WHEAT STUDIES

OF THE

FOOD RESEARCH INSTITUTE

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THE WORLD WHEAT SITUATION, 1927-28

A REVIEW OF THE CROP YEAR

THE wheat year under review, like the year preceding, was a fairly normal one, taking account of upward trends in production, trade, and utilization. World acreage set a new record. Yield per acre, though not extraordinarily high, was above the post-war average. Excluding Russia, the 1927–28 crop approximated the big crops of 1915 and 1923. Russia included, the world outturn was a little above that of 1926, and was exceeded only by the bumper crop of 1915. Distinctly large crops were harvested in Canada, South America, and a few European countries, and distinctly small ones only in Australia, Jugo-Slavia, and the soft red winter-wheat belt of the United States; but in general the crop distribution was not extreme. Wet harvests, in Canada and part of Europe, lowered grades and damaged quality.

International trade was heavy, though not quite as large as in 1926–27 or in 1923–24. The great exporters—Canada, the United States, and Argentina—furnished an unusually large proportion of total exports. The international position was neither tight nor easy. Prices in general continued the decline from the high level of 1924–25, but were about midway between that peak and the trough of 1923–24. Commercial visibles ran high, and were exceptionally heavy at the close of the year, especially in Canada; but the total outward carryover probably did not exceed the large carryin.

Bad prospects for the 1928 crop, especially in the United States and to some extent in Europe, caused sharp advances in prices from February to April 1928. After May 1, however, a general and marked improvement in new-crop prospects, coupled with the weight of visible supplies, caused a spectacular price decline which continued beyond the end of the crop year.

STANFORD UNIVERSITY, CALIFORNIA

December 1928

WHEAT STUDIES

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The central feature of the series is a periodic analysis of the world wheat situation, with special reference to the outlook for supplies, requirements, trade, and prices. Each volume includes a comprehensive review of the preceding crop year, and three surveys of current developments at intervals of about four months. These issues contain a careful selection of relevant statistical material, presented in detail in appendix tables for reference purposes, and in summary form in text tables and charts.

Each volume also includes six special studies bearing on the interpretation of the wheat situation and outlook or upon important problems of national policy. Subjects of issues published in recent volumes are listed inside the back cover.

The series is designed to serve the needs of all serious students of the wheat market, in business, government, and academic circles, by summarizing and interpreting basic facts and presenting current developments in due perspective. The special studies are written not merely for students of the wheat market, but as well for various groups of readers who are especially concerned with the fields discussed.

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THE WORLD WHEAT SITUATION, 1927-28

A REVIEW OF THE CROP YEAR

This review is designed to present a balanced, comprehensive statement, in due perspective, of a year's developments in the world wheat situation, in the light of fuller information than is available in the course of the year. The series of annual reviews, of which this is the fifth, not merely furnishes a continuing historical record, but makes for an increasingly reliable understanding of the permanent factors in the wheat market and contributes an essential background and basis for analyses, judgments, and forecasts regarding current and future developments.

SUMMARY

Crop scares in the late winter of 1928, later to prove unjustified, constituted the major disturbing factor in what can otherwise be called a fairly normal wheat year. Apart from this, however, 1927–28 displayed a group of distinctive characteristics.

World wheat acreage, in continuation of its upward trend since the war, appears to have set a new record. The average world yield per acre, Russia excluded, was somewhat above the post-war average, but much lower than in the exceptionally good years 1915 and 1923. The world crop of 1927 was one of the three largest ever harvested. The crop, exclusive of Russia, was about as large as those of 1915 and 1923; inclusive of Russia, it approximated those of 1915 and 1926. But wheat disappearance both for food and seed, and perhaps for feed as well, has been tending definitely upward in recent years. Even per capita consumption for food appears to be tending upward except in English-speaking countries and France. Trends in absorption considered, therefore, the 1927 crop was not oppressively large.

Nor was the distribution an extreme one. There were few instances of record crops or exceedingly poor ones. Large outturns in Canada and Argentina and a good crop in the United States coincided with fair crops in Europe and Russia, a mediocre one in India, and a short crop in Australia. Hence three countries of North and South America, which usually furnish the great bulk of the export wheat, contributed an even larger proportion than usual.

The international statistical position was neither tight nor easy. Exportable surpluses were substantial, but so also were import requirements. Europe's import demand was the larger because a wet harvest damaged considerable quantities of wheat and rye in countries north of the Alps, and because crops of feed grains were rather scanty, growth of livestock population considered.

The international movement of wheat was one of the heaviest in history. Net exports were around 820 million bushels, a little smaller than in 1923–24, and some 30 million bushels less than in 1926–27. Ex-European importing countries as a whole took more wheat than in 1926–27, while European importers took less. Europe's imports, however, decreased by less than the increase in domestic crops. This was attributable to lower wheat prices, larger quantities of unmillable wheat, higher prices of feed grains, and the upward trend of human consumption. Most countries of northern and central Europe imported more wheat than ever before. Because of short crops, Australia, Roumania, Jugo-Slavia, and India exported little wheat. Russia, whose good crop was situated unfavorably for export, furnished small exports and imported perhaps an equal amount toward the end of the year. But Canada, the United States, and Argentina were abundantly able to ship the quan-

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tities demanded abroad. Three noteworthy features of the international movement were the record aggregate shipments from the ports of the Pacific Northwest; the restricted exports from the United States in the second half of the crop year; and exceptionally large exports from Canada in the months of June and July.

Commercial visibles chiefly in the United States and Canada ran exceptionally high throughout the second half of the year; and total year-end stocks in the major exporting countries and afloat were somewhat the highest of any post-war year. Canadian stocks attained notably high levels, mainly because of a number of unpredictable caprices of the weather. European stocks, both of import and domestic wheat, however, on the whole appear to have declined in the course of the year. Hence the net change in world stocks was presumably slight, and the outward carryover, like the inward one, stood fairly high.

Export prices, and world prices by and large, were somewhat lower than in 1926–27, and roughly midway between the low post-war level of 1923–24 and the high level of 1924–25. Prices on the international import markets ruled lower than in 1926–27, partly because of a somewhat easier statistical position, but also because in part of 1926–27 these prices were abnormally enhanced in a period of high ocean freight rates peculiar to that year. Poor quality was a special factor contributing to depress prices in several European countries.

The outstanding features of the price movement were a rapid advance in February–April 1928, followed by a marked recession in the next three months. The rise was due to unfavorable new-crop prospects for winter wheat, especially in the United States but also in Europe, and had little relation to the supply position of 1927–28. The spectacular decline was due to marked improvement in the new-crop outlook, coupled with the pressure of exceptionally heavy visible supplies in export countries following a period of restrained sale. Both rise and fall were sharpest in the United States, where the reversal in crop prospects was most pronounced.

I. THE SUPPLY POSITION

Initial Carryovers

World stocks of wheat and flour significant in commerce were relatively large at the beginning of the crop year 1927–28, apparently larger than at the opening of any of the past six crop years except 1924–25.[1] In that year short crops and high prices led to heavy reductions in stocks. The level remained abnormally low in 1925–26. But in 1926–27, in consequence of abundant crops in exporting countries and moderately low prices, a substantial upbuilding of stocks took place in many countries. To large initial carryovers in 1927–28 were added the excellent crops of 1927.

North American Wheat Crops of 1927

According to official estimates now standing, the combined crop of the United States and Canada reached 1,318 million bushels in 1927. It exceeded the crop of 1926 by about 80 million bushels, and was clearly the largest outturn in history except for the bumper crop of 1915. The United States crop of 878 million bushels, though above average, was not of distinctly exceptional size; it had been approximately equaled[2] in three of the past eighteen years and exceeded in four. The Canadian crop, however, was the largest in history except for the 474 million bushel crop of 1923; and it was probably as large as that crop, since the official estimate of 440 million bushels seems below the truth.[3]

[1] See Table 7, p. 61.

[2] The crop of 1926, officially placed at 831 million bushels, appears to have been underestimated; and we reckon it about as large as the crop of 1927. The crop of 1927 is thought by many to have been overestimated; but in our judgment the fact is not clear. Disposition statistics (see Appendix Table XXXI) show a residual item covering feed, waste, and error in estimate of 81 million bushels, a figure in line with those of 1922–23, 1923–24, and 1924–25. Low figures for 1925–26 and 1926–27 indicate clearly that official estimates were too low in these two years; but whether or not the crops of 1922–24 and 1927 were overestimated remains uncertain. One can say with assurance only that the crop of 1927 certainly was not underestimated, and may have been slightly overestimated.

[3] See below, p. 56.

The winter-wheat crop of the United States proved a disappointment, after promising well throughout the winter and early spring. The area sown was considerably larger than in the preceding three years, though smaller than in the first five years after the war; and abandonment, while larger than in 1926, was not far above average.[1] Official estimates of condition as of April 1 and May 1 were somewhat higher than in any of the preceding five years; and early in May private and official forecasts of production[2] suggested a crop of around 600 million bushels, a fairly high figure in view of the acreage remaining for harvest. But expectations were reduced during May, especially with respect to the crop in the southwestern states and in the Ohio Valley; and condition on June 1 was officially placed at 72.2 per cent, the second lowest figure in seven years. There was some recovery in June, but threshing returns were disappointing. The latest official estimate indicated a per acre yield of 14.7 bushels and a crop of 553 million bushels—well above the distinctly poor crop of 1925 but otherwise somewhat the smallest crop of recent years. With the crop of 1926, some 627 million bushels, the 1927 crop compared the more unfavorably because the former was apparently underestimated.

By contrast, the United States spring-wheat crop of 1927 turned out remarkably well after a poor start. Seeding was delayed by excessive rainfall during April and early May. Nevertheless an area of 21.06 million acres was harvested, the largest ever recorded except in the three war years 1918, 1919, and 1920. Aside from rust infestation in the southeastern portion of the spring-wheat belt during July, the crop progressed favorably. Private forecasts of production as of June 1 averaged 233 million bushels; but the first official forecast as of July 1 was 274 million, and subsequent official forecasts and estimates were higher still.[3] By December 1 the official estimate stood at 319 million bushels, and the final estimate of 326 million gave a figure equaled or exceeded only three times since 1910. The crop was of record size for post-war years; it surpassed the very short crop of 1926 by over 120 million bushels or 60 per cent. The yield per acre of 15.5 bushels was notably high; in only four years since 1910 have higher figures been recorded.

Thus the large outturn of spring wheat offset the rather low outturn of winter wheat. The total 1927 crop of the United States finally ranked as a good one, approximately equal to those of 1922, 1924, and 1926, and clearly inferior only to those of 1914, 1915, 1918, and 1919.

In view of the many factors affecting quality — test weight, moisture content, dockage, protein content, and others—the general quality of the United States crop is always difficult to assess with precision. The evidence suggests, however, that the winter- and spring-wheat crops were both about average. Some 73 per cent of the winter-wheat crop graded Nos. 1 and 2, a figure considerably lower than that of 1926, when the crop was of unusually good quality, but about the same as in 1924 and 1925 and higher than in 1921–23.[4] About 71 per cent of the spring-wheat crop graded Nos. 1 and 2, a figure higher than those of 1921, 1923, 1925, and 1926, but lower than those of 1922 and 1924. On the basis of grading alone, the total crop appears to have been rather above average in quality than below. But the prevalence of exceptionally high premiums for protein content on hard red spring and hard red winter wheat suggests relatively poor quality with respect to this important factor. According to adjusted census data, the amount of wheat required to produce a barrel of flour was 4.689 bushels in 1927–28; the figure suggests better than average quality, since it was somewhat the lowest in the past eight years except for 1924–25 and 1926–27.[5]

In distribution by classes,[6] the crop of 1927 was noteworthy for the small outturn of soft red winter wheat, the large proportions of hard red spring and durum, and

[1] See Appendix Table VI.

[2] See Appendix Table VII.

[3] Private forecasts differed from the official in showing a decrease between August 1 and September 1; and October private estimates averaged some 20 million bushels below the official. Some students regard the official estimate now standing as too high; but conclusive evidence is not available.

[4] See Appendix Table VIII.

[5] For comparable figures, see below, p. 56.

[6] See Appendix Table IX.

the good crop of Pacific white. Among the states leading in the production of hard red winter wheat, Oklahoma harvested a notably poor crop, Nebraska the largest crop in her history. All of the leading producers of soft red winter wheat, Michigan excepted, secured poor crops; Illinois and Missouri suffered most. Of the four leading producers of hard red spring and durum, all but Minnesota had crops well above average in size; and Montana secured the largest outturn in her history, 80 million bushels. Idaho, Washington, Oregon, and California together harvested a crop of 131 million bushels, the largest in history except for that of 1923, though none of the four obtained a crop which had not been exceeded in several other years.

The Canadian crop of 1927 came through a series of vicissitudes with distinct success. Like the United States spring-wheat crop, it was sown late. The late sowing gave rise to more than the usual risk of damage from rust and frost during the growing season, but it did not greatly reduce acreage. The final official estimate of wheat area was 22.46 million acres, the highest figure on record except for those of 1921 and 1926.[1] Rainfall during June and July was ample; but rust infestation in its incipient stages was reported from Manitoba and parts of Saskatchewan during July and early August, and gave rise to much uneasiness in world markets. Progress of rust was retarded by cool weather. Accentuating the precarious condition, a serious frost occurred in some regions on August 7. Nevertheless, as early as August 1 private observers anticipated a distinctly large crop —400 million bushels or more; and the official forecast as of July 31, 357 million bushels, was generally regarded as too low. In spite of the frosts of August, the next official forecast of 459 million bushels was in line with unofficial estimates as of August 31. Harvest began late as a result of late sowing, and rain and snow hindered harvesting and threshing operations, delayed the flow of wheat to market, and gave rise to some reduction in later official estimates of production.[2] The final estimate was 440 million bushels. Many observers, however, regard this estimate as too low,[3] and our own calculations, which agree closely with others, suggest that it should be raised by some 40 million bushels.[4] Hence the Canadian crop of 1927 may in fact have equaled or even slightly exceeded the 474 million bushel crop of 1923. Yield per acre of 19.5 bushels was the highest since 1915, except for that of 1923.[5]

The crop was distinctly poor in quality. Weight per measured bushel was officially estimated as 58.75 pounds, the lowest since 1917 except for the crop of 1921. Grain unmerchantable and lost in cleaning was placed at 39 million bushels, the highest figure in the past eight years.[6] Protein content was the lowest in six years, according to data of the Canadian Pool; No. 3 Manitoba averaged only 11.80 per cent in protein content as against 12.40 per cent in 1926–27 and a six-year average of 13.08 per cent. The grading of the crop, as shown in Table 1, was the poorest of the past five years. Less than 1 per cent of the wheat inspected in the Western Division graded No. 1 Northern; only 7.7 per cent graded No. 2 Northern. The percentage grading No. 3 was relatively high, as was the proportion of Nos. 4, 5, and 6. As in 1926–27, a large proportion was classified as "No grade" on account of excessive moisture content; but this wheat apparently proved satisfactory for milling when properly dried. All told, the crop of 1927 contained far more than the usual proportion of frosted, rusted, and damp kernels, especially the last. Nevertheless the quantity of sound milling wheat obtainable under appropriate methods of cleaning and conditioning was distinctly large because the crop was large; the crop was of poor qual-

[1] See Appendix Table I.

[2] See Appendix Table XI.

[3] See especially *Foreign News on Wheat*, August 20, 1928, p. 18.

[4] See Appendix Table XXXI.

[5] Statistics of Canadian production, acreage, and yield per acre must be employed with caution. Fairly conclusive tests of the accuracy of production estimates may be secured for recent years, as shown in Appendix Table XXXI. But when production estimates are apparently erroneous, errors must have been made either in the acreage or in yield per acre estimates. In a country containing so large a pioneer area, the acreage would presumably tend to be underestimated rather than overestimated; but probably not by a constant percentage each year.

[6] See Appendix Table XXXI.

ity as compared with most other Canadian crops, but even so Canada produced a huge crop of millable wheat.

TABLE 1.—PERCENTAGES OF VARIOUS GRADES OF CANADIAN HARD RED SPRING WHEAT TO TOTAL WHEAT INSPECTED IN THE WESTERN DIVISION, SEPTEMBER–AUGUST 1923–28*

Classification	1923-24	1924-25	1925-26	1926-27	1927-28
No. 1 Northern ...	37.3	19.3	22.4	9.2	.9
No. 2 Northern ...	25.8	18.3	27.1	17.5	7.7
No. 3 Northern ...	22.9	18.6	13.9	7.8	22.3
Nos. 4, 5, 6	9.2	27.6	4.2	5.5	20.2
Feed, etc.[a]	3.1	1.8	1.3	2.6	1.5
No grade[b]	1.0	12.2	28.6	51.2	43.1
Total above	99.3	97.8	97.5	93.8	95.7

* Data from *Canadian Grain Statistics*.

[a] Includes also rejected, condemned, and no established grade.

[b] Wheat containing a higher proportion of moisture than wheat of numbered grades. Aside from higher moisture content, it may be of as good quality as the numbered grades, and is always better than feed, rejected, or condemned wheat.

EUROPEAN CROPS

The wheat crop of 1927 in Europe (ex-Russia) was relatively large—some 1,263 million bushels, according to the latest available official data,[1] as shown in Table 2. It ranked with the good crops of 1921, 1923, and 1926 rather than with the excellent one of 1925 or the poor ones of 1920, 1922, and 1924. Of the eleven European countries which ordinarily produce more than 30 million bushels of wheat, Hungary, Bulgaria, Germany, and Czecho-Slovakia secured the largest outturns of post-war years; the British Isles, France, Spain, Poland, and Roumania harvested crops slightly above the average of the preceding five years; and Italy and Jugo-Slavia obtained crops below average in size.[2] South and east of the Alps harvest operations appear on the whole to have been conducted under favorable conditions, and quality was good. But in France, Great Britain, Germany, Poland, and other countries lying mostly west and north of the Alps, heavy rains delayed the harvest and resulted in an unusual proportion of bleached, damp, and sprouted grain unfit for milling. Hence, with deductions for this unmillable grain, the total European crop compared somewhat the less favorably with the crops of preceding years. The precise quantity of unmillable wheat cannot, of course, be measured.

TABLE 2.—EUROPEAN (EX-RUSSIAN) GRAIN AND POTATO CROPS, 1920–27*

(Million bushels)

Year	Wheat	Rye	Potatoes	Corn	Barley	Oats
1920	946	533	3,351	520	551	1,478
1921	1,215	758	3,078	393	566	1,509
1922	1,038	713	4,803	423	598	1,544
1923	1,249	823	3,864	467	663	1,756
1924	1,050	651	4,201	590	577	1,628
1925	1,390	937	4,745	626	691	1,792
1926	1,203	745	3,840	665	689	1,922
1927	1,263	800	4,735	482	680	1,840
Average 1909–13 .	1,347	977	4,162	528	701	1,931
1922–26 .	1,186	774	4,290	554	644	1,728

* Summarized from most recent official data for individual countries, as reported by the U.S. Department of Agriculture. Excludes a few minor European producers. Pre-war averages are estimates for territory within present boundaries, and include 2-year or 4-year averages for a few countries.

The rye crop[3] of around 800 million bushels was also fairly large, being exceeded in post-war years only by the good crop of 1923 and the bumper crop of 1925. In effect the crop of 1927 was probably not so large as the bare figures suggest. It too suffered in quality from the unfavorable harvesting weather. And since Europe's production is largely concentrated in central and northern Europe, the proportion of unmillable grain was probably heavier in the rye than in the wheat crop. European crops of potatoes, barley, and oats were also among the largest of post-war years; but the corn crop of 1927 was relatively small.[4] With respect to the bread grains and potatoes, therefore, European native supplies appear to have been larger in 1927–28 than in any other post-war year except 1925–26; but supplies of feed grains were not as large as in 1926–27, and but little larger than in 1923–24. The feed grain supply situation of 1927–28 was relatively tight, not because of poor crops but because the European livestock count has

[1] Revisions of official estimates in the course of the year were insignificant and in general compensating.

[2] See Appendix Table III.

[3] See Appendix Table IV.

[4] See Appendix Table V.

been increasing and was unusually high in 1927.[1]

Russia also secured good crops in 1927. According to the latest official estimates, the wheat crop reached 749 million bushels, about the same as in 1925, some 70 million bushels smaller than in 1926, but otherwise much the largest of post-war years. Acreage was exceptionally large, but the yield per acre was low. The rye crop reached 933 million bushels, the largest of post-war years and 30 million above the crop of 1926. The potato crop was excellent. Russia apparently had available in 1927–28 some 40 million bushels less of the two bread grains than in 1926–27, though she had nearly 190 million bushels more of potatoes.

Other Northern Hemisphere Crops

In spite of a harvested acreage below the average of the preceding five years, and far below the high figures of 1926, the three French dependencies of northern Africa secured wheat crops totaling 61.2 million bushels, smaller only than the crops of 1923 and 1925. Egypt obtained the largest crop of post-war years from the largest acreage. For the third successive year India harvested a mediocre crop, some 335 million bushels. In the three years 1925–27, the Indian crops averaged 330 million bushels, while the good crops of the three preceding years averaged 367 million. Low yield per acre rather than low harvested acreage was responsible. The Japanese crop of 40.4 million bushels was slightly the largest since 1920. The Chinese and Manchurian crops, for which estimates are not available, are reported to have been of distinctly good size, certainly larger than those of 1925 and 1923.

Southern Hemisphere Wheat Crops

The wheat acreage of 1927 in both Argentina and Australia, in continuation of an upward trend, was the largest on record, despite drought in both countries during the seeding season. According to the official estimate, the Argentine crop of 239 million bushels was the largest in history except for that of 1923. Moreover, the standing estimate seems appreciably too low;[2] and the crop in reality may have exceeded that of 1923. It appears to have been well above average in quality. Chile and Uruguay also secured record crops. The Australian crop, however, was distinctly small, only 110 million bushels as compared with 161 million in 1926 and an average of 135 million in 1922–26. Yield per acre of 9.3 bushels was the lowest in recent years on account of deficient rainfall not only during the crucial months of August and September, but also in the seeding season. Quality, as usual, was good. New Zealand had a distinctly large crop, South Africa a small one. All told, the wheat crop in the Southern Hemisphere approximated 417 million bushels, without allowance for an underestimated crop in Argentina, a figure exceeded only in 1923 and 1926. Unlike the Canadian, the Southern Hemisphere crops progressed uneventfully after seeding was accomplished, and gave rise to few disturbances in prices in world markets.

World Wheat Crops Summarized

Charts 1, 2, and 3 summarize data on world wheat production, acreage, and yield per acre in 1927, with comparisons for earlier years. As Chart 1 shows, the world crop ex-Russia and China, according to the estimates of the United States Department of Agriculture, in 1927 reached approximately 3,543 million bushels. This outturn was exceeded only slightly by the crop of 1923, and was somewhat larger even than the crop of 1915. If probable underestimates of the Canadian and Argentine crops be considered, the world crop of 1927 was apparently the largest ever harvested. It exceeded the crop of 1926 by about 120 million bushels, more or less; precise comparisons are misleading in view of inaccuracies in crop estimates.[3] Including Russia, and again employing the Department's figures, the crop of 1927 reached about 4,290 mil-

[1] See *Agriculture Yearbook, 1927*, pp. 982, 1003 f.

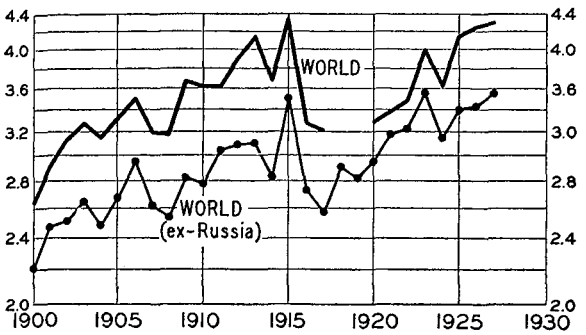
[2] See below, p. 57, and Appendix Table XXXI.

[3] Thus the French, American, and Canadian crops of 1926 appear to have been underestimated; the Canadian and Argentine crops of 1927 undesestimated; the American of 1927 (possibly) overestimated. But these errors cannot be measured precisely. Moreover, there is good reason to suppose that the

lion bushels, a higher outturn than in any other year except 1915, but only 60 million above the crop of 1926. Production either of the world or of the world ex-Russia appears to have fallen close to the line of post-war trend (measured from 1921 or 1922), but rather above than below. Broadly speaking, the year 1927 is to be regarded as a normal and not an exceptional year in wheat production.

