 1924, and has been made the subject of special reports: by Dr. H. M. Tory, *Report on Agricultural Credit* (Dominion Sessional Papers, No. 142, 1924), and a similar report in 1925; and by Dr. D. A. McGibbon, *Report of the Commission on Banking and Credit with respect to the Industry of Agriculture in the Province of Alberta* (mimeographed), 1922.

The economic position of the farmer in the period of depression from 1920 to 1924 can be studied in great detail in the reports of evidence given to the Select Special Committee of the House of Commons to Inquire into Agricultural Conditions, 1923, *Dominion House of Commons Journal 1923,* Appendix No. 3.

Costs of production of wheat in Western Canada have not been specifically discussed in this study, because they have already received detailed consideration in WHEAT STUDIES, No. 6, *Average Pre-War and Post-War Farm Costs of Wheat Production in the North American Spring-Wheat Belt.*

CANADIAN WHEAT IN THE WORLD MARKETS

Up to January 1920, statistical reports on Canadian wheat stores and movements were printed in the *Weekly Bulletin* of the Department of Trade and Commerce (later the *Commercial Intelligence Journal*). At the present time, statistical information, in much fuller form, is presented weekly in *Canadian Grain Statistics,* Board of Grain Commissioners, Fort William, Ontario (since January 1921); monthly in the *Monthly Bulletin of Agricultural Statistics* (after 1917: it was published as the *Census and Statistics Monthly,* 1908–17) and the *Monthly Report on the Trade of Canada,* Dominion Bureau of Statistics, Ottawa; and annually in the reports of the Department of Trade and Commerce and the Department of Customs and Excise.

Information upon the export demand that exists for Canadian wheat by virtue of its qualities is to be found in occasional articles in the *Commercial Intelligence Journal,* weekly, Department of Trade and Commerce, Ottawa. The demand in England and Scotland is discussed in great detail in an appendix to *Report of the Royal Grain Inquiry Commission,* 1925. The periodical literature of the milling trade also gives occasional references to the demand for Canadian wheat and flour in various markets. To the list of periodicals given in WHEAT STUDIES, January 1925, must be added the *Canadian Milling and Grain Journal,* Montreal. This paper of course contains unique information on Canadian supply and demand, but pays little attention to export markets.

NOTES CONCERNING STATISTICAL TABLES

The statistical data underlying the discussion are presented at length in the tables included on the following pages. They are computed from many scattered sources, some of them difficult of access, and present information on many points which are not fully considered in the text. The tables are arranged in an order which appears to possess advantages for study and comparison.

Statistics on the economic activities of Canada and on Canadian wheat production, have been compiled for many years. It is inevitable that, in so long a time, the methods of collecting and publishing, and the authorities responsible for these tasks, should have changed on many occasions, and that continuous consistent statistical records are seldom to be found. Furthermore, many of the statistics presented in this study and in the following tables have been published at various times, even by the same compiling authority, with different numerical values. In some cases a reason has been assigned for the change, but in others no explanation could be discovered. There are also to be found cases in which figures have required correction in order to harmonize them with earlier or later figures, and such corrections have not been made. In the face of these contradictions, the general principle adopted in the course of preparation of this study has been to select for reproduction the latest figures issued by the compiling authorities. Doubtless many errors of detail remain, even when this has been done; but it is unlikely that any serious misconception can arise as a result.

It will be observed that the statistics of wheat production are reproduced from three sources—provincial, Census, and Dominion. Some explanation of these sources is necessary.

The Manitoba Department of Agriculture issued yearly statistics of agricultural production from 1883, and the Department of Agriculture of the Northwest Territories from 1898 on. After the provinces of Saskatchewan and Alberta had been formed out of the Northwest Territories in 1905, the two newly-created departments of agriculture began to issue statistics, each for its own province. The statistics for earlier years were also recomputed, in order to produce a continuous series for each provincial area from 1898 on. Prior to 1918 the annual statistics for all the provinces were probably compiled from reports by local crop correspondents.

The character of the census reports is plain. Statistics of agricultural production were determined by enumerators, each of whom visited all farms in his district. In the earlier censuses, at least, they collected statistics of agricultural production for the growing season of the *previous* year. For this and other reasons, the accuracy of the compilation is not beyond question, although it is doubtless superior in this respect to the yearly statistics prepared by the provinces or the Dominion.

Not until 1908 did the Dominion government begin to publish annual agricultural statistics, although the Census and Statistics Office (after 1918 the Dominion Bureau of Statistics). This office collected reports from its own crop correspondents and published statistics which did not agree with either provincial or census estimates. Since 1918, however, the Dominion and provincial governments have worked more closely together, and they now publish agreed results. At the present time the crop correspondents make the returns on which the provincial estimates of acreage and the forecasts of crops are based. They also make the final estimates of yield after the crops have been harvested. The final statements of acreage are based upon returns made by individual farmers, the forms for the purpose being distributed and collected through the rural schools. In Manitoba and Saskatchewan about 30 per cent of the estimated number of farmers make these returns, in Alberta about 20 per cent.

TABLE I.—WHEAT PRODUCTION, 1920–24, OF FIVE LEADING PRODUCER-EXPORTERS*

Year	United States	Canada	Argentina	Australia	British India
	Production *(million bushels)*				
1920	833	263	156	146	378
1921	815	301	191	129	250
1922	868	400	196	109	367
1923	797	474	257	126	369
1924	873	262	191	164	364
Average	837	340	198	135	346
	Percentage of World Production (ex-Russia)				
1920	28.8	9.1	5.4	5.0	13.1
1921	26.2	9.7	6.1	4.1	8.0
1922	27.5	12.7	6.2	3.5	11.6
1923	22.8	13.6	7.4	3.6	10.6
1924	28.2	8.5	6.2	5.3	11.7
Average	26.6	10.8	6.3	4.3	11.0

* Sources: Official data, and U. S. Department of Agriculture estimates of world production.

TABLE III.—COMPARISON OF PRE-WAR AND POST-WAR ACREAGE, PRODUCTION, AND NET EXPORTS OF WHEAT (INCLUDING FLOUR), FOR FIVE LEADING PRODUCER-EXPORTERS*

5-year period	United States	Canada	Argentina	Australia	British India
	Acreage *(million acres)*				
1909–13	47.1	9.9	16.1	7.6	29.2
1920–24	60.2	21.7	16.0	9.8	29.1
Net change	+13.1	+11.8	−0.1	+2.2	−0.1
Per cent	+28	+119	−0.6	+29	−0.3
	Production *(million bushels)*				
1909–13	690	197	147	90	352
1920–24	837	340	198	135	346
Net change	+147	+143	+51	+45	−6
Per cent	+21	+73	+35	+50	−1.7
	Net Exports, Including Flour *(million bushels)*				
1909–14	110	96	85	55	50
1920–25	231 [a]	234 [a]	126 [a]	91 [a]	17 [a]
Net change	+121	+138	+41	+36	−33
Per cent	+110	+144	+48	+65	−66

* Sources: Official data; *International Crop Reports*.
[a] Including preliminary approximation for 1924–25.

