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CANADA
DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
AGRICULTURAL BRANCH

THE PRODUCTION AND DISTRIBUTION OF COARSE GRAINS

III. RYE

A survey of statistical and other data relating
to Canadian rye and its place in world
production and trade.

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DEPARTMENT OF TRADE AND COMMERCE
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RYE

The Roman Naturalist, Pliny is thought to have made the first historical reference to the cultivation of rye as a cereal. In his *Historia Naturalis*(1) Pliny writes as follows:

"Secale Taurini sub Alpibus asiaticam vocant, deterrimum, et tantum ad arcendam famem; fecunda, sed gracili stipula, nigritia triste, sed pondere praecipuum."

This appraisal of rye was made during the first century of Christian era, and suggests that the cultivation of rye has an historical background of not much over two thousand years. Consequently, rye is of recent origin as compared with wheat and barley. Pliny is not enthusiastic about rye in as much as he regarded it as suitable for human consumption only to avert famine. He conceded, however, that rye possessed high yielding ability and good weight as a grain.

A study of early central and northern European peoples indicates that rye has been extensively cultivated in these areas for a long time. The spread of rye cultivation in northern Europe, no doubt, reflected the ability of the rye plant to thrive under adverse climatic and soil conditions. Rye will grow in soil which is not attractive to wheat and it can be produced in northerly areas owing to its hardiness.

The ruggedness of rye probably enabled it to gain a foothold among the cultivated plants of Europe. Once its cultivators became accustomed to its taste and food qualities, rye was elevated to the position of a leading cereal. There is reason to believe that during the middle ages rye was the main foodstuff of rural Europe. Authorities suggest that at one time rye was a very important breadstuff in the British Isles. Whatever the extent to which rye was used in the United Kingdom, it has now been replaced almost entirely by wheat. In other countries also rye has been displaced by wheat but not to the extent of the displacement in the United Kingdom.

The decline of rye consumption in favour of wheat consumption is discussed in the *International Review of Agriculture* (September, 1929). The Review advances several reasons for the trend toward wheat as follows:

"The habit of doing what other people do, especially those whom we consider superior, has, no doubt, been one of the strongest forces working in favour of an increased wheat consumption. Wheat, being too expensive to be used by all people, came quite early to be regarded as a mark of superior social position, and consequently its use spread as the result of social ambition and imitation."

"As rye has been more the bread of the country than of the city, the growth of the city population has also been a strong contributing factor to the decrease in the consumption of rye bread and so has too the increase in the real wages of the masses, an increase which has made it possible for them to realize to a still greater extent their social ambition in respect of wheat eating."

"The increase in the demand for wheat has been met by a huge increase in the supply owing to the opening up of new production areas in non-European countries, the improvement and cheapening of transport, the results obtained by seed selection, which has been much more generally directed towards wheat than rye cultivation, and not least, the invention of methods for producing nearly unlimited quantities of cheap synthetic nitrogen, a factor of a much greater importance for wheat-growing than for rye-growing."

Qualities of Wheat and Rye

The fact that rye is still the chief food of millions of people indicates in a tangible way the merits of the grain as a breadstuff. While there are slight differences in the intrinsic qualities of the two cereals, the preference that wheat enjoys is largely due to its superiority in the abstract qualities of appearance, palatability and digestibility.

Bread made from wheat flour has a more attractive appearance than rye bread due to its whiteness and fine texture. It is generally conceded that bread made from wheat flour is more palatable than bread made from rye flour. This advantage on the part of wheat pre-supposes the experience of having eaten wheaten bread for a long enough period to become accustomed to its characteristics. It is probably true that people who have eaten nothing but rye bread for many years find its peculiar flavour quite natural. In general, however, the test of palatability tends to switch consumption from rye to wheat.

It is thought that wheaten bread is more digestible than rye bread. This advantage lies in the fact that wheat bran is more digestible than rye bran and rye contains a larger percentage of bran than wheat. The superiority of a sample of wheat flour would be largely negatived if compared with a sample of rye flour containing the same percentage of bran as contained in the sample of wheat flour.

The foregoing points constitute some of the main reasons why wheat has increased in relative importance as compared with rye. In spite of the increase in wheat production and consumption in the past thirty years, the world still produces and consumes from one and one half to two billion bushels of rye annually. These figures indicate the importance of the rye industry especially in Europe.

Uses of Rye

In Europe the chief use of rye is for the production of rye flour for human consumption. Rye bread is most generally used in Russia, Germany and Poland where a large part of the world's rye crop is produced. Rye is also used as feed grain in these countries especially when large crops are harvested. In 1930, Germany de-natured large quantities of rye in order to divert surplus stocks to the feeding industry.

Rye is used for distilling purposes. In Canada the distilling industry provides the largest industrial outlet for surplus rye. Small amounts are used in Canada in flour and feed mills and for the production of various kinds of food products. It is also apparent that considerable rye produced in Canada is fed or otherwise consumed on farms.

The Production of Rye in Canada

The relative position of rye among cereals produced in Canada is shown in the following table:

	Area (acres)	Percent	Production (bushels)	Production (tons)	Percent
Rye	583,100	1.3	4,725,000	132,300	.9
Barley	3,658,000	8.4	63,737,000	1,529,700	10.1
Oats	13,528,900	30.9	311,312,000	5,292,300	35.0
Wheat	<u>25,991,100</u>	<u>59.4</u>	<u>271,821,000</u>	<u>8,154,600</u>	<u>54.0</u>
Total	43,761,100	100.0	651,595,000	15,108,900	100.0

The area sown to rye in Canada in 1933 amounted to 583,500 acres compared with 3,646,000 acres sown to barley and 25,986,000 acres sown to wheat. Of the total area sown to the four cereals, 1.3 per cent was sown to rye.

According to the provisional estimate of 1933 cereal production, the outturn of rye amounted to 4,725,000 bushels. At the same time wheat production was estimated at 271,821,000 bushels; oats production at 311,312,000 bushels and barley production at 63,737,000 bushels.

Converting the above figures to a tonnage basis as shown in the foregoing table, total production of the four cereals amounted to 15,594,800 tons of which 132,300 tons or .9 per cent amounted to rye.

The above statistics refer to the relative position in 1933. It should be recalled, however, that the area devoted to rye has decreased sharply during the past three years. In 1930 rye acreage reached its highest point in the past ten years.

In this year rye acreage constituted 2.7 per cent of the acreage sown to cereals in Canada. It is apparent that the production of rye in Canada has never assumed a very important place in cereal production, reflecting, of course, a limited market for rye in a country where wheat is cultivated on a large scale.

The following table shows acreage and production of rye in Canada from 1910 to 1933:

Production of Rye in Canada

Year	Area (acres)	Production (bushels)
1910	114,728	1,542,219
1911	131,532	2,500,100
1912	127,000	2,428,000
1913	119,300	2,300,000
1914	111,280	2,016,800
1915	121,677	2,486,200
1916	148,404	2,876,400
1917	211,880	3,857,200
1918	555,294	8,504,400
1919	753,081	10,207,400
1920	649,654	11,306,400
1921	1,842,498	21,455,260

Production of Rye in Canada

	Area (acres)	Production (bushels)
1922	2,105,367	32,373,400
1923	1,448,142	23,231,800
1924	890,814	13,750,900
1925	642,976	9,158,500
1926	753,786	12,178,900
1927	743,311	15,570,600
1928	839,565	14,617,700
1929	991,944	13,160,500
1930	1,184,050	22,018,500
1931	777,534	5,322,000
1932	773,800	8,938,000
1933	583,100	4,725,000

Rye acreage has followed different trends in the various provinces in Canada interested in rye production. The development of rye production in eastern and western Canada will be briefly traced in the following pages. Reference to the data contained in the foregoing table will illustrate the trend of rye acreage in Canada as a whole. Prior to the war, rye acreage in Canada was small and relatively stable. From 1910 to 1914 the acreage sown to rye ranged from 131,532 acres to 111,280 acres and production ranged from 1,542,219 bushels to 2,500,100 bushels. In 1915 a slight increase occurred in rye acreage. In 1916 and 1917, rye acreage increased sharply amounting to 211,880 bushels in the latter year.

In 1918 rye acreage in Canada was more than doubled. The increase continued in 1919, acreage in that year amounting to about 7 times the 1914 acreage. After a small recession in 1920, the area sown to rye increased to 1,842,498 acres in 1921. In 1922 a total of 2,105,367 acres was sown and production reached a total of 32,373,400 bushels, a figure which has not been surpassed since. Under the stimulus of the war and early post-war demand, rye acreage in Canada had increased from 111,280 acres in 1914 to 2,105,367 acres in 1922.

In 1923 rye acreage decreased by some 700,000 acres and in 1924 another 600,000 acres were taken out of rye cultivation. Thus in two years, the greater part of war-time and post-war expansion in rye was eliminated. From 1925 to 1930 rye acreage in Canada increased steadily until a total of 1,184,000 acres were sown in 1930. Over 400,000 acres were eliminated during the next season and in 1933 Canadian rye acreage stood at 583,100 acres--the lowest point since 1918. Owing to low yields per acre in 1933 production amounted to only 4,725,000 bushels--the smallest outturn since 1917.

It is apparent that the development of the rye industry in Canada has been marked by radical increases and decreases in acreage due to the influences exercised by the war and post-war conditions. Rye acreage still stands above pre-war levels however in spite of the violent upward and downward swings that have taken place in the meantime.