CHART 1.—WORLD WHEAT PRODUCTION, 1900–1927*

(Billion bushels; logarithmic vertical scale)



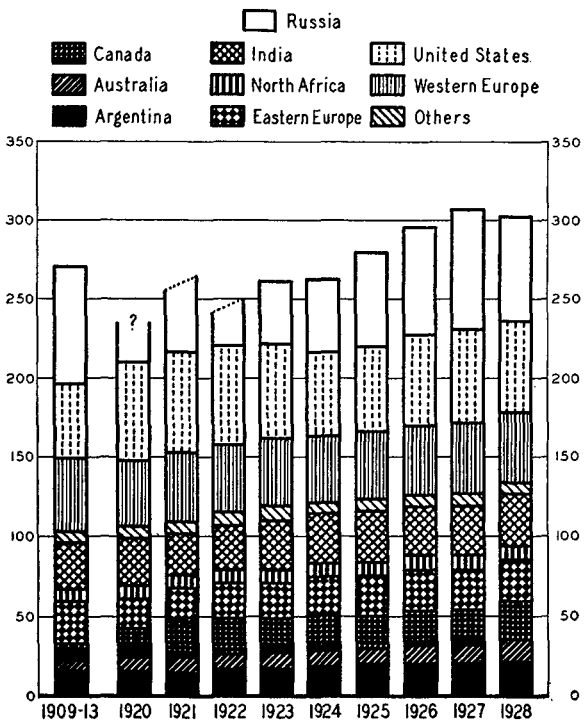
* Chiefly official data, supplemented by estimates of U.S. Department of Agriculture, from *Agriculture Yearbook 1927*, p. 748, and *Foreign Crops and Markets*. Russian production figures for 1923 and 1924 from *International Yearbook of Agricultural Statistics, 1926–27;* Russian figures for 1920–22 are incomplete.

Chart 2 shows trends in wheat acreage over the past nine years in comparison with the pre-war average. Expansion of acreage has proceeded without a break since 1920 in almost all regions except the United States and Russia, though most of the expansion is accounted for by Argentina, Australia, Canada,[1] and the countries of eastern Europe. Wheat acreage, including or excluding Russia, reached its highest point in 1927, and hence was partially responsible for the large world crop.

Chart 3 (p. 52) helps to explain the upward trend of wheat production since 1921 and the large crop of 1927. This chart shows yields per acre in the world ex-Russia and in different regions, in terms of percentage deviations from eight-year average yields, 1920–27. There was obviously an upward trend in yield per acre over this

CHART 2.—WORLD WHEAT ACREAGE, BY PRINCIPAL PRODUCING AREAS, AVERAGE 1909–13 AND ANNUALLY 1920–28*

(Million acres)



* Data from U.S. Department of Agriculture, *Agriculture Yearbooks* and *Foreign Crops and Markets*, and from *International Yearbooks of Agricultural Statistics*. Partly acreages sown, partly acreages harvested. For Russia, data not available in 1920; acreages in 1921 and 1922 estimated to lie within ranges indicated; acreage in 1924 shown 6.7 million acres below the latest revision, which was not available when chart was drawn.

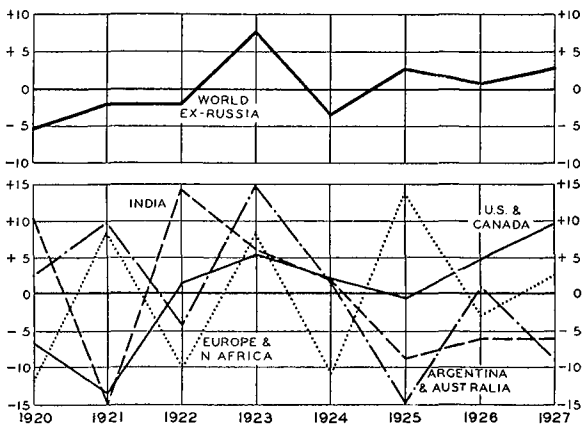
period; and such a trend is not unreasonable in view of the recovery of agriculture in Europe and improved methods of wheat production in other countries. But even a single year of yields as far below average as those of 1923 were above average would suffice to alter the direction of the trend substantially. Moreover, the period is too short, and fluctuations in yields are too large, to justify the statement that the post-war trend in world yield per acre is definitely upward on account of improved cultural practices. The chart is here presented to emphasize the broad facts that world yield per acre in 1927, though above aver-

American and Canadian crops of 1925 were underestimated; and reputable students believe that pre-war Russian crops were underestimated, and that German pre-war crops were overestimated while early post-war crops were underestimated. Further study might throw suspicion upon other estimates.

[1] The upward trend was not unbroken in Canada; but here the interruptions have been due chiefly not to intentional reduction of areas, but to unfavorable weather curtailing the area seeded.

age, was not extraordinarily high, as in 1923; and that only in Canada and the United States was yield per acre distinctly exceptional, some 9.5 per cent above average. In 1923, yield was high in all regions. The large world crop of 1927 was due to exceptional acreage and moderately high yield, whereas the large crop of 1923 was due to generally high yields per acre in a degree considerably more marked.

CHART 3.—WHEAT YIELDS PER ACRE IN PRINCIPAL PRODUCING AREAS, IN TERMS OF PERCENTAGE DEVIATIONS FROM THE AVERAGE, 1920–27*



* Computed from data of U.S. Department of Agriculture. See Appendix Table II.

Table 3 summarizes the distribution of world wheat crops. The outstanding feature of the distribution in 1927 was the relatively large proportion of the world crop produced in North and South America. The United States, Canada, and Argentina secured crops well above average in size; but the Australian and Indian were distinctly below average, and the European and northern African only a little above. The distribution differed from that of 1926 chiefly in that Russia and Australia had smaller crops, while the United States, Canada, Argentina, and the importing countries of Europe had distinctly larger ones. A striking similarity appears between the distribution of crops in 1927 and 1923, the only outstanding differences being the smaller crops of the United States and Russia, and the larger crop of India, in the earlier year. Like 1923 and 1926, the year 1927 was characterized by a much more normal distribution than those of 1924 and 1925. In 1924 the Canadian and European crops were abnormally small, the Australian abnormally large; in 1925 European crops were abnormally large, the American unusually small.

TABLE 3.—WHEAT PRODUCTION IN PRINCIPAL PRODUCING AREAS, PRE-WAR AND POST-WAR*

(Million bushels)

Year	United States	Canada	Soviet Russia	Lower Danube[a]	Other Europe	North Africa	India	Japan, Chosen	Northern Hemisphere ex-Russia	Argentina	Australia	Southern Hemisphere	World ex-Russia
1920.....	833	263	...	172	774	71	378	41	2,550	156	146	350	2,900
1921.....	815	301	...	212	1,002	98	250	40	2,726	191	129	376	3,102
1922.....	868	400	...	224	815	71	367	39	2,800	196	109	354	3,154
1923.....	797	474	419	260	989	106	372	35	3,051	248	125	427	3,478
1924.....	864	262	472	204	846	85	361	35	2,671	191	165	407	3,077
1925.....	676	395	730	296	1,094	105	331	40	2,949	191	115	360[b]	3,309[b]
1926.....	831	407	820	294	909	90	325	39	2,906	221	161	435[b]	3,341[b]
1927.....	878	440	749	278	986	106	335	40	3,076	239	110	417[b]	3,493[b]
1928.....	903	501	860	364	1,003	106	290	42	3,221	...	150	...	.....
Average 1909–13...	690	197	759[c]	330	1,017	93	352	32	2,725	147	90	280	3,005
1922–26...	807	388	610[d]	256	930	92	351	38	2,875	209	135	397	3,272

* Summarized from most recent official data for individual countries (see Appendix Table III), as reported by the U.S. Department of Agriculture. Totals exclude China, Asia Minor, Brazil, and a number of small producers. All estimates are for territory within post-war boundaries.

[a] Hungary, Bulgaria, Roumania, Jugo-Slavia.

[b] Includes our estimate for Peru.

[c] Regarded as too low by Soviet officials, whose estimate is 908 million bushels.

[d] Four-year average.

THE INTERNATIONAL STATISTICAL POSITION

The influences affecting international wheat prices are many. Among these, however, none seems more important (at least

in the absence of monetary disturbances which violently affect the general level of prices) than the relationship between exportable surpluses of wheat in exporting countries and the quantities of wheat required for import by importing countries. This relationship depends largely upon the distribution of wheat crops between importing and exporting countries. But precise measurements of both exportable surpluses and import requirements are not feasible; for crop estimates are subject to an indeterminate margin of error, and not much is known about trends in consumption.

The crop year 1927–28, however, was one in which the international statistical position was relatively easy. The margin between available exportable supplies and supplies required by importing countries to maintain consumption at a normal level was certainly wider than in the three preceding years, though not so wide as in 1923–24 and perhaps 1922–23. Broomhall's successive estimates for the past six years appear in Chart 4. In our judgment the margin of 1927–28 here appears too narrow by comparison with that of 1926–27; in actuality, the margin was presumably wider in 1927–28. Broomhall appears to have underestimated the extent of Europe's demand for wheat in the earlier months of 1926–27,[1] so that the margin in 1926–27 is made to appear wider than in fact it was.

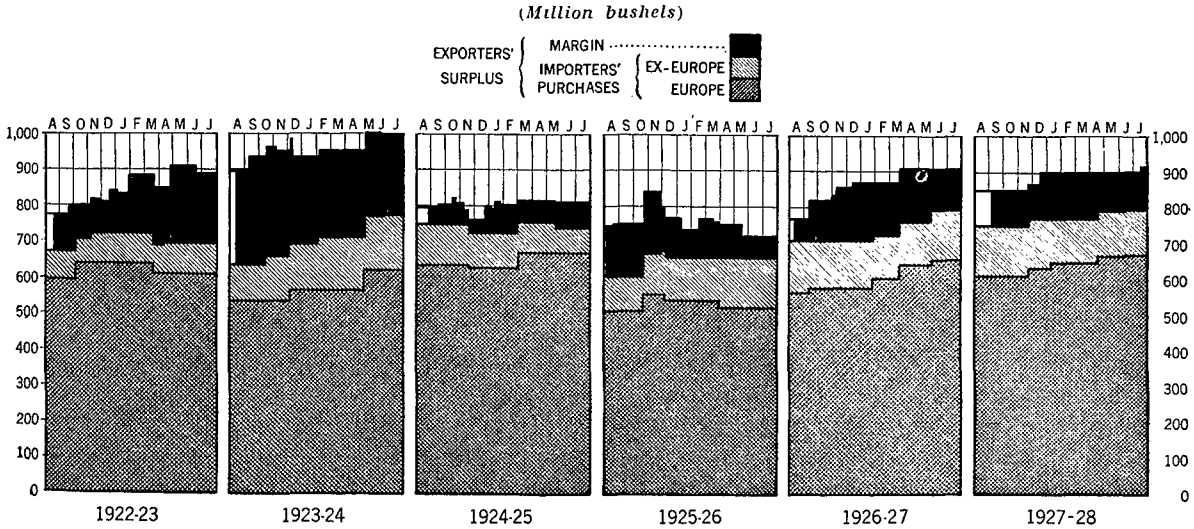
Further evidence bearing on the international statistical position is given in the following rounded figures, which show in million bushels the wheat crops of European importing countries (all Europe except Spain and the four Danube countries) in comparison with the crops of the four leading exporting countries. The latter are adjusted for apparent official underestimates in 1924–26.[2]

	1922	1923	1924	1925	1926	1927
European importers ..	690	830	725	930	760	840
Major exporters ..	1,570	1,640	1,500	1,440	1,675	1,730

In comparison with 1926–27, the year 1927–28 was characterized by considerably larger crops in European importing countries and by somewhat larger crops in the major exporting countries. But these figures, if used without qualification, exaggerate the ease of the statistical position in 1927–28. The margin between exportable

CHART 4.—BROOMHALL'S SUCCESSIVE FORECASTS OF EXPORTERS' SURPLUSES AND IMPORTERS' PURCHASES, 1922–23 TO 1927–28*

(*Million bushels*)



* Data from *Corn Trade News*. See Appendix Table XII for 1927–28 figures.

[1] See WHEAT STUDIES, IV, 9.

[2] These underestimates appear to have reached about 15 million bushels in 1924, 65 million in 1925, 55 million in 1926, and 65 million in 1927. See Appendix Table XXXI.

surpluses and import "requirements" was by no means 135 million bushels larger in 1927–28 than in 1926–27, as might at first glance be inferred from the figures given above. European consumption requirements due to growth of population alone apparently increase by some 15 million bushels a year,[1] and per capita consumption is also increasing; ex-European requirements increase by 3 or 4 million;[2] and requirements in the major exporting countries increase by some 15 million.[3] Moreover, Russia proved to have available for export in 1927–28 some 40–50 million bushels less than in 1926–27; and India and the Danube basin had about 15 million less, though Chile and northern Africa had a little more. Allowances merely for these factors suggest that the margin was only about half as large as the crop figures seem to show. Furthermore, the poorer quality of the Canadian and northern European wheat crops, and the smaller European crops of feed grains, served to narrow the margin between exportable surpluses and import "requirements" of wheat still further. All told, exportable surpluses throughout the world, if calculated without reference to changes in wheat stocks, appear to have been no larger in 1927–28 than in 1926–27, principally because of small exportation from Russia. But stocks were relatively low at the opening of 1926–27, high at the opening of 1927–28; hence exportable surpluses in effect were larger in the year under review. With import "requirements" smaller, the statistical position was easier. Once the Canadian crop was assured, the broad fact was fairly clear. After mid-November, Broomhall and other students made few important changes in their estimates during the course of the year;[4] and prices remained relatively stable until new-crop prospects, especially in the winter-wheat belt of the United States, began to exert their influence in the spring.

II. CONSUMPTION

Reliable measurement of the quantities of wheat annually used respectively for human food, for animal feed, and for seed is impossible even in a few countries where the data are fullest; and in most countries even reasonable estimates are rendered difficult by the lack of essential statistics. Calculations are usually uncertain because so little is known about dockage, the feeding of wheat to animals, and changes in stocks of wheat and flour; but in most countries milling statistics also are deficient, and even crop estimates are not trustworthy within narrow limits. The situation is clearer in the major exporting countries than elsewhere, but generalizations, based even on careful study, must be accepted with some reserve. We offer the following provisional statements for what they may be worth, in view of the importance of the subject rather than because our analysis is exhaustive.

Trends of Utilization

The quantity of wheat used for seed must have tended upward during the post-war period, for acreage has increased in most regions (see Chart 2, p. 51), while the quantity sown per acre presumably remains fairly constant. From 1920 to 1927, the wheat area of the world exclusive of Russia and China increased on the average about 3 million acres per year, with fluctuations in the annual totals due principally to changes in the United States. If sowings per acre average 1.5 to 2 bushels, the annual increase in the use of wheat for seed approximates 4–6 million bushels, and the increase for the period may have amounted to 30–45 million bushels. Since the area sown in 1927–28 for the crop of 1928–29 was about 5 million acres larger than the area sown for the crop of 1927–28, seed use of wheat in the world ex-Russia was apparently the highest on record in post-war years; but reduction of the acreage in Russia may have offset the increase elsewhere.

[1] Estimate derived from population statistics and an estimated per capita disappearance of approximately 4.8 bushels per year during 1922–27.

[2] See "Ex-European Trade in Wheat and Flour," Wheat Studies, August 1928, IV, 345.

[3] Based on seed and consumption estimates shown in Appendix Table XXXI.

[4] See Appendix Table XII.

In most countries of the world, wheat consumed for human food apparently has tended since the war to increase not only with growth of population but also per capita. Some rough evidence to this effect is given in Table 4. This table shows apparent increases and decreases in per capita disappearance of wheat—sometimes for human consumption only, sometimes for food, feed, waste, and seed—in terms of annual averages, between the period 1922–23 to 1924–25 and the period 1925–26 to 1927–28. The use of averages serves in considerable degree to eliminate changes in apparent consumption due to changes in wheat and flour stocks; but for all except the major exporting countries, the per capita figures include wheat wasted and fed to domestic animals. Hence in most instances the figures give only an approximation to the trend of human consumption. Interpretation of the data cannot be pressed far in view of possible inaccuracies in crop estimates and population estimates.

TABLE 4.—APPROXIMATE ANNUAL PER CAPITA CONSUMPTION OF WHEAT IN DIFFERENT REGIONS, AVERAGES 1922–25 AND 1925–28*

(Bushels)

Country or region	1922–23 to 1924–25	1925–26 to 1927–28	Percentage change
United States[a]	4.22	4.14	— 1.9
Canada[a]	4.56	4.53	— .7
Australia[a]	4.87	4.81	— 1.2
Argentina[a]	4.72	5.42	+14.8
India[b]	1.06	1.00	— 5.7
British Isles[c]	5.90	5.74	— 2.7
France[c]	7.24	7.13	— 1.5
Germany[c]	2.09	2.85	+36.4
Italy[c]	6.49	6.87	+ 5.9
Danube countries[c,d]	3.84	4.58	+19.3
Other Eastern Europe[c,e]	2.26	2.53	+11.9
Other Western Europe[c,f]	4.58	4.74	+ 3.5
Japan[b]	.79	.79	0.0

* Calculated chiefly from population estimates and data shown in Appendix Tables XXIX and XXXI.

[a] Human consumption only. See Appendix Table XXXI.

[b] Disappearance for all categories.

[c] Disappearance for all categories except seed.

[d] Hungary, Bulgaria, Jugo-Slavia, Roumania.

[e] Austria, Czecho-Slovakia, Poland, Finland, Latvia.

[f] Netherlands, Belgium, Denmark, Norway, Sweden, Switzerland.

It is of interest to observe, however, that only in the United States, Canada, Australia, the British Isles, India, and France is there an indication of declining consumption per capita. For all of these countries the declines are so small as to fall within the probable margin of error in the figures; and in India the apparent decline is clearly attributable to three successive large crops in 1922–24 and three successive mediocre ones in 1925–27. Moreover, wheat prices generally averaged lower in the period 1922–23 to 1924–25 than in the period 1925–26 to 1927–28, a situation tending broadly to encourage consumption in the earlier period. Presumably the figures for the earlier period are relatively higher (or those of the later period relatively lower) than would have been true under a constant level of wheat prices. Hence such declines as appear in the figures may have been due partially to this cause, and if so, need not be regarded as evidence of any definite tendency for wheat to be displaced in the diet by other foods.

All other regions show increases in per capita disappearance, and presumably in wheat consumption for human food. The most noteworthy increases have been in Argentina, Germany, and the Danube countries. In so far as price has affected consumption, the upward tendencies are probably understated. Economic recovery in Europe during the post-war period is largely responsible for the widespread increases in per capita consumption, and parcellation of land and larger wheat crops have probably been important influences in Danube countries. But the causes of increasing wheat consumption differ from country to country, and need not receive detailed consideration here. Table 4 here serves merely to emphasize the fact that on the whole wheat consumption per capita throughout the world has tended to increase during the past six years, and to do so in the face of relatively higher prices in the later than in the earlier portion of the period.

On the whole, the crop year 1927–28 was characterized by relatively large utilization for food, feed, and waste. Disappearance was especially heavy in northern and eastern Europe, where rapidly increasing use of wheat for food was supplemented in many countries by an exceptional use of

poor-quality wheat for feed, in part the result of tightness in the feed grain position.

Consumption in Leading Exporting Countries

For the United States, we tentatively estimate consumption of wheat for human food in 1927–28 as 505 million bushels, some 13 million more than in 1926–27 or 1925–26.[1] More wheat was required to produce a barrel of flour than in 1926–27 or 1924–25, when the crops were of better quality, but somewhat less than in any other year since 1920–21.[2] Our estimate, so far as it is in error, presumably overstates rather than understates the fact; the point can be cleared up only with the appearance of census data on mill output in 1927. On account of the large acreage sown for the crop of 1928, wheat used for seed, according to official estimates, reached 94 million bushels, the highest figure in history except for those of 1918 and 1921.

These items plus net exports (including shipments to possessions) and calculable year-end stocks, when deducted from supplies apparently available, leave a residue of some 81 million bushels to cover disappearance in the form of feed and waste, and changes in invisible stocks. Such a figure is much higher than those of 1926–27 and 1925–26 but is roughly in line with those of the three preceding years. How near the truth any of these figures may be is largely a matter of conjecture. Murray estimated that some 3 per cent, or 26 million bushels, of the crop of 1927–28 was fed to livestock on farms.[3] A good deal of unmilled wheat shipped off the farm is fed to poultry every year, and waste in the form of dockage[4] and other loss is certainly appreciable every year. It is probably safe to say that the amount of wheat fed and wasted (including dockage) seldom or never is less than 50 million bushels a year, and usually runs somewhat higher. It is not inconceivable that some 81 million bushels were so used in 1927–28, for dockage was presumably fairly heavy with a large spring-wheat crop, and comparatively high prices of corn and mill offals may have tended to increase the use of wheat for animal feed in 1927–28. But part of the figure may represent increases in invisible stocks.

For the second successive year, the outstanding feature of consumption in Canada was the large quantity of grain unmerchantable and lost in cleaning, officially estimated as 39 million bushels as compared with the previous high figures of 31 million in 1926–27 and 1923–24. If the crop was underestimated, even this high figure is too low; for it is derived from estimates of the percentage of the crop unmerchantable and lost in cleaning. This wheat apparently constitutes the only fraction of the crop which is fed to farm animals. The official estimate of wheat milled for domestic consumption is not yet available. On account of the poor quality of the crop, the milling ratio for all wheat milled reached 4.59 bushels per barrel of flour—the highest of any in the past six years. Hence even if per capita consumption tends to decline slightly, growth of population and the higher milling ratio must have resulted in a larger quantity of wheat ground for domestic consumption than in any preceding year. We tentatively estimate this quantity as 44 million bushels. Because of the large area sown for the crop of 1928, seed use of wheat was presumably somewhat larger in 1927–28 than in any earlier year, about 41 million bushels. All told, total domestic utilization in Canada in 1927–28 reached about 124 million bushels. If these figures and the official data on stocks and net exports are correct, the crop must have been underestimated by some 40 million bushels.

Little can be said of consumption in Australia, particularly because statistics of wheat milled are not yet available for 1927–28. The population is growing slowly, but per capita consumption is apparently tend-

[1] See Appendix Table XXXI.

[2] Wheat required per barrel of flour (census estimates raised 1.5 per cent to account for unreporting small mills) ran as follows in the past eight years, in bushels:

1920–21	4.712	1924–25	4.651
1921–22	4.727	1925–26	4.705
1922–23	4.701	1926–27	4.639
1923–24	4.700	1927–28	4.689

[3] Circular of Clement, Curtis, and Co., Chicago, March 1, 1928.

[4] Strictly speaking, dockage is not wheat, but since it is included in wheat as shipped it must be regarded as wheat in considering the disposition of the reported crop.

ing to decline slightly. The difference from last year probably did not exceed half a million bushels, and in rounded figures we estimate wheat consumed for human food as 30 million bushels, the same as in 1926–27. Seed use was presumably unusually large, since the area sown for grain alone for the crop of 1928 is estimated as 14 million acres; if, as usually occurs, somewhat over a million acres were sown for hay, seed use of wheat in 1927–28 must have approximated 14 million bushels.

In Argentina, consumption of wheat for human food has increased rapidly in recent years. According to official data,[1] flour production minus net exports of flour were 799,351 tons in the calendar year 1922, and 1,124,641 tons in 1927. Unless flour stocks were greatly increased over the interval, as seems improbable, wheat ground for human consumption totaled approximately 59 million bushels in the crop year 1927–28, as compared with 57 million in 1926–27 and only 49 million in 1923–24. Seed use of around 25 million bushels was also the largest in recent years, unless the poor quality of the crop of 1925 increased the quantity required per acre in sowing the crop of 1926. The quantity of wheat fed to animals and wasted is not accurately measurable in any year. It was presumably exceptionally high in 1925–26 and somewhat high in 1926–27, following the distinctly poor-quality crop harvested in December 1925–January 1926. But in 1927–28, with the crops of 1926 and 1927 both of good quality, wheat fed and wasted was presumably a small item in Argentine disposition. If wheat used for seed and human food reached 84 million bushels, stocks on August 1, 1928 some 70 million, and net exports 178 million, total disposition in Argentina approximated 332 million bushels. The crop was estimated as 239 million, and our estimate of stocks (subject to a margin of error unlikely to exceed 10 million bushels) on August 1, 1927 was some 65 million. Hence only about 304 million bushels of wheat appear to have been available in Argentina, as against 332 million disposed of. This calculation suggests that the crop of 1927 was underestimated by 20–40 million bushels.