TABLE II.—WHEAT EXPORTS (INCLUDING FLOUR) OF FIVE LEADING PRODUCER-EXPORTERS, CROP YEARS 1920–21 TO 1924–25*

Ending July 31	United States	Canada	Argentina	Australia	British India
	Net Exports *(million bushels)*				
1921	318	168	64	89	15
1922	251	187	118	115	(14) [a]
1923	200	281	139	50	29
1924	127	348	172	86	20
1925	260 [b]	184 [b]	135 [b]	115 [b]	35 [b]
Average	231	234	126	91	17
	Percentage of Net Exports to World Exports (ex-Russia)				
1921	48.6	25.7	9.8	13.6	2.3
1922	36.7	27.3	17.3	16.8	2.0
1923	28.2	39.6	19.6	7.0	4.1
1924	16.1	44.2	21.8	10.9	2.5
1925	34.7 [b]	24.6 [b]	18.0 [b]	15.4 [b]	4.7 [b]
Average	32.2	32.6	17.6	12.7	2.4
	Percentage of Net Exports to Preceding Crop				
1921	38.2	63.9	41.0	61.0	4.0
1922	30.8	62.1	61.8	89.1	(5.6) [a]
1923	23.0	70.2	70.9	45.9	7.9
1924	15.9	73.4	66.9	68.3	5.4
1925	29.8 [b]	70.2 [b]	70.7 [b]	70.1 [b]	9.6 [b]
Average	27.5	68.0	62.3	66.9	4.3

* Sources: See WHEAT STUDIES, December 1924, pp. 50, 55.
[a] Net imports.
[b] Preliminary approximation. See WHEAT STUDIES, I, 161.

TABLE IV.—POPULATION OF PRAIRIE PROVINCES AND CANADA, 1871–1921*
(Thousands)

Census year	Canada	Prairie provinces	Manitoba	Saskatchewan	Alberta
1871	3,689	43	25	18 [a]	
1881	4,325	100	62	38	
1891	4,833	219	153	67	
1901	5,371	420	255	91	73
1906	6,171 [b]	809	366	258	185
1911	7,207	1,328	461	492	374
1916	8,036 [b]	1,698	554	648	497
1921	8,788	1,956	610	758	588

* Source: Census Reports. The following additional figures were obtained by special censuses:—

	Manitoba	Northwest Territories (organized districts)	
1886	109	1885	48
1896	193	1894	87

[a] 1906 Census Report. [b] Official estimates.

TABLE V.—POPULATION OF THE PRAIRIE PROVINCES, CLASSIFIED BY PLACE OF BIRTH, 1881–1921*
(Thousands)

Place of birth	1881	1891	1901	1906	1911	1916	1921	Place of birth
Prairie provinces [a]	56	82	158	233	384	586	834	Prairie provinces [a]
Other provinces	25	74	120	211	297	340	327	Other provinces
Canada, total	81	156	278	444	681	926	1,161	Canada, total
United States	2	5	21	91	167	198	209	United States
United Kingdom	8	40	50	122	243	282	308	United Kingdom
Other countries (chiefly European)	9	18	71	152	237	292	278	Other countries (chiefly European)
Total	100	219	420	809	1,328	1,698	1,956	Total

* Source: Census Reports. [a] This includes the native Indian population, which has been reported as 36, 26, (no report), 47, (no report), 36, 39, and 41 thousand in successive census years.

TABLE VI.—IMMIGRATION TO CANADA, 1881–1925*

(Thousands)

Year ending	Total	From United States	From United Kingdom	From other countries	Year ending	Total	From United States	From United Kingdom	From other countries
Dec. 31, 1881	48.0	21.8 [a]	17.0	9.1	June 30, 1905	146.3	43.5	65.4	37.4
1882	112.5	58.4 [a]	41.3	12.8	1906	189.1	57.8	86.8	44.5
1883	133.6	78.5 [a]	45.4	9.7	Mar. 31, 1907	124.7 [c]	34.7 [c]	55.8 [c]	34.2 [c]
1884	103.8	65.9 [a]	31.8	6.2	1908	262.5	58.3	120.2	84.0
					1909	146.9	59.8	52.9	34.2
1885	79.2	57.5 [a]	18.6	3.1					
1886	69.2	40.6 [a]	23.5	5.0	1910	208.8	103.8	59.8	45.2
1887	84.5	41.0 [a]	31.1	12.4	1911	311.1	121.5	123.0	66.6
1888	88.8	45.0 [a]	30.9	13.0	1912	354.2	133.7	138.1	82.4
1889	91.6	67.9 [a]	19.4	4.3	1913	402.4	139.0	150.5	112.9
					1914	384.9	107.5	142.6	134.7
1890	75.1	50.3 [a]	21.8	2.9					
1891	82.2	52.5 [a]	22.0	7.6	1915	144.8	59.8	43.3	41.7
1892	31.0	[a]	22.6	8.4	1916	48.5	36.9	8.7	2.9
1893	29.6	[a]	20.1	9.6	1917	75.4	61.4	8.3	5.7
1894	20.8	[a]	16.0	4.8	1918	79.1	71.3	3.2	4.6
					1919	57.7	40.7	9.9	7.1
1895	18.8	[a]	15.0	3.8					
1896	16.8	[a]	12.4	4.5	1920	117.3	49.7	59.6	8.1
1897	21.7	2.4	11.4	7.9	1921	148.5	48.1	74.3	26.2
1898	31.9	9.1	11.2	11.6	1922	90.0	29.3	39.0	21.6
1899	44.5	11.9	10.7	21.9	1923	72.9	22.0	34.5	16.4
					1924	148.6	20.5	72.9	55.1
June 30, 1900	23.9 [b]	8.5 [b]	5.1 [b]	10.2 [b]					
1901	49.1	18.0	11.8	19.4	1925	111.4	15.8	53.2	42.4
1902	67.4	26.4	17.3	23.7					
1903	128.4	49.5	41.8	37.1					
1904	130.3	45.2	50.4	34.8					

* Sources: 1881–1923, *Report of the Department of Immigration and Colonization*, 1923; 1924–25, *Monetary Times*, Toronto, May 8, 1925, p. 12.

a The earlier figures for immigrants from the United States are not comparable with the other statistics, since they include large numbers of seasonal migratory laborers. No statistics were collected for 1892–96.

b Six months.

c Nine months.