Thousand Acres

Rye Acreage in Canada 1910 to 1933

2800

2400

2000

1600

1200

800

400

0

Canada

Prairie Provinces

175

150

125

100

75

50

25

0

Ontario

Quebec

1910

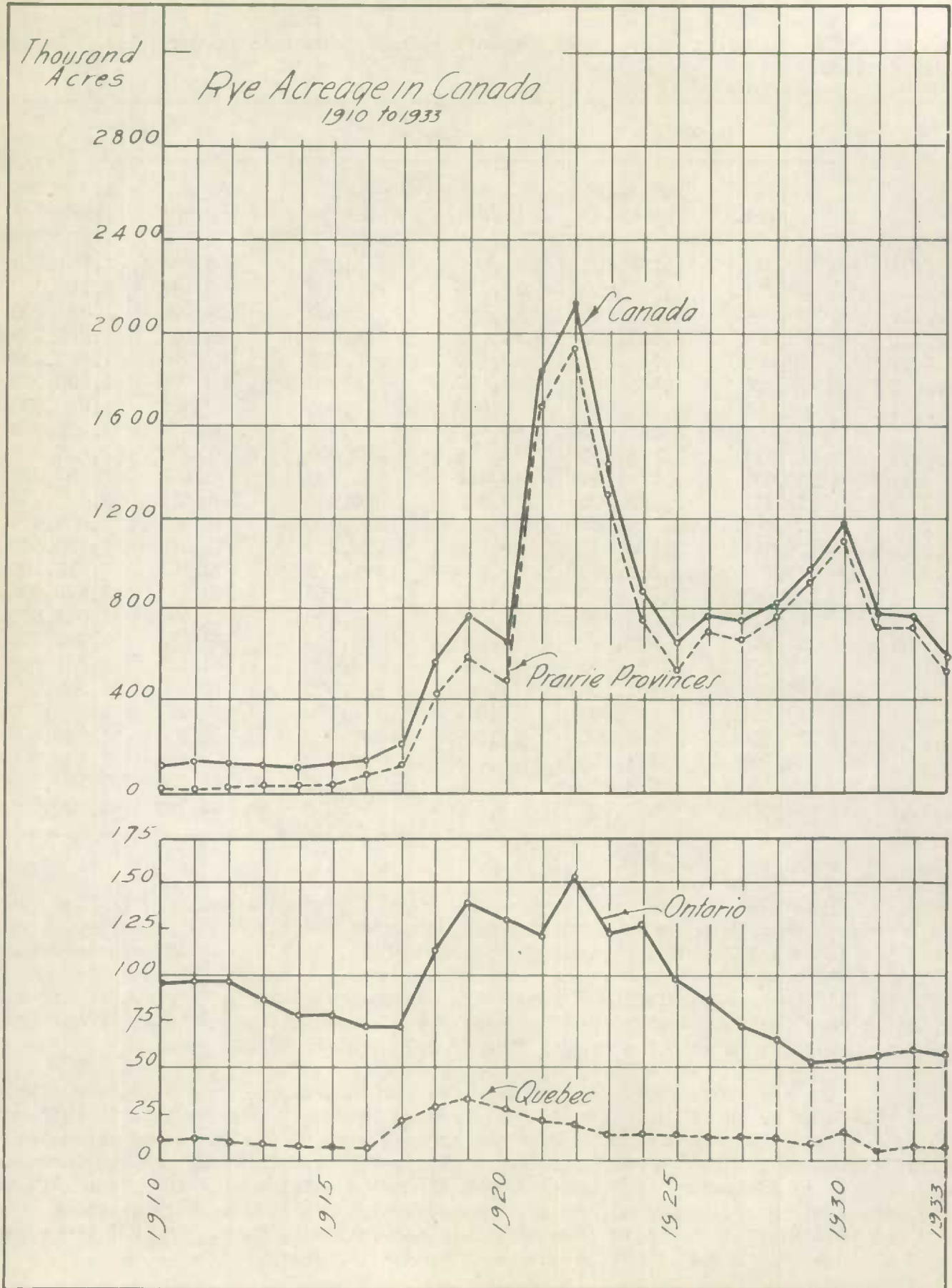
1915

1920

1925

1930

1933



Rye Production in Eastern Canada

The following table shows rye acreage and production in Ontario and Quebec from 1910 to 1933:

Year	Ontario		Quebec		Total	
	Area (acres)	Production (bushels)	Area (acres)	Production (bushels)	Area (acres)	Production (bushels)
1910	92,731	1,232,493	11,099	148,925	103,830	1,381,418
1911	96,751	1,723,000	12,735	200,000	109,486	1,923,000
1912	93,000	1,711,000	11,000	173,000	104,000	1,884,000
1913	85,000	1,567,000	10,000	156,000	95,000	1,723,000
1914	78,000	1,341,000	9,000	156,000	87,000	1,497,000
1915	78,000	1,551,000	8,700	145,000	86,700	1,696,000
1916	69,000	1,208,000	8,300	118,000	77,300	1,326,000
1917	68,000	1,207,000	22,450	376,000	90,450	1,583,000
1918	112,726	1,813,000	29,063	472,000	141,789	2,285,000
1919	140,072	2,219,000	33,481	578,000	173,553	2,797,000
1920	133,090	2,349,900	28,462	534,000	161,552	2,883,900
1921	122,868	1,775,600	24,940	430,000	147,808	2,205,600
1922	152,709	2,500,000	18,736	238,500	171,445	2,738,500
1923	123,354	2,011,000	13,499	201,100	136,853	2,212,100
1924	126,641	2,300,000	13,000	195,000	139,641	2,495,000
1925	98,652	1,784,600	13,000	238,000	111,652	2,022,600
1926	86,355	1,501,000	12,500	199,000	98,855	1,700,000
1927	72,323	1,289,000	12,200	214,000	84,523	1,503,000
1928	66,307	1,131,000	12,000	181,000	78,307	1,312,000
1929	52,023	873,000	10,954	173,500	62,977	1,046,500
1930	53,000	937,000	17,500	309,000	70,500	1,246,000
1931	56,398	993,000	5,456	86,000	61,854	1,084,000
1932	57,500	1,024,000	6,200	98,000	63,700	1,122,000
1933	54,000	923,000	5,100	77,000	59,100	1,000,000x

x Provisional estimates.

From 1910 to 1917 rye acreage in Ontario decreased steadily. In 1918 rye acreage increased sharply reaching a peak of 140,072 acres in 1919. The area sown to rye decreased in 1920 and 1921 but increased sharply in 1922. In this year acreage amounted to 152,709 acres and production amounted to 2,500,000 bushels - a record for the province. From 1922 to 1933 rye acreage followed a downward course, declining about 100,000 acres during the 11-year period. A sharp decline took place between 1924 and 1929. From 1929 to 1933 rye acreage in Ontario has ranged from 52,000 acres to 57,500 acres.

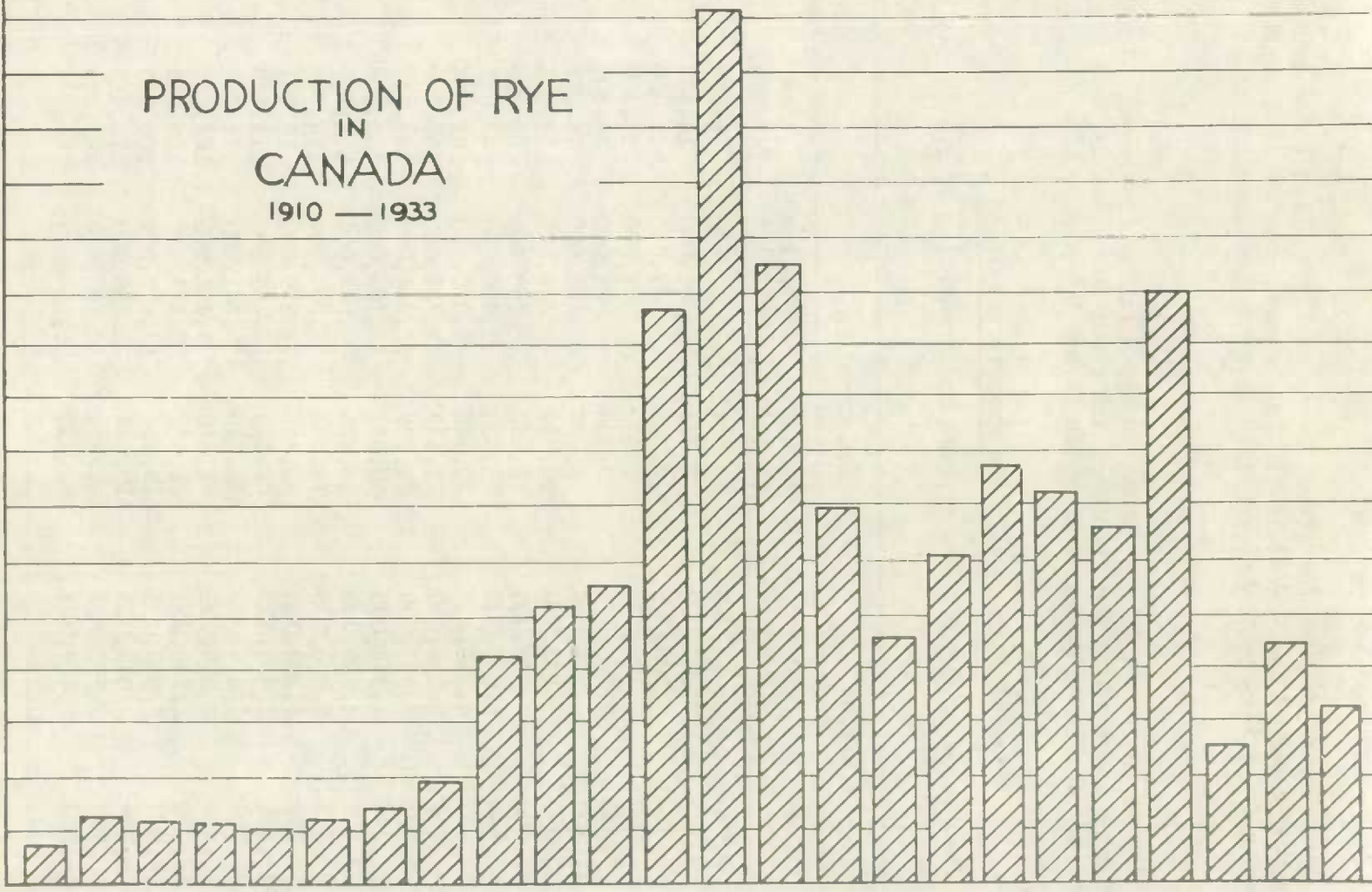
The area sown to rye in Quebec since 1910 has ranged from 5,100 acres in 1933 and 28,462 acres in 1920. Production has ranged between 77,000 bushels in 1933 and 578,000 bushels in 1919. From 1910 to 1916 the acreage sown to rye in Quebec decreased gradually, amounting to 8,300 acres in 1916. In 1917, 1918 and 1919 rye acreage increased sharply, acreage in the latter year being over 4 times the acreage of 1916. From 1919 to 1933 the area sown to rye in Quebec has declined steadily. In 1930 a sharp increase occurred but this increase was more than offset in the following year. In 1933 rye acreage in Quebec stood at the lowest level in the past twenty-four years.