[1] See *Revista Seminal*, September 18, 1928, VII, 20.

Consumption in Minor Exporting Countries

Not much is known of consumption in India. The crop of 1927 was only of moderate size; but net exports were small, and domestic retention of wheat for all uses approximated 326 million bushels. The figure is 13 million above that of 1926–27, and a little higher than those of 1924–25 and 1925–26. Seed use must have been somewhat higher than in earlier years in view of the record acreage of the crop of 1928. On the whole, 1927–28 appears to have been a year of normal consumption in India. There was no such decrease as occurred in 1921–22, following a short crop, and no such increase as in 1923–24, when a large crop and low world wheat prices acted to encourage domestic consumption.

The situation in Russia is difficult to appraise, despite considerable statistical data. Table 5 (p. 58) summarizes available pertinent material, including the latest revisions of crop and acreage estimates. These figures indicate that per capita wheat disappearance for food, feed, and changes in stocks approximated 4 bushels or more in each of the past three years. There can be no doubt that the years 1920–21 to 1924–25 were years of distinctly short crops both of wheat and rye, and were accompanied by reduced consumption and persistently low stocks. The years 1925–26 to 1927–28, with much larger crops, were undoubtedly characterized by heavier consumption than occurred during the preceding period.

But the broad question, whether or not wheat production and consumption in Russia have in recent years returned to the pre-war level, remains unsettled. In the first place, per capita disappearance of wheat in pre-war years (and within pre-war boundaries) may have averaged nearer to 3.50 than to 2.94 bushels, if pre-war crops were as far underestimated as some Soviet officials suppose. In the second place, some of the wheat available for consumption during the three years 1925–26 to 1927–28 may have been used to build up stocks abnormally depleted during the preceding five crop years; the assumption is by no means unreasonable. If so, per capita disappearance for the past three years may

actually have averaged below 4 bushels, though perhaps not so low as 3.5 bushels. Nevertheless, the evidence suggests that actual consumption of wheat in Russia during the past three years at least equaled and perhaps exceeded the pre-war average. During recent years a decided drift toward wheat consumption and away from rye production has been noted.[1]

tion continues to increase as rapidly as the figures of Table 5 suggest, if replacement of rye by wheat in the Russian diet proceeds further, if the pre-war level of wheat acreage has not yet been reached, if wheat stocks have not yet attained normal proportions, and if facilities for transporting grain remain decidedly imperfect, then the return of Russia as a heavy wheat exporter can be

TABLE 5.—WHEAT DISAPPEARANCE IN RUSSIA, PRE-WAR AND POST-WAR, CARRYOVERS DISREGARDED*

July-June	Acres (Million acres)	Production (Million bushels)	Seed requirements[a] (Million bushels)	Net exports (Million bushels)	Domestic supplies (Million bushels)	Estimated population[b] (Millions)	Apparent per capita consumption (Bushels)
1909–13[c]	78.0	815.0	149.7	160.1	505.3	171.9	2.94[c]
1923–24	39.2[d]	419.1[d]	98.1	21.4	299.7	136.7	2.19
1924–25	52.7[d]	472.3[d]	111.2	0.3	360.8	140.0	2.58
1925–26	59.8	729.9	131.8	27.1	571.0	143.3	3.99
1926–27	70.9	819.6	141.2	49.2	629.1	146.4	4.30
1927–28	75.9	749.0	124.1	7.0	618.0	149.8	4.13
1928–29	66.7	859.8	.....	.....	.....	.....	....

* Based chiefly on data in *Foreign Crops and Markets*, March 26, 1928, XVI, 405. Latest revisions of acreage and production substituted for figures there shown.

[a] Calculated by multiplying acreage of succeeding year by seed requirement of 1.86 bushels per acre.

[b] Derived from data on domestic supplies and per capita consumption given by U.S. Department of Agriculture. The figure for 1923–24 is extrapolated.

[c] All data for pre-war boundaries. Soviet officials regard the production figure as too low by some 90 million bushels. To accept this view implies a per capita consumption of somewhat less than 3.5 bushels.

[d] Data reported by International Institute of Agriculture.

The year 1927–28 was apparently characterized by heavy consumption in Russia. Official estimates suggest that stocks were built up during the course of 1926–27, and most observers suppose that a reduction occurred in 1927–28. If such changes occurred, per capita disappearance may have been larger in 1927–28 than in 1926–27, not smaller, as Table 5 suggests. But possible revisions of crop and acreage data may alter the picture given in the table; and evidence respecting the direction of changes in wheat stocks is not altogether conclusive.[2]

It is of interest to observe that, although per capita wheat consumption in Russia appears to have reached or passed above the pre-war level, exports have remained small. There is at present no method of anticipating whether or not exports will ever reach the pre-war figures. If popula-

only remotely in prospect. On all of these points the evidence is still inconclusive; but such evidence as there is suggests that decidedly large exports from Russia can reasonably be anticipated only in years when yield per acre is unusually high in the regions immediately adjacent to Black Sea ports.

As we have seen, per capita consumption of wheat is apparently tending upward more rapidly in the Danube countries than elsewhere in Europe, Germany perhaps excepted.[3] The following figures, in million bushels, show apparent domestic utilization (crop minus net exports) in these countries in the past two years and in terms of averages for 1922–23 to 1924–25 and 1925–26 to 1927–28:

Country	1922–25 average	1925–28 average	1926–27	1927–28
Roumania	83.6	94.6	99.7	89.2
Hungary	46.2	53.3	53.0	55.1
Jugo-Slavia	49.0	61.4	61.7	55.4
Bulgaria	27.1	38.8	34.3	45.2
Total	205.9	248.1	248.7	244.9

[1] See indexes of per capita wheat and rye consumption in urban and rural areas as computed by Professor Lossitzky and quoted in U.S. Department of Agriculture, *Foreign Crops and Markets*, March 26, 1928, XVI, 396.

[2] See below, pp. 67 f.

[3] See Table 4, p. 55.

In all four countries domestic utilization was appreciably higher in 1927–28 than in the period 1922–25. In Hungary and Bulgaria the figures were higher than ever before: both countries harvested large wheat crops, and short crops of corn may have contributed somewhat to increased wheat consumption. Some increase in stocks may have occurred, though the evidence is not clear. Relatively short wheat crops in Jugo-Slavia and Roumania made for lower apparent domestic utilization in 1927–28 than in the two preceding years; but that human consumption was smaller is doubtful. Stocks in these countries were apparently built up in 1925–26 and 1926–27, and at the same time poor quality presumably encouraged the feeding of wheat to animals; whereas in 1927–28 good quality wheat, short crops of corn, and (possibly) reductions in stocks may have combined to maintain human consumption of wheat.

Consumption in European Importing Countries

A broad view of apparent domestic utilization of wheat in European importing countries (excluding Greece, Portugal, Esthonia, and Lithuania) is given by Table 6. The heavy apparent consumption of wheat during 1927–28 in Germany and all other importing countries of northern and eastern Europe is striking. Total available supplies in these countries were 474 million bushels in 1925–26, 480 million in 1926–27, and 539 million in 1927–28.

Improving economic conditions making effective a growing taste for wheat bread, increasing population, smaller crops of rye and feed grains, and to some extent lower wheat prices are factors jointly responsible for the relatively high domestic disappearance of wheat in this group of European countries in 1927–28. There is no evidence that stocks, except in Germany, were built up appreciably more than during the two preceding years. But not all of the 59 million bushel increase over 1926–27 can reasonably be accounted for by reference to these factors. Unfortunately the quantities of wheat unfit for milling, and hence used for animal feed and industry, cannot be determined with precision; but that the quantity was larger than usual in 1927–28 seems certain. If so, human consumption of wheat, especially in Germany, was not so much larger in 1927–28 than in the two preceding years as the bare figures suggest; but the presumption remains that, in continuation of an upward trend, human consumption in central and eastern Europe was larger than ever before.

Table 6.—Apparent Domestic Utilization of Wheat in Certain Countries and Regions of Europe*

(Million bushels)

Country or region	1922–25 average	1925–28 average	1925–26	1926–27	1927–28
France	319	319	341	294	323
Italy	277	300	309	307	285
British Isles	285	281	264	289	289
Spain	135	151	162	146	144
Germany	139	191	176	187	209
Western countries[a]	102	110	106	107	118
Scandinavia[b]	42	44	42	41	48
Eastern countries[c]	133	153	150	145	164
Total	1,432	1,549	1,550	1,516	1,580

* Based on data in Appendix Table XXIX.

[a] Belgium, Netherlands, Switzerland.

[b] Norway, Sweden, Denmark.

[c] Czecho-Slovakia, Poland, Austria, Finland, Latvia.

In France, apparent domestic utilization of 323 million bushels was seemingly nearly 30 million bushels larger than in 1926–27, though not so large as in 1925–26, when the domestic crop was of record size for post-war years and domestic wheat prices were low. Comparisons between the past two years are obscured by several factors. During 1926–27, stocks were built up, but net imports were understated to an indeterminate extent. During 1927–28, stocks apparently changed little, but net imports were overstated.[1] With adjustment for these factors, supplies apparently available for consumption may have been little if any higher in 1927–28 than in 1926–27. But quality is known to have been so poor in 1927–28 that much wheat was unmillable on account of the wet weather during harvests; and if unmillable wheat amounted to 10–20 million bushels, as observers have assumed, then supplies available for consumption in all categories must have been smaller, not larger, in 1927–28 than in 1926–27. But even so much cannot be said with assurance in view of conflicting opinions

[1] See below, p. 80.

respecting the official crop estimate,[1] which may be too low for both years. It is of interest to observe that, if official crop estimates are correct, available wheat supplies in France averaged 337 million bushels annually over the three years 1923–24 to 1925–26, but only 308 million over the two past years. So great a decline can be explained partly by the higher average level of prices in the past two years, in part by an observed tendency toward substitution of more expensive foods, notably meat, for bread in the diet,[2] and in part by the exceptionally large crop of 1925–26.[3] Moreover, French bread consumption is so heavy that one would expect it to decline rather than to increase. Alternative interpretations of the data on available supplies, then, are (1) that declining per capita wheat consumption in France accounts for reduced available supplies in the past two years, while official crop estimates are substantially accurate; and (2) that per capita consumption could not have declined so extensively as the domestic utilization figures suggest, if at all, and that official crop estimates have been too low in the past two years. There is probably truth in both hypotheses, but which of the two fits the facts better is difficult to say.

Available supplies in Italy totaled 285 million bushels in 1927–28 as against 307 million in 1926–27. That so considerable a reduction in consumption, if any, actually occurred is nevertheless doubtful. Stocks, after having increased considerably in the course of 1926–27, were reduced in the course of 1927–28; the corn crop was shorter; wheat prices were lower; and the trends are upward in population growth and apparently in per capita wheat consumption. These factors made for heavier consumption in 1927–28 than in 1926–27. On the other hand, revaluation of the lira in April 1927 was followed by increased unemployment and lower wages; and these factors together with exceptionally low prices of rice and a good deal of propaganda directed toward increasing the consumption of that cereal, may have tended to reduce wheat consumption. To evaluate the various influences on wheat consumption is of course impossible; but on the whole the evidence suggests that actual consumption of wheat in Italy could not have been much smaller in 1927–28 than in 1926–27.

In the British Isles wheat crops plus net imports totaled 289 million bushels, the same as in 1926–27, and only 4 million above the average for 1922–25 and 8 million above the average for 1925–28. Unemployment appears to have been on somewhat the lowest level since 1923–24; wheat prices both of native and of imported wheats were the lowest in four years; an unusually large proportion of the domestic wheat crop was thought to be unfit for milling; and population presumably increased. These factors would make for larger domestic utilization of wheat in 1927–28 than in 1926–27, and identical figures for the two years seem explicable only on the assumption that stocks were reduced or that per capita wheat consumption is tending to decline. Port stocks showed an increase, though a smaller one than occurred in the course of 1926–27; but the evidence suggests that other stocks were reduced during 1927–28. Hence, if unmillable wheat was considerably larger in amount in 1927–28 than in 1926–27, whereas human consumption of wheat was smaller, the decline in human consumption seems attributable only to a rather persistent tendency for bread to be displaced in the British diet by other and more expensive foods.

Domestic disappearance of wheat in Spain, carryovers disregarded, necessarily varies directly with the size of the domestic crop. In recent years the tariff has been extremely high; imports have been prohibited in most years; and exports of appreciable size have been impossible. Under the rigid governmental regulation of the grain trade, only changes in crops and in stocks can affect Spanish consumption; and little is known of changes in stocks.

[1] See WHEAT STUDIES, IV, 44, 108 n., and *Foreign News on Wheat*, October 20, 1928, p. 8.

[2] See M. Georges Lefebvre in *Bulletin des Halles*, November 27 and 28, 1927.

[3] Regulations requiring admixture of other cereals with wheat flour were perhaps more stringent in the past two years than in the preceding, and may have tended to restrict consumption. French regulations since 1922 have involved high rates of extraction by mills, together with admixture of various other cereals with wheat flour. Admixture requirements were 8 per cent in 1923–24 and 1924–25, but were substantially reduced in 1925–26; they were 10 per cent in 1926–27 and 6 per cent (after September 10) in 1927–28.

III. STOCKS AND CARRYOVERS

A Broad View

Wheat and flour stocks at any time occupy many different positions—on farms, in country elevators, in transit, in terminal elevators, on piers and afloat, in mills, in jobbers' warehouses, in bakeries, and in households. For several of these positions statistics are either incomplete or entirely lacking, even in countries having the fullest data; and for most countries the available data are decidedly fragmentary. Accurate comparisons of stocks in all positions, in any one country or in the world as a whole, are therefore impossible. But the importance of the subject justifies inexact comparisons.

At the beginning of the crop year 1927–28, as we have noted, commercially significant stocks of wheat and flour stood at an unusually high level, though perhaps exceeded by those on August 1, 1924. These readily calculable items, in the aggregate, ran on a high level throughout the year, seasonal factors considered. In the closing months, as we shall see (p. 73) the size of these stocks became a factor of major importance in the decline of wheat prices, and at the end they were higher even than at the end of 1923–24. Such fragmentary evidence on other stocks as we have been able to gather, however, points to the conclusion that these other items, in the aggregate, were neither very high nor very low during the year, but declined from the beginning to the end by as much as, or perhaps slightly more than, the more prominent group increased. All told, world stocks were relatively high at the beginning and end of the crop year 1927–28, much as they were at the end of the crop year 1923–24, and distinctly higher than they were in the intervening years; but the net change during 1927–28 was comparatively slight, and possibly downward.

Table 7 shows our estimates of stocks in the four principal exporting countries and afloat for Europe for the past six years. Wheat stocks in these positions appear to have been over 25 million bushels larger on August 1, 1928, than on August 1, 1927;[1] and somewhat larger even than the previous high figure of 1924. The greater part of the increase is accounted for by the higher Canadian figure.

But this increase may have been offset by a decrease in stocks of import wheat and domestic wheat in Europe. European net imports in June and July were considerably smaller in 1928 than in 1927 both in absolute amount[2] and in proportion to the annual total; hence, on the assumption that no change occurred in the seasonal course of wheat consumption, less wheat was available from which stocks of import wheat could have been built up. Earlier

Table 7.—Approximate Carryovers of Wheat in Exporting Countries and Afloat, August 1, 1922–28*

(Million bushels)

Location	1922	1923	1924	1925	1926	1927	1928
United States ...	130	151	165	135	111	138	142
Canada	36	29	41	26	35	48	75
Argentina	61	65	66	56	61	65	70
Australia	27	42	38	36	30	41	33
Afloat for Europe	49	39	42	33	39	46	45
Total	303	326	352	286	286	338	365

* Summarized from Appendix Tables XXV and XXXI; includes some estimates, as indicated in notes to these tables. United States data as of July 1.

[1] Other comprehensive estimates of stocks in these positions also indicate an increase. The U.S. Department of Agriculture, employing less complete data, estimated that July 1 stocks in similar positions and in United Kingdom ports increased from 323 to 346 million bushels (see *Foreign News on Wheat*, August 20, 1928, p. 12). The monthly statement of visible supplies in similar positions as of August 1 showed an increase from 173 to 217 million bushels (see Appendix Table XXV). The differences between the three sets of estimates arise partly from differences in dates, but chiefly from differences in methods of evaluating Argentine and Australian stocks. For these countries we attempt to measure stocks of wheat and flour in all positions; the Department of Agriculture attempts to measure stocks available for export and carryover, but not for domestic consumption; Broomhall attempts to measure only visible supplies. In addition, Broomhall's figures fall far below ours and the Department of Agriculture's because he disregards farm and city mill stocks in the United States.

[2] Excluding Greece, Portugal, and Spain, for which data are not available, June–July net imports of all other European countries totaled 129 million bushels in 1927, and 104 million in 1928; they were 20.3 per cent of the crop year total in 1927, and 16.6 per cent in 1928. These figures overstate the contrast, however, because French net imports in 1926–27 as a whole were understated, the imports of 1927–28 overstated, and the imports of June–July 1927 overstated.

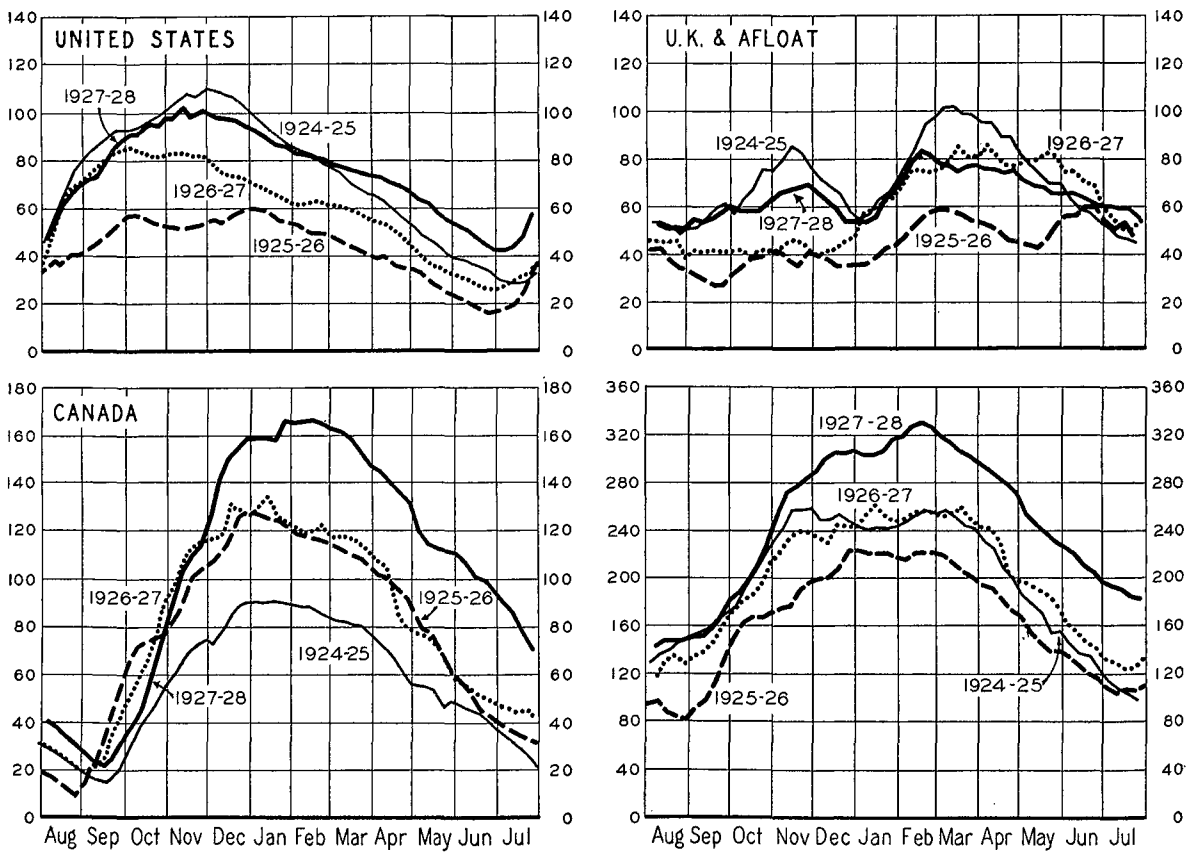
harvests this year than last made imports less necessary in the closing weeks of the crop year. Moreover, in countries where hedging is not extensively practiced, bakers and millers tend to withdraw from the market and to reduce their stocks to a minimum during a period of declining prices such as occurred in May–July 1928—a decline considerably more drastic than that of June–July 1927. Finally, Russian purchases of wheat in July 1928, which were apparently effected chiefly in continental ports, must have drawn down import wheat stocks to some extent. In spite of evidence that certain elements of import wheat stocks in France and the United Kingdom and perhaps in Poland were higher on August 1, 1928, than on August 1, 1927, we infer that stocks of import wheat and flour in all positions in Europe, though by no means extraordinarily low, were lower at the end of this year than at the beginning to an extent that went far toward counterbalancing the increase in stocks in exporting countries and afloat. In Europe ex-Russia as a whole, supplies of native wheat may also have decreased somewhat on balance, though the evidence is not altogether clear. Stocks in Russia seem to have been reduced, and a succession of crops of moderate size favored a decrease in India.

Visible Supplies

The weekly course of visible supplies in the United States, Canada, United Kingdom ports, and afloat for Europe during 1927–28 and the three preceding years is shown in Chart 5. United States visibles vary from year to year in accordance with the size of

Chart 5.—Visible Wheat Supplies in the United States, Canada, and United Kingdom Ports and Afloat to Europe, Weekly from August 1924*

(Million bushels)



* Data from *Grain World, Northwestern Miller, and Canadian Grain Statistics.* The fourth section of this chart shows the aggregate of the other three items.

the wheat crop, especially spring wheat;[1] the rapidity of the movement from farms; and the rapidity of the export movement. They are influenced by prices, and exert some influence upon prices. Higher visibles in 1927–28 than in 1926–27 are accounted for partly by the larger crop of spring wheat in 1927, partly by more rapid marketing, and partly (especially in the latter half of the year) by more restricted exportation. Until February 1928, visibles were higher than in any of the three preceding years except 1924–25.; thereafter, they were higher even than in 1924–25. The contrast between these two years, in which the wheat crops were of much the same size, is striking. Receipts at primary markets[2] during August 1924–January 1926 totaled 385 million bushels, 55 million bushels more than during the same period of 1927–28. Net exports during these periods totaled 184 million bushels in 1924–25, and 147 million in 1927–28; hence heavier marketings in the earlier year were not counterbalanced by exports equally large, and visibles ran higher. But in February–June 1928 primary receipts totaled 108 million bushels as against 87 million in 1925; and net exports totaled only 32 million as against 63 million. Consequently the more rapid marketing and less rapid exportation in 1927–28 resulted in higher visible supplies in the latter months of the year. These heavy accumulations were fundamentally due to unusually wide spreads between domestic and international wheat prices. During February–April prices in the United States rose more rapidly than elsewhere, encouraging heavy marketings by farmers; and decreasing spreads between Chicago and Liverpool prices made sales for export difficult.[3]

A noteworthy feature of the visible supply situation in 1927–28 was the unusually heavy accumulation of stocks at Duluth-Superior and Minneapolis.[4] Another feature was the rapid increase of visibles in July 1928, as large quantities of winter wheat from the new crop were marketed from fields harvested with the combined harvester-thresher. Wheat appears not to have ripened especially early, but the combine was used more extensively than ever before.

Note on the Harvester-Thresher Combine

Practical experiences with this device are now sufficiently prolonged in time and extensive in area to warrant a tentative judgment on the innovation. The widespread introduction of the combine constitutes a revolutionary factor in wheat growing in North America. But the combine, like other outstanding improvements in mechanization, is not proving an unqualified benefit to wheat growers or to the grain. In fact, the pressing problem of the wheat belt from the Panhandle of Texas to the Peace River region of Alberta is to retain and develop the advantages of the combine while avoiding the disadvantages.