TABLE VII.—DISPOSITION OF THE SURVEYED AREAS OF MANITOBA, SASKATCHEWAN, AND ALBERTA, JANUARY 1, 1921*

(Thousand acres)

Disposition	Total	Manitoba	Saskatchewan	Alberta
Hudson's Bay Co.	6,556	1,197	3,183	2,176
Railway grants	31,864	3,567	15,177	13,120
School lands	9,324	1,631	3,942	3,752
Special grants	16,835	5,095	7,835	3,905
Under homestead	54,114	8,367	25,479	18,268
Sales under irrigation system	1,058	—	77	981
Total allotted to private ownership [a]	119,751	19,857	57,693	42,202
Available for entry	25,650	5,276	4,913	15,461
Forest reserves, etc.	28,948	3,133	7,384	18,432
Other purposes [b]	25,931	7,306	9,036	9,587
Total unallotted	80,529	15,715	21,333	43,480
Total surveyed areas	200,280	35,572	79,026	85,682

* Source: *Report of the Department of the Interior*, 1921.

a The reported figure for total area alienated from the crown is 123,628,182 acres. The figures given above for total allotments are obtained by addition of listed items and are probably not inclusive of certain small allotments which cannot be separated from items of unallotted areas on the basis of available data.

b Road allowances, Indian reserves, timber leases, grazing leases, water-covered lands, etc.

TABLE VIII. — HOMESTEAD ENTRIES IN PRAIRIE PROVINCES, 1872–1924*

Year ending	Entries	Cancellations
Dec. 31, 1872	283	[a]
1873	878	[a]
Oct. 31, 1874	1,376	[a]
1875	499	[a]
1876	347	[a]
1877	845	[a]
1878	1,788	[a]
1879	4,068	[a]
1880	2,074	[a]
1881	2,753	[a]
1882	7,483	[a]
1883	6,063	1,104
1884	3,753	1,334
1885	1,858	1,296
1886	2,657	1,033
1887	2,036	633
1888	2,655	935
1889	4,416	1,337
1890	2,955	1,167
1891	3,523	1,002
1892	4,840	1,093
1893	4,067	1,277
1894	3,209	1,558
Dec. 31, 1895	2,394	1,222[b]
1896	1,857	1,165
1897	2,384	1,090[c]
1898	4,848	1,546
1899	6,689	1,746
June 30, 1900	4,132[d]	1,096[d]
1901	8,167	1,682
1902	14,673	3,296
1903	31,383	5,208
1904	26,073	8,702
1905	30,819	11,296
1906	41,869	11,637
Mar. 31, 1907	21,647[e]	14,110[e]
1908	30,424	15,668
1909	39,081	14,677
1910	41,568	16,832
1911	44,479	22,122
1912	39,151	18,608
1913	33,699	17,280
1914	31,829	15,997
1915	24,088	12,514
1916	17,030	12,731
1917	11,199	9,570
1918	8,319	6,314
1919	4,227	4,115
1920	6,732	7,891
1921	5,389	7,336
1922	7,349	7,806
1923	5,343	7,061
1924	3,657[f]	[g]

* Source: *Annual Reports of the Department of the Interior.*

[a] Until 1882–83 data for annual cancellations are not available.

[b] Ten months ending Oct. 31, 1895.

[c] Year ending June 30.

[d] Six months only.

[e] Nine months only.

[f] Preliminary figure.

[g] Data not available.

TABLE IX.—SALES OF GRANTED LANDS IN PRAIRIE PROVINCES, 1893–1924*

Year ending	Area (thousand acres)	Average price per acre ($)
Dec. 31, 1893	120	2.93
1894	69	3.02
1895	115	1.94
1896	108	3.34
1897	222	3.23
1898	449	3.18
1899	462	3.28
June 30, 1900	648	3.27
1901	621	3.36
1902	2,202	3.56
1903	4,229	3.46
1904	1,267	4.39
1905	990	5.09
1906	1,643	6.01
1907	1,278[a]	6.02[a]
Mar. 31, 1908	347	8.80
1909	109	11.08
1910	1,185	13.36
1911	1,407	13.59
1912	1,329	13.70
1913	707	13.95
1914	502	14.75
1915	193	17.01
1916	355	15.32
1917	755	16.35
1918	1,116	18.71
1919	1,039	17.47
1920	1,026	18.70
1921	554	19.62
1922	155	16.96
1923	123	15.12
1924	160	15.40

* Sources: *Annual Reports of the Department of the Interior; Canada Year Book*, 1924.

[a] Nine months, July 1, 1906–March 31, 1907.

TABLE X.—LAND OWNERSHIP AND FARM AREA IN WESTERN CANADA, 1921*

(Thousand acres)

	Total	Manitoba	Saskatchewan	Alberta
In private ownership [a]	119,751	19,856	57,693	42,202
Not in farms	31,819	5,240	13,670	12,909
Occupied farms	87,932	14,616	44,023	29,293
Improved farm land	44,863	8,058	25,037	11,768
Unimproved farm land	43,069	6,558	18,986	17,525

* Sources: Appendix Table VII; *Census of Agriculture*, 1921, Bulletin No. 11.
[a] See footnote to Table VII.

TABLE XI.—FARMS OF OVER 100 ACRES IN WESTERN CANADA, CENSUS YEARS 1880–1921*

(Number of "Occupiers")

Census year	Total	Manitoba	Saskatchewan	Alberta
1880	8,754	7,914	840	
1884	—	—	6,836	
1885	—	16,142	—	
1891	28,131	19,535	6,352	2,244
1901	51,987	29,598	13,225	9,164
1906	116,000 [b]	33,000 [b]	55,000 [b]	28,000 [b]
1911	190,403	38,188	93,758	58,457
1916	209,953	41,067	102,887	65,999
1921	245,616	47,550	117,629	80,437

* Source: Census Reports, in particular, Vol. IV, 1911, Table 4.
[a] Over 80 acres.
[b] Approximate figure roughly computed.

TABLE XII.—AREAS OF OCCUPIED AND IMPROVED LANDS IN WESTERN CANADA, CENSUS YEARS, 1880–1921*

(Thousand acres)

Census year	Occupied				Census year	Improved [a]			
	Total	Manitoba	Saskatchewan	Alberta		Total	Manitoba	Saskatchewan	Alberta
1880	2,698	2,384	314		1880	279	250	29	
1884	—	—	3,861		1884	—	—	196	
1885	—	4,171	—		1885	—	753	—	
1890	8,138	5,228	2,910		1890	1,429	1,232	197	
1901	15,412	8,843	3,833	2,736	1901	5,593	3,995	1,123	475
1911	57,642	12,184	28,099	17,359	1911	22,970	6,746	11,872	4,352
1916	73,300	13,437	36,801	23,063	1916	34,330	7,188	19,632	7,510
1921	87,932	14,616	44,023	29,293	1921	44,863	8,058	25,037	11,768

* Source: Census Reports.
[a] The definition of "improved land" was made more exacting in 1911.