MILLION
BUSHELS

PRODUCTION OF RYE
IN
CANADA
1910 — 1933

3 2
2 8
2 4
2 0
1 6
1 2
8
4
0

1910 1915 1920 1925 1930 1933



Considering Quebec and Ontario together rye production reached its maximum in 1920 when 2,883,900 bushels were produced. Production in 1933 was the lowest in the past twenty-four years and amounted to 1,000,000 bushels.

It is apparent from the above figure that rye acreage and production in Ontario and Quebec are now at the lowest levels in the past quarter of a century. Since 1919 or 1920, acreage has been declining steadily in both provinces.

Maritime Provinces

Rye is not grown to any extent in the Maritime Provinces. In 1930 about 350 acres of rye were reported in New Brunswick and about 200 acres in Nova Scotia. Total production in the two provinces amounted to about 12,000 bushels.

Production of Rye in the Prairie Provinces

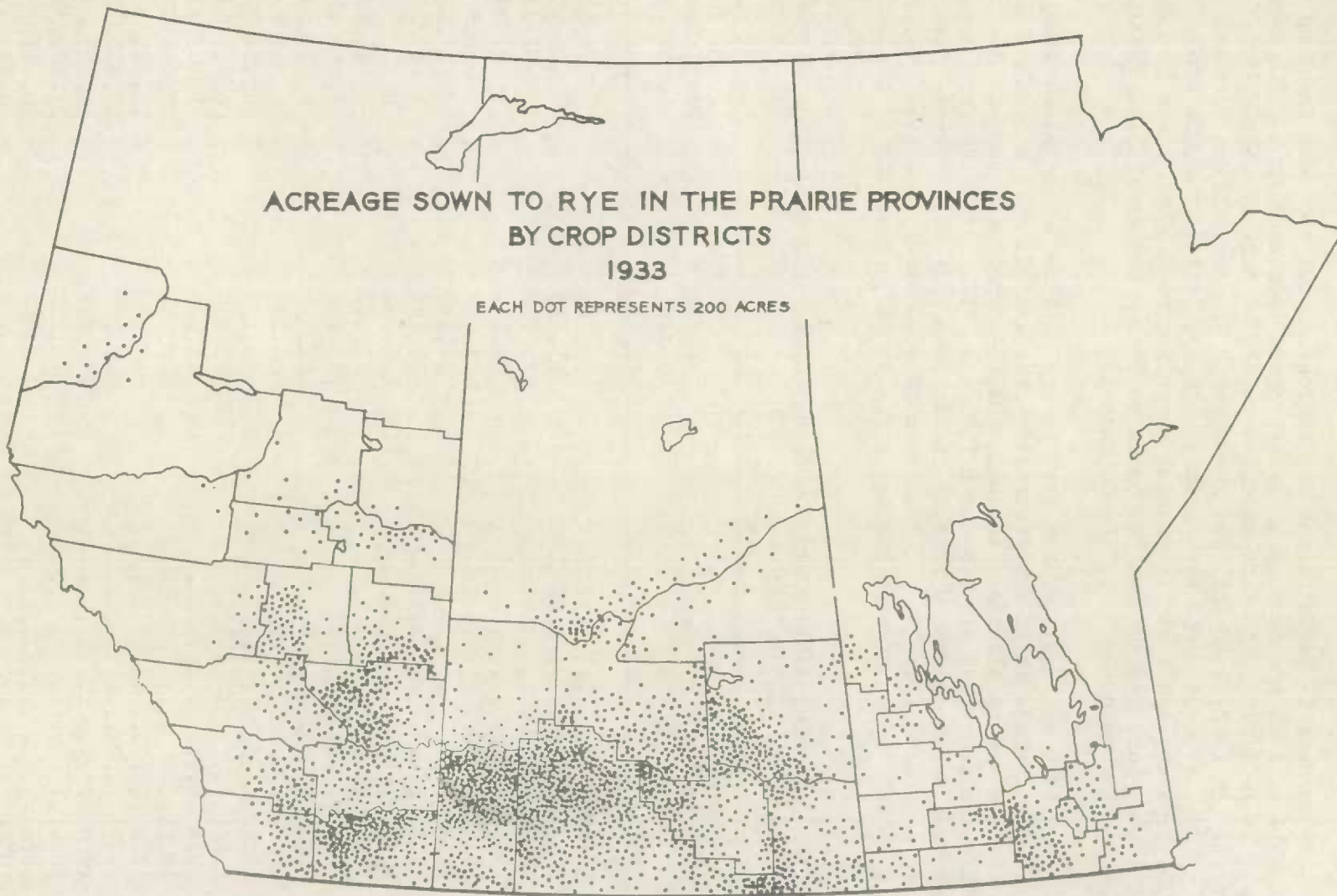
The following table shows acreage and production of rye in the Prairie Provinces from 1910 to 1933:

Year	Manitoba		Saskatchewan		Alberta	
	Area (acres)	Production (bushels)	Area (acres)	Production (bushels)	Area (acres)	Production (bushels)
1910	2,738	29,045	754	11,639	6,672	109,006
1911	4,725	104,000	2,271	61,000	14,443	394,000
1912	5,000	105,000	2,700	57,000	15,000	377,000
1913	5,000	103,000	3,000	68,000	16,000	398,000
1914	5,000	100,000	2,600	54,000	16,400	360,800
1915	11,507	208,000	7,207	203,000	15,963	374,700
1916	30,050	557,000	22,759	548,000	17,975	440,000
1917	37,000	638,000	53,250	998,400	30,880	633,000
1918	240,469	3,935,700	123,500	1,420,000	47,877	826,000
1919	298,932	4,089,400	190,482	2,000,000	83,804	1,173,000
1920	148,602	2,318,600	172,449	2,535,000	160,960	3,420,000
1921	257,793	3,564,700	1,208,299	13,546,000	222,136	1,999,000
1922	421,603	7,078,000	900,931	16,184,000	603,583	6,187,000
1923	337,528	4,620,000	568,924	8,582,000	396,758	7,640,000
1924	290,573	5,875,000	178,094	2,507,000	274,372	2,744,000
1925	253,492	3,288,000	190,831	2,850,000	78,832	877,000
1926	225,482	3,563,000	307,499	5,454,000	114,479	1,374,000
1927	136,368	2,215,000	358,215	8,561,000	156,547	3,131,000
1928	120,222	2,066,000	471,073	8,412,000	162,620	2,680,000
1929	85,040	1,309,000	641,638	8,301,000	195,539	2,372,000
1930	87,000	2,052,000	819,000	14,875,000	200,000	3,714,000
1931	49,128	661,000	510,562	2,396,000	152,019	1,100,000
1932	40,600	560,000	482,500	5,190,000	183,100	1,988,000
1933	45,700	559,000	305,000	1,733,000	169,000	1,353,000

From 1914 to 1919 the acreage sown to rye in Manitoba increased from 5,000 acres to 298,932 acres and production increased from 100,000 bushels to 4,089,400 bushels. A reduction in rye acreage took place in the following year but this decrease was largely offset by an increase in 1921. In 1922 rye acreage reached its peak in Manitoba when 421,603 acres were sown and production amounted to 7,078,000 bushels. From 1922 to 1929

ACREAGE SOWN TO RYE IN THE PRAIRIE PROVINCES
BY CROP DISTRICTS
1933

EACH DOT REPRESENTS 200 ACRES



rye acreage decreased steadily and in the latter year only 85,040 acres were sown. Rye acreage increased slightly in 1930 but has decreased in the past three years. In 1933 a total of 45,700 acres was sown to rye and production amounted to 559,000 bushels.

Rye acreage in Saskatchewan has followed about the same trend as in Manitoba. From 1914 to 1921 rye acreage in Saskatchewan increased from 2,600 acres to 1,208,299 acres. In 1914 rye production amounted to 54,000 bushels and in 1921 to 13,546,000 bushels. In 1922, 1923 and 1924 rye acreage in Saskatchewan decreased drastically. In 1925, 190,831 acres were sown as compared with 1,208,299 acres in 1921. From 1925 to 1930, rye acreage again increased, amounting to 819,000 acres in 1930. During the past three years rye acreage has again decreased and in 1933, 305,000 acres were sown and production amounted to 1,733,000 bushels.

From 1910 to 1914 the area sown to rye in Alberta increased steadily. From 1914 to 1922 rye acreage in Alberta increased sharply. In 1914 a total of 16,400 acres had been sown to rye in Alberta. In 1922, 603,583 acres were sown to rye. The large part of this increase took place between 1921 and 1922. From the peak reached in 1922 rye acreage in Alberta decreased sharply and in 1925 only 78,832 acres remained. Acreage gradually increased from 1925 to 1930 when 200,000 acres were sown. During the past three years Alberta's rye acreage has again fallen off, amounting to 169,000 acres in 1933.

The following table shows the total acreage and production of rye in the Prairie Provinces from 1910 to 1933.

Year	Area (acres)	Production (bushels)
1910	10,164	149,690
1911	21,439	559,000
1912	22,700	539,000
1913	24,000	569,000
1914	24,000	514,800
1915	34,677	785,700
1916	70,784	1,545,000
1917	121,130	2,269,700
1918	411,846	6,181,700
1919	573,218	7,262,400
1920	482,011	8,273,600
1921	1,688,228	19,109,700
1922	1,926,117	29,429,000
1923	1,303,210	20,842,000
1924	743,039	11,126,000
1925	523,155	7,015,000
1926	647,460	10,391,000
1927	651,130	13,907,000
1928	753,915	13,158,000
1929	922,217	11,982,000
1930	1,106,000	20,641,000
1931	711,709	4,157,000
1932	706,200	7,738,000
1933	519,700	3,645,000

Taking the Prairie Provinces as a whole, rye acreage increased from 24,000 acres in 1914 to 1,926,117 acres in 1922. Where 514,800 bushels were produced in 1914, 29,429,000 bushels were grown in 1922. During the next three years the total rye acreage in the three western provinces decreased sharply, amounting to 523,155 acres in 1925. Acreage swung upward in the next five years, reaching a total of 1,106,000 acres in 1930. During the past three years rye acreage has declined in the West and amounted to 519,700 acres in 1933. Production in 1933 amounted to 3,645,000 bushels.