At the recent Wheat Improvement Research Conference held in Manhattan, Kansas, the statement was made that with the use of the combine in harvesting and threshing wheat, together with the corresponding changes in plowing, fallowing, and seeding with the tractor, the savings would average as much as three dollars per acre. When one considers that, according to the United States Department of Agriculture, the operative cost of planting and harvesting the acre of wheat runs between eight and nine dollars, a saving of three dollars would represent an outstanding achievement. Whether in fact the potential or actual economy is so large as this, it is certainly large under favorable circumstances. Against the saving, however, stand certain demonstrated disadvantages, affecting both yield and quality of the wheat.

The combine method of harvesting wheat requires a stiff straw; the stand must resist lodging before cutting and must endure the mechanical handling of the machine. Secondly, the head must be non-shattering, if heavy losses are to be avoided. Our present wheats clearly do not satisfy these requirements; up to the present, relatively heavy losses have occurred in harvesting, varying from region to region and from variety to variety. Stiff straw and resistance to shattering have long been among the objectives of wheat breeding. The combine has made these desiderata still more important.

[1] The proportion of the spring-wheat crop passing through terminal elevators in the Northwest, and hence measured in the visible, is apparently larger than the proportion of any other class of wheat passing through terminals in other regions. There is less milling at country points in the Northwest than elsewhere.

[2] See Appendix Table XV.

[3] See below, p. 73.

[4] The Chicago Board of Trade visible supply figures, which are somewhat smaller than Bradstreet's, were as follows on June 30 of the past six years, in thousand bushels:

Year	Duluth and Minneapolis	Total United States	Year	Duluth and Minneapolis	Total United States
1923	16,567	26,313	1926	4,511	12,325
1924	10,456	34,901	1927	8,316	22,107
1925	12,818	29,146	1928	23,116	38,922

Equally important are considerations of quality. In a stand of wheat ripe for harvest, the moisture content in the kernels rises during the night and is lowered by transpiration during the day; at daybreak it may be several per cent higher than at sundown. Wheat harvested during the forenoon has a higher moisture content than wheat harvested during the afternoon; harvested early in the day, it is likely to have a moisture content so high as to provoke heating in the bin unless watched and treated. Heavy losses are known to have occurred from such bin burning; and the juice of green weeds crushed during the threshing, and the high water content of green weed seeds, accentuate the danger of heating in the bin.

Attempts are being made to combat high moisture content by installation of a small heater on the combine, by sprinkling a dessicating powder over the wheat directly after threshing or when placed in the bin, and by cutting the wheat first like hay and passing it through the thresher a few hours later. These solutions of the problem do not strike us as practicable over large areas. It is better to clean the wheat immediately after threshing (something desirable in itself) and to store it in self-ventilating bins or to pass it through a blower in an elevator. Combine-harvested wheat must be treated more like corn. But this solution implies extensive construction of suitable self-ventilating storage bins both on farms and in country towns.

Lastly, unless measures are taken to the contrary, the use of the harvester-thresher is attended with heavy marketing of wheat during the harvest months, intensifying the usual strain upon transport and elevator facilities and the seasonal pressure upon prices. Restraint in the marketing of wheat threshed from the shock or from the stack is advisable. Restraint in the marketing of wheat threshed immediately after cutting will be found still more advantageous.

The extremely high Canadian visible supplies in 1927–28 were of outstanding significance. Although the crop was one of the two largest in history, the harvest was greatly delayed; hence marketings were smaller than usual in September and early October, and visible supplies until late November remained rather low in view of the large crop. But marketings in November–February were of huge volume, larger even than in 1923–24; and net exports, principally because early closing of navigation on the Great Lakes hampered the movement, were not large enough to reduce the visible. From December 1927 through the remaining months of the crop year the Canadian visible loomed large in the eyes of traders, and the carryover at the end of the crop year proved the largest in history.

Whether or not the visible was maintained at high figures principally through the activities of the Canadian Pool is an interesting question, but one not susceptible of definite answer by outsiders. The Pool could not prevent the wet harvesting weather which delayed marketing and curtailed exportation, in part by creating the necessity for huge quantities of grain to be passed through dryers. The Pool could not prevent an early close of navigation. It did not restrict the export movement through Vancouver and by rail during the winter months, if the size of these movements is a criterion. And it could not prevent the late opening of navigation in the spring, which precluded heavy exportation in April. Hence it is difficult to perceive how the Pool could have effected an appreciable reduction in Canadian stocks from August 1927 to April 1928. But rising prices during February–April, and the possibility of still higher prices, may have caused the Pool somewhat to restrict sales for shipment after the opening of navigation.[1] At some time after prices broke in early May, Pool offers appear to have been pressed decidedly; Canadian net exports, at least, were of record volume during May–August, and selling pressure was frequently commented upon in European journals. Thus there seems reason to believe that the exceptional year-end visibles in Canada were due to Pool operations only in so far as forward sales may have been deliberately restricted during April and May. This policy may have been misguided in the sense that higher prices might have been obtained had more sales been made in April and fewer in July; but at the time a policy of restricted sales appeared to be warranted by the poor winter-wheat prospects in the United States and Europe. With spring wheat sown and progressing favorably, and winter-wheat prospects improving, the huge

[1] In its *Director's Report* for 1927-28, p. 7, the Pool states that "Our policy last year, in view of the comparatively low intrinsic value of the crop and the possibility of a high quality crop being harvested, was to keep well sold up. Nothing happened during the year to make us alter this policy....." It is interesting to observe that sales of 24.2 million bushels were made in February, 25.6 million in March, but only 22.6 million in April; and that sales in May were smaller than those of June. But not much information can be gained from these sales figures, for they presumably include sales of futures and sales for shipment in distant months.

Canadian visible became a price-depressing factor of considerable significance.

Visible supplies afloat for Europe and in ports of the United Kingdom were naturally large in 1927–28 because shipments were heavy. Only in 1924–25, a year in which the distant exporters, Australia and India, were heavy shippers, were these visibles on a higher level. They were larger during August–December 1927 than in the same period of 1926, for in the earlier year shipments had been greatly restricted by a bulge in ocean freight rates which caused importers to curtail their purchases. In January–June 1928 these visibles were lower than in the preceding year, because with lower freight rates in the early months of 1927, shipments and afloat stocks alike became extraordinarily high.

The concordance of high visibles in Canada, the United States, and afloat, but especially in Canada, made for record totals. The highest figures reached in the preceding six years had been recorded in 1923–24, when from January to March 1924 total visibles ranged from 260 to 275 million bushels;[1] but in 1927–28 the total ranged from 305 to 330 million bushels during most of the December–March period. Such ample supplies in sight in North America and afloat positions together with a large Argentine wheat crop contributed to the stability of wheat prices in the winter months and to the resistance of international prices to the spring advance in the United States and Canada.

Outward Carryovers in North America

Principally on account of the large increase in Canadian stocks during 1927–28, the outward carryover in North America (July 1 in the United States, August 1 in Canada) was undoubtedly the largest in recent years. The figures are as follows, in million bushels:

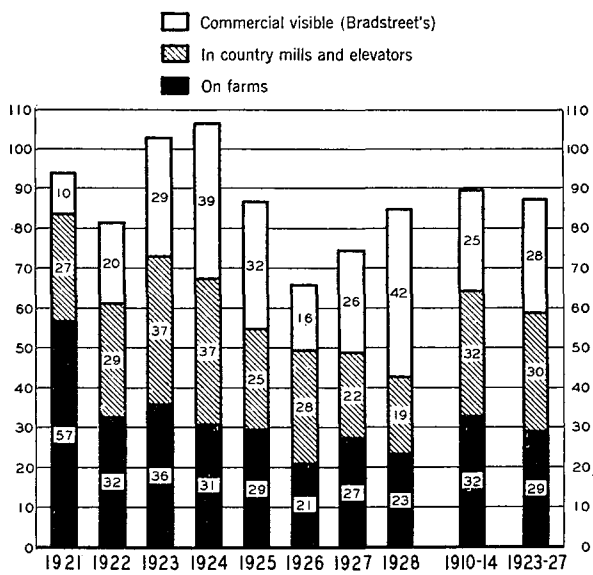
1923	180	1926	146
1924	206	1927	186
1925	161	1928	217

[1] See Chart in Wheat Studies, II, 32.

[2] Apparently, however, the distribution of the crop among its various classes was also effective. Country mill and elevator stocks were exceptionally low in states east of the Mississippi, where the soft red winter-wheat crop of 1927 was distinctly small, rather than in the states west of the Mississippi.

A partial statement of the United States carryover is given in Chart 6, which shows the Department of Agriculture's estimates of stocks on farms and in country mills and elevators together with Bradstreet's commercial visible. Stocks on farms were the lowest since 1919, except in 1926, as a result of exceptionally heavy marketings induced by the high prices of April–May. The exceptionally low stocks in country mills and elevators, only 18.9 million bushels as compared with a 5-year average of 29.9 million, were perhaps affected by the same factor.[2]

Chart 6.—Wheat Stocks in the United States, July 1, 1921–28, with Comparisons*



* Official data except Bradstreet's visible, as tabulated in Appendix Table XXIII. Country mill and elevator figures for 1926–28 are estimated on a new basis, and probably are not strictly comparable with figures for earlier years.

But visible supplies as of July 1 were 42.2 million bushels, larger than in any year since the war. Hence the carryover consisting of these three items was 85 million bushels, some 10 million larger than that of 1927 and about average in size.

A closer approach to the total United States carryover is afforded by the addition of the Census Bureau's reports of stocks held by city mills. Data of the four years for which they are available are summarized in Table 8 (p. 66). Flour stocks were slightly higher than in any of the three preceding years. Wheat stocks of 46 million

bushels were somewhat lower than those of 1927, but higher than those of 1925 and 1926, as were total stocks of 63 million. The total United States carryover calculated to include city mill stocks (except those in country elevators and public terminal elevators, in order to avoid duplication with country mill and elevator stocks and visible supplies elsewhere reported) reached 142 million bushels. As compared with 138 million in 1927, 111 million in 1926, and 135 million in 1925, the figure does not appear remarkably high.[1]

TABLE 8.—UNITED STATES CENSUS REPORTS ON MILL STOCKS OF WHEAT AND FLOUR, JUNE 30, 1925–28

(Million bushels)

	1925	1926	1927	1928
Wheat:				
Country elevators	2.16	2.52	2.56	1.90
Public terminals	3.44	3.00	3.88	3.68
Private terminals, in transit, and in mills	26.72	30.32	46.15	40.50
Total	32.32	35.84	52.59	46.08
Flour as wheat[a]	15.73	14.67	16.76	17.08
Grand total	48.05	50.51	69.35	63.16

[a] Barrels of flour converted at 4.7 bushels per barrel.

The outward carryover of Canadian wheat (exclusive of flour) on July 31 was officially placed at 76.5 million bushels in all positions.[2] This is by far the largest figure since data have been compiled, presumably the largest in history, and 26 million bushels larger than the heavy carryover of last year. Stocks in elevators and in transit, 67.3 million bushels, were distinctly large. Transit stocks alone reached 13.7 million bushels, more than twice as high as any other recorded figure. Some 9 million bushels of this wheat was afloat on the Great Lakes, apparently moving to export via Montreal — a quantity distinctly unusual for the end of the Canadian crop year. The Pool seems to have had no carryover, at least in the sense of ownership; but some 6.1 million bushels apparently remained in the physical sense in Pool elevators at Port Arthur alone on August 3.[3]

SOUTHERN HEMISPHERE STOCKS

Wheat stocks in Argentina have been estimated directly only twice in recent years; ordinarily the official statements of exportable surpluses consist merely of subtraction of estimated seed and consumption requirements from the estimated crop, and further subtraction of reported exports. But as of August 21, 1926, a direct official estimate of stocks in all positions was made;[4] and as of June 30, 1928, an unofficial estimate was made of stocks in ports, in railway stations, and on farms.[5] The latter figure reached 78 million bushels. But it is too low by comparison with the official figure of 55 million bushels for August 21, 1926, since it includes no estimate of stocks in mills and bakeries, which constituted 30 per cent of the earlier official estimate. Adjusting the unofficial estimate for wheat exported and consumed domestically during the month of July, we reach a figure of 54 million bushels as stocks on August 1, 1928; and this figure raised by 30 per cent to 70 million bushels seems to yield as close an approximation as can now be secured to total Argentine stocks on August 1. The figure is higher than figures for other years[6] reached on calculations of net exports and domestic consumption during August–December (including a rough assumption that stocks on January 1 remain constant at 10 million bushels); but a high figure is not unreasonable in view of the relatively heavy exportation during August–November 1928. The whole subject of Argentine stocks remains obscure, and we regard our estimates as tentative. But there seems little reason to doubt that stocks on August 1 were large rather than small, despite the heaviest January–August export movement in history.

Australian stocks also are not directly estimated. Broomhall placed the Australian visible supply on August 1, 1928, at 9.5 mil-

[1] Sydney Anderson, president of the Millers' National Federation, has calculated the total United States carryover as 175 million bushels. This calculation employs probably too low a figure (40 million bushels) for feed and waste.

[2] See Appendix Table XXIII.

[3] See *Directors' Report, 1927–28*, p. 7, and *Canadian Grain Statistics*, August 3, 1928.

[4] The full official report appears in *Revista Seminal* September 14, 1926, pp. 2–4, 22.

[5] Reported in *Times of Argentina*, July 16, 1928, p. 34.

[6] See Table 7, p. 61.

lion bushels, as against 12.7 million in 1927. But the visible supply does not constitute a large proportion of total stocks, and may perhaps fluctuate differently from year to year. Accepting official crop estimates and estimating other items of disposition directly, we reach a figure of about 33 million bushels for stocks on August 1, 1928, as against 41 million a year before. The figure is somewhat lower than those of other years except 1926 and 1922, but relatively low stocks are usually to be expected after a small crop.

European Stocks

The limited statistical evidence available to us respecting stocks of import wheat in European countries relates to the United Kingdom and France. Broomhall estimated stocks in ports of the United Kingdom[1] on August 1, 1928 as 10.1 million bushels, somewhat the highest figure since 1920, and 2.3 million above those of 1927. Stocks of wheat and flour in customs warehouses in France on July 31 were officially placed at 1.61 million bushels, the highest since 1924.[2] But these quantities must represent only a small fraction of import stocks in all positions, and observers agree in describing stocks of import wheat in mills as moderately low, at least lower than in 1927, practically throughout Europe. The conclusion seems reasonable in view of the smaller imports this year than last, Russian purchases of wheat in July, the tendency of millers and bakers to buy from hand to mouth on a falling market, and the prospects for a reasonably early harvest of domestic wheat crops. Yet we see no reason to suppose that import wheat stocks were abnormally low at the close of 1927–28. But Italy and Poland alone among European countries imported distinctly more heavily in June–July this year than last, and in these countries stocks of import wheat may have been somewhat increased.[3]

[1] See Appendix Table XXV.

[2] The figures for the past five years are as follows, in thousand bushels: 1924—1,630; 1925—1,321; 1926—536; 1927—1,436; 1928—1,613.

[3] The *Polish Economist* of October 1928, p. 390, mentions the "existence of large stocks owing to excessive imports . . . ."

[4] *Polish Business Conditions*, July 1928, I, 57.

[5] *Statistical Review*, February 1928, p. 25.

Reliable evidence is not available respecting stocks of native wheat in most European countries. Observers are agreed that a reduction occurred in Italy, where stocks were exceptionally high at the end of 1926–27. In Jugo-Slavia, Roumania, and Spain the crops of 1927 were too small to permit any increase, and reductions seem probable. Most observers speak of a slight reduction in France, though M. Sicot estimated that year-end stocks reached some 36 million bushels, the same as in 1927. On the other hand, reserves were apparently higher in a few countries. In Germany, stocks of winter wheat for sale on farms on June 15 were estimated by the German Agricultural Council as 9.85 million bushels in 1928 as against 4.15 million in 1927. In Hungary and Bulgaria, exceptionally large domestic utilization figures for 1927–28 suggest that an increase in stocks may have occurred. Some observers believe that stocks were increased in Poland, because farmers held their wheat in anticipation of a poor crop;[4] and this view is not inconsistent with data showing that apparent domestic utilization in 1927–28 was nearly 14 per cent higher than in 1926–27, when the figure was higher than in any other post-war year. Part of this heavy increase over 1926–27 is to be accounted for by increasing per capita consumption and part by a greater quantity of low-quality wheat fed to animals; but some of it may well have gone to increase stocks. Information is too scanty for other countries of Europe ex-Russia to warrant confident inferences; but there seems no reason to suppose that significant changes in stocks occurred. All told, reserves in Europe ex-Russia were presumably normal at the end of 1927–28, but perhaps somewhat smaller than at the end of 1926–27.

Most reports speak of a reduction of stocks in Russia during 1927–28. Official estimates suggest that stocks had been considerably built up in the course of the preceding year. Mr. N. Dubenietzky presents figures (apparently official) showing that stocks of all grains increased from 87.8 million quintals at the beginning of 1926–27 to 138.2 million at the beginning of 1927–28.[5] One may reasonably infer that wheat stocks were increased along with

other grains; but the extent of the increase in wheat alone is of course uncertain. That wheat stocks were reduced in the course of 1927–28 is probable in view of the smaller crop and of purchases of wheat for import in July 1928, though some of this wheat may have been imported for seed. On the other hand, reports that peasants parted with their grain reluctantly, on account of a great disparity between the prices obtained and the prices of manufactured articles, have been current during 1927–28 as well as in preceding years. If this factor was of real importance, a further increase of stocks in peasant hands during 1927–28 may conceivably have occurred. But since Russian officials have mentioned a lack of grain stocks at the beginning of the 1928 harvest, and the need for accumulation in 1928–29,[1] a reduction during 1927–28 seems on the whole somewhat more probable than an increase.

IV. WHEAT PRICE MOVEMENTS

The Level of Prices

The general level of international wheat prices in 1927–28 was lower than in 1926–27, and lower indeed than in any other post-war year except 1922–23 and 1923–24. As one simple indicator we cite below the annual weighted average prices per bushel of all wheat imported into the United Kingdom, as derived from customs declarations:

1922–23	$1.38	1925–26	$1.70
1923–24	1.22	1926–27	1.64
1924–25	1.77	1927–28	1.55

Essentially the same fact is evident from Chart 7, which presents three-week moving averages of British parcels prices, of No. 3 Northern Manitoba at Winnipeg, and of cash sales of all classes and grades of wheat in the principal markets of the United States. The world crops (ex-Russia) of 1927 were somewhat larger in size than those of 1923, but in the interval the world demand for wheat increased. Broadly speaking, the level of prices in 1927–28 was much higher than that of 1923–24 because the margin between import requirements and export surpluses was distinctly narrower; it was somewhat lower than that of 1926–27 because the margin was slightly wider.[2]

As Chart 7 shows, spreads between average prices in Great Britain, Canada, and the United States do not remain the same from year to year. Conditions peculiar to Canada or the United States, as well as variations in the cost of transportation, affect these spreads. Consequently annual average prices in exporting countries do not show the same changes from year to year as annual average prices of British imports. For example, British parcels prices in 1927–28 were farther below those of 1925–26 than were United States prices, because in 1925–26, with a short crop, the prices of several types of wheat in the United States were enhanced by tariff protection. In countries which import a considerable proportion of their wheat requirement, moreover, changes in tariffs or in tariff effectiveness, or in the domestic wheat crops, may give rise to year-to-year changes in price levels which do not correspond to changes in the levels of British import prices. Thus the average of French domestic wheat prices was $1.45 in 1925–26 and $1.66 in 1927–28, or 21 cents higher in the later year, while British customs prices were 15 cents lower. The French domestic crop was exceptionally large in 1925–26, only small imports were necessary, and the tariff was lower and less effective.

Other examples could be cited with respect both to exporting and to importing countries; but these are sufficient to show that much caution must be used in speaking of year-to-year changes in the level of "world" wheat prices. The fact that British consumers pay less for wheat and presumably bread in one year than another does not necessarily imply that French, Italian, American, or Chinese consumers pay less. There is always a range of wheat prices throughout the world, and movements of prices are not always in the same direction in different countries. As a general rule,

[1] Statement of Trade Commissioner Mikojan, reported in the *Corn Trade News*, September 25, 1928.

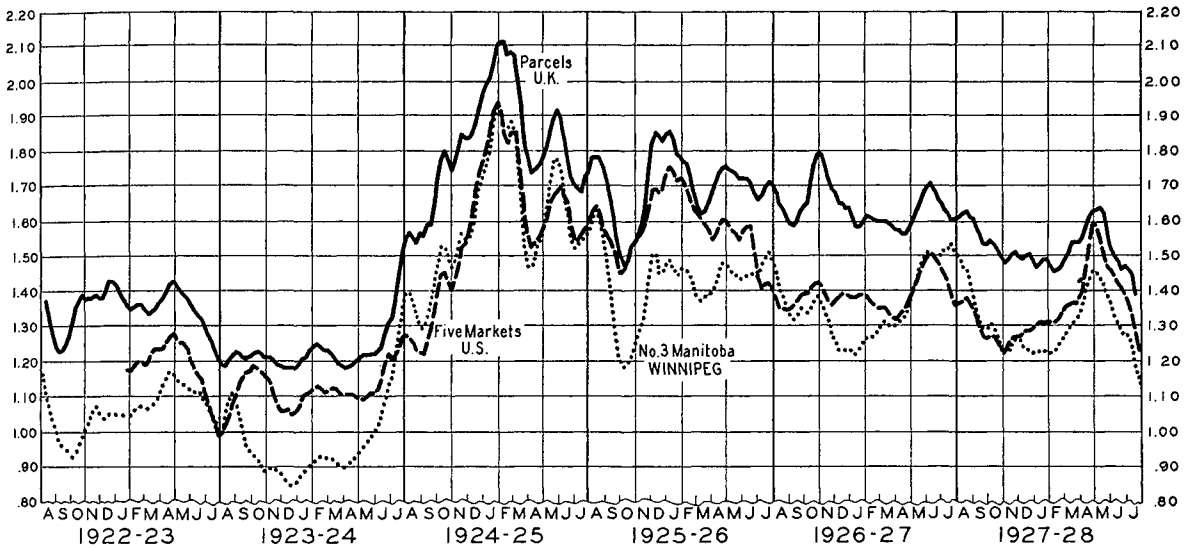
[2] See above, pp. 53 f.

in exporting countries whose exportable surpluses form a large proportion of the crop—Argentina, Australia, Canada—price movements conform more closely to the international price movement than is true in importing countries or in countries where exportable surpluses form a relatively small proportion of the crop, as in the United States, India, and the Danube countries.

dormant, little can be ascertained of their progress, and spring-wheat crops are not sown. Hence at this time new-crop prospects as a rule exert their minimum influence, and the actual rather than the prospective statistical position is effective in price making. If, then, changes in the level of international wheat prices are to be accounted for principally by reference to harvested crops and their positions, the

CHART 7.—WEEKLY AVERAGE CASH WHEAT PRICES IN THE UNITED KINGDOM, THE UNITED STATES, AND CANADA, FROM AUGUST 1922*

(U.S. dollars per bushel; 3-week moving average)



* United Kingdom prices are averages of sales of wheat parcels in British markets, from *London Grain, Seed, and Oil Reporter;* United States prices are weighted averages of all classes and grades of wheat in five markets (six markets after December 1926) from *Crops and Markets;* Canadian prices are weekly average cash closing prices of No. 3 Northern Manitoba at Winnipeg.

To explain changes in the level of international wheat prices is a complex process. Prices in a given year are affected not only by the available supplies and the demand situation in that year, but also by prospective changes. There is only a short period in the middle of the crop year when the supply situation remains practically stable and is reasonably well known to traders. In January–March the outcome of all the crops available for use in a given crop year is fairly certain, as is not true of the important Canadian and European crops in August–September, or of the Argentine and Australian crops in October–November, often in December. In this period, moreover, the Northern Hemisphere winter-wheat crops for the next harvest are

price levels considered might well be the mid-winter levels rather than the levels of the year as a whole.