TABLE XIII.—WHEAT ACREAGE, PRODUCTION, AND YIELD PER ACRE IN MANITOBA, 1883–97*

Crop year	Acreage *(thousand acres)*	Production *(million bushels)*	Yield per acre *(bushels)*	Crop year	Acreage *(thousand acres)*	Production *(million bushels)*	Yield per acre *(bushels)*
1883	261	5.7	21.8	1891	917	23.2	25.3
1884	307	6.2	20.1	1892	876	14.5	16.5
1885	357	7.4	20.8	1893	1,004	15.6	15.6
1886	384	5.9	15.3	1894	1,010	17.2	17.0
1887	432	12.4	28.6	1895	1,140	31.8	27.9
1888	[a]	[a]	[a]	1896	1,000	14.4	14.4
1889	632	7.2	11.4	1897	1,291	18.3	14.1
1890	746	14.7	19.6				

* Sources: *Annual Report of the Department of Agriculture and Immigration of the Province of Manitoba.* No satisfactory annual data are available for the Northwest Territories until 1898.
[a] There was a partial crop failure in 1888 due to a frost in the middle of August, and no official statistics were compiled. The Winnipeg Board of Trade estimated a 20 per cent loss in Manitoba, so that, when allowance is made for the increase of acreage from 1887 to 1888, the crop of 1888 was probably of about the same size as the crop of 1887. (*Report of the Department of the Interior*, 1888.)
The Winnipeg Immigration Agent reported for 1876 a crop of 480 thousand bushels and a yield of 32 bushels, and for 1881 a crop of 2 million bushels and a yield of 23 bushels. (Reports of the Department of Agriculture.)

TABLE XIV.—PROVINCIAL ESTIMATES OF WHEAT ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE PRAIRIE PROVINCES, 1898–1924*

Year	Acreage *(thousand acres)*				Production *(million bushels)*				Yield per acre *(bushels)*			
	Total	Manitoba	Saskatchewan	Alberta	Total	Manitoba	Saskatchewan	Alberta	Total	Manitoba	Saskatchewan	Alberta
1898	1,795	1,488	276	31	30.9	25.3	4.8	.8	17.2	17.0	17.3	25.3
1899	1,993	1,630	328	35	34.8	28.0	6.1	.8	17.5	17.1	18.5	23.7
1900	1,869	1,457	382	30	17.1	13.0	3.4	.6	9.1	8.9	9.0	19.2
1901	2,517	2,012	470	35	63.3	50.5	12.0	.9	25.2	25.1	25.4	24.6
1902	2,666	2,040	581	45	67.0	53.1	13.1	.9	25.1	26.0	22.6	18.9
1903	3,284	2,443	778	63	56.4	40.1	15.1	1.2	17.2	16.4	19.4	19.0
1904	3,377	2,412	910	55	56.0	39.2	16.0	.9	16.6	16.2	17.5	17.1
1905	3,881	2,644	1,130	107	84.2	55.8	26.1	2.3	21.7	21.1	23.1	21.6
1906	5,051	3,142	1,731	178	102.3	61.3	37.0	4.0	20.2	19.5	21.4	22.3
1907	5,046	2,790	2,048	208	71.6	39.7	27.7	4.2	14.2	14.2	13.5	20.2
1908	6,873	2,851	3,704	318	107.0	49.3	50.7	7.1	15.6	17.3	13.7	22.3
1909	7,153	2,642	4,085	426	144.5	45.8	90.2	8.5	20.2	17.3	22.1	19.9
1910	8,219	2,962	4,665	592	120.5	39.9	72.7	7.9	14.7	13.5	15.6	13.4
1911	9,535	3,339	5,256	940	178.4	61.1	97.2	20.1	18.7	18.3	18.5	21.3
1912	9,286	2,823	5,384	1,079	185.4	58.4	107.2	19.8	20.0	20.7	19.9	18.4
1913	10,028	3,141	5,760	1,127	196.7	62.8	112.4	21.6	19.6	20.0	19.5	19.2
1914	10,410	3,366	6,004	1,040	143.0	52.5	74.6	15.9	13.7	15.5	12.4	15.3
1915	13,857	3,664	8,524	1,669	371.5	96.7	214.8	60.1	26.8	26.4	25.2	35.9
1916	13,096	2,995	8,533	1,568	193.9	30.4	121.9	41.6	14.8	10.2	14.2	26.5
1917	13,801	2,853	8,273	2,675	213.4	42.7	117.9	52.8	15.5	14.9	14.2	19.7
1918	15,228	2,917	9,249	3,062	164.4	48.1	92.5	23.8	10.8	16.5	10.0	7.8
1919	16,315	2,862	10,587	2,866	165.5	41.0	90.0	34.6	10.1	14.3	8.5	12.1
1920	16,822	2,688	10,061	4,073	234.1	37.5	113.1	83.4	13.9	14.0	11.2	20.5
1921	21,591	3,385	13,557	4,649	293.4	39.1	201.3	53.0	13.6	11.5	14.8	11.4
1922	21,189	3,091	12,332	5,766	376.0	60.1	250.2	65.7	17.7	19.4	20.2	11.4
1923	21,587	2,822	12,791	5,974	455.7	32.8	252.6	167.3	21.1	11.6	19.7	28.0
1924	21,065	2,459	13,033	5,573	235.7	41.5	132.9	61.3	11.2	16.9	10.2	11.0

* Sources: Annual Reports and Crop Bulletins of the Department of Agriculture of each province. The wheat crop of the Northwest Territories in 1894 was about 2.5 million bushels. In 1896 the wheat area was 242 thousand acres and the crop 4.8 million bushels. (Reports of Lieutenant-Governor of the Northwest Territories.)