Distribution of Rye Acreage in Prairie Provinces

The following table shows the distribution of 1933 rye acreage in the Prairie Provinces, by crop districts:

Crop District	Manitoba (acres)	Saskatchewan (acres)	Alberta (acres)
1	2,700	27,100	46,700
2	1,000	26,900	8,700
3	15,400	99,300	18,600
4	1,100	59,700	11,700
5	3,700	35,900	38,600
6	2,900	31,700	9,500
7	1,900	7,900	12,100
8	6,900	4,300	11,400
9	1,900	12,200	2,200
10	1,000	-	2,600
11	2,200	-	1,800
12	800	-	400
13	2,700	-	500
14	1,500	-	1,600
15	-	-	300
16	-	-	2,300
17	-	-	-
T O T A L S	45,700	305,000	169,000

About one-half of the rye acreage in Manitoba is found in crop districts 3 and 3, in the south-central part of the province. The balance is scattered among the remaining 12 districts. In Saskatchewan, rye acreage is fairly evenly distributed over the southern and central portions of the province and is relatively small in the northern crop districts. In Alberta about one-half of total acreage sown to rye in 1933 was located in crop districts 1 and 5. Acreage sown to rye is relatively small in the northern areas of the province.

The map on page 9 shows the distribution of rye acreage by crop districts in the Prairie Provinces.

Rye Production in British Columbia

The following table shows acreage and production of rye in British Columbia from 1918 to 1933:-

Year	Area (acres)	Production (bushels)
1918	820	25,000
1919	4,911	110,000
1920	5,367	138,200
1921	5,614	126,300
1922	6,982	140,000
1923	7,833	172,000
1924	7,662	119,000
1925	7,794	115,000
1926	7,008	80,000
1927	7,173	152,000
1928	6,708	136,000
1929	6,013	121,000
1930	7,000	120,000
1931	3,971	81,000
1932	3,900	78,000
1933	4,300	80,000x

x Provisional Estimate.

The acreage sown to rye in British Columbia gradually increased from 1918 to 1923. In the latter year rye acreage amounted to 7,833 acres and production amounted to 172,000 bushels. Rye acreage in British Columbia has gradually declined during the past ten years. In 1933 a total of 4,300 acres was sown to rye and production amounted to 80,000 bushels.

Long-Time Average Yields of Cereals

The following table shows long-time average yields for various cereals in Canada:-

	<u>Canada</u>	<u>Quebec</u>	<u>Ontario</u>	<u>Manitoba</u>
	(bushels per acre)			
RYE	16.1	16.5	17.0	16.0
Wheat	17.1	16.4	23.2	16.8
Barley	25.2	23.1	30.4	24.5
Oats	32.3	26.6	35.5	32.2
	<u>Saskatchewan</u>	<u>Alberta</u>	<u>British Columbia</u>	
	(bushels per acre)			
RYE	16.0	15.1	19.2	
Wheat	16.3	18.0	24.2	
Barley	22.7	25.2	32.8	
Oats	31.5	34.6	48.2	

Taking Canada as a whole, the long-time average yield per acre of rye amounts to 16.1 bushels per acre as compared with 17.1 bushels per acre for wheat, 32.3 bushels per acre for oats and 25.2 bushels per acre for barley. As far as rye is concerned the highest yields have been harvested in British Columbia and Ontario. In the Prairie Provinces rye yields have averaged slightly less than wheat yields.

Grading of Western Rye Production

The following table shows Statutory Grades of Western Rye as established by the Canada Grain Act:

Number and name of Grade	Maximum Weight per bushel in pounds	Standard of Quality	Percentage of Ergot after dockage removed	Maximum limits of		
				Foreign material other than dockage		
				Matter other than cereals	Grains other than wheat	Total foreign matter including wheat
			%	%	%	%
No. 1 C.W.	58	Sound	Free	Free	Practically Free	Practically Free
No. 2 C.W.	56	Sound	Practically free	About 1/2%	1 1/2	2
No. 3 C.W.	55	Reasonably sound. Slightly damaged	1/3	About 1%	3	5
No. 4 C.W.	-	Damaged with not more than about 5% heat damage	1/3	About 2%	7	10
Ergoty Rye	-	Excluded from preceding grades a/c of ergot	Over 1/3%	About 2%	7	10
Ergoty Rye and other Grains		Excluded from preceding grades a/c of admixture of other grains	Over 1/3%	About 2%	Rye predominating	

Grading of Inspections

Grade	1930-31		1931-32		1932-33	
	Cars	% of Total Inspections	Cars	% of Total Inspections	Cars	% of Total Inspections
No. 1 C.W.	514	9.2	102	4.5	60	3.1
No. 2 C.W.	3,595	64.3	1,246	55.2	999	50.8
No. 3 C.W.	997	17.8	410	18.2	754	38.4
No. 4 C.W.	70	1.3	41	1.8	23	1.2
No. Grade	312	5.6	417	18.5	-	-
Rejected	36	.6	2	.1	3	.1
Others	65	1.2	38	1.7	127	6.4
TOTAL (Cars)	5,589	100.0	2,256	100.0	1,966	100.0
TOTAL (Bushels)	9,578,831	-	5,932,607	-	2,702,306	-

During the past three cereal years the bulk of rye deliveries in Western Canada have graded No. 2 C.W. In 1930-31, 3,595 cars or 64.3 per cent of inspections graded 2 C.W. In 1931-32, 1,246 cars or 55.2 per cent of total inspections grade 2 C.W. During the past crop year (1932-33) 999 cars graded 2 C.W. and this number constituted 50.8 per cent of total inspections of rye.

The second largest group of inspections graded No. 3 C.W. In 1930-31, 997 cars graded No. 3 C.W. or 17.8 per cent of total inspections. In 1931-32, 410 cars or 18.2 per cent of total inspections graded No. 3 C.W. During 1932-33, 754 cars or 38.4 per cent of total inspections graded No. 3 C.W. The volume of inspections falling into other grades has been very small, varying from 1.2 per cent in 1931-32, to 6.4 per cent in 1932-33.

Production and Deliveries

The following table shows production of rye in the Prairie Provinces and inspections during each of the past three crop years:-

	<u>Production</u>	<u>Inspections</u>
1930-31	20,641,000	9,578,831
1931-32	4,157,000	5,932,607
1932-33	7,738,000	2,702,306
TOTAL	32,536,000	18,213,744

During the past three crop years inspections have amounted to 18,213,744 bushels or 56 per cent of production in the Prairie Provinces.

Disposition of Canadian Production of Rye

Estimated Disposition of Rye Crops - 1920-31 to 1932-33.

	Total Supplies			Stocks Accounted for				
	Inward Carry-over	New Crop	Imports X	Total Supplies	Exports	Outward Carry-over	Total	Domestic / Disappearance
	(Bushels)							
1920-21	121,772	11,306,000	4,494	11,432,266	3,219,435	830,550	4,049,985	7,382,281
1921-22	830,550	21,455,000	4,028	22,289,578	4,521,010	2,606,575	7,127,585	15,161,993
1922-23	2,606,575	32,373,000	1,143	34,980,718	10,175,442	3,308,070	13,483,512	21,497,206
1923-24	3,308,070	23,232,000	483	26,540,553	7,571,653	2,558,629	10,130,282	16,410,271
1924-25	2,558,629	13,751,000	7,001	16,316,630	6,336,131	1,319,184	7,655,315	8,661,315
1925-26	1,319,184	9,159,000	77	10,478,261	6,222,961	974,227	7,197,188	3,281,073
1926-27	974,227	12,179,000	6,721	13,159,948	8,301,191	1,293,777	9,594,968	3,564,980
1927-28	1,293,777	14,951,000	95,243	16,340,020	11,265,030	2,080,940	13,345,970	2,994,050
1928-29	2,080,940	14,618,000	155,270	16,854,210	5,751,232	4,219,756	9,970,988	6,883,222
1929-30	4,219,756	13,161,000	256,957	17,637,713	347,789	9,190,705	9,538,494	8,099,219
1930-31	9,190,705	22,019,000	16,500	31,226,205	2,089,847	14,435,795	16,525,642	14,700,563
1931-32	14,435,795	5,322,000	13	19,757,808	9,047,138	5,418,715	14,465,853	5,291,955
1932-33	5,418,715	8,938,000	2	14,356,717	2,866,358	5,814,727	8,681,085	5,675,632
Average 1923-24 to 1932-33	4,479,980	13,733,000	53,827	18,266,806	5,979,933	4,730,646	10,710,579	7,556,228

X Imports on Fiscal Year Basis

/ Including the factor of error in crop estimates.

Disposition of Canadian Rye Production

The table on the preceding page shows the estimated disposition of rye production in Canada from 1920-21 to 1932-33. The calculation of domestic disappearance should be considered as an approximation rather than as an exact calculation. Rye production in Canada is relatively small and a minor error in crop estimating might amount to an appreciable percentage of total production or total disposition. The statistics on the preceding page are intended to give a general picture of the rye position in Canada.