The following figures show January–March average prices per bushel of all wheat imported into the United Kingdom, in comparison with the annual averages of the same data as given above.

Year	Jan.–March	Aug.–July	Year	Jan.–March	Aug.–July
1922–23	$1.40	$1.38	1925–26.....	$1.75	$1.70
1923–24	1.20	1.22	1926–27.....	1.62	1.64
1924–25	2.00	1.77	1927–28.....	1.49	1.55

In 1926–27, international wheat prices advanced and receded sharply in September–December because of a bulge in ocean

freight rates; and another advance and recession occurred on account of delayed seeding of the 1927 spring-wheat crop in North America. These bulges, which were in no way due to a change in the quantity of wheat actually available in 1926–27, raised the annual average import price above what it would have been if only the actual statistical position for the year had been effective. In 1927–28 also prices were fortuitously raised in the spring of 1928 on account of poor prospects for United States and European winter-wheat crops; the annual average price was some 6 cents above the January–March average price. As measured by annual average British customs prices, the international wheat price level in 1927–28 was 33 cents above that of 1923–24, 22 cents below that of 1924–25, and 9 cents below that of 1926–27. As judged by January–March prices, the level of 1927–28 was only 29 cents above that of 1923–24, but was 51 cents below that of 1924–25,[1] and 13 cents below that of 1926–27. The latter method thus leads to the conclusion that 1927–28 was a year in which the characteristic level of wheat prices was lower relative to the characteristic levels of earlier years than appears from a comparison based on average annual prices.

A broad view of differences in average annual prices between 1926–27 and 1927–28 is given by the following figures, in cents per bushel:

	1926–27	1927–28	Decrease
British (customs)	164	155	– 9
United States (farm)..	123	120	– 3
Canadian (farm)	109	100	– 9
Argentine (Barletta)..	144	137	– 7
Australian (f.o.b.)	137	134	– 3
British (domestic) ...	157	137	–20
French (domestic) ...	182	166	–16
German (domestic) ..	177	162	–15
Italian (domestic)	208	192	–16

[1] The January–March price level of 1924–25—months in which the peak of prices was reached—is presumably too high properly to be regarded as the level representing the balance between actual supplies and demand in that year, though on the other hand the August–July level is too low. See WHEAT STUDIES, November 1925, II, 36–41. A difference of 51 cents in 1924–25 and 1927–28 prices overstates the difference in the international statistical positions of the two years, though a difference of 22 cents understates it.

[2] See Appendix Table XXII.

[3] The annual average prices of No. 3 Northern Manitoba at Winnipeg declined only 5 cents, from $1.35 to $1.30 per bushel.

The decrease in wheat prices in exporting countries was (except in Canada) smaller than the decrease in international prices. Ocean freight rates on most routes were considerably lower in 1927–28 than in 1926–27, or indeed than in any recent year;[2] and since changes in transportation charges tend initially to affect c.i.f. prices more than f.o.b. prices, the smaller decreases in export than in import prices may be partially accounted for by the lower level of ocean rates. In the United States, however, other factors were operative: the crop of soft red winter wheat was short in 1927–28, and high premiums for this variety tended to raise the average price on the total crop; premiums for protein ran exceptionally high; and the advance of prices in the spring of 1928 was more extreme than in other exporting countries. Presumably the poorer quality of the 1927 crop tended to lower the average price of the Canadian crop below that of 1926; crops of identical quality might not have differed so much as 9 cents per bushel in price.[3] The decline in Australian prices might have been more than 3 cents had not the Australian crop of 1926 been distinctly large, that of 1927 distinctly small.

The prices of domestic wheat in important European importing countries decreased more between the two years than did international wheat prices. In Germany, the United Kingdom, Poland, and France, the 1927 crops of native wheat were larger than those of 1926, and poorer in quality as well. Italy had a smaller crop; but the decline in prices is perhaps to be attributed to the fact that large stocks were carried out of 1926–27, and swelled the supplies available in 1927–28. The decline in French prices would doubtless have been greater had not the tariff been raised from 25 to 35 francs per quintal on November 19, 1927.

THE GENERAL COURSE OF PRICES

From week to week and from month to month within a given year, wheat prices do not move in precisely the same direction or to precisely the same extent between any two markets, because the influences affecting prices differ in different countries. Prices in the leading export-

ing countries, however, tend to move fairly closely with international prices, except at times when changes in transportation costs (as in the autumn of 1926) disturb the relationships. When fluctuations are wide, similarities in movements are naturally more striking than when fluctuations are narrow. Prices in European countries seldom follow the international price movement so closely as do prices in the leading exporting countries.

As judged by the prices of import wheats or wheat futures in the United Kingdom or by cash and futures prices in the four leading exporting countries, four major price movements occurred during August–July 1927–28. From August until the end of October a considerable decline took place in all these markets; comparative stability prevailed from early November to early February with prices moving upward in some countries and downward in others; from early February to the end of April the course was distinctly upward, especially in April; and during May–July a drastic decline occurred. Chart 7 (p. 69) shows the movement of cash prices in the United Kingdom, the United States, and Canada; Chart 8 (p. 72) shows the movement of futures prices in Liverpool, Chicago, Winnipeg, and Buenos Aires. Monthly average cash wheat prices in Argentina and Australia appear in Appendix Table XXVIII.

The decline of August–October 1927 was due chiefly to improving crop prospects in Canada. A sharp rise of prices—7 cents in Winnipeg, 4½ cents in Liverpool—occurred on August 8–9, following a frost in Canada on the night of August 7. For a week or more thereafter the futures markets were nervous. In response on the one hand to conflicting reports on the extent of frost damage, the progress of rust infestation, and wet harvesting weather in Europe, and on the other hand to profit-taking, futures prices moved erratically but did not depart far from the level established on August 8–9. The definite downward trend began on August 18, on reports of good weather in Canada and private estimates of a large crop despite the frost. Subsequently every day of fair weather in Canada occasioned further recessions. Especially sharp declines were recorded following the appearance of the American and Canadian crop estimates on September 9 and 13, both of which were regarded as bearish; and exceptionally heavy marketings in both Canada and the United States, together with favorable crop news from the Southern Hemisphere, combined to force a further sharp recession in the middle of October.

From November to early February, comparative stability prevailed; but price movements were different in different markets. Canadian cash prices of the higher grades moved irregularly; they rose in November as evidence of poor quality became increasingly clear, but declined in December and thereafter remained stable. Chicago futures prices tended upward throughout the period, but not so rapidly as weighted average cash prices in the United States, which were influenced strongly by increasing premiums on soft red winter wheat (see Chart 10, p. 75). In Australia, Argentina, and the United Kingdom, the trend of cash prices was moderately but clearly downward as the Southern Hemisphere crops were secured and marketed. During this period, with visible supplies running exceptionally high and the uncertainties of the supply situation largely eliminated, importers pursued a policy of leisurely but not niggardly purchasing, which proved sufficiently active to prevent large recessions in prices as the Argentine crop was pressed on the market. Speculative activity in the United States—and presumably elsewhere—was at a low level, the lowest of any period after 1921 except December–February 1924.[1]

From early February 1928 until the last of April, new-crop prospects dominated the price movement and gave rise to a sharp upturn, most extreme in the United States. The crop outlook naturally exerted its influence more strongly as spring approached —more strongly in April than in March, in March than in February. May futures prices rose 41 cents in Chicago, 24 cents in Winnipeg, 18 cents in Liverpool, and 16 cents in Buenos Aires; cash prices were similarly affected. The principal cause of the advance was the increasingly unfavorable

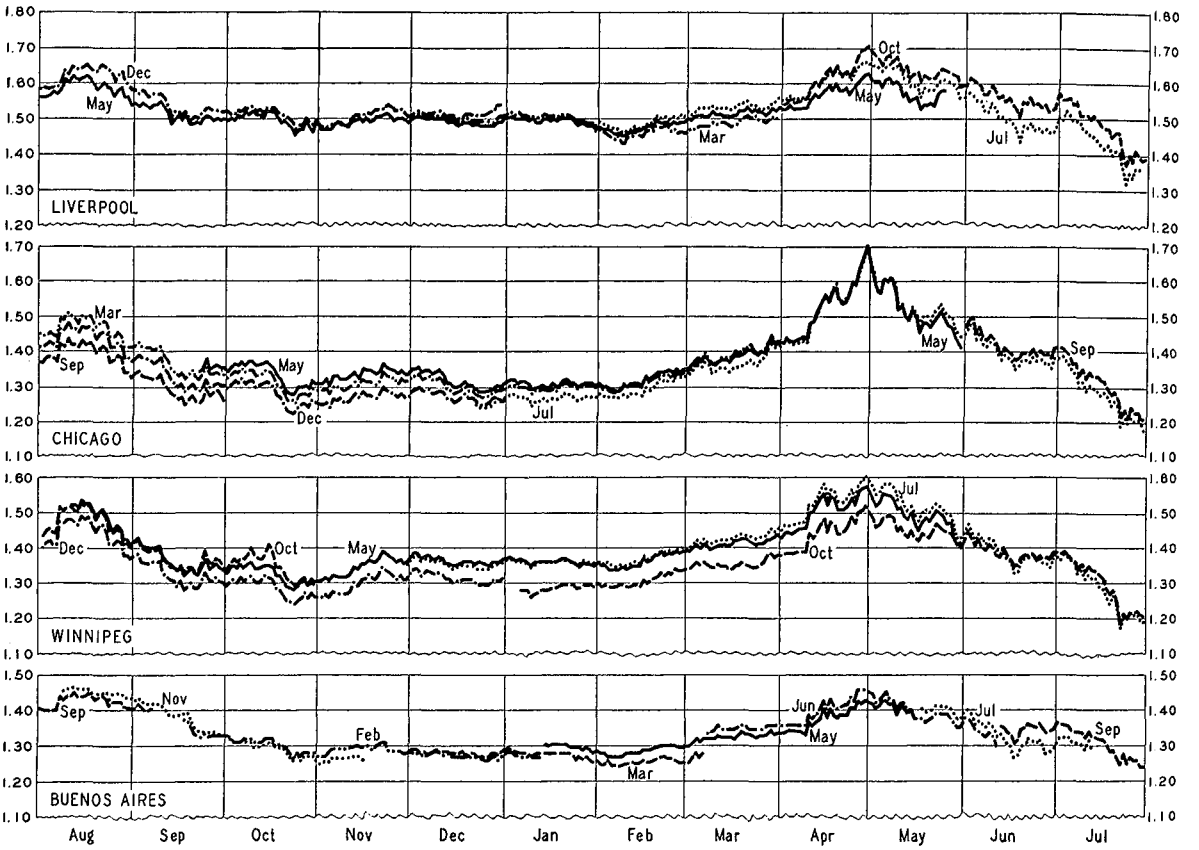
[1] See Appendix Table XXX.

outlook for winter-wheat crops, chiefly in the United States east of the Mississippi, but also in western and central Europe. Partly because of the new-crop outlook, partly because stocks of import wheat had become depleted by restrained buying on a falling market, European purchasing became active in early February. Rumors—officially denied the next day—that Russia was on an import basis were circulated on February 16, and tended to strengthen prices. In the United States milling demand for cash wheat strengthened perceptibly as milling activity increased from the abnormally low seasonal levels of the winter months.[1] Speculative activity in the United States became increasingly pronounced. On the upward movement, the spreads between Chicago and Liverpool, Chicago and Winnipeg, and Winnipeg and Liverpool futures were gradually reduced. On April 30 the Chicago July future stood 4 cents above the Liverpool instead of 21 cents below, as had been the case three months before; and Winnipeg stood only 6 cents below Liverpool as against 13 cents below on February 3. Traders outside of the United States saw little reason to follow the Chicago advance to its full extent, especially in the face of the huge visible. The narrowing of the Winnipeg - Liverpool spread was remarkable while so large a visible existed.

The last three months of the crop year witnessed one of the most extreme recessions in wheat prices recorded since the crash of prices in 1920–21. From the peak of $1.69 per bushel on April 30, the July

CHART 8.—DAILY CLOSING PRICES OF PRINCIPAL WHEAT FUTURES IN FOUR LEADING MARKETS, AUGUST–JULY 1927–28*

(*U.S. dollars per bushel*)



* Data from *Chicago Journal of Commerce* and *Daily Trade Bulletin*, Chicago.

[1] See below, p. 86.

future at Chicago fell to a low point of $1.17 on July 31, a decline of 52 cents in three months. The recession was naturally more drastic in Chicago than elsewhere, since Chicago prices had moved far out of line in the earlier advance. This extensive decline began on May 1, when unofficial forecasts of American winter-wheat crops ran higher than had generally been expected. Profit-taking by "longs" probably was influential. The official report of condition and abandonment, issued May 9, occasioned a sharp decline on the following day; unfavorable though it was, it was less so than had been expected. Subsequently rains visited the droughty Southwest, and further declines occurred as prospects there improved. Reports of dry weather in the spring-wheat belt supported the market during the second half of May; but improving prospects of spring wheat, both in the United States and Canada, were the principal cause of the weakness of prices in the first half of June, though the heavy visible supplies also began to exert pressure. The decline was temporarily checked in late June and early July by frequent rains hampering the winter-wheat harvest in the United States, and by reports of Russian wheat purchases. But excellent crop prospects both in the North American spring-wheat belt and in Europe, hedging pressure, and the weight of visible supplies combined to force a precipitous decline throughout the remainder of the crop year under review.

On the decline, the narrow spread between both Winnipeg and Liverpool and Chicago and Liverpool futures prices widened steadily; but that between Chicago and Winnipeg did not. With improving crop prospects, the Canadian visible assumed an increasingly bearish aspect. Acute competition for export business arose between Canada, the United States, and Argentina. Whereas in March–April, Chicago led in the upward movement of prices and Winnipeg followed with reserve, no reserve was shown by either market in the decline of May–July; and Argentine prices had consistently remained low. Canadian wheats during most of the period could be purchased c.i.f. Europe at lower prices than comparable American wheats; and No. 3 Manitoba became cheaper even than Argentine Rosafé wheat at Liverpool in June and July.[1] As a result of these price relationships, themselves due to changing crop prospects and the large supplies of Canada, Canadian exports were unusually heavy in June and July,[2] whereas but little United States wheat was exported. The export business went to Canada and Argentina, where stocks were worked down; but with the new American crop flowing to market, the United States visible rose higher and by July 31 reached heights unprecedented for the season.

The evidence suggests that Canadian wheat was pressed for sale in June–July. If much of it was owned by the Pool, the Pool must have pressed its offers; and if this pressure contributed to the decline of prices, the Pool appears to be partially responsible for the general decline. But it was perhaps in some part responsible, if it then tended to restrict sales, for the advance of February–April, and the net effect of Pool policy on wheat prices remains uncertain in 1927–28 as in preceding years.

An extended analysis of wheat price movements in various European countries is beyond the scope of this review. Chart 9 (p. 74) is pertinent, however, to illustrate the extent to which prices of native wheat in Italy, France, Germany, Poland, Hungary, and England have moved at variance with international wheat prices (British parcels) in the course of the past two years. German prices alone show a marked tendency to fluctuate with international prices; and even here the tendency was little in evidence in 1926–27. French prices in 1927–28 would have conformed more closely to the international movement if the increase in the tariff had not caused a sharp rise between October and November, whilst international prices were declining slightly. In most of these countries prices tend to be low in relation to international prices directly after harvest, and high immediately before harvest; there is apparently a marked seasonal movement, so strong as practically to obscure the tendency toward coincidence of international and domestic

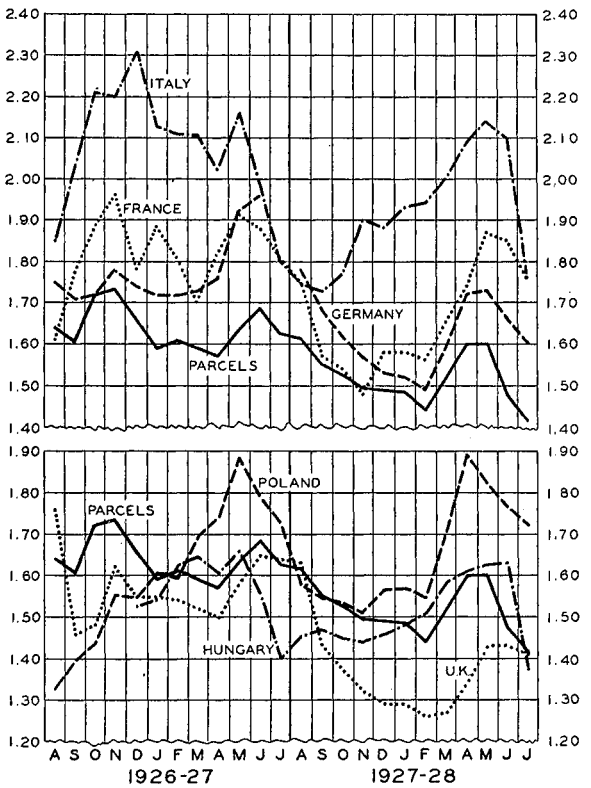
[1] See Appendix Table XXVII.

[2] See below, p. 83.

price movements. The subject requires further investigation; but one may reasonably suppose that the comparative lack of facilities for hedging and of terminal storage space is one cause of the common sharp post-harvest declines.

CHART 9.—MONTHLY PRICES OF DOMESTIC WHEAT IN EUROPE, COMPARED WITH BRITISH PARCELS PRICES, FROM AUGUST 1926*

(U.S. dollars per bushel)



* For sources of Italian, French, German, and United Kingdom domestic prices, see Appendix Table XXVIII. British parcels prices are from *London Grain, Seed, and Oil Reporter;* Polish prices from *Wiadomosci Statystyczne;* Hungarian prices from *Magyarorszag.*

RELATIONSHIPS OF NEAR AND DISTANT FUTURES

Certain features of the relationships of near and distant futures in the leading markets during 1927–28 are of interest. Most striking were the considerable and unusual discounts of the May future under the July and the July under the October in Liverpool in the last four months of the year. This was largely the result of abnormally high visible supplies toward the close of the crop year. At Chicago the July and September futures ordinarily run at substantial discounts under the May, but in 1927–28, after December 1927, these discounts were small. Unfavorable prospects for new crops maintained the prices of July and September futures relative to the May, and high visible supplies tended to depress the May relative to the July and September. The September future seldom commands a premium over the July, but such was the case in the last two months of 1927–28. In Winnipeg, the spread between the October (new-crop) and the May and July (old-crop) futures was narrower than usual; and in June–July, the October sold above the July. This situation presumably could not have occurred unless the existence of large stocks had justified a carrying charge between the two futures. In the preceding two years the July future commanded premiums of more than 10 cents over the October; and this relationship appears to be normal. The whole subject of normal or customary spreads between near and distant futures requires further analysis; nevertheless, the characteristic relationships now appear to have been disturbed toward the close of 1927–28 by the exceptionally high level of visible wheat supplies.

Another unusual fact was that futures prices in Winnipeg during the closing months of the several futures (October, December, May, and July) failed to approximate at all closely the cash prices of No. 1 Northern Manitoba, the only grade of Canadian wheat deliverable without discount on futures contracts. The spreads between cash prices of Nos. 1, 2, and 3 Northern were abnormally wide in 1927–28 because the two upper grades were very scarce while No. 3 was plentiful. These spreads may be illustrated by the following average cash prices in May of the past five years:

Year	No. 1 Northern	No. 3 Northern	Spread
1924	$1.04	$0.98	$0.06
1925	1.82	1.74	0.08
1926	1.53	1.44	0.09
1927	1.56	1.46	0.10
1928	1.57	1.42	0.15

With No. 3 wheat deliverable on futures contracts at a discount of only 8 cents, it is

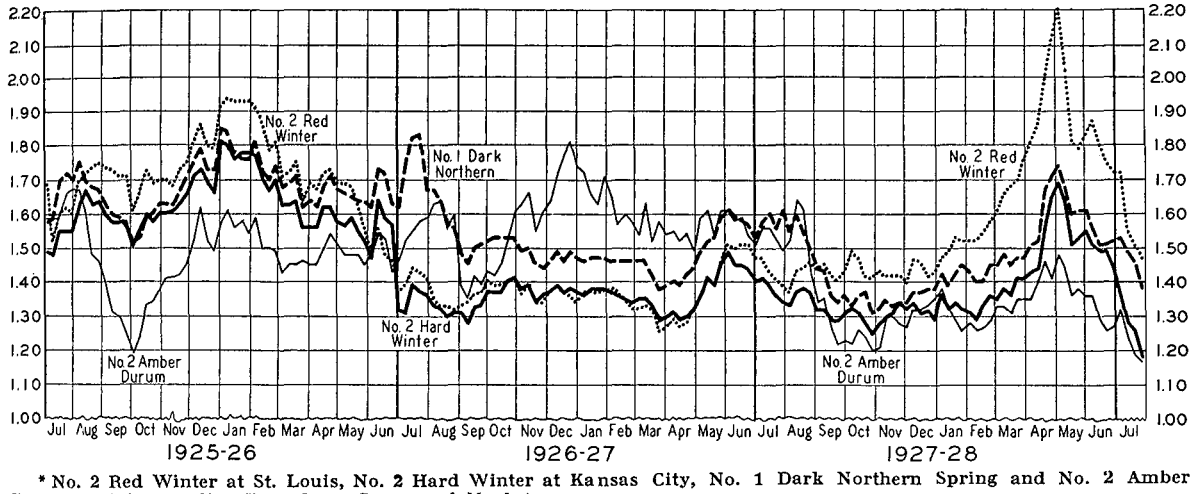
not surprising that futures prices throughout the year ran distinctly lower than cash prices of No. 1 wheat, and for the first time in five years they were at or below the cash prices of No. 2 wheat in all four of the futures closing months.

United States Cash Prices

Cash prices of the several varieties of wheat in the United States vary from year to year in accord with special circumstances affecting the particular varieties. Chart 10 shows weekly weighted averages of four different grades and types of wheat for the past three years. Early in the crop year, while prices of No. 2 Red and No. 2 Hard Winter wheat were falling as the crops were secured, the prices of the spring wheats, No. 1 Dark Northern and No. 2 Amber Durum, remained high. This general relationship usually occurs, but in 1927–28 spring-wheat prices were perhaps exceptionally high on account of unusual possibilities of damage from rust and frost.

Chart 10.—Weekly Average Cash Prices of Typical Wheats in United States Markets, from July 1925*

(U.S. dollars per bushel)



* No. 2 Red Winter at St. Louis, No. 2 Hard Winter at Kansas City, No. 1 Dark Northern Spring and No. 2 Amber Durum at Minneapolis. Data from *Crops and Markets*.

The outstanding feature of cash price relationships was the considerable premium on soft red winter wheat, a result of the short crop. The fact that winterkilling of the 1928 crop was heaviest in the soft red winter-wheat area caused this premium to increase markedly in January–April; and by the first of May, No. 2 Red Winter sold for over 45 cents per bushel more than No. 1 Dark Northern, the dearest of the other three wheats whose prices appear on the chart. The peak of soft red winter prices in early May, $2.20 per bushel, was the highest recorded since the great decline of wheat prices in 1920. Despite American predilection for strong flour, soft red winter wheat readily rises to a premium position under shortage.

No. 2 Amber Durum wheat was the discount wheat in 1927–28. The domestic crop was much larger than in 1926–27, when durum commanded a premium; and Canada and North Africa also secured larger crops. The discount on durum in 1927–28 was not as heavy as in 1925–26; but in the earlier year the prices of other varieties of wheat were enhanced not only by short crops but by tariff protection. The United States crop of durum, of which the bulk always goes for export, does not benefit from tariff protection as other varieties may do under appropriate circumstances.

The larger size of the hard red spring-wheat crop and the smaller size of the hard red winter-wheat crop resulted in a smaller spread in 1927–28 between the prices of No. 1 Dark Northern and No. 2 Hard Winter than prevailed in 1926–27.

Extraordinarily high premiums for protein content in hard spring and hard winter

wheat were also an outstanding feature of the cash price situation in 1927–28. Data are not available to show precisely how great were the spreads in price within particular grades due to differences in protein content alone. There can be little question, however, that for the year as a whole premiums on protein ruled higher than ever before—not necessarily because the crop was the lowest in average protein content, but in part because the purchase of wheat on protein analysis has grown rapidly in favor in recent years. During a good part of 1927–28 millers paid as high as 10 cents per bushel premium for each additional per cent of protein over 11 per cent. Such high premiums were the more striking in view of the margin of error in sampling and in the chemical determination of protein content, and in view of the effect of other factors upon milling quality.