TABLE XV.—PROVINCIAL ESTIMATES FOR LAND CULTIVATION IN THE PRAIRIE PROVINCES, 1908–1924*

(Thousand acres)

Year	New breaking				Summer fallowing				Fall plowing		Spring plowing [a]
	Prairie provinces	Manitoba	Saskatchewan	Alberta	Prairie provinces	Manitoba	Saskatchewan	Alberta	Manitoba	Saskatchewan	Saskatchewan
1908	[b]	[b]	1,721	[b]	[b]	[b]	1,191	[b]	[b]	[b]	[b]
1909	[b]	155	1,758	[b]	[b]	684	1,773	[b]	1,333	[b]	[b]
1910	[b]	307	2,443	[b]	[b]	1,023	1,824	[b]	2,197	[b]	[b]
1911	[b]	233	2,303	[b]	[b]	964	2,188	[b]	978	[b]	[b]
1912	[b]	233	2,298	[b]	[b]	1,017	2,418	[b]	696	[b]	[b]
1913	[b]	156	1,149	[b]	[b]	1,144	2,775	[b]	1,582	1,734	4,253
1914	[b]	175	1,076	[b]	[b]	1,208	2,601	[b]	2,734	4,407	2,459
1915	[b]	193	946	[b]	[b]	1,094	2,668	[b]	1,509	2,254	7,086
1916	[b]	90	659	[b]	[b]	1,235	2,536	[b]	1,847	1,296	9,727
1917	[b]	106	432	[b]	6,293	1,381	3,759	1,153	1,900	1,944	6,135
1918	[b]	182	615	[b]	7,204	1,475	4,061	1,668	1,834	1,164	10,494
1919	1,629	196	850	583	7,464	1,351	4,396	1,718	1,833	499	11,604
1920	1,224	188	550	486	6,995	1,410	3,752	1,834	2,730	420	17,154
1921	1,291	158	616	517	9,797	1,612	5,908	2,276	3,133	636	19,082
1922	1,057	129	433	494	9,461	1,597	5,403	2,460	2,996	668	[b]
1923	1,010	97	425	487	9,624	1,518	5,346	2,760	2,815	529	[b]
1924	877	71	407	399	9,068	1,446	5,309	2,313	1,126	2,838	[b]

* Sources: Annual Reports and Crop Bulletins of the Department of Agriculture of each province.
[a] Following spring. [b] Data not available.

TABLE XVI. — CENSUS ESTIMATES OF WHEAT ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE PRAIRIE PROVINCES, 1880–1921

Year	Acreage *(thousand acres)*				Production *(million bushels)*				Yield per acre *(bushels)*			
	Total	Manitoba	Saskatchewan	Alberta	Total	Manitoba	Saskatchewan	Alberta	Total	Manitoba	Saskatchewan	Alberta
1880	57	51	6		1.1	1.0	.1		20.2	20.1	21.1	
1890	1,010	897	107	6	17.9	16.1	1.7	.09	17.7	17.9	15.8	15.2
1900	2,495	1,965	487	43	23.5	18.4	4.3	.80	9.4	9.3	8.8	18.6
1905	3,941	2,417	1,376	148	82.5	47.6	31.8	3.04	20.9	19.7	23.1	20.5
1906	5,062	2,721	2,117	224	110.6	54.5	50.2	5.93	21.8	20.0	23.7	26.5
1910	7,867	2,759	4,228	880	110.2	34.1	67.0	9.06	14.0	12.4	15.8	10.3
1911	9,991	3,095	5,256	1,640	208.4	62.7	109.1	36.60	20.9	20.3	20.8	22.3
1915	13,867	2,800	8,929	2,138	360.2	69.3	224.3	66.54	26.0	24.8	25.1	31.1
1916	14,363	2,726	9,032	2,605	242.3	29.7	147.6	65.09	16.9	10.9	16.3	25.0
1920	16,775	2,507	10,189	4,079	207.2	33.4	115.5	58.20	12.3	13.3	11.3	14.3
1921	19,389	2,819	11,684	4,886	—	—	—	—	—	—	—	—

TABLE XVII.—DOMINION ESTIMATES OF WHEAT ACREAGE, PRODUCTION, AND YIELD PER ACRE IN THE PRAIRIE PROVINCES, 1908–24*

Year	Acreage *(thousand acres)*				Production *(million bushels)*				Yield per acre *(bushels)*			
	Total	Manitoba	Saskatchewan	Alberta	Total	Manitoba	Saskatchewan	Alberta	Total	Manitoba	Saskatchewan	Alberta
1908	5,624	2,957	2,396	271	91.9	50.3	34.7	6.8	16.3	17.0	14.5	25.2
1909	6,878	2,808	3,685	385	147.5	52.7	85.2	9.6	21.4	18.8	23.1	24.9
1910	7,868	2,760	4,228	880	110.2	34.1	67.0	9.1	14.0	12.4	15.8	10.3
1911	9,991	3,095	5,256	1,640	208.4	62.7	109.1	36.6	20.9	20.3	20.8	22.3
1912	10,011	2,839	5,582	1,590	204.3	63.0	107.0	34.3	20.4	22.2	19.2	21.6
1913	10,036	2,804	5,720	1,512	209.4	53.3	121.7	34.4	20.8	19.0	21.2	22.8
1914	9,335	2,616	5,348	1,371	141.0	38.6	73.6	28.9	15.1	14.8	13.7	21.1
1915	13,867	2,800	8,929	2,138	360.2	69.3	224.3	66.5	26.0	24.8	25.1	31.1
1916	14,363	2,726	9,032	2,605	242.3	29.7	147.6	65.1	16.9	10.9	16.3	25.0
1917	13,620	2,449	8,273	2,898	212.0	41.0	117.9	53.0	15.6	16.8	14.2	18.3
1918	16,125	2,984	9,249	3,892	164.4	48.2	92.5	23.8	10.2	16.4	10.0	6.1
1919	17,750	2,880	10,587	4,283	165.5	41.0	90.0	34.6	9.3	14.2	8.5	8.1
1920	16,841	2,706	10,061	4,074	234.1	37.5	113.1	83.5	13.9	13.9	11.2	20.5
1921	22,181	3,501	13,557	5,123	280.1	39.1	188.0	53.0	12.6	11.2	13.8	10.4
1922	21,224	3,126	12,332	5,766	375.2	60.1	250.2	65.0	17.7	19.2	20.2	11.3
1923	20,879	2,916	12,791	5,172	452.3	35.8	271.6	144.8	20.8	12.3	21.3	28.1
1924	21,065	2,459	13,033	5,573	235.7	41.5	132.9	61.3	11.2	16.9	10.2	11.0