A study of the table on page fifteen brings out the following points:-

1. Carry-over of rye in Canada increased sharply from 1926-27 to 1931-32. During 1932-33 year-end stocks were reduced on account of two successive small crops.
2. Imports of rye into Canada have been small and have never been a serious factor in the Canadian rye situation.
3. Exports of rye from Canada have not consistently followed the trend of production. The four largest rye crops in Canadian history were harvested in 1921, 1922, 1923 and 1930. In each case production was not entirely compensated for by increased exports and therefore domestic disappearance increased sharply. During the ten-year period from 1923-24 to 1932-33 exports of rye averaged 43.5 per cent of production and averaged 33.0 per cent of available supplies. In individual years, exports of rye have varied greatly in relation to the volume of available supplies as shown by the following table:-

	Total Supplies	Exports	Per cent Exports of Total Supplies
	(bushels)	(bushels)	(per cent)
1923-24	26,540,553	7,571,653	28.0
1924-25	16,316,630	6,336,131	39.0
1925-26	10,478,261	6,222,961	59.0
1926-27	13,159,948	8,301,191	63.0
1927-28	16,340,020	11,265,030	69.0
1928-29	16,854,210	5,751,232	34.0
1929-30	17,637,713	347,739	2.0
1930-31	31,226,205	2,089,847	7.0
1931-32	19,757,808	9,047,138	46.0
1932-33	14,356,717	2,866,358	20.0

From 1923-24 to 1927-28 the percentage of available supplies of rye exported increased from 28 to 69 per cent. In 1928-29 only 34 per cent of total supplies was exported, the decrease being wholly due to a fall in exports. In 1929-30 only 2 per cent of rye supplies was exported. In 1931-32, due to a sharp decrease in total supplies and an increase in exports, 46 per cent of total supplies was exported. In 1932-33 total supplies and exports decreased, the latter amounting to 20 per cent of the former.

4. The volume of domestic utilization of rye in Canada is very difficult to establish. It appears to be a great deal of variation in consumption from one year to another. As in the case of oats, a large crop of rye appears to be accompanied by a sharp increase in domestic utilization. The large crops of 1921, 1922, 1923, and 1930 are examples. In the twelve months following the harvesting of these crops, domestic utilization was above average. This situation is, of course, related to the fact that exports did not respond to the extent of the increase in production. During the ten-year period from 1923-24 to 1932-33 domestic disappearance of rye in Canada averaged about 7 1/2 million bushels. Feed requirements for the ten years would average about 1 1/4 million bushels. With due allowance for industrial uses of rye in Canada it is apparent that farm consumption of rye has been one of the chief factors in the situation especially in years of high yield. Considerable quantities of low grade rye have been fed to live stock.

Industrial Uses of Rye

The following table shows the quantity and value of rye used in the Manufacturing Industries of Canada, 1927 to 1931 (1):-

	1927		1928		1929		1930		1931	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Bushels	\$	Bushels	\$	Bushels	\$	Bushels	\$	Bushels	\$
Distilleries	715,008	829,358	1,175,291	1,537,601	1,741,460	2,001,365	1,191,792	1,197,775	694,970	457,207
Flour and feed mills.	105,468	99,493	195,463	203,898	97,863	98,595	65,037	46,038	185,236	86,229
Miscellaneous foods..	not available previous to 1930.						30,000	21,849	30,000	15,099
TOTAL	820,476	928,851	1,370,754	1,741,499	1,839,323	2,099,960	1,286,829	1,265,062	910,206	558,535

(1) Prepared by General Manufactures Division, Dominion Bureau of Statistics.

As shown by the above table, there is considerable variation in the amount of rye used in the manufacturing industries of Canada. The chief industrial use of rye is in the distilling industry where the volume of production determines the amount of basic materials used. From 1927 to 1929 a marked increase in the volume of rye used by distilleries is noted. In 1927, 715,008 bushels were used, while in 1929 a total of 1,741,460 bushels was used. The quantity of rye consumed in 1930 showed a large reduction, and in 1931 a total of 694,970 bushels was used. Use of rye in 1931 amounted to slightly over one-third the amount used in 1929.

-17-

The use of rye in flour and feed mills ranged from 97,863 bushels in 1929 to 185,236 bushels in 1931. It is interesting to note that the quantity of rye used in flour and feed mills increased substantially in 1931 when prices were low.

Statistics showing the quantity of rye used in miscellaneous food industries have only been gathered since 1930 and show a comparatively small volume of rye so used.

The total quantity of rye known to have been used in industries in Canada has ranged from 820,476 bushels in 1927 to 2,099,960 bushels in 1929, the volume depending largely upon the quantity in distilling.

The consumption of rye in Canada is not limited to industrial uses described above. A study of disposition data shows that varying quantities of rye are consumed on the farm and have entered into the live-stock feeding industry. The volume of farm consumption appears to bear a relation to the volume of production.

Rye Prices

The following table shows monthly average prices for No. 2 C.W. rye at Winnipeg, by crop years, from 1920-21 to 1932-33. The prices are monthly average cash price basis in store at Port Arthur and Fort William:

Monthly Average Cash Prices for No. 2 C.W. Rye at Winnipeg, 1920-21 to 1932-33.

	1920-21	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33
	(dollars per bushel)												
August	1.94	1.45	.70	.63	.88	.99	.96	.93	.95	1.11	.55	.29	.33
September	1.94	1.11	.69	.66	1.01	.81	.94	.95	.95	1.08	.43	.33	.32
October	1.82	.89	.71	.63	1.26	.74	.96	.94	1.05	1.02	.37	.37	.29
November	1.68	.85	.83	.65	1.25	.81	.93	1.02	1.04	.94	.31	.49	.30
December	1.64	.87	.82	.65	1.33	.99	.91	1.04	1.02	.94	.30	.43	.30
January	1.69	.81	.80	.67	1.55	1.01	.96	1.03	1.03	.86	.27	.44	.31
February	1.61	.99	.82	.67	1.59	.94	1.01	1.05	1.12	.73	.29	.44	.32
March	1.59	1.03	.80	.65	1.33	.86	.99	1.16	1.09	.60	.31	.48	.34
April	1.46	1.04	.84	.64	1.12	.89	1.02	1.29	1.00	.66	.32	.46	.38
May	1.59	1.07	.77	.66	1.17	.84	1.10	1.35	.87	.62	.34	.41	.45
June	1.49	.90	.67	.72	1.07	.89	1.15	1.18	.87	.54	.36	.34	.53
July	1.32	.83	.63	.82	.96	1.02	1.05	1.05	1.11	.52	.33	.33	.68
AVERAGE	1.65	.99	.76	.67	1.21	.90	1.00	1.08	1.01	.80	.35	.40	.38

Rye Prices in Eastern Canada

The following page contains a long-time series of prices for rye in Ontario. The series extends from 1890 to 1933 and shows monthly average prices of No. 2 Rye at Toronto

Rye Prices - Ontario No. 2 Rye at Toronto (1)

(dollars per bushel)

	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900
January	.45	.58	.92	.48	.45	.42	.49	.36	.46	.53	.49
February	.44	.64	.75	.51	.47	.42	.48	.34	.48	.55	.49
March	.44	.71	.87	.54	.44	.42	.46	.33	.51	.56	.50
April	.45	.80	.80	.54	.45	.48	.45	.33	.48	.54	.52
May	.46	.79	.80	.51	.45	.57	.46	.33	.60	.53	.53
June	.48	.73	.64	.50	.45	.58	.44	.33	.60	.54	.50
July	.45	.71	.62	.49	.44	.60	.42	.32	.42	.53	.53
August	.45	.75	.60	.48	.44	.47	.40	.34	.48	.50	.49
September	.48	.75	.59	.46	.45	.43	.32	.41	-	.50	.50
October	.53	.80	.49	.44	.46	.44	.34	.40	.42	.55	.50
November	.57	.85	.49	.44	.40	.46	.35	.44	.49	.56	.46
December	.58	.88	.49	.44	.41	.47	.35	.46	.50	.50	.47
Yearly Average	.48	.75	.67	.48	.44	.48	.41	.36	.49	.53	.50
	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
January	.43	.58	.49	.52	.76	.70	.70	.80	.70	.70	.60
February	.48	.56	.51	.54	.76	.70	.70	.81	.67	.67	.63
March	.49	.57	.50	.55	.76	.68	.66	.85	.70	.68	.72
April	.50	.57	.51	.60	.72	.67	.64	.85	.73	.69	.72
May	.50	.58	.52	.60	.70	.70	.62	.88	.73	.68	.71
June	.50	.61	.52	.58	.62	.68	.70	.88	.74	.68	.71
July	.48	.50	.52	.58	.60	.62	.70	.88	.75	.68	.71
August	.46	.50	.52	.58	.60	.60	.65	.68	.75	.68	.71
September	.49	.48	.49	.59	.56	.59	.65	.70	.68	.68	.71
October	.49	.48	.50	.60	.62	.65	.75	.80	.68	.68	.80
November	.49	.49	.51	.74	.67	.75	.88	.79	.75	.67	.90
December	.55	.50	.52	.76	.70	.71	.82	.74	.73	.61	.92
Yearly Average	.49	.53	.51	.60	.67	.67	.70	.80	.71	.67	.74
	1912	1913	1914	1915	# 1916	1917	1918	1919	/ 1920	/ 1921	1922
January	.98	.72	.63	1.08	.90	1.39	1.78	1.46	1.77	1.55	.85
February	1.07	.64	.62	1.22	.91	1.40	2.05	1.25	1.78	1.54	.87
March	1.01	.62	.63	1.20	.86	1.45	2.42	1.43	1.84	1.52	.87
April	.91	.61	.63	1.08	.89	1.75	2.62	1.64	1.97	1.36	.95
May	.85	.61	.63	1.15	.92	1.98	2.25	1.68	2.20	1.37	.95
June	.85	.61	.63	1.09	.94	2.00	1.97	x 1.68	2.22	1.37	.95
July	.83	.61	.63	1.07	.95	2.05	1.88	x 1.68	2.22	1.25	.95
August	.75	.61	.66	.94	1.02	x 2.05	1.90	1.38	1.75	1.08	.72
September	.70	.61	.75	.72	1.16	1.76	x 1.90	1.38	1.75	1.00	.65
October	.75	.61	.81	.86	1.21	1.74	x 1.90	1.38	1.65	.91	.67
November	.81	.67	.84	# .87	1.38	1.74	1.67	1.38	1.62	.75	.79
December	.79	.66	1.03	# .87	1.37	1.77	1.56	1.50	1.51	.85	.82
Yearly Average	.86	.63	.72	1.03	1.05	1.71	2.03	1.50	1.86	1.21	.84
	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
January	.84	.72	1.34	.89	.95	1.03	1.05	.93	.35	.36	.30
February	.85	.77	1.39	.86	.97	1.05	1.05	.74	.35	.38	.31
March	.82	.77	1.16	.85	.97	x 1.05	1.05	.74	.35	.43	.31
April	.79	.76	1.00	.85	.98	x 1.05	1.05	.74	.35	.45	.33
May	.80	.76	1.02	.85	1.01	x 1.05	1.05	.74	.35	.45	.36
June	.79	.76	.98	.84	1.05	x 1.05	1.05	x .74	.35	.45	.38
July	.77	.76	-	.85	x 1.05	x 1.05	x 1.05	x .74	.35	.45	.46
August	# .61	.88	-	.89	.85	x 1.05	x 1.05	x .74	.35	.40	.46
September	.61	.91	-	.85	.89	.94	x 1.05	.61	.35	.35	.42
October	.74	1.10	-	.87	.94	1.02	1.05	.47	.35	.33	-
November	.74	1.09	.80	.89	.99	1.02	1.04	.45	.44	.31	-
December	.73	1.18	.80	.91	1.00	1.02	.98	.45	.43	.30	-
Yearly Average	.81	.87	1.10	.87	.96	1.04	1.04	.66	.36	.39	-

(1) Prepared by Internal Trade Branch, Dominion Bureau of Statistics.

x Nominal.