The spreads between roughly comparable grades of American and Canadian wheats, No. 1 Dark Northern at Minneapolis and No. 3 Manitoba at Winnipeg,[1] were, as in 1926–27, too small to permit profitable importation of Canadian wheat into the United States over the tariff wall of 42 cents per bushel. The spread in favor of Minneapolis was only 5 cents per bushel at the beginning of the crop year. But by July 1928 the spread had increased to 27 cents as Canadian prices were reduced more than American under the pressure of high visible supplies. This was the widest spread of the year; at no time did the discrepancy become so great as that prevailing in most of 1925–26, when duty-paid importation at times became feasible.

Returns to Wheat Growers

Comparisons of the profitableness of of wheat production are always difficult. Data are not available to permit an extensive and accurate tabulation showing for many countries weighted annual average prices in relation to crops produced and to gross costs of production. For the leading wheat producers, however, sufficient information is available to justify discussion.

Table 9 shows approximate crop values for the past five years in several important wheat-producing countries, as calculated from annual average prices and crop production. The year 1923–24 stands out among the five as one of distinctly low crop values —so low, indeed, that despite deficiencies in the data, that year may safely be regarded as distinctly the least profitable to wheat growers generally. It was followed by reduced acreage in the United States and western Europe, though apparently not in most other important producing regions (see Chart 2, p. 51). Crop values were much higher in all four of the following years, but close comparisons of the relative profitableness of wheat production in these years must remain uncertain on account of shortcomings in the data.

Table 9.—Approximate Value of Wheat Crops in Selected Wheat-Producing Countries, 1923–24 to 1927–28*

(Million dollars)

Country	1923–24	1924–25	1925–26	1926–27	1927–28
United States	734	1,106	1,022[a]	1,076[a]	1,054
Canada	318	342[a]	529[a]	452[a]	480[a]
Argentina	263	317	317	318	370[a]
Australia	128	237	169	220	147
France	372	486	480	422	458
Italy	270	316	501	459	376
Germany	111	139	190	169	195
British Isles	71	86	85	82	78

* Calculated from official crop estimates (sometimes corrected) multiplied by annual average prices as follows: U.S., weighted average farm price; Canada, official average farm price; other countries, unweighted averages of monthly average terminal prices at Buenos Aires, Melbourne, Chartres, Milan, and Berlin, and of *British Gazette* prices. See Appendix Tables III, XXVII, XXVIII, XXXI.

[a] Using official crop estimate adjusted according to our estimates of error.

In the first place, the crop values shown in Table 9 do not represent accurately the gross returns of farmers from wheat. Weighted average prices and sales from the farm are required for this purpose, but are not available. In the second place, gross returns from sales would not necessarily indicate the profitableness of wheat growing; one would need also to consider wheat used on farms, production costs, and changes in the wheat-growing population. Information is not available on most of these subjects.

Nevertheless, if, as seems reasonable to suppose, operative costs of production per acre (rent of land excluded and yield dis-

[1] See Appendix Table XXVII.

regarded) have not changed materially in most countries, the year 1927–28 would seem to have been distinctly unprofitable only in Australia and the British Isles. Australian producers suffered from the disadvantages of high acreage with increased gross production costs, a short crop, and only moderate prices; unless operative costs have declined considerably in the interval, 1927–28 may have been as unsatisfactory a year as 1923–24. In the British Isles so much of the crop of 1927 was unmillable that the crop value and the net return to farmers may have been lower even than in 1923–24.

The higher crop values in Germany and France in 1927–28 than in 1926–27 may be partially fictitious, since so much wheat was unfit for milling. The Italian situation is confused by the fact that a good deal of the wheat crop of 1926 was held over and marketed in 1927–28, so that returns to farmers in 1927–28 were perhaps not so much smaller than in 1926–27 as the figures suggest; but in any event returns were presumably higher than in 1923–24 and 1924–25, though lower than in 1925–26. Producers in Argentina appear to have enjoyed a distinctly remunerative year in 1927–28; though high acreage increased gross costs, net returns were probably high because of the record crop. Canadian producers also seem to have enjoyed a remunerative year, somewhat the best of the period except 1925–26, despite a crop of poor average quality. The Canadian acreage was not extraordinarily large, while yield per acre was unusually high.

So far as can be judged by crop values in the United States, which must be calculated by the use of adjusted official crop estimates for 1925 and 1926, the year 1927–28 differed comparatively little from the three preceding, but was distinctly more profitable than 1923–24. The areas both sown and harvested[1] were considerably larger than in 1924–26, however, so that gross costs were relatively high, unless increased use of the combine and other factors caused a compensating reduction.[2] In view of the fact that farmers on August 1, 1928, expressed intentions of planting an area to winter wheat 6 per cent smaller than they intended to plant on August 1, 1927, and 2.1 per cent smaller than they actually planted for the crop of 1927, the year 1927–28 as a whole may have appeared unremunerative. But intentions to plant were announced at a time when prices were lower than at any time during the preceding crop year; and this price situation rather than returns from the crop of 1927 may have influenced farmers' decisions.

Within the United States, the situation differed in different areas. Weighted average terminal prices of several grades of representative wheats appear in Table 10,

TABLE 10.—ANNUAL WEIGHTED AVERAGE WHEAT PRICES IN THE UNITED STATES, 1920–28*

(Dollars per bushel)

Crop year July–June	Farm price	No. 2 Red St. Louis	No. 2 Hard Kansas City	No. 1 Dark Northern Minneapolis	No. 2 Amber Durum Minneapolis
1920–21....	1.83	2.13	1.83	2.01	2.00
1921–22....	1.04	1.27	1.20	1.48	1.19
1922–23....	.98	1.21	1.13	1.26	1.07
1923–34....	.92	1.07	1.05	1.24	1.06
1924–25....	1.28	1.59	1.35	1.58	1.56
1925–26....	1.46	1.69	1.63	1.65	1.44
1926–27....	1.23	1.38	1.35	1.51	1.55
1927–28....	1.20[a]	1.49	1.35	1.41	1.32
Average 1909–14....	.89	1.00	.95	.99[b]	.89[c]

* Data of U.S. Department of Agriculture.

[a] Preliminary.

[b] No. 1 Northern, which commonly sells from 3 to 5 per cent under No. 1 Dark Northern. The latter was not quoted prior to August 1, 1917.

[c] No. 2 Durum.

and wheat production by classes is shown in Appendix Table IX. Growers of hard red spring wheat appear to have enjoyed a distinctly good year in 1927–28, perhaps the best in the past seven years except 1924–25, for the crop was of record size while prices were not too low to counterbalance this advantage. Durum wheat growers also enjoyed a relatively good year, better even than 1924–25 because the crop was so much larger. Growers of hard red winter prospered less than in either 1924–25 or 1926–27. Growers of soft red winter

[1] See Appendix Table VI.

[2] Net costs per acre excluding land rent, according to official data, show no definite trend over the past five years, but in 1927–28 were slightly the lowest in the past five years. See June issues of *Crops and Markets*.

suffered most; the crop was so small that in spite of fairly good prices per bushel the gross returns were the smallest in post-war years. Growers in the Pacific Northwest, with a distinctly large crop, presumably enjoyed relatively good returns.

V. INTERNATIONAL TRADE IN WHEAT AND FLOUR

The movement of wheat and flour in international trade in the year under review provided fewer surprises and striking features than was true in 1926–27. With crops and their distribution fairly well known early in the year and fairly stable prices and freight rates in prospect, most observers expected the volume of trade to prove distinctly large, though not of record size; and such was the event. The course of trade suffered no such disturbance as occurred in 1926–27. The outstanding features of the international trade in 1927–28 were the enormous exports from North America (especially the Pacific Northwest) and Argentina, the heavy imports of central European countries, and in the latter months of the year the heavy movement from Canada. But events in particular countries, often of little effect on the general volume or course of international trade, were of interest and of some significance. Trade in wheat flour is discussed below, in Section VI.

Volume and Course of Trade

As measured by the sum of net exports from net exporting countries, the volume of international trade in 1927–28 reached some 818 million bushels, about 28 million smaller than in the preceding year, but the second (or third) largest movement in history. Overseas shipments (Broomhall's data) were smaller, 793 million bushels; these data show a decline of some 21 million bushels from the record figure of 1926–27. For the past six years, net exports compare with overseas shipments as follows, in million bushels:

Year August–July	Net exports[a]	Broomhall's shipments[b]
1922–23	711	676
1923–24	824	775
1924–25	767	715
1925–26	693	668
1926–27	846	814
1927–28	818	793

[a] See Appendix Table XVII. Partially estimated, especially with reference to Russian exports.
[b] See Appendix Table XVI.

Discrepancies between the two sets of figures arise from several causes which need not here be discussed;[1] that trade was of distinctly large volume in 1927–28 is clear. If one accepts net exports as the more accurate measure, trade in 1927–28 was of much the same volume as in 1923–24. The principal difference between these two years lies in the fact that in 1927–28 exports to ex-European destinations were much smaller—by over 30 million bushels—than in 1923–24, while exports to European destinations were correspondingly larger.[2]

The decline in the total volume of trade between 1926–27 and 1927–28 was due principally to the fact that Europe harvested wheat crops some 60 million bushels larger in 1927 than in 1926, and hence needed to import less wheat. The volume of trade in 1927–28 might have proved smaller except for the considerable quantities of unmillable wheat in the European crop, the upward trend in both European and ex-European wheat consumption, the larger supplies in exporting countries, and the lower level of international wheat prices.

The course of trade presents several features of interest. Broomhall's shipments data, which represent the actual week-to-week movement overseas better than net export data,[3] are summarized in the form of three-week moving averages of weekly data in Chart 11. In 1927–28 the August-September movement was exceptionally heavy, largely because European crops were late and supplies of foreign wheat were needed. As usual, shipments declined in December with the closing of lake

[1] See Wheat Studies, November 1927, IV, 10 f., and August 1928, IV, 340.

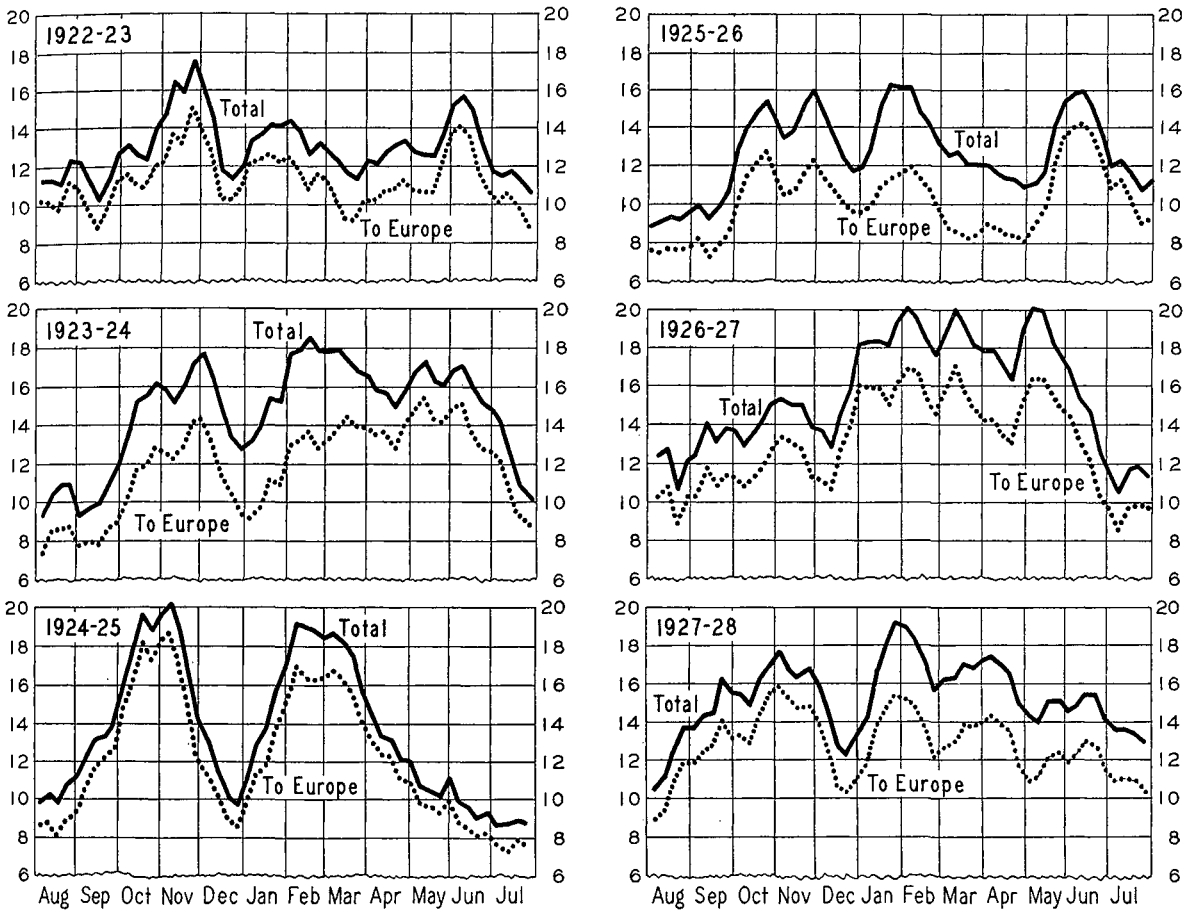
[2] See below, p. 80.

[3] Net export data are available only in monthly figures. Moreover, Canada sends large quantities of wheat into the United States in September–November; but some of this wheat, which appears as net exports from Canada, does not pass overseas within the period, but is shipped in the winter months when navigation on the Great Lakes is closed. Hence monthly net export statistics exaggerate the autumn overseas movement at the expense of the winter movement.

navigation; and the customary peak was reached in late January with the free movement of newly harvested wheat from Argentina and Australia. No conspicuous peak occurred, however, in May or June, as is usual with the opening of lake navigation in years when Canada has large stocks. European importers appear to have restricted their purchases with sharply rising prices in April and declining prices in May, but resumed their buying in June and July as the decline progressed and Canadian offers became more pressing. As a result, the flow of wheat to export declined less in May–July 1928 than in any of the past six years. All told, the international movement was more evenly distributed than usual. The contrast with 1926–27 is noteworthy: in that year exports were restricted in the first half of the year by a bulge in ocean freight rates, and were swelled in the second half when freight rates declined and importers made up their arrears.

CHART 11.—INTERNATIONAL SHIPMENTS OF WHEAT AND FLOUR, WEEKLY FROM AUGUST 1922*

(Million bushels; 3-week moving average)



* Broomhall's data, from the *Corn Trade News*.

IMPORTS AND THEIR DISTRIBUTION

In the absence of statistics for many countries, especially the ex-European, an entirely satisfactory analysis of net imports of wheat and flour by crop years cannot be obtained; nor is it possible to employ statistics of exports by destination, since "orders" shipments confuse the picture. A rough allocation of net exports to Europe and to ex-Europe is made feasible by computing the sum of exports from net export-

ing countries to ex-European destinations, and assuming that the difference between total net exports and exports to ex-Europe constituted the amount of wheat exported to Europe. This allocation is at best only approximate because total net exports are for August–July crop years, while exports to ex-Europe are for July-June years, and the ex-European figures are subject to other qualifications.[1] The figures are as follows for the past six years, in million bushels:

Crop year	Total net exports	Exports to ex-Europe	Exports to Europe
1922–23	711	98	613
1923–24	824	164	660
1924–25	767	96	671
1925–26	693	132	561
1926–27	846	126	720
1927–28	818	134	684

Among the principal ex-European importing countries—Japan, China, the West Indies, Brazil, Egypt, and South Africa—all except Egypt took a little more wheat and flour in 1927–28 than in 1926–27.[2] All told, the five principal ex-European importers took about 13 million bushels more wheat in 1927–28 than in 1926–27. The increase was most noteworthy in Brazil and South Africa, and amounted to nearly 12 million bushels. Most of the minor importers took a little more; but New Zealand, Mexico, and the Dutch East Indies reduced their takings. It is significant that Chinese and Japanese takings were increased only slightly, despite lower international wheat prices. In general, upward trends in wheat consumption and lower international prices account for the increase in ex-European trade.

Table 11 shows the net imports of most of the European importing countries during each of the past five years. The principal omissions are Greece and Portugal, for which adequate data are not available. The total of these imports, 630 million bushels, was apparently only 5 million bushels smaller in 1927–28 than in 1926–27, not some 36 million bushels smaller, as our estimates of exports to Europe suggest. But the net import statistics require qualification. To include Greek imports, if they were available, would presumably raise the figure of 1926–27 in relation to that of 1927–28, and thus increase the difference. Greece had a considerably larger wheat crop in 1927 than in 1926, and required smaller imports; moreover, changes in the tariff seem clearly to have cut down her imports of flour.[3] The French imports of 1926–27 are understated, those of 1927–28 overstated.[4] With allowance for these fac-

TABLE 11.—NET IMPORTS OF WHEAT AND FLOUR BY PRINCIPAL EUROPEAN IMPORTING COUNTRIES, AUGUST–JULY, 1923–28*

(*Million bushels*)

Importing area	1923–24	1924–25	1925–26	1926–27	1927–28
British Isles[a]	239.7	227.9	209.9	237.2	232.2
Italy	69.9	88.7	67.9	86.6	89.6
Germany	30.7	80.9	57.4	91.8	88.5
France	53.3	58.5	10.3	62.3	46.9
Belgium	40.0	39.0	39.2	39.5	41.9
Netherlands	26.7	26.8	27.2	28.5	31.0
Scandinavia[b]	27.7	22.7	18.8	19.5	26.2
Switzerland	17.1	13.9	15.6	16.3	18.4
Austria	18.1	16.0[c]	14.7[d]	16.9	16.5
Czecho-Slovakia	21.2	21.5	21.7	20.1	21.4
Poland	2.6	17.1	....[e]	8.1	8.6
Baltic States[f]	7.9	7.3	7.8	7.7	8.6
Total	554.9	620.3[c]	490.5	634.5	629.8

* See Appendix Table XVII for sources and further details.

[a] Includes Irish Free State.
[b] Norway, Sweden, Denmark.
[c] Partially estimated.
[d] July–June.
[e] Net export of 4.6 million bushels.
[f] Finland, Latvia, Esthonia.

[1] We include in this calculation only the net exports to ex-Europe from Argentina, Australia, Canada, and the United States. India and Chile also make appreciable exports to ex-Europe, but data for recent years are not available. Partly because exports from India and Chile are omitted, partly because exports from the United States to ex-Europe are understated, our tabulation understates total exports to ex-Europe and overstates total exports to Europe.

[2] Appendix Table XIX shows exports from the principal exporters to these countries.

[3] See below, p. 93.

[4] In some months of 1926–27 importers were allowed a partial refund of the duty; actual imports were not required to be reported until the wheat had passed into consumption, and an indeterminate proportion of actual imports was not immediately reported. As a result, actual imports in the latter half of 1926–27 were understated; but early in 1927–28, with the refund discontinued, the monthly net import figures included not only all wheat actually imported in the stated months, but also some wheat which had arrived in France months earlier. Hence imports in the early part of 1927–28 were overstated. At some time during the middle of 1927–28, import statistics again presumably began to reflect actual arrivals.

tors, the apparent discrepancy between the changes in estimated exports to Europe and in reported imports of Europe becomes smaller. But total net imports always tend to fall below total net exports.

As Table 11 shows, the British Isles, Germany, and France were the only European countries (Greece and possibly Austria excepted) that imported less wheat and flour in 1927–28 than in 1926–27; and only in France was the decline of appreciable size. The decline of 5 million bushels in British imports equals almost exactly the increase of the domestic crop; but since an unusual proportion of the domestic crop was apparently unmillable, smaller imports were presumably due to declining per capita consumption and/or reduction in import wheat stocks. That the increase in Italian imports was only three million bushels is somewhat surprising since the domestic crop was about 25 million bushels smaller; but stocks were drawn down in the course of the year. Germany, despite a crop 25 million bushels larger in 1927–28 than in 1926–27, imported only 3.3 million bushels less wheat. Here per capita consumption is increasing, stocks were increased in the course of the year, and the effective increase in the domestic crop was smaller than the apparent increase on account of unmillable grain. The decline in French imports (apparently 15 million bushels, but actually more) naturally occurred because the domestic crop was larger; but the imports of 1927–28 might have been smaller still had not unmillable grain bulked so large in the domestic crop. The increases in other countries may be ascribed partly to lower international wheat prices, partly to the upward trend in per capita wheat consumption made more effective by continuance of economic recovery, and partly to the general prevalence of unmillable wheat. The relative strength of these influences presumably differed in different countries.

Sources of Exports

Table 12 shows a statement of the relative contributions of the several exporting countries to the total volume of international trade for 1927–28 and the four preceding years. In some slight degree, as will be noted, this falls short of completeness and accuracy. Exports from North America and Argentina comprised nearly 85 per cent of the total, by far the largest proportion in recent years. The proportion of the whole furnished by North America was also unusually large. As usual, the exports of individual countries were determined principally by the size of their crops; but certain unusual features appeared with respect both to the movement and to the volume of exports from particular countries.

Table 12.—Net Exports of Wheat and Flour from Principal Exporting Countries, August–July, 1923–28*

(Million bushels)

Exporting area	1923–24	1924–25	1925–26	1926–27	1927–28
United States ...	127	256	103	199	184
Canada	346	192	324	292	332
Argentina	172	123	94	143	178
Australia	86	124	77	103	70
India	20	38	8	12	9
Danube basin[a] ..	34	25	46	45	33[b]
Russia	21[c]	...	27[c]	49[c]	...[d]
Other countries[e]	18	9	14	3[b]	12[b]
Total	824	767	693	846	818

* See Appendix Table XVII for sources and further details.

[a] Bulgaria, Hungary, Jugo-Slavia, and Roumania.
[b] Partially estimated.
[c] July–June.
[d] Exports from Russia during July–June totaled 7 million bushels; but there were imports in July, and for the August–July crop year we assume that imports equaled exports.
[e] Includes Morocco, Algeria, Tunis, Chile, Spain, and Poland, for the years in which these countries were net exporters.

Net exports from the United States during August–July (not including shipments to possessions) totaled 184 million bushels from a crop of 878 million. In 1926–27, from a crop officially estimated as 42 million bushels smaller, net exports were 199 million, though outward carryovers differed little in the two years. But in retrospect the decline in net exports is not surprising. The crop of 1926 was clearly underestimated; that of 1927 may have been slightly overestimated; and more wheat was required both for food and for feed and waste in 1927–28. These factors could not be foreseen clearly early in the crop year, and most observers anticipated heavier exportation than actually occurred.

Exports of flour and of durum and Pacific wheats—in other words, unrepresentative varieties—appear to have constituted an exceptionally large proportion of the total; but precise classification of exports is impossible. The following figures in million bushels, summarized from data of the U.S. Department of Commerce, show the gross quantities of wheat (including flour) exported from groups of customs districts for the past five years ending June 30:

Customs districts	1924	1925	1926	1927[a]	1928[a]
Canadian border and lake ports ..	18.3	56.0	21.3	24.6	49.0
Atlantic Coast	42.3	84.0	40.9	59.1	47.1
Gulf Coast	32.1	91.9	12.0	80.5	36.5
Mexican border ...	2.5	.4	1.3	7.1	6.8
Pacific Coast	64.7	28.5	32.5	47.9	67.2
Total	159.9	260.8	108.0	219.2	206.6

[a] Figures for 1927 and 1928 are preliminary with respect to accurate distribution to the several customs districts. The figures for exports across the Mexican border have not yet been published, and here signify merely exports not officially allocated to other customs districts.

In so far as these and other data[1] are a guide, exports of Pacific white and soft red wheats appear to have been the largest in the past five years, while exports of durum were decidedly large, and exports of typical hard red winter, soft red winter, and hard red spring wheats—especially soft red winter—were small. The large exports from Canadian border and lake ports consisted principally of durum, as may be judged by shipments from Duluth-Superior,[2] which are destined much more largely for export than for milling in the eastern cities of the United States.