TABLE XVIII.—DOMINION ESTIMATES OF FARM PRICES AND FARM VALUES OF CANADIAN WHEAT, 1908–24*

Crop of	Average estimated farm price *(dollars per bushel)*					Estimated farm value *(million dollars)*					
	Manitoba	Saskatchewan	Alberta	Prairie provinces	Total Canada	Crop of	Manitoba	Saskatchewan	Alberta	Prairie provinces	Total Canada
1908	.83	.74	.68	.79	.81	1908	41.9	25.9	4.6	72.4	91.2
1909	.87	.81	.73	.82	.85	1909	45.9	68.7	7.0	121.6	141.3
1910	.80	.69	.69	.72	.75	1910	27.3	46.2	6.3	79.8	99.5
1911	.67	.58	.62	.61	.64	1911	42.0	63.3	22.5	127.8	148.1
1912	.67	.56	.54	.59	.62	1912	42.2	59.9	18.5	120.6	139.1
1913	.71	.64	.61	.65	.67	1913	37.9	77.8	21.0	136.7	156.5
1914	1.01	.95[a]	.91	.96[a]	.98[a]	1914	39.0	69.8[a]	26.4	135.2[a]	157.5[a]
1915	.90	.91	.88	.90	.91	1915	62.7	203.9	58.3	324.9	356.8
1916	1.23	1.28	1.33	1.29	1.31	1916	36.5	188.9	86.6	312.0	344.1
1917	2.05	1.95	1.74	1.92	1.94	1917	84.1	230.0	91.9	406.1	453.0
1918	2.06	1.99	1.92	2.00	2.02	1918	99.3	184.1	45.6	328.9	381.7
1919	2.40	2.32	2.31	2.34	2.37	1919	98.3	208.8	79.9	387.1	457.7
1920	1.83	1.55	1.52	1.58	1.62	1920	68.8	175.4	126.9	371.0	427.4
1921	.91	.76	.77	.78	.81	1921	35.5	142.9	40.8	219.2	242.9
1922	.83	.85	.77	.83	.85	1922	49.8	212.6	50.0	312.5	339.4
1923	.67	.65	.65	.65	.67	1923	24.0	176.6	94.1	294.7	317.0
1924	1.24	1.21	1.20	1.21	1.22	1924	51.4	160.8	73.6	285.8	320.4

* Sources: *Census and Statistics Monthly*, 1908–17; *Monthly Bulletin of Agricultural Statistics*, 1917–.

a The reported 1914 figures for Saskatchewan were $1.48 a bushel and 108.7 million dollars. These are evidently errors, in view of the fact that *spot* prices of No. 1 Manitoba wheat during the months September to December 1914, never exceeded $1.18. The price figure has been adjusted on the basis of farm prices in Alberta and Manitoba for that year, and the value figure altered in accordance.

TABLE XIX.—RAILWAY MILEAGE IN THE PRAIRIE PROVINCES, 1895–1923*

As of June 30	Total	Manitoba	Saskatchewan	Alberta	As of June 30	Total	Manitoba	Saskatchewan	Alberta
1895	3,244	1,472	1,772		1910	7,641	3,221	2,932	1,488
1896	3,254	1,474	1,780		1911	8,081	3,466	3,121	1,494
1897	3,355	1,575	1,780		1912	9,171	3,520	3,754	1,897
1898	3,399	1,621	1,778		1913	10,856	3,993	4,651	2,212
1899	3,533	1,603	1,930		1914	11,710	4,076	5,089	2,545
1900	[a]	[a]	[a]		1915	12,999	4,498	5,327	3,174
1901	4,141	2,056	1,107	978	1916	13,581	4,309	5,378	3,894
1902	4,208	2,128	1,102	978	1917	14,762	4,194	6,124	4,444
1903	4,319	2,224	1,117	978	1918	14,603	4,168	6,162	4,273
1904	4,564	2,364	1,180	1,020	1919 [b]	14,688	4,193	6,141	4,354
1905	5,215	2,672	1,523	1,020	1920 [b]	15,097	4,403	6,220	4,474
1906	5,996	2,823	1,973	1,200	1921 [b]	15,270	4,417	6,296	4,557
1907	6,422	3,074	2,025	1,323	1922 [b]	15,532	4,585	6,267	4,680
1908	6,515	3,111	2,081	1,323	1923 [b]	15,822	4,521	6,517	4,784
1909	7,157	3,205	2,631	1,321					

* Sources: Annual Reports of the Department of the Interior and of the Department of Railways and Canals; *Canada Year Books.*

[a] Data not available. [b] As of December 31.

TABLE XX.—CAPACITY OF LICENSED ELEVATORS AND WAREHOUSES AT COUNTRY POINTS IN THE PRAIRIE PROVINCES, AND OF ONTARIO TERMINAL ELEVATORS,[a] 1901–25*

(Thousand bushels)

Year ending August 31	Country elevators and warehouses in prairie provinces				Ontario terminal elevators [a]		Year ending August 31
	Total	Manitoba	Saskatchewan	Alberta	Public	Private [a]	
1901	12,759	10,323	2,436		5,570	—	1901
1902	15,449	12,255	3,194		7,100	—	1902
1903	21,226	16,121	5,105		8,580	—	1903
1904	27,214	19,297	7,917		13,422	—	1904
1905	28,492	19,558	8,934		17,912	—	1905
1906	31,324	20,656	8,952	1,716	18,580	—	1906
1907	36,278	20,502	12,990	2,786	18,075	—	1907
1908	39,501	21,016	14,666	3,819	17,059	—	1908
1909	42,898	20,588	17,924	4,386	18,583	—	1909
1910	53,978	21,624	24,314	8,040	21,741	—	1910
1911	57,043	21,814	26,465	8,764	25,700	—	1911
1912	61,587	22,410	29,314	9,863	25,700	—	1912
1913	70,322	22,253	36,503	11,566	28,885	495	1913
1914	79,478	21,690	42,995	14,793	40,050	1,405	1914
1915	86,209	22,046	48,074	16,089	40,600	1,580	1915
1916	93,863	22,113	52,943	18,807	41,350	1,735	1916
1917	102,981	21,250	58,625	23,106	41,750	3,575	1917
1918	115,053	21,826	64,394	28,833	46,375	2,995	1918
1919	122,406	22,926	67,332	32,148	46,100	5,305	1919
1920	124,544	23,024	68,058	33,462	49,500	2,755	1920
1921	126,657	22,074	68,867	35,716	46,100	8,585	1921
1922	128,432	22,159	70,181	36,092	37,850	15,435	1922
1923	131,366	21,970	72,542	36,854	42,600	14,210	1923
1924	133,815	21,354	76,199	36,262	39,775	25,335	1924
1925	138,203	20,341	81,022	36,840	41,525	24,465	1925

* Source: *List of Licensed Elevators and Warehouses in the Western Grain Inspection Division,* 1924–25. In 1884, the capacity of country elevators in Manitoba was 680 thousand, in the Northwest Territories 110 thousand bushels (Report of Emerson Immigration Agent, 1884). In 1892, the capacity of elevators at country points in Western Canada was 5,262 thousand bushels, and of warehouses at country points 754 thousand (Report of Dominion Lands Commissioner).

[a] Mainly at Fort William and Port Arthur, but including certain private elevators, of a present capacity of 1,800,000 bushels, at Kenora and Keewatin, on the Lake of the Woods.