/ Rye No. 3 from 3rd week of January 1920 - January 1921.

November and December 1915 and January - July 1916 No. 1 Commercial 3/4 less than No. 2 Ontario.

The Export Market

The development of Canadian export trade in rye is indicated in the following table showing exports since 1878. The following table shows exports of rye from Canada from 1878 to 1915:

Fiscal Year	Exports of Rye			
	To United Kingdom	To United States	To Other Countries	To All Countries
	(Bushels)			
1878	2,537	404,207	9,081	415,825
1879	38,222	440,544	162,158	640,924
1880	37,040	560,324	360,456	957,820
1881	60,125	454,825	355,346	870,296
1882	2,450	893,787	385,441	1,281,678
1883	-	912,486	135,323	1,047,809
1884	-	628,530	244,439	872,969
1885	3,756	249,140	34,400	287,296
1886	-	164,324	6,440	170,764
1887	-	26,030	98,397	124,427
1888	-	26	-	26
1889	-	-	-	-
1890	34,387	237,042	165,264	436,693
1891	103,623	150,330	86,011	339,964
1892	59,222	111,503	50,526	221,251
1893	37,617	10,541	10,963	59,121
1894	45,544	51	17,377	62,972
1895	49,548	13,394	-	62,942
1896	-	29	-	29
1897	178,141	24	38,298	216,463
1898	513,149	5,163	621,234	1,139,546
1899	326,354	1,126	6	327,486
1900	472,416	2,156	-	474,572
1901	521,555	4	165,500	687,059
1902	377,913	8	21,359	399,280
1903	321,490	-	148,929	470,419
1904	45,347	33,783	22,410	101,540
1905	-	19,678	724	20,402
1906	-	4	-	4
1907x	-	-	41	41
1908	48,716	-	11,000	59,716
1909	58,076	4,005	147,298	209,379
1910	42,113	10,388	52,554	105,055
1911	-	71,908	1,605	73,513
1912	-	11,670	-	11,670
1913	25,544	616	-	26,160
1914	95,413	16,978	45	112,436
1915	-	146,055	30,085	263,422

x Nine Months only.

The foregoing table shows exports of rye from Canada from 1878 to 1915. It is noted that from 1878 to 1884 the United States provided the chief market for Canadian rye. In 1885, however, the United States ceased to import Canadian rye in quantity and exports to the United States since that time have been small. From 1890 to 1903 the British market expanded somewhat but exports to the United Kingdom never exceeded 600,000 bushels.

Exports During Recent Years

The following table shows exports of rye from Canada from 1914-15 to 1932-33:

<u>Crop Years</u>	<u>Bushels</u>
1914-15	281,495
1915-16	835,720
1916-17	1,021,629
1917-18	1,011,806
1918-19	833,611
1919-20	2,344,132
1920-21	3,219,435
1921-22	4,521,010
1922-23	10,175,442
1923-24	7,571,653
1924-25	6,336,131
1925-26	6,222,961
1926-27	8,301,191
1927-28	11,265,030
1928-29	5,751,232
1929-30	347,789
1930-31	2,089,847
1931-32	9,047,138
1932-33	2,866,358

From the outbreak of the World War until 1922-23, Canadian exports of rye increased steadily. During 1922-23 rye exports amounted to over 10 million bushels. This increase in rye exports reflected the disorganization of European agriculture and the increased demand for rye in Europe. From 1923-24 to 1927-28 rye exports remained relatively steady, ranging from 6,222,961 bushels in 1925-26 to 11,265,030 bushels in 1927-28. In 1928-29 rye exports decreased to 5,751,232 bushels. In 1929-30 Canada was off an export basis for a considerable part of the crop year and markets for rye were limited. In this crop year, Canada exported only 347,789 bushels of rye and as a result year-end stocks increased from 4,219,750 bushels on July 31, 1929 to 9,190,705 bushels on July 31, 1930. With a record carry-over on hand, Canada produced a large rye crop in 1930 production amounting to 22,019,000 bushels. In 1930-31 exports of rye amounted to 2,089,847 bushels. While these exports marked an improvement over the previous year, they were not sufficient to move the surplus existing in Canada. On July 31, 1931 year-end stocks amounted to 14,435,795 bushels, a figure slightly in excess of average production for the past 10 years. In 1931 and 1932 small rye crops were harvested in Canada with the result that exports of 9,047,138 bushels in 1931-32 and 2,866,358 bushels in 1932-33 reduced year-end stocks from 14,435,795 bushels on July 31, 1931 to 5,814,727 bushels on July 31, 1933.

Trade in Rye

The marketing of surplus rye presents a different problem than that involved in the disposing of wheat, oats, and barley. In preceding studies on coarse grains published by the Dominion Bureau of Statistics,^x it was pointed out that the United Kingdom constituted a substantial market. In the case of rye, however, the United Kingdom is not interested to any extent. Imports in recent years have averaged less than 300,000 bushels. Almost the only foreign market for rye is found in continental Europe. During 1931 Europe imported 57 million bushels of rye, practically the entire volume of world imports. In this year the largest importers were Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, the Netherlands, Norway and Sweden.

Since the major part of the world's rye crop is produced and consumed in Europe (including Russia) it is only natural that there should be considerable trading in rye between European countries. In recent years the following European countries have exported rye: Russia, Germany, Poland, Belgium, Hungary and Roumania. Rye exports from these countries have been supplemented by exports from Canada, the Argentine and the United States.

^xThe Production and Distribution of Coarse grains (1) Oats (2) Barley - Dominion Bureau of Statistics (1933).

Exports of Rye

The following table shows world exports of rye from 1927 to 1931:-

Country	1927	1928	1929	1930	1931
	(Bushels)				
Canada	9,950,176	9,937,574	1,938,324	1,281,197	3,673,152
Algeria	36,691	54,470	68,907	57,647	37,148
Argentina	5,356,242	6,832,994	7,358,091	494,941	2,359,236
Austria	115,224	38,825	43,270	59,978	41,093
Belgium	18,302	73,418	9,169	25,688	590,138
Bulgaria	781,543	953,513	148,652	1,081,587	2,912,045
Czechoslovakia	45,750	447,510	2,936,374	1,753,217	210,110
Denmark	4,838	6,307	2,976	2,067	7,173
Estonia	272	134	1,110	787	51
France	3,205	4,539	4,228	10,122	63
Germany	4,905,591	15,904,311	21,744,226	9,456,613	3,342,756
Hungary	5,411,523	4,768,643	4,544,719	4,021,142	2,681,105
Italy	11,653	118	630	-	394
Latvia	19,066	11,685	11,570	9,633	736
Lithuania	7,141	121,948	327	252,325	191,284
Netherlands	508,877	355,364	185,741	231,306	1,539,112
Poland	347,817	278,280	7,889,081	15,075,632	5,225,121
Roumania	2,404,010	1,280,224	614,534	1,146,119	3,779,770
Sweden	967,485	429,731	177,934	3,673	7,413
Turkey	101,331	125,231	126,145	568,473	787,102
Union of Socialist					
Soviet Republics	13,977,314	383,961	44,605	25,417,563	43,652,777
United States	35,941,090	14,499,395	3,433,575	266,037	121,035
Yugoslavia	251,915	29,026	66,797	22,176	31
Other Countries	147,683	110,645	64,430	39,179	26,322
T o t a l	81,314,739	56,647,846	51,415,415	61,277,102	71,185,167

The foregoing table reveals the fact that outside of Europe, there are only three countries interested in exporting rye. These countries are Canada, the United States and the Argentine. A perusal of the above table shows an important development during the five years from 1927 to 1931. In 1927 the United States was the world's largest exporter of rye. In this year the United States exported 36 million bushels of rye as compared with world exports of 81 million bushels. Since 1927 rye exports from the United States have declined steadily and Russia has taken the place vacated by the Republic to the south. Russian exports of rye in 1931 amounted to 44 million bushels out of total exports of 71 million bushels. Canadian rye exports followed a downward trend during the five years. The decline of North American rye shipments and the increase in European exports may be illustrated by the following table:-

Exports of Rye from Canada, the Argentine and the United States
1924 to 1931.

	1924	1925	1926	1927
(Bushels)				
Canada	7,455,851	5,450,246	6,137,577	9,950,176
Argentine	3,184,754	213,015	2,913,505	5,356,242
United States	35,666,385	28,674,563	11,940,974	35,941,090
Total	46,306,990	34,337,824	21,002,056	51,247,508
Per cent of World Exports	54.1	55.0	33.7	62.6

	1928	1929	1930	1931
(Bushels)				
Canada	9,937,574	1,938,324	1,281,197	3,673,152
Argentine	6,832,994	7,358,091	494,941	2,359,236
United States	14,499,395	3,433,575	266,037	121,035
Total	31,269,963	12,729,990	2,042,175	6,153,423
Per cent of World Exports	53.6	24.9	4.0	10.8

The foregoing table shows the drastic decline that has taken place in the movement of rye from Ex-European exporting countries. During the five years from 1924 to 1928 exports of rye from Canada, United States and the Argentine averaged 51.8 per cent of total world exports. During the past three years shipments from these countries have averaged only 13.2 per cent of total world exports. In other words, during the five years from 1924 to 1928 Europe was able to supply 48.2 per cent of world exports. During the past 3 years Europe has supplied 86.8 per cent of world exports and European rye has dominated importing markets.