The concentration of American exports in the first half of the crop year was distinctly peculiar. The percentages of total net exports leaving the United States in the first and second halves of the past six years are as follows:

Year July–June	July–December	January–June
1922–23	66.5	33.5
1923–24	65.2	34.8
1924–25	70.6	29.4
1925–26	53.7	46.3
1926–27	66.6	33.4
1927–28	77.4	22.6

In 1927–28, January–June net exports constituted only 22.6 per cent of the total, considerably the smallest figure of recent years. The reasons are not yet entirely clear, but several factors may be cited in explanation. In the early months marketings were heavy, but demand for wheat by domestic mills was relatively light;[3] hence more than a normal proportion of receipts was available for export. In the second half of the year, milling demand was relatively heavy, and prices of representative bread wheats were forced above export parity partly by this demand and partly by the poor outlook for the winter-wheat crop of 1928; hence exports were restricted. Toward the end of the crop year, when new-crop prospects had improved, the competition from Canadian and Argentine wheat was too keen to permit United States prices of these wheats to fall to export parity, so that restriction of exports continued. Even so, the carryover was not built up to extreme heights; the visible alone was abnormally high, and it consisted largely of durum wheat, which is presumably less subject than representative wheats to the influences mentioned above.

Canada, with apparently the largest crop and the largest inward carryover in her history, exported 332 million bushels net, some 14 million less than in 1923–24, when the crop was of about the same size (but better in quality) and the inward carryover somewhat smaller. Advance estimates of exports proved too low because they were based upon official crop estimates which now appear to have understated the crop. One striking feature of Canadian trade was the heavy movement from Pacific ports. Shipments through Vancouver alone exceeded 85 million bushels, some 25 million more than in any previous year. The large crop of Alberta, and a readjustment of railway rates enabling Vancouver to draw upon a wider territory, were the principal causes of this high figure. For the first time in history Vancouver apparently han-

[1] See Appendix Table XX for a classification of American wheat exports in recent years.

[2] These shipments (Duluth Board of Trade date) were as follows for the past six years August–July, in million bushels:

1922–23	44.6	1925–26	31.7
1923–24	21.0	1926–27	22.3
1924–25	35.3	1927–28	44.0

[3] See Appendix Table XXVI, and below, p. 86.

dled more Canadian wheat than Montreal, for Canadian exports through all Canadian seaboard ports totaled only 173 million bushels.[1] The heavy movement from Pacific ports made for the heaviest mid-winter movement ever recorded from Canada. Exports in April were abnormally small, in May not large,[2] stocks considered. But in June–July, with offers pressed, exports were larger than in any year since the war. During these months Canadian exports formed a higher proportion of the world exports than ever before.

In the course of the year Canadian wheat imported into the United States for milling in bond totaled 15.04 million bushels, 1.87 million more than in 1926–27 and 1.57 million more than in 1925–26. Imports for consumption, however, were again small, only about 150 thousand bushels.[3]

The volume of Argentine net exports, 178 million bushels, was the largest in history. Such heavy exportation was not foreseen early in the crop year. The crop was officially estimated as 239 million bushels, 8 million smaller than in 1923–24, when exports reached 172 million; and the rapid growth of domestic disappearance in Argentina suggested that exports of 1927–28 must fall well below the figure of 1923–24. It now appears that the crop of 1927 was considerably underestimated, perhaps by 30 million bushels more or less.[4] Exports during August–December were by no means large; but the January–July movement was of record size. Exports in these months totaled 148 million bushels, as against 138 million in 1924.[5] Free offers of Argentine wheat in competition with Canadian in the closing months of the year, when Argentine supplies are ordinarily insignificant, were an important factor in the drastic decline of prices during April–July.

Australia, with the shortest crop since 1922, naturally exported less wheat and flour than usual. Total net exports of 70 million bushels were not small, however, size of crop considered. Only 50 million bushels were exported from a crop of similar size in 1922–23. Unless the crop of 1927–28 was officially underestimated, Australian exports were made partly by reducing stocks.

Of the minor exporters, the Danube countries exported some 33 million bushels of wheat and flour. Of this quantity Hungary furnished 21.8 million and Roumania 7.5 million. Hungary, with a crop the largest in recent years and of excellent quality, exported a trifle less than in 1926–27; here, as in other Danube countries, short corn crops tended to restrict exports slightly. Jugo-Slavia's net exports were only a little more than a million bushels; her crop was the shortest since 1922, and in the winter months net imports were necessary. Roumania's exports held up surprisingly well in view of the relatively small crops both of wheat and of corn, especially the latter. Bulgaria exported a little over 2 million bushels, not so large a quantity as seemed possible in view of the distinctly large crop; here also the short corn crop tended to restrict wheat exports.

Net exports from India were 8.5 million bushels, the smallest since the war except for 1921–22, when India was a net importer, and 1925–26. Some imports from Australia were made in the winter months of 1927–28. The Indian crop was only of moderate size for the third successive year, and the new crop harvested in the spring of 1928 was quite small. Algeria and Tunis, and presumably Morocco, were able to export more than in 1926–27, largely toward the end of the year when the crop of 1928 promised exceptionally well. Data are not available for Chile, but the record crop presumably afforded relatively large exports during January–July 1928.

The lack of information from Morocco and Chile renders our estimate of total net exports subject to a margin of error, though not a large one. The totals are also incomplete in all years because exports from Uruguay, which must have been exceptionally large in 1927–28 on account of the large crop, are omitted for lack of data. Furthermore, wheat seems to have been exported from North Manchuria to Japan in 1927–28, but probably not in sufficient volume to place Manchuria as a whole in the list of net exporting countries.

[1] See Appendix Table XIV.

[2] See Appendix Table XX.

[3] See Appendix Table XIII.

[4] See above, p. 57.

[5] In 1920, January–July exports were 188 million bushels; but in that year the seasonal movement was exceptional, following the release of war-time stocks.

Furthermore, the very status of Russia is not clear. For the crop year July–June she was, according to official trade statistics, a net exporter of 7 million bushels of wheat. Most of these exports occurred in the first half of the year. The total crop was some 70 million bushels smaller than in 1926–27, and the crop lying near the exporting centers around the Black Sea was especially deficient. With consumption increasing, these factors alone seem sufficient to account for the decline in exports; for the difficulties involved in inducing peasants to part with grain appear to have been no greater in 1927–28 than in earlier years. During July Russia imported wheat, effecting simultaneous purchases in several continental ports. Neither the volume of these purchases nor their disposition has yet been made public. According to unofficial advices, some 11–13 million bushels were purchased in July–August, half of it moving to northern and half to southern Russia.[1] One may infer that a portion was used for seed and a portion for consumption. If, as seems probable, rather more than half of these imports occurred in July, then Russian imports for the crop year August–July may have balanced her exports; and we assume this balance in our estimate of total world net exports in August–July 1927–28. We employ July–June net exports from Russia in earlier years; and adjustments to an August–July year might slightly disturb the totals of world net exports.

All told, advance estimates of the total volume of international trade in 1927–28 proved much more accurate than in 1926–27, when early estimates, predicated partly upon trade in early months, proved far too low because the trade in the first half of the crop year was sharply curtailed by prevailing high ocean freight rates. Although the total movement in 1927–28 was foreseen with fair accuracy, there were significant errors of detail. The experience of 1927–28 teaches that such errors are to be avoided chiefly by the development of more adequate methods of estimating crops and of more precise measures of the quantities of wheat unmillable and fed to farm animals.

VI. THE YEAR IN MILLING

In our two preceding annual reviews we have set forth certain persisting characteristics of the milling situation in the United States, Canada, and various regions abroad, and have remarked the difficulties encountered in attempting to obtain a reliable appraisal of the situation in any one year. To repeat these observations in detail is unnecessary. It suffices to say that statistics of mill output, mill operation, and flour prices, as well as mill profits, are available for few countries; that devices are lacking to test the accuracy of impressions gained by perusal of milling journals; and that the general situation throughout the world is still characterized by milling capacity much in excess of annual flour requirements—a situation which gives rise to strenuous efforts to ease the strain of competition in numerous ways.

The milling situation varies greatly from country to country and from region to region within a country, and our present review deals chiefly with new or special features of detail. With respect to 1927–28, a few broad statements are warranted. Flour production was large, but international trade in flour was of about the same volume as in the two preceding years, probably a little smaller. Flour prices, like wheat prices, were in most countries presumably the lowest since 1923–24. Prices of millfeed, on the other hand, were exceptionally high in both North America and Europe. Milling industries located in countries where wheat crops were short and output was curtailed—in the soft red winter-wheat belt of the United States, in Australia, in Jugo-Slavia, and in Roumania—experienced a relatively unsatisfactory year; and for special reasons the situation was unsatisfactory in France. In most regions and countries the situation appears to have been somewhat better in 1927–28 than in 1926–27, though the milling quality of wheat was less satisfactory in the United States, Canada, and western Europe, and conversion costs may have been larger.

[1] See *Northwestern Miller*, October 31, 1928, p. 449.

International Trade in Flour

In 1927–28, for the fourth successive year, the volume of international trade in wheat flour showed a decline. Gross exports of flour, according to somewhat incomplete data of the International Institute of Agriculture, were as follows in the past six years, in million barrels:

1922–23	37.3	1925–26	38.3
1923–24	48.1	1926–27	38.2
1924–25	45.0	1927–28	37.1

Trade was exceptionally heavy in 1923–24 because of low prices which induced heavy importation in most countries, but especially in China, where the domestic wheat crop was short. In 1924–25, despite high prices, the volume of trade was again large on account of urgent needs in Europe, especially Germany and Poland.[1] In the other four years the volume has apparently varied within narrow limits. For some years there has been a tendency for the international movement of flour to decline relative to the trade in wheat, as importing countries have raised tariff barriers to protect domestic milling. But it is not possible to demonstrate the present existence of a downward trend in flour shipments in absolute figures, and there are numerous causes of variation in the annual volume of international trade in flour.

The United States, Canada, Australia, Argentina, India, Hungary, Roumania, and Japan have been the leading flour exporters of the world in recent years, and Canada and the United States combined have exported more than half of the total. In 1927–28, however, the major exporters as a group furnished a smaller proportion than usual, chiefly because high prices of millfeed in Europe favored domestic milling there. Canada, Argentina, Hungary, and Japan each exported more flour than in 1926–27, while the other four countries exported less. The decline in Australian gross exports was greatest, some 1.17 million barrels. Presumably the short crop with accompanying high prices, and restricted demand from Egypt, were responsible. Exports from the United States declined by some 605 thousand barrels; Canadian and Argentine competition, aided by the relatively high American prices prevailing during March–June, appears to have cut down exports to most destinations, China excepted. Distinctly short wheat crops reduced the gross exports of Jugo-Slavia and Roumania by 806 million barrels, or more than 62 per cent.

The increase in exports of Canada, Hungary, Japan, and Argentina, which totaled 1,646 thousand barrels, was much less than the aggregate decline in exports from the four other leading exporters, viz., 2,365 barrels. The increased exports of Hungary were in part fortuitous: Hungary benefited by the defection of Roumania and Jugo-Slavia, and to some extent by a heavy year-end movement produced by the announcement of an increase in the Austrian duty to take effect on July 15, 1928. Other changes were smaller in volume; but an increase in Japanese and a decrease in French exports were noteworthy. France became a net importer of flour for the first time during post-war years.

Among the European importing countries for which statistics are available, only the British Isles and Germany imported appreciably less flour in 1927–28 than in 1926–27. In these and other countries of western Europe, high prices of millfeed probably rendered milling operations relatively remunerative and permitted flour to be sold at relatively low prices. Greece also appears to have imported much less flour in 1927–28 than in 1926–27, though complete statistics are not available. Among the ex-European countries,[2] China alone appears to have imported appreciably more flour in 1927–28 than in 1926–27. Egypt, with a large crop of domestic wheat, took some 400 thousand barrels less; and Algeria became a net exporter rather than a net importer of flour.

Milling in the United States, 1927–28

The United States mill output was the smallest of the past five years, 1925–26 excepted.[3] We tentatively estimate the flour production in July–June 1927–28 as 115.8 million barrels, some 3.6 million less than in 1926–27. This estimate is subject to revision when the biennial census data for 1927

[1] See Appendix Tables III, XVIII.
[2] See Appendix Table XIX.
[3] See Appendix Table XXVI.

become available. If our figure is in error, it is presumably slightly too low. According to the monthly milling census, 968 identical mills produced 107.5 million barrels of flour in 1927–28 as against 109.1 million in 1926–27.

In general, this decline was perhaps due more to a decline in flour stocks in consumptive channels than to any other single factor. In the early months of the year, when wheat prices were declining, flour buyers, who held large stocks at the opening of the year, tended to purchase from hand to mouth, and mill output was curtailed. In the winter and spring purchases and mill output alike assumed larger seasonal volume; but with declining wheat prices in May-June flour buyers again curtailed their purchases sharply and presumably drew upon stocks. Hence milling output, though it remained at a high seasonal level in the second half of the crop year, was not so high as it would have been had not flour buyers curtailed their purchases toward the end of the year; and total output for the crop year was reduced thereby. The decline of flour stocks in consumptive channels[1] accounts largely for the decline in mill output; but one must at least mention the possibility that flour consumption per capita may also have declined.

Some of the factors making for comparative prosperity in 1926–27 were absent in 1927–28. In the first place, more wheat was required to produce a barrel of flour, some 4.689 bushels as compared with 4.639 bushels in 1926–27. But the rate of extraction in 1926–27 was considerably better than the average on account of the excellent quality of the hard red winter-wheat crop; and the rate for 1927–28 was somewhat higher than the average for the past four years.[2]

In the second place, although prices of ordinary wheat were lower, unusually high premiums for protein content prevailed, in contrast with unusually low premiums in 1926–27. The insurance afforded by hedging was consequently less adequate for the industry as a whole, though individual concerns may have profited by shrewd buying.

Other unfavorable features, the effects of which varied according to the sales policies of the various milling concerns, were unusual seasonal distribution of domestic demand and low flour prices. Seasonal concentration of demand in the first half of the crop year was conspicuously weak. The percentage of annual total flour output by identical mills reporting to the census in the first and second halves of the crop years 1924–25 to 1927–28[3] was as follows:

	July–December	January–June
1924–25	55.6	44.4
1925–26	54.6	45.4
1926–27	54.4	45.6
1927–28	52.7	47.3

The flour market was a buyer's market for most of the year. Millers were so concerned about getting business that many appear to have participated in destructive competition and price cutting. The return of the 5-cent loaf and bread-price wars in different parts of the country were factors in the situation. Flour buyers were slow to provide mills with shipping directions except during the notable advance in wheat prices in the spring. Millers probably lost more money than usual by extending credit to poor risks.

Throughout the year prices of millfeed were on an exceptionally high level, higher even than in 1926–27.[4] Beginning on a higher level than in July 1927, prices maintained this level until October and then climbed steadily to an extraordinarily high peak in March. After a recession in April, they reached the same high level again in May, after which they dropped precipitously, but still not to the level at which they commenced the year, and well above the level at which they began in 1926–27. One cannot say, of course, how far high prices for millfeed may have been offset by low flour prices and reduced output in the industry as a whole.

Milling census reports on percentage of capacity operated afford interesting re-

[1] This decline is not measurable, and the view that it occurred does not receive support from statistics of flour stocks held by city mills. See Appendix Table XXIV. Nevertheless indirect evidence suggests that such a decline took place.

[2] See above, p. 56.

[3] See also Appendix Table XXVI, which shows our estimates of domestic disappearance by months for the past five years.

[4] No satisfactory explanation of high prices of millfeed can be found in the general feed-grain situation in recent years. The problem will receive attention in a later issue of WHEAT STUDIES.

gional comparisons with 1926–27. For the country and year as a whole, percentage of capacity operated was 55 per cent in 1927–28 compared with 56 per cent in 1926–27. Buffalo mills continued to maintain their usual high percentage of operation. Northwestern mills showed a moderate increase in average percentage of operation, owing to the larger spring-wheat crop of 1927. Southwestern mills maintained a high average operation, but not an exceptional operation as was the case last year. Pacific Coast mills enjoyed another good year in consequence of a large crop, good export demand from China, and the ability to compete in South Atlantic and Gulf ports with the soft wheat flour of the southern mills. The soft wheat milling industry of the southeastern states appears not to have fared so well. Percentage of capacity operated was not distinctly low, despite a short crop; but the total capacity appears to have been reduced, so that percentage operated in 1927–28 seems relatively more favorable than in fact it was. Moreover, the markets of southeastern mills were invaded in two directions: by shipments of Pacific flour via the Panama Canal to the Atlantic Coast; and, following a reduction of railway rates, by rail shipments via Ogden to the central western states.

In the important spring-wheat-producing states of Minnesota, North Dakota, South Dakota, and Montana, 257 mills produced 28.8 million barrels of flour in 1927–28 compared with a total of 28.7 million barrels produced by 264 mills in the same states last year; but larger mills produced more, smaller mills less.[1] In this region at least the smaller mills continued to drop out. The increase may have been due entirely to larger outturns of semolina and durum flour. According to census data, 2,317 thousand barrels of semolina were produced in 1927–28 as against 2,034 thousand in 1926–27; and production of durum flour increased from 674 to 764 thousand barrels.

Production in the three important winter-wheat-producing states of Kansas, Oklahoma, and Nebraska, and at the two principal Missouri River terminal market centers, Kansas City and St. Joseph, Missouri, was as follows, in thousand barrels:[2]

State or city	1926–27	1927–28	Percentage increase or decrease
Kansas	16,512	14,230	−16.0
Oklahoma	3,336	2,626	−37.0
Nebraska	3,674	3,546	− 3.6
Kansas City	7,218	7,451	+ 3.2
St. Joseph	1,992	1,541	−29.3
Totals	32,732	29,394	−11.3

This considerable decline, however, reflects mainly the exceptional situation in 1926–27, when the Southwest had a huge crop of excellent quality. Production was greater in 1927–28 than in any previous year except 1926–27. Kansas City mills are peculiar in showing increased production in 1927–28 because of the exceptional additions made to the size and number of the mills of that city in 1927 and 1928. Nebraska showed the least percentage of decline in production because of her large crop in 1927.

Flour exports showed a further decline of about half a million barrels, continuing a downward trend. Exports in 1927–28 were 12.9 million barrels, compared with 13.4 in 1926–27, a decrease of 3.7 per cent.[3] The decrease in value of exports of wheat flour, however, was from $90,387,000 to $83,866,000, a decline of 7.2 per cent. Canadian flour and Argentine flours were often quoted abroad at lower prices than American; hence competition was difficult. The largest decline in volume of exports occurred with respect to the United Kingdom, where our exports suffered as well as those of Canada. In Germany our exports suffered from competition with Canadian. Exports to Greece showed a considerable falling off as a result of tariff discrimination against flour in that market. Egyptian imports from the United States fell off about half, in part because of the Australian policy of consigning flour to that market, in part because Egypt required less flour from all sources. Increased trade with Cuba, the Philippines, and China partially offset these declines. Pacific Coast flour was apparently in the most favorable posi-

[1] See *Northwestern Miller*, October 31, 1928, p. 440.

[2] *Ibid.*, p. 441.

[3] Including shipments to possessions, the decline was from 14,023 to 13,471 thousand barrels. See Appendix Table XXVI.

tion to compete abroad this year, not only in the Orient but also in Europe. Exports of flour from customs districts of the Pacific Coast reached 3,766 thousand barrels in 1927–28 as against 2,798 thousand in 1926–27. Hence, since total flour exports decreased half a million barrels while Pacific Coast exports increased a million barrels, exports from other regions declined by nearly 1.5 million barrels.

Milling in Canada, 1927–28

Although Canada reaped one of the largest crops in her history, the percentage of lower grades of wheat ran high, and the amount of wheat required to produce a barrel of flour was the highest of the last five years. To just what extent lower freight rates on flour,[1] higher prices for millfeed, various forms of operating economies learned in recent years of hardship, and growing control by flour mills over the stronger baking organizations tended to offset these disadvantages, it is difficult to say. Certainly some of the most important milling concerns showed larger profits than in 1926–27.[2]

Total mill output was slightly over a million barrels larger than in 1926–27, 18.9 barrels compared with 17.8. The ratio of wheat flour exported to total flour produced remained the same as in 1926–27, 52 per cent, a fact significant in view of the alarm expressed so strongly last year over the declining trend of exports. The actual volume of exports improved by somewhat more than half a million barrels (from 9.2 million in 1926–27 to 9.9 in 1927–28), but remained less than the exports of the four years 1922–23 to 1925–26.

[1] An order of the railway board of Canada, dated August 26, 1927, to become effective as soon as new tariffs could be printed, lowered carrying charges on both wheat and flour and purported to correct certain regional discriminations. Besides facilitating the general export of flour, millers hoped that the change in rates would favor Canadian routes at the expense of the United States.

[2] Balance sheets or profit and loss statements for the Ogilvie Flour Mills, the Western Canada Flour Mills, the St. Lawrence Flour Mills, and the Maple Leaf Milling Company may be found in various milling journals.

[3] Exports of flour to the United Kingdom have been as follows in thousand barrels:

1923–24	4,112	1926–27	3,318
1924–25	2,685	1927–28	3,099
1925–26	3,368		

The increase in flour exports was not divided equally among all export destinations. Exports to the United Kingdom continued the decline which has been in evidence since 1923–24.[3] On the other hand, there was some improvement in the trade with continental Europe. Germany stood second to the United Kingdom as one of the chief importers of Canadian flour, and Canadian flour appears to find an increasing market as far east in Europe as Czecho-Slovakia and Poland. Although there was less open complaint in 1927–28 than in 1926–27 about the disparity between prices of Canadian wheat at home and abroad, attributed to the sales policies of the Canadian Pool, underlying discontent over the matter remains. The President of the Canadian National Millers' Association, at the annual meeting of the Association in September 1928, stressed this price disparity as one of the outstanding causes of the languishing export trade with the United Kingdom. As far as we have been able to ascertain, the Pool did not respond to the appeal made by the Association in May 1927 for wheat prices fully as favorable as those granted to foreign millers. Exports of flour to the Orient increased, China taking considerably more than in 1926–27 and Japan slightly less. Much low grade flour was available for the Chinese trade; but Japan tends to import less flour and more wheat.

The domestic situation is harder to appraise. In general, buyers of flour seem to have expected lower prices and to have bought cautiously throughout much of the year, a situation comparable with that in the United States. Since the crop was late, milling operations did not reach peak volume until November, a month later than usual. Operation averaged about 52 per cent of capacity for the year as a whole, compared with 55 per cent in the United States. There are indications that the westward movement of milling concerns for the present tends to accentuate the over-capacity of milling in Canada, for the rate at which new concerns or branches of old ones are built in the Western Division probably exceeds the rate at which old concerns are liquidated in the Eastern Division. In 1927 the Western Division produced more flour than the Eastern Division for the first time in history. Milling naturally tends to con-

centrate nearer to the wheat-producing centers. The recent adjustment of the freight rates and the development of shipping facilities in the western port of Vancouver promise to accelerate the movement in this direction.

Milling in Australia, 1927–28

The milling industries of the several Australian states operated under serious handicaps in 1927–28. The economical operation of mills in Australia is largely dependent upon the export trade in flour, which usually absorbs between 40 and 50 per cent of the flour produced. Milling costs are relatively high because of the protective tariff and the system of settling wage disputes by reference to the cost of living. Australian net exports of flour were over a million barrels less than in 1926–27 and the smallest since 1922–23, primarily as a result of a short wheat crop and relatively high wheat prices. In New South Wales and Victoria, the two most important milling states, most of this business is said to have been conducted at a loss in order to keep mills running and to maintain brands on the export markets. Western Australia was in a somewhat better position because of her large crop of wheat and her slight advantage in nearness to Far Eastern markets. It is stated that Western Australia in 1927–28 obtained business in markets which the eastern states had come to regard as their own. However, even in Western Australia the margin of profit is said to have been very small. The eastern states were particularly disturbed by New Zealand's imposition of an anti-dumping duty on flour.[1] The Union of South Africa also has an anti-dumping duty on Australian flour. The Egyptian market was early flooded with Australian flour on consignment. In the domestic market, buyers of flour had the advantage over millers. Competition between mills for business was very keen. Even the millers of Queensland complained that Sydney millers were dumping flour in their state. New South Wales millers were unfortunate in having to fulfil flour contracts made at low prices by grinding wheat purchased at high prices.[2] Millers in this state were also handicapped by a relatively high rate of extraction. There were bread-price wars in both New South Wales and Victoria.