TABLE XXI.—DATES OF SEEDING AND CUTTING WHEAT IN SASKATCHEWAN, 1905–23*

Year	Seeding		Cutting	
	Commenced	General	Commenced	Completed
1905	April 3	April 10	*a*	*a*
1906	April 4	April 9	*a*	*a*
1907	May 6	May 10	*a*	*a*
1908	April 10	April 18	*a*	*a*
1909	April 4	April 9	*a*	*a*
1910	April 1	April 10	*a*	*a*
1911	April 10	April 17	*a*	August 28 *b*
1912	April 4	April 10	August 23	August 28 *b*
1913	April 4	April 19	August 8	August 25 *b*
1914	April 6	May 1	August 10	August 11 *b*
1915	April 4	April 10	August 19	September 7
1916	April 15	April 21	August 15	September 11
1917	April 27	May 5	August 18	September 7
1918	April 7	April 15	August 15	September 7
1919	April 17	April 24	July 28	August 18
1920	May 1	May 6	August 25	September 10
1921	April 24	April 30	August 12	August 30
1922	April 26	May 2	August 15	September 1
1923	April 23	April 29	August 17	September 3

* Sources: *Reports of Saskatchewan Department of Agriculture.*

a Not available.

b Cutting general.

TABLE XXII.—IMPORTANCE OF WHEAT AND FLOUR IN CANADIAN EXPORTS, 1920–25*

(Million dollars)

Year ending March 31	Wheat	Flour	Wheat and flour	Total exports	Percent. of total
1921	311	67	378	1,189	31.8
1922	180	53	233	740	31.5
1923	252	60	312	931	33.5
1924	268	63	331	1,045	31.7
1925	252	71	323	1,069	30.2
Total	1,263	314	1,577	4,974	31.7

* Sources: Department of Trade and Commerce, *Reports on the Trade of Canada*, monthly and yearly.

TABLE XXIII.—CANADIAN EXPORTS OF WHEAT AND FLOUR, 1890–1924*

(Millions)

Year ending	Total wheat and flour *(bus.)*	Wheat *(bus.)*	Flour as wheat *(bus.)*	Flour *(bbls.)*
June 30, 1891	3.4	2.1	1.3	.30
1892	10.4	8.7	1.7	.38
1893	11.1	9.3	1.8	.41
1894	11.2	9.3	1.9	.43
1895	9.8	8.8	1.0	.22
1896	10.8	9.9	0.8	.19
1897	9.8	7.9	1.9	.42
1898	24.6	19.0	5.6	1.25
1899	13.9	10.3	3.6	.79
1900	20.3	16.8	3.5	.77
1901	14.8	9.7	5.0	1.12
1902	31.0	26.1	4.9	1.09
July 31, 1903	39.9	33.8	6.1	1.36
1904	23.2	16.3	6.9	1.54
1905	19.4	13.7	5.7	1.27
1906	48.1	40.8	7.3	1.62
1907	46.5	39.4	7.0	1.56
1908	47.6	40.1	7.5	1.67
1909	56.7	47.7	9.0	2.01
1910	67.8	52.6	15.2	3.37
1911	62.4	48.4	14.0	3.10
1912	97.9	78.8	19.1	4.25
1913	115.7	95.5	20.2	4.50
1914	135.6	114.9	20.7	4.60
1915	86.7	63.9	22.8	5.08
1916	269.2	235.7	33.4	7.43
1917	174.6	140.2	34.3	7.63
1918	169.2	118.6	50.7	11.26
1919	104.1	63.0	41.0	9.12
1920	92.5	63.4	29.0	6.46
1921	167.2	137.0	30.2	6.72
1922	185.8	151.0	34.7	7.72
1923	279.4	229.9	49.5	11.00
1924	346.5	292.4	54.1	12.02

* Sources: Canadian official statistics, *International Crop Reports*, and *International Yearbooks of Agricultural Statistics*. See note to Table XXIV.

NOTE.—This table has been specially compiled in order to show, as nearly as possible, the exportation of Canadian wheat from successive crops.

TABLE XXIV.—CANADIAN EXPORTS OF WHEAT AND FLOUR BY COUNTRIES OF DESTINATION, FISCAL YEARS, 1905–25*

Year ending	Wheat and flour as wheat *(million bushels)* Total	Great Britain	Other Northern Europe	Southern Europe	United States	Japan, China, Hongkong	Other countries	Year ending	Flour *(thousand barrels)* Total	Great Britain	Other Northern Europe	Southern Europe	United States	Japan, China, Hongkong	Other countries
June 30,								June 30,							
1905	17.9	13.9	.57	—	.44	.08	2.90	1905	1,322	593	39	—	31	17	642
1906	47.3	40.3	.66	.02	3.95	.09	2.30	1906	1,532	944	53	5	26	20	484
Mar. 31,								Mar. 31,							
1907	30.4	27.3	.46	.04	.82	.26	1.53	1907	1,093	634	67	8	4	52	328
1908	52.5	48.1	.66	.03	.24	.69	2.78	1908	1,964	1,131	50	6	29	153	595
1909	57.0	50.5	2.50	.27	.91	.17	2.59	1909	1,738	1,029	66	—	58	37	548
1910	63.5	55.0	2.00	—	2.42	.18	3.89	1910	3,064	1,877	198	—	126	39	824
1911	59.5	52.1	2.16	—	.36	.09	4.80	1911	3,049	1,885	195	—	26	19	924
1912	81.3	70.9	4.32	.02	1.26	.31	4.51	1912	3,739	2,339	291	5	58	68	978
1913	113.3	90.7	6.89	.07	9.97	.59	5.12	1913	4,478	2,880	362	15	30	79	1,112
1914	142.2	121.2	5.50	.17	7.61	1.45	6.20	1914	4,833	2,795	444	30	19	208	1,337
1915	94.2	78.4	4.66	.47	4.33	.32	6.00	1915	4,951	3,137	457	28	52	70	1,207
1916	186.5	157.9	8.77	5.11	9.50	.14	5.08	1916	6,399	3,895	1,127	31	251	31	1,064
1917	223.1	170.2	20.82	8.29	19.03	.04	4.69	1917	7,426	4,031	1,886	291	185	9	1,024
1918	195.1	153.1	11.64	.41	25.87	—	4.06	1918	9,932	6,604	1,863	43	519	—	903
1919	83.2	61.0	14.10	1.65	2.03	—	4.49	1919	9,205	5,254	2,859	93	9	—	990
1920	117.9	77.6	13.67	13.77	6.80	—	5.98	1920	8,863	5,825	866	812	30	1	1,329
1921	156.3	41.7	30.32	28.60	47.67	.09	7.95	1921	6,017	2,747	221	179	1,188	20	1,662
1922	169.9	113.8	12.42	14.81	19.16	2.93	6.72	1922	7,415	4,737	525	33	571	112	1,437
1923	261.1	188.1	24.76	13.88	18.97	5.61	9.77	1923	10,228	4,724	1,992	303	613	496	2,100
1924	309.6	192.3	46.70	20.60	22.23	16.72	11.08	1924	11,716	4,234	3,745	393	222	989	2,133
1925	241.4	157.7	44.82	14.17	5.68	9.34	9.68	1925	11,029	3,275	4,952	380	57	514	1,851
5-year average								5-year average							
1905–09	41.0	36.0	.97	.07	1.27	.26	2.42	1905–09	1,530	866	55	4	30	56	519
1910–14	92.0	78.0	4.19	.05	4.32	.52	4.90	1910–14	3,833	2,355	298	10	52	83	1,035
1915–19	156.4	124.1	12.00	3.19	12.15	.10	4.86	1915–19	7,583	4,584	1,638	97	203	22	1,038
1920–24	202.9	122.7	25.58	18.33	22.97	5.07	8.30	1920–24	8,848	4,453	1,470	344	525	324	1,732