Many causes have contributed to this development in respect to rye. One of the chief factors has been the high yields per acre harvested in Europe during the past 4 years. Trade restrictions of many kinds are influencing the course of international movement of rye. The nearness of Russia to importing markets has rendered the Soviet a strong competitor in all rye markets. Price levels in the United States in recent years have been above world parity and hence the movement of rye from the United States has been curtailed. The sharp contraction in rye acreage in North America during the past three years may also be mentioned. Among European exporters

of rye, Russia, Germany, Poland, Hungary and Roumania stand out clearly. These countries in 1931 provided the greater part of world rye exports.

Imports of Rye

The following table shows imports of rye in the leading importing countries of the world:-

	1927	1928	1929	1930	1931
	(Bushels)				
United Kingdom	646,750	344,781	259,997	192,465	215,527
Austria	4,095,316	4,017,725	4,128,799	4,440,523	4,060,050
Belgium	1,615,738	298,606	982,772	2,832,249	6,876,941
Czechoslovakia	6,605,290	4,487,978	849,001	487,351	7,839,292
Denmark	7,478,212	6,473,551	8,675,054	12,957,913	10,382,714
Estonia	1,110,326	1,353,040	2,504,778	2,632,670	272,572
Finland	4,406,930	6,522,140	7,313,045	3,774,294	1,177,602
France	2,504,848	191,185	760,674	893,378	3,014,170
Germany	31,019,709	13,334,324	5,687,429	2,524,167	4,008,623
Greece	22,601	870	1,610	2,827	3,787
Italy	91,217	131,570	175,820	1,036,612	622,967
Latvia	2,116,577	3,256,598	4,988,461	2,352,335	302,291
Lithuania	91,756	306,114	535,258	295	2,094
Netherlands	4,445,448	3,311,292	4,147,708	7,253,796	10,117,823
Norway	7,091,342	5,379,426	5,454,872	6,113,290	6,302,464
Poland	5,171,572	4,237,003	56,769	17,121	180,241
Sweden	3,227,312	3,871,274	3,837,645	2,874,739	1,163,969
Switzerland	48,671	11,818	196,760	286,103	213,554
Turkey	1,941	20,562	209,566	405	12
Other countries	80,130	144,723	314,063	161,281	181
Total	81,871,686	58,299,580	51,080,081	50,634,314	56,756,874

The foregoing table shows the relatively small imports of rye into the United Kingdom where rye is not used to any extent. The chief rye importing countries are found in continental Europe. Germany and Poland are the chief rye producers outside of Russia and the part played by these two countries in rye trade forms an interesting study. A few years ago Germany was probably the largest importer of rye in the world. Germany also exports rye. The following table shows German imports and exports of rye from 1924 to 1928.

	<u>Imports</u>	<u>Exports</u>
	(bushels)	
1924	20,277,270	1,663,028
1925	14,202,722	6,941,592
1926	9,668,872	11,044,577
1927	31,019,709	4,905,591
1928	13,334,324	15,904,311
Total	88,502,897	40,459,099

The above table shows that Germany was, on balance, an importer of rye from 1924 to 1928. In two years, 1926 and 1928, exports exceeded imports, but over the five year period imports greatly exceeded exports.

During the past four years the situation has been different as shown by the following table:-

	<u>Imports</u>	<u>Exports</u>
	(Bushels)	
1929	5,687,429	4,905,591
1930	2,324,167	15,904,311
1931	4,008,623	21,744,226
1932	25,434,550	3,646,578
Total	<u>37,454,769</u>	<u>46,200,706</u>

During 1930 and 1931 exports of rye from Germany greatly exceeded imports. This situation was due in part to the accumulation of surplus rye in 1929 and the endeavour of the German government to promote the consumption of stocks on hand. In 1932, Germany again returned to an import basis. The foregoing figures show that Germany is, on balance, either an importing or exporting country depending upon internal production and demand. The situation in Germany will be dealt with further when governmental policies in respect to rye are considered.

The rye situation in Poland resembles that of Germany in many respects. Another large rye producer, Poland exports and imports from year to year. The following table shows exports and imports from 1924 to 1931:-

	<u>Imports</u>	<u>Exports</u>
	(Bushels)	
1924	3,008	4,191,005
1925	2,587,475	6,970,669
1926	329,325	8,767,172
1927	5,171,572	347,817
1928	4,237,003	273,280
1929	56,769	7,889,081
1930	17,121	15,075,632
1931	180,241	5,225,121

During recent years Poland has become chiefly an exporting country whereas up to 1928 imports of rye were frequent. Governmental aids to the rye industry in Poland have accounted for the increase in exports and decrease in imports since 1929.

Austria, Czechoslovakia, Denmark, the Netherlands, Norway and Sweden constitute a group of countries which import rye on a continuous basis. Imports into Austria have averaged slightly over 4 million bushels in recent years. Apart from 1929 and 1930 when exports exceeded imports, Czechoslovakia has imported from 4 to 7 million bushels per year. Denmark imports from 6 to 13 million bushels with imports tending higher in recent years. From 1927 to 1931 imports of rye into the Netherlands ranged from 3 to 10 million bushels. Imports into Norway have been steady and range between 5 and 7 million bushels. Sweden imported from 1 million to 4 million bushels per year between 1927 and 1931.

Total Imports

Total world imports of rye amounted to about 82 million bushels in 1927. In 1928 imports declined sharply to about 58 million bushels and reached a low point of 50 to 51 million bushels in 1929 and 1930. Imports of rye have declined as Germany and Poland have taken more interest in exporting than importing rye in recent years.

World Acreage and Production of Rye

Acreage

The following table shows the area sown to rye in the leading rye producing countries of the world:-

Europe

	Average 1925-29	1930	1931	1932	1933
(Thousand Acres)					
Germany	11,614	11,642	10,788	10,996	11,179
Austria	946	927	934	944	977
Belgium	568	574	553	562	553
Bulgaria	481	657	600	544	523
Denmark	448	369	332	296	296x
Spain	1,717	1,551	1,516	1,516	1,458
Estonia	354	367	356	364	376
Finland	553	556	554	538	563
France	1,953	1,878	1,760	1,732	1,714
Greece	121	163	172	163	191
Hungary	1,649	1,611	1,486	1,553	1,674
Italy	307	302	304	294	285
Latvia	627	660	572	593	637
Lithuania	1,192	1,197	1,257	1,194	1,210
Luxembourg	17	22	16	20	20
Norway	21	19	15	16	16x
Netherlands	489	475	445	410	406
Poland	14,016	14,567	14,263	13,951	14,312
Portugal	488	406	427	366	366x
Roumania	720	968	1,006	861	944
Sweden	741	595	511	516	546
Switzerland	49	49	46	46	46
Czechoslovakia	2,535	2,599	2,470	2,585	2,595
Yugoslavia	531	626	603	511	530
Total	42,137	42,780	40,986	40,571	41,417

x 1932 figures.

North America

	Average 1925-29	1930	1931	1932	1933
(Thousand Acres)					
Canada	794	1,184	778	774	583
United States	3,546	3,543	3,143	3,326	2,716
Total	4,340	4,727	3,921	4,100	3,299

South America

Argentine	901	1,322	1,378	1,624	1,730
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About 88 per cent of the world's (excluding Russia) rye acreage is found in Europe. World rye acreage amounts to about 45 million acres excluding Russia, and of this amount slightly more than 40 million acres are found in Europe. Of European rye acreage (excluding Russia) over 60 per cent lies in Poland and Germany. These two countries are the chief rye producers in the world outside of Soviet Russia and annually seed about 25 million acres of rye--or the equivalent of Canada's wheat acreage.

Russia, of course, is the largest producer and consumer of rye in the world. The International Institute of Agriculture estimates that Russian rye acreage in 1933 amounted to 63,000,000 acres. If this figure is correct, Russia has a greater area devoted to rye production than all other countries in the world combined.

It is significant that world trade in rye is very small and therefore rye production is largely consumed in the countries where it is produced. Germany, Poland and Russia are the largest producers of rye in the world and are likewise the largest consumers of this grain.

Rye acreage in the four chief wheat exporting countries is relatively small, amounting to about 11 per cent of the world's total, excluding Russia.

Production

The following table shows rye production in the leading producing areas:

	<u>Europe</u>				
	Average 1925-29	1930	1931	1932	1933
	(Thousand bushels)				
Germany	299,040	302,317	262,982	329,261	344,451
Austria	20,102	20,636	18,931	24,377	32,066
Belgium	21,797	18,630	20,483	23,662	22,019
Bulgaria	7,329	12,620	10,653	10,136	10,865
Denmark	11,337	10,026	8,406	8,661	8,661
Spain	23,847	21,544	21,103	25,905	19,986
Estonia	5,937	8,885	5,820	7,113	7,598
Finland	11,985	14,104	11,792	12,966	14,027
France	35,648	29,255	29,519	33,876	36,718x
Greece	1,549	1,866	1,800	2,629	3,255
Hungary	30,064	28,406	21,672	30,301	37,191
Italy	8,516	6,127	6,521	6,313	6,794
Latvia	9,335	14,377	5,615	11,795	13,828
Lithuania	20,379	25,177	16,282	20,808	25,096
Luxembourg	367	480	336	496	549
Norway	580	556	378	522	438
Netherlands	15,832	14,892	14,167	13,661	13,688
Poland	243,534	273,928	224,504	240,560	251,565
Portugal	4,401	4,901	5,070	6,411	3,615
Roumania	10,662	18,288	13,962	10,513	15,747
Sweden	12,609	18,005	11,745	17,094	18,267
Switzerland	1,629	1,484	1,402	1,481	1,476
Czechoslovakia	66,099	70,374	54,631	85,661	77,497
Yugoslavia	7,407	7,825	7,614	8,328	8,328x
Total	874,985	924,703	775,388	932,528	973,725

x 1932 figures.