* Sources: *Reports of the Department of Trade and Commerce*, and *Reports on the Grain Trade of Canada*. In Tables XXIII and XXIV, wheat and flour have been equated according to the general rule that one barrel of flour (196 pounds) is extracted from 4½ bushels of wheat (270 pounds)—an average extraction of 72.6 per cent. Canadian trade statistics of production show that this extraction is realized in practice from year to year to within 1 or 2 per cent.

It is probable that the same ratio applies fairly well to the whole volume of flour exports, as shown in Table XXIII and the totals columns of Table XXIV; but it is more doubtful whether it can be employed with the same degree of accuracy, to the wheat and flour imports of separate countries. For example, the United States market will certainly purchase a higher grade of flour (of lower extraction) than the Oriental market in general can afford to buy.

TABLE XXV.—CANADIAN EXPORTS OF WHEAT AND FLOUR, SEPTEMBER 1 TO AUGUST 31, 1921–24*

(Million bushels)

Wheat and flour	1920–21	1921–22	1922–23	1923–24
To United States	54.9	19.0	14.9	22.1
To other countries				
(1) by U. S. ports	63.6	113.7	148.9	165.3
(2) by Canadian ports	48.7	61.3	115.7	155.7
Total	167.2	194.0	279.5	343.1
Wheat, by ports				
Vancouver	—	7.8	17.8	53.8
Quebec	0.04	0.6	2.7	2.3
Montreal	25.8	27.6	54.4	61.3
St. John	6.5	6.6	12.0	9.4
Portland	13.5	9.2	18.4	7.7
Boston	0.8	5.1	7.9	7.2
New York	24.2	39.7	47.8	63.1
Philadelphia	6.1	28.1	26.1	23.2
Baltimore	5.5	7.7	15.6	15.0
Norfolk	—	—	—	12.6

* Source: *Reports on the Grain Trade of Canada*, 1921–24.

TABLE XXVI.—WHEAT GROUND IN CANADA, 1920–21 TO 1924–25*

(Million bushels)

Month	1920–21	1921–22	1922–23	1923–24	4-yr. ave. 1920–24	1924–25
Aug.	1.3	3.1	5.4	4.9	3.7	6.3
Sept.	2.7	5.7	7.3	6.6	5.6	7.7
Oct.	5.2	7.2	9.8	10.3	8.1	9.6
Nov.	4.6	7.6	10.1	10.4	8.2	7.6
Dec.	4.0	6.7	8.8	8.2	6.9	6.5
Jan.	4.8	5.7	7.4	8.5	6.6	7.7
Feb.	3.5	6.0	6.5	8.0	6.0	7.0
Mar.	4.3	6.5	7.6	7.7	6.5	7.6
Apr.	2.7	4.1	6.2	6.5	4.9	5.6
May	3.5	5.3	6.0	8.2	5.8	4.6
June	3.7	4.5	5.5	6.2	5.0	[a]
July	3.4	4.4	5.3	6.0	4.8	[a]
Total	43.7	66.8	85.9	91.5	72.0	[a]

* 1921–24—*Reports on the Grain Trade of Canada*, 1921–24; 1924–25—preliminary figures, *Canadian Grain Statistics*, July 3, 1925.

[a] Not available.

TABLE XXVII.—SEASONAL MOVEMENT OF CANADIAN WHEAT*

(Average 1920–21 to 1923–24)

Month	Cars loaded in Western Canada		Receipts at Fort William and Port Arthur		Lake shipments from Ft. William and Port Arthur		Exports of wheat grain		Exports of wheat flour	
	Number	Per cent	Quantity *(mil. bus.)*	Per cent	Quantity *(mil. bus.)*	Per cent	Quantity *(mil. bus.)*	Per cent	Quantity *(000 bbls.)*	Per cent
Aug.	4,000	1.9	3.45	1.6	6.19	3.1	7.94	3.9	498	5.3
Sept.	36,322	17.1	26.36	12.0	18.26	9.0	6.40	3.2	456	4.9
Oct.	48,113	22.6	52.58	24.0	40.21	19.9	26.09	12.9	810	8.7
Nov.	39,812	18.7	50.90	23.2	57.22	28.2	43.72	21.6	1,043	11.1
Dec.	25,457	12.0	33.72	15.4	22.63	11.2	41.82	20.6	1,052	11.2
Jan.	11,130	5.2	9.92	4.5	.09	—	9.90	4.9	853	9.1
Feb.	7,881	3.7	3.93	1.8	—	—	8.42	4.2	790	8.4
Mar.	10,144	4.8	5.47	2.5	—	—	8.40	4.1	1,106	11.8
Apr.	7,744	3.6	5.99	2.7	11.38	5.6	4.49	2.2	692	7.4
May	8,480	4.0	10.61	4.8	21.60	10.7	18.87	9.3	709	7.6
June	9,231	4.3	9.32	4.2	13.58	6.7	16.02	7.9	777	8.3
July	4,568	2.1	7.20	3.3	11.40	5.6	10.48	5.2	585	6.2
Total	212,882	100.0	219.46	100.0	202.56	100.0	202.55	100.0	9,371	100.0

* Sources: *Reports on the Grain Trade of Canada*, 1920–24; Theo. D. Hammatt, *Seasonal Aspects of Wheat Exporting*, U. S. Dept. of Commerce, *Trade Information Bulletin No. 350*, May 1925, p. 12.

This study is based upon research work conducted by C. P. Wright, with the collaboration of J. S. Davis during the later stages. In their present form, Sections II–V, VII, and VIII have been written by the former and the other sections by the latter. The statistical tables and charts have been prepared by E. Gail Benjamin, Margaret Milliken, and P. S. King, under the direction of J. S. Davis. The map on page 220 was drawn by L. E. Kemnitzer from official Canadian maps.

The Institute is deeply indebted to many correspondents for information supplied to it. Special thanks are due to the Dominion Bureau of Statistics, the Natural Resources Intelligence Service, and the Departments of Agriculture of Manitoba, Saskatchewan, and Alberta, for the generous manner in which they have supplied the Institute with published material of all kinds and for their courtesy and consideration in answering numerous inquiries.

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