North America

	Average 1925-29	1930	1931	1932	1933
(Thousand bushels)					
Canada	12,937	22,018	5,322	8,938	4,725
United States	44,737	45,379	32,746	40,409	23,116
Total	57,674	67,397	38,068	49,347	27,841

South America

	(Thousand bushels)			
Argentine	5,986	4,724	9,055	11,811

World production of rye is chiefly located in Europe as shown by the foregoing table. North American production in 1933 amounted to 28 million bushels, while European production, exclusive of Russia, amounted to 974 million bushels. In addition Russia probably produces from 800 to 900 million bushels of rye or nearly as much as all other European countries combined.

The Argentine has been increasing rye acreage and production in recent years. The area sown to rye in the Argentine in 1933 is nearly double the average acreage sown from 1925 to 1929. As yet no estimate has been made of 1933 rye production in this country.

Russia, Germany and Poland are the largest rye producing countries in the world and annually harvest a large percentage of the total world rye crop. In addition rye is produced in moderate proportions in most European countries.

Rye acreage has not been increased in Europe in recent years as has been the case with wheat. In fact rye acreage has decreased slightly since 1930, and 1933 rye acreage in Europe, excluding Russia, was about 600,000 acres less than the average acreage from 1925 to 1929. It is apparent from these statistics that, in general, European agricultural policies have been designed to encourage wheat production rather than rye production. Among countries which have decreased their rye acreages in the past five years may be mentioned Germany, Spain, France, Italy, the Netherlands, Norway and Sweden. It is significant that the foregoing group of countries have all been active in supporting wheat prices and encouraging wheat production.

It is also thought that rye acreage in Europe, excluding Russia, is lower than in pre-war years. It is very difficult to establish a pre-war and post-war comparison because the chief rye producing countries were involved in boundary changes as a result of the war. The fact that rye acreage has not increased in recent years may constitute evidence to support the view that in some countries at least the dietary trend is toward wheaten breadstuffs.

Governmental Policies in Respect to Rye.

Being a substitute for wheat or a potential substitute for wheat, rye has been affected by many forms of governmental regulation. These regulatory measures have taken the form of restriction of imports, tariff protection and price supporting measures. In many cases control measures have been applied to rye as assistance to policies directed in the first instance toward wheat. A brief review of some of the measures affecting rye is contained in the following paragraphs.

Germany.

Germany has probably taken more action in respect to rye than any other country. Several reasons lie behind this situation. In the first place, Germany produces more rye than wheat and policies directed toward the maintenance of wheat prices naturally had to be supplemented by action in regard to rye. In a broad sense high wheat prices could not be maintained in Germany along with low rye prices. In the second place, Germany has alternated between an export and import basis in recent years and the difficulty of maintaining rye prices in the face of occasional surpluses has been marked. And finally exporting countries, especially Russia and the Danubian countries, have offered rye at very low prices since 1929 with the result that rye prices on the international market have fallen exceptionally low. Export subsidies have added to the pressure of supplies.

The simplest form of protection given to rye producers in Germany has been the imposition of import duties. These duties have been increased in recent years along with wheat duties. At the present time the import duty on wheat amounts to \$1.62 per bushel, while the import duty on rye amounts to \$1.21 per bushel. This tariff structure provides the background of German policy in respect to rye.

Supplementary policies have been added from time to time to meet what were considered as emergency conditions. Germany has recognized its geographical characteristics for many years. In general, the eastern part of Germany produces a surplus of cereals, while the large industrial populations are located in western Germany. For many years it has been customary for eastern Germany to export a part of its cereal surplus through eastern ports and western Germany has imported through western ports. This movement of cereals is due to the fact that for many years eastern Germany could get better prices for cereals by selling them abroad in the Scandinavian countries, Belgium, Netherlands or the United Kingdom rather than by shipping westward through internal Germany to the Rhine area. Also the breadstuffs of Germany were improved by the admixture of foreign grains. The system allowed Germany to import without changing the domestic supply situation. This method of trading has been fostered by the German Government by the granting of import certificates equivalent to the volume of grain exported. The import certificates carried a low rate of duty or allowed imports to be made duty free. Facilitating exports also assisted in maintaining prices in the months succeeding harvest when domestic supplies were large. In the past crop year import certificates were granted for all rye exported during the period from August 1 to October 31 and carried duty free privileges. Certificates issued for rye exported late in the season, that is, after October 31 carried a small import duty. This regulation was designed to promote export sales early in the crop year when the domestic market was well supplied.

Another method of control in respect to rye has been the setting up of milling regulations to suit the volume of production. In 1931 Germany had a relatively small rye crop. The Government decreed that millers must make at least a 70 per cent extraction from all rye milled. This regulation tended to make the limited supply of rye go as far as possible. In 1932, however, Germany harvested a large rye crop and supplies were plentiful. The Government then established a rye extraction of 55 to 65 per cent. This regulation tended to improve the quality of rye flour, promote consumption of rye products and increase the quantity of rye required to make a barrel of flour. By determining the rate of extraction in the milling of rye, the Government has a method of dealing within limits with conditions of surplus or scarcity.

In 1930, Germany had a rye surplus and some of this surplus was diverted to the feeding industry. A quantity of rye was "eosined" thereby rendering it unfit for human consumption. The eosine rye was handled by a semi-official grain company and was offered to hog feeders in north-western Germany at a relatively low price. To cover losses in the sale of de-natured rye, the company was allowed to import feed barley under a greatly reduced import duty. The profit on the barley was supposed to cover the loss on rye. Under this operation, surplus rye was diverted to the hog raising industry. Imports of feed grains were thereby reduced.

In 1932 Germany had a surplus of rye and in addition, the company previously referred to, had a surplus of imported Russian rye. To move these stocks, the Government allowed the company to sell this rye in combination with domestic rye and barley. The mixture consisted of 50 per cent Russian rye, 25 per cent German rye and 25 per cent German barley. The mixture was offered to farmers at a low price. This method of disposal opened a new outlet for domestic grains, assisted the feeding industry and lessened imports of feed grains.

The foregoing paragraphs indicate some of the most important measures taken by Germany to deal with the current position of rye.

Poland

As one of the large rye producing and consuming countries of the world, the action of the Polish Government on behalf of rye is interesting.

Poland has used import duties as has Germany. The 1924 tariffs in Poland formed the basis of the tariff structure up to 1933 but revisions have been made from time to time. In 1931 the import duty on rye was increased from 31 to 48 cents per bushel.

In December, 1931 the Polish Government applied a system of import prohibitions covering many commodities. Prohibitions were to remain in effect until such time as the Government could see fit to establish import quotas. These regulations applied to cereals.

Poland has subsidizing exports. In 1929 the Government commenced a policy of granting "customs receipts" on exports of specified products. These receipts are honoured in paying import duties on imported products and in some cases are redeemable in cash. Exports of cereals including rye are included in the list of commodities for which custom receipts are issued for exports actually made. The system in effect acts as a direct subsidy on exports.

Rye has played an important part in Poland's cereal policy in recent years. Protection given to the rye producer from 1924 to 1928 has materially increased domestic production of rye and in 1929 Poland had a large surplus. The Government had accumulated about 20 million bushels of rye in the course of supporting prices. The quality of this stock was very poor and steps had to be taken to feed this rye. Exports were pushed but Germany at this time also had a rye surplus and Polish-German competition seriously threatened to drive rye prices on the international market to even lower levels. Early in 1930 Germany and Poland signed a rye agreement. The agreement simply provided for regulated exports from each country and co-operation in selling. The agreement provided that 6 bushels of German rye would be exported for 4 bushels of Polish rye. Sales would not be made below an established price. Both countries agreed to pay bounties on exports. The agreement was modified in July, 1930 and Poland received a larger share of joint exports. Under the agreement Poland actually exported more rye than Germany. The withdrawal of German bounties in 1931 interfered with exports from that country. In June, 1931 the agreement was cancelled. Poland then established a Cereal Export Bureau with a view to promoting wheat and rye exports.

Poland also has legislation in effect to control the rate of extraction in domestic mills. This legislation is similar to that in effect in Germany.

Czechoslovakia

In 1925 Czechoslovakia placed import duties on a wide range of farm products including cereals. Sliding scale duties were levied, the duty increasing with decreases in price. In 1926, sliding scale duties were replaced with fixed duties. In 1930 sliding scale duties were again applied on cereals, the import duty to be increased as prices fell below a stated level. In 1933 the rye duty amounted to over 50 cents per bushels.

Czechoslovakia maintains milling quotas applicable to wheat and rye. These quotas establish the percentage of imported wheat or rye which can be used at any time. The quotas are flexible and can be changed to meet particular conditions in the domestic market.

In 1931 Czechoslovakia established a system of import licenses for farm products. This regulation made it necessary for importers to obtain a license before importing grains. In this way imports were carefully controlled.

In 1932 a Grain Importing Syndicate was established to control imports of cereals into Czechoslovakia. The organization is designed to regulate domestic cereal prices by controlling imports. The Syndicate establishes monthly import quotas and importers must secure a license to import. Regulations governing the importation of rye have been severe as the pressure of domestic crops has made it difficult to maintain prices.

Finland

Finland is an agricultural country but has to import certain classes of farm products including cereals. Domestic markets have been protected by the imposition of tariffs. In 1930 and 1931 import duties on rye were increased. Finland also employs milling quotas and mills must use a certain percentage of domestic rye in manufacturing rye flour. The quotas are intended to permit the utilization of domestic rye production of milling quality.

NORWAY

Norway has legislated in respect to cereals on several different occasions. During the war an import monopoly was formed to purchase home-grown grain and import such quantities as were required. This legislation was revised in 1926 and again in 1928. The law enacted in the latter year provided as follows:

1. That the monopoly purchase all wheat, rye, oats and barley offered by domestic producers at established prices.
2. That the monopoly sell its stocks to flour mills and other consumers.
3. That the monopoly has the sole right to import and export cereals.

The importation of rye into Norway is a state monopoly as outlined above.

SWEDEN

Sweden has milling quotas in effect governing the use of wheat and rye. The Government is able to control the volume of foreign and domestic rye being used by changing the milling quotas from time to time. In addition, the Government requires millers to purchase the domestic surplus at fixed prices. Any domestic wheat or rye which is left at the end of the cereal year must be purchased by the milling industry. Under this legislation millers regulate their purchasing in such a way as to utilize the entire domestic production of these grains.

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