Milling in Argentina in 1927

Argentine milling statistics are reported for calendar years. In respect to both per capita domestic consumption and volume of exports, 1927 was a record year. A greater percentage of capacity was utilized than in 1926, but even so, of the 336 mills included in the official records, 149 remained idle. Percentage extraction was 70.2 compared with 68.4 in 1926 and an average of 70.0 for the five years 1921–25. Since the crop milled in 1926 was of unusually poor quality, the percentage extraction of that year was abnormally low; but in 1927 the extraction ratio was average or better. Wheat milled, flour produced, and flour exported in thousand tons, and percentage of extraction during the last six calendar years, were as follows:

Year	Wheat milled	Flour produced	Percentage extraction	Exports
1922	1,309	913	69.8	114
1923	1,343	936	69.7	82
1924	1,691	1,196	70.7	175
1925	1,634	1,155	70.7	137
1926	1,701	1,164	68.4	142
1927	1,845	1,294	70.2	170

Flour exports were the largest in volume since 1924. Brazil took over 50 per cent of the total. While exports of flour to the United Kingdom for the calendar year 1927 show a decrease, imports of flour from Argentina into the United Kingdom for the crop year 1927–28 show an increase. Some of the flour shipped "to orders" undoubtedly went to the United Kingdom. Among the principal exporters of flour to the United Kingdom, Argentina alone appears to have shipped more flour in 1927–28 than in 1926–27.

[1] The New Zealand duty on flour, effective September 13, 1927, was a complex one based on the export price of flour. It created many difficulties for Australian exporters.

[2] Bakers usually buy three months' supplies in January, but in 1927–28 delayed their buying until February when flour prices were low. Millers, anticipating the usual seasonal buying, bought early from the short crop at high prices. When wheat prices dropped in February, farmers held wheat to such an extent that millers were forced to bid the price up in order to obtain supplies to fill their flour contracts.

MILLING IN EUROPE, 1927–28

The picture of milling in Europe, though still not bright, is less dark than that of 1926–27. Readjustment to post-war boundaries and much-needed liquidation of excessive capacity have continued, though by no means without expressions of dissatisfaction. Larger crops of native wheat in the majority of countries, lower prices for import wheat, and higher prices of millfeed, were generally favorable factors. Most countries imported more flour in 1927–28 than in 1926–27, and this may have worked to the disadvantage of domestic mills. But the situation varied from country to country.

Among the wheat and flour exporting countries of the lower Danube, Hungary had a large crop, of better quality than any in the post-war period. Several circumstances combined to enable Hungary to increase her exports of flour. In the first place, the quality of Hungarian flour was improved by the better quality of the wheat, and the flour regained some of its lost standing in export markets. Because of a pending increase in Austrian duties on wheat and flour, both wheat and flour flowed into Austria in anticipation of the advance, which finally became effective on July 15, 1928. An agreement with Czecho-Slovakia, signed on August 8, 1927, in which some concessions were granted to Hungary, enabled Hungary to sell more flour in that country. Under special dispensation of the Ministers of Finance and of Industry and Trade of Poland, appreciable quantities of Hungarian flour were allowed to enter Poland in spite of the general import restriction. The domestic market seems also to have improved somewhat. Millers lowered the price of export flours to attract foreign buyers, but raised the price on the home market, apparently with some success.[1] Millers may also have profited in the spring of 1928 when advancing world wheat prices caused a flurry of flour buying in European markets.[2] Furthermore, prices of millfeed were highly remunerative in 1927–28, owing to a general shortage of fodder crops, especially corn, in Hungary and other countries.

Bulgaria, which also produced a large crop in 1927–28, was probably in somewhat the same position as Hungary. The large crop was mostly ground in domestic mills, and exports were mainly in the form of flour. Jugo-Slavia probably took some Bulgarian flour, at least until her import duty was doubled on April 14, 1928. In Roumania and Jugo-Slavia, which harvested short crops in 1927, milling conditions were distinctly unfavorable. In Jugo-Slavia the wheat crop was barely sufficient to cover home requirements, mills could not operate to as great a capacity as usual, and some flour was imported. To stop this importation, on April 14, 1928, the import duty was raised from 4 gold dinars to 8 gold dinars (conventional rate). The scarcity of wheat, and other factors making for high operating costs, made the grinding of wheat so expensive that 26 mills went bankrupt and 15 stopped grinding in 1927, the others utilizing no more than about 30 per cent of capacity. Similar but presumably less extreme conditions appear to have prevailed in Roumania. A reduction in export duties on both wheat and flour, as of October 20, 1927, seems not to have relieved the situation notably.

Austria, Czecho-Slovakia, and Poland all harvested larger crops in 1927 than in 1926. The Austrian parliament revised the tariff rates upward on wheat and flour in late October 1927, but the new duties[3] did not become effective, owing to negotiations with Hungary, until July 15, 1928. Imports of flour in 1927–28 increased slightly over those of 1926–27, chiefly because consignments were sent into Austria in advance of the imposition of the new rates. Austrian mills resented this influx of foreign flour at low prices, and many were forced to close down. Milling conditions in Czecho-Slovakia in 1927–28 were probably somewhat less favorable than in the previous year, especially since a treaty with Hungary, signed May 31, 1927 and effective as of August 8, 1927, permitted some Hungarian flour to enter the market in competition

[1] *Pesti Naplo* (Budapest), July 26, 1928.

[2] It was stated in August (*ibid.*, August 10, 1928) that Hungarian mills had sold such large quantities of flour to European importing states that if they could not sell one kilogram of flour during the near future, the Budapest mills could work for 3 months up to 100 per cent capacity to fill standing orders.

[3] The present conventional rate amounts to a change from 0.25 gold crowns to 2 gold crowns on wheat and from 1.70 gold crowns to 5 gold crowns on flour.

with domestic flour. On the other hand, domestic milling was favored by the large domestic crop and the import certificate system in force since August 1926.[1] There has been agitation, as in other central European countries, to re-establish futures trading in order that millers may protect themselves by hedging.

In Poland the government has continued actively to try to favor both grain growers and millers. To prevent the export of grain early in the crop year and subsequent importations, export duties of 20 zloty per 100 kilos were placed on wheat and flour, effective from November 29, 1927 to June 30, 1928. In addition the government imposed import prohibitions on wheat and flour as of December 4, 1927, the prohibition on wheat being removed as of April 30, 1928, while that on flour continued throughout the crop year. These prohibitions, however, were lifted in certain instances by agreement of the Ministers of Finance and of Industry and Trade. Imports of flour were then subject to the import duty of 15 zloty. As of March 15, 1928, import duties on most commodities were increased by 30 per cent to compensate for the depreciation of the zloty, and flour was one of these. In addition to this control of exports and imports, the government regulated the domestic wheat and flour market in other ways.

In Great Britain, domestic millers in 1927–28 supplied a larger share of total flour supplies than in 1926–27. Business, however, was done at much lower prices and was highly competitive. There was less complaint about "dumping" of foreign flour; importers experienced great difficulty in trying to place flour on this market. British millers were in a better position partly on account of high prices for millfeed, which does not lend itself to ocean transportation so well as wheat. Imports of flour were reduced by about three-quarters of a million barrels over 1926–27, while wheat imports remained approximately the same. Argentina furnished a notably larger portion of the total flour imports; the United States and Canada combined supplied a notably smaller portion than usual. According to export statistics of the United States and Canada (more reliable as to sources of imports than are British import figures), the United States exported to the United Kingdom over half a million barrels less and Canada about a quarter of a million barrels less. This was to be expected in view of the fact that Canadian flour was cheaper than United States flour during most of 1927–28. Although Great Britain harvested the largest crop since 1923, so great a percentage of it was damp and unmillable that comparatively little of it reached the mills until the second half of the year. Large arrivals of foreign wheat at low prices, and a high return for millfeed, enabled millers to produce in large quantities in the first quarter of the year.

In the Irish Free State the milling situation was unimproved in 1927–28. The Tariff Commission completed its hearings in August 1927 and rejected the appeal of the Irish Flour Mills Association for a tariff on flour of 3 shillings per 280 pounds. Agitation for some sort of legislation on behalf of millers is nevertheless still keen. In comparison with the English and Scotch industries with respect to supplies of wheat, the Irish milling industry is handicapped by its unfavorable geographical location. Another factor is the higher wage scale in Ireland.

The situation in Germany is far from clear. In 1927–28, as in most years of the post-war period, much dissatisfaction was expressed in milling circles. The wheat crop of 1927 was large, but much of it was damp and created difficulties in the milling process. Millers complain that flour consumption is declining[2] and that milling capacity tends to increase too rapidly because large mills are built faster than smaller and older competing concerns can go out of business. Mergers have been undertaken and price fixing and agreements concerning sales have been entered into. On the whole there can be no question that the German milling industry is overextended and that profitable operation is difficult. Yet the evidence indicates that the year 1927–28 was less unsatisfactory than most of its recent predecessors. Even with allowance for a considerable proportion of unmillable wheat in the domestic crop,

[1] The import certificate system enables millers to export flour of lower grades which, prior to the establishment of the system, could not be consumed by the domestic market nor exported profitably.

[2] The evidence hardly bears out this assertion. See above, p. 59.

total available wheat supplies were the largest in recent years and one may infer that milling output was correspondingly large. Furthermore, German milling was apparently sufficiently efficient to bring imports of flour to the lowest figure in post-war years and to increase flour exports to such a degree that the net import of flour in 1927–28 was only 2 thousand barrels as compared with over 5 million in 1924–25.

France was a net importer of flour in 1927–28, an unusual occurrence in the face of a large crop of domestic wheat, a large carryover, and fairly low prices of foreign wheat. The occurrence was the net result of reduced exports of flour and increased imports of flour. Exports were only a third as large as those of 1926–27; imports were over twice as great. Changes in and uncertainty over the tariff on wheat and flour were responsible for a large share of the difficulties of millers. The following changes, in francs per 100 kilos, were made in the tariff on wheat and flour in 1927–28:

	Wheat	Flour (70 per cent extraction)
Previous rate	18.20	37.40
Effective September 3, 1927	25.00	45.00
Effective November 19, 1927	35.00	60.00

The tariff effective from September 3 to November 19, while raising the duties, did not raise the duty on flour to the same extent as that on wheat. Thus wheat during this period was expensive and imports of foreign flour entered to compete in the flour market. The new rates effective November 19 restored relative protection to flour, but they were so highly protective to both wheat and flour that the cost of production of flour made competition of French flour with other flour in foreign markets practically impossible. It is also pertinent to recall that this year no reimbursement of wheat duty was allowed millers grinding wheat for domestic consumption. Revaluation of the franc had the effect of removing the abnormal stimulus to exports previously resulting from the depreciating franc. The poor quality of the French crop necessitated admixture with foreign wheat to produce a blend acceptable to flour purchasers, and also a higher rate of extraction. In the face of these facts, a reduction in the official rate of extraction, a lowering of the percentage of admixture of other cereals, and removal of the export restriction on wheat and flour, did little to ameliorate conditions.

Italy had the smallest crop of wheat since the very small crop of 1924. The small crop, combined with the protective tariff, made the Italian price of wheat extremely high during the year compared with other European markets, as has been true in earlier years. High taxes and government control of wages also made for high flour production costs. Milling regulations requiring high extraction of flour were continued, and appreciation of currency tended to encourage flour imports. Imports increased by 10 thousand barrels, but exports increased by 25 thousand barrels in 1927–28. The large export was largely fortuitous. The poor crop of Jugo-Slavia and the desperate condition of the milling industry of that country, and the tariff uncertainty in Austria, probably encouraged export of Italian flour to those countries.

Before the war, Belgium, because of her favorable location at the crossroads of Europe, was in a position profitably to grind imported wheat and to export flour. Since the war, tariff barriers erected by flour-importing countries have made this business difficult. In 1926–27 Belgium's net export of flour was only 64 thousand barrels. In 1927–28, however, net exports recovered to the level of 1925–26, 152 thousand barrels. Germany and Holland were formerly the chief importers of flour from Belgium. The German market is effectively closed by a high protective duty on flour. In the Dutch market Canadian flour competes severely with that from Belgium, with the domestic product, and with flour from other foreign countries. Hence the recovery of flour exports is difficult to explain. Belgian millers, like the English, probably benefited from prevailing high prices for millfeed. Moreover, France, usually an exporter to Belgium, may have been a customer this year because revaluation of the French franc made French flour relatively more expensive than Belgian, and because the changes in the French tariff tended to favor flour imports during part of the year.

The milling industries of Denmark and Holland, which in the pre-war period had been quite prosperous, have suffered in the

post-war period from severe competition from flour both from overseas and from neighboring countries. In both countries consumers have become accustomed to imported flour and have acquired a preference for it. In Holland the abolition of night work in bakeries (part of a broad program of social legislation) has necessitated greater use of hard wheat flours. This fact favors flour imports.

In 1927–28 Spain had the smallest crop of wheat since 1924. For most of the year the embargo on foreign wheat and flour was continued, but the scarcity of wheat finally led to its removal on wheat as of May 3, 1928. For the protection of millers the government has continued to try out various elaborate measures. A measure published August 29, 1927, permitted the importation of a maximum of 50 thousand tons of wheat during six months, the flour from which must be exported in three months in order to receive reimbursement of the import duty. The object of this measure was to increase employment in the flour mills. To facilitate the movement of the crop to the mills, freight rates were reduced 10 per cent in the early part of 1928. The milling industry is protected by an extraordinarily high duty on flour of 21 pesetas (gold), and in addition the embargo on flour continues.

The situation in Greece presents an interesting picture. As part of an effort to balance the budget through increasing tariff revenues, the duties on both wheat and flour were raised to a high level in July 1927. The duty on wheat amounts to approximately $2.00 per 100 kilos and that on flour to about $3.55. Under this schedule flour imports have been much curtailed, and the increased revenues from wheat imports have scarcely made up for loss of revenue on flour imports. The restriction of flour imports has not aided domestic milling industries, as was anticipated. As a result of the ability of small grist mills effectively to compete because of a high legal extraction rate, internal competition has spoiled the market for the larger commercial mills.

A definite picture of the Russian milling situation cannot be secured. The Soviet Government is apparently attempting to restore the industry. The plan is to unite all mills into a small number of organizations and to lend special support to cooperative mills. Early in 1928 the sum of about three and a half million dollars was voted by the government for the refurbishing of existing mills and the erection of new ones. The cost of production of flour in Russia is still so high relative to costs in other countries that profitable exportation of flour is impossible.[1]

Milling in the Orient, 1927–28

In China, the important group of mills at Shanghai, despite favorable supply conditions in Kiangsu Province, appear to have experienced a rather unsatisfactory year. Flour prices were not remunerative in either the domestic or export markets. Contrary to the experience of the past four years, wheat and flour prices declined from September to May, causing losses to many millers accustomed to speculate in wheat in the opening months of the season. The low point in flour prices was reached in December and was reflected in the low operation of about 40 per cent of capacity in January and February. Earlier and later in the crop year operation was maintained at about 80 per cent of capacity. Shanghai grinds wheat chiefly for export to other Chinese ports; her exports represent three to four times the amount ground for local consumption. In 1927–28 there was a large rice crop in the Shanghai region, so that rice competed more severely than usual with flour. But the export situation seems chiefly responsible for the unremunerative flour price. Of the average export of Shanghai, North China ports usually take about 75 per cent, South China ports about 20 per cent. In 1927–28 trade with the South Manchurian port of Dairen was reduced to exceptionally small proportions because a large crop in North Manchuria served to furnish flour enough for South Manchuria as well as for North Manchuria. On the other hand, exports to Tientsin and South China increased perceptibly. Trade within

[1] The *Northwestern Miller* (May 2, 1928, p. 464) reported that Russian flour was being sold in Egypt below cost, in competion with Australian flour. Exporters of flour are given a license by the Soviet to import an equivalent amount of value of other products. Import goods procured in this way can be sold at an enormous profit, enough to offset the losses on flour exported and more in addition.

the local area near Shanghai was rendered difficult by transportation troubles on the Yangtze, inadequate protection of goods in transit, and arbitrary taxes levied by different military leaders.

Mills in and around Harbin had a good year, the best in several years, owing to the excellent wheat crop of North Manchuria. The capacity operated was almost 100 per cent for a good part of the year. A large volume of flour was exported to South Manchuria for the first time since 1922 and almost sufficed to supply import requirements there. This movement considerably curtailed imports into South Manchuria through the main port of entry at Dairen. Probably only Japan, which has peculiar connections and facilities for quick delivery in that port,[1] was able to do a profitable export business there in 1927–28. Imports from Shanghai and foreign countries other than Japan were estimated at only a third of the amounts in 1926–27.

The milling situation in Tientsin and Tsinan is less clear. Tientsin milled less flour in 1927 than in 1926 and imported larger quantities of flour, perhaps because the wheat crop of the neighborhood was smaller, perhaps because transportation of wheat to mills was hampered, perhaps because cheap flour from Shanghai competed severely. The total trade assumed larger proportions than in 1926.

All told, so far as can be judged from export statistics of the United States, Canada, and Australia, imports of flour into China were somewhat larger in 1927–28 than in 1926–27. Exports of flour as wheat from these countries to China, Hongkong, and Kwantung totaled 14.33 million bushels as against 8.99 bushels in the preceding year.[2] Increased takings of the Tientsin, South Manchurian, and South China areas appear to have more than offset decreased takings of the Shanghai region.

The Japanese milling industry appears to have progressed in 1927–28. The difficulties attendant upon a rapid expansion (amounting in the six years 1921–26 to over 40 per cent) are slowly being overcome. The rapid expansion (fostered by the protective tariff on flour, and the rebate of the wheat duty on exportation of flour) and the consequent cutthroat competition in both domestic and export markets, which was responsible for great difficulties in the industry in 1926, have been retarded by restrictions on production, price agreements, and reduction in exports. Agreements between the chief milling companies of Japan in regard to restriction of output, effective on June 1, 1926[3] and operative until June 1, 1928, served to curtail production with respect to the domestic market to the extent of 40 per cent in the case of the largest mills. The agreement did not affect output for export. Domestic consumption has supposedly been increasing rapidly, but there is some evidence that the effect of the tariff in raising flour prices has curtailed the natural increase of consumption in the past two years. Domestic demand was probably somewhat curtailed in 1927–28 by low prices for rice. But recovery from the general business depression has been especially noticeable in 1928 and has been an influence in the opposite direction. Millers were favored by a large domestic crop of wheat in 1927 and by the fact that foreign wheat could be had in the autumn at low prices. Those millers who laid in stocks of foreign wheat at low prices profited later when prices rose toward the end of the year.

Gross exports of flour, which in 1925–26 amounted to 1,020 thousand barrels, and in 1926–27 fell off to only 746 thousand barrels, increased in 1927–28 to 1,155 thousand barrels. This figure, however, presumably represents a profitable export business, whereas the high exports of 1925–26 represented an unprofitable dumping trade. Japan, along with other flour exporters, did an increased volume of business with the North China port of Tientsin in 1927–28 and was probably the only exporter to do a profitable business with the South Manchurian port of Dairen in 1927–28.

[1] The port of Dairen is located in Japanese leased territory and the import business is in the hands of a few strong Japanese organizations.

[2] See Appendix Table XIX.

[3] See WHEAT STUDIES, IV, 41.

This issue is chiefly the work of M. K. Bennett, with substantial assistance from Joseph S. Davis, Katharine Merriam, Janet Murray, and Alonzo E. Taylor

APPENDIX

TABLE I.—WHEAT ACREAGE IN PRINCIPAL PRODUCING AREAS, 1920–28*

(Million acres)

Year	United States	Canada	India	Australia	Argentina	Chile	Uruguay	Hungary	Bulgaria	Jugo-Slavia	Roumania	Soviet Russia	Mexico
1920	61.14	18.23	29.95	9.07	13.22	1.26	.70	2.66	2.17	3.56	5.00	.....	....
1921	63.70	23.26	25.78	9.72	14.10	1.34	.81	2.89	2.23	3.70	6.15	.....	2.28
1922	62.32	22.42	28.21	9.76	16.06	1.47	.66	3.52	2.30	3.67	6.55	.....	2.62
1923	59.66	21.89	30.85	9.54	17.04	1.54	1.06	3.29	2.38	3.84	6.65	39.16	3.05
1924	52.54	22.06	31.18	10.82	15.98	1.43	.85	3.50	2.49	4.24	7.84	52.73	1.40
1925	52.26	20.79	31.78	10.20	17.62	1.43	.96	3.52	2.55	4.31	8.16	59.77	1.13
1926	56.34	22.90	30.47	11.69	18.26	1.46	.99	3.71	2.62	4.18	8.22	70.87	1.29
1927	58.78	22.46	31.30	11.82	19.71[a]	....	1.04	4.05	2.66	4.63	7.66	75.94	1.31
1928	57.72	24.12	32.21	14.00	20.90[a]	....	....	4.13	2.82	4.48	7.92	66.68	1.25
Average 1909–13	47.10	9.94	29.22	7.60	14.88	1.00	.79[b]	3.71	2.41	3.98	9.52[b]	74.21	2.17[c]
1922–26	56.62	22.01	30.50	10.40	16.99	1.47	.90	3.51	2.47	4.05	7.48	55.63[b]	1.90

Year	Morocco	Algeria	Tunis	Egypt	British Isles	France	Germany	Italy	Belgium	Netherlands	Denmark	Norway	Sweden
1920	1.99	3.45	1.32	1.19	1.98	12.59	3.40	11.29	.31	.15	.18	.04	.36
1921	1.96	3.04	1.49	1.46	2.08	13.30	3.56	11.88	.34	.18	.22	.04	.36
1922	2.07	3.74	1.07	1.52	2.07	13.07	3.40	11.40	.30	.15	.24	.02	.36
1923	2.25	3.17	1.61	1.54	1.84	13.67	3.65	11.45	.35	.15	.20	.03	.36
1924	2.46	3.53	1.24	1.42	1.63	13.62	3.62	11.28	.34	.12	.15	.02	.32
1925	2.62	3.61	1.62	1.38	1.57	13.87	3.84	11.67	.36	.13	.20	.02	.36
1926	2.56	3.74	1.84	1.53	1.68	12.97	3.96	12.15	.35	.13	.25	.02	.38
1927	2.30	3.47	1.40	1.65	1.71[d]	13.06	4.36	12.30	.39	.15	.27	.02	.40
1928	2.35	3.59	1.73	....	1.46[d]	12.80	4.28	12.30	.43	.15	...	...	...
Average 1909–13	1.70	3.52	1.31	1.31	1.89	16.50	4.03	11.79	.40	.14	.15	.01	.26
1922–26	2.39	3.56	1.48	1.48	1.76	13.44	3.69	11.59	.34	.14	.21	.02	.36

Year	Spain	Portugal	Switzerland	Austria	Czecho-Slovakia	Poland	Finland	Latvia	Esthonia, Lithuania	Greece	Japan, Chosen	South Africa	New Zealand
1920	10.25	1.10	.12	.37	1.57	1.79	.02	.04	.19	1.08	2.18	.88	.22
1921	10.39	1.09	.12	.38	1.56	2.09	.03	.05	.21	.95	2.14	.99	.35
1922	10.31	1.16	.11	.46	1.53	2.57	.04	.07	.25	1.06	2.12	.85	.28
1923	10.49	1.05	.11	.48	1.51	2.51	.04	.11	.26	1.06	2.07	.78	.17
1924	10.38	.94	.10	.48	1.50	2.65	.04	.11	.25	1.15	2.03	.75	.17
1925	10.72	....	.10	.48	1.53	2.70	.04	.12	.33	1.15	2.04	.97	.15
1926	10.78	1.06	.13	.50	1.55	2.72	.04	.12	.36	1.15	2.04	.88	.22
1927	10.83	1.08	.13	.50	1.58	2.81	.04	.14	.30[e]	1.14	2.06	...	.26
1928	10.75	....	.13	.50	1.61	2.67	.04	...	.40[e]	1.31	....	...	...
Average 1909–13	9.55	1.21[f]	.10	.64	1.72	3.35	.01	.08	.23	1.13[g]	1.75	.74[b]	.24
1922–26	10.54	1.05[b]	.11	.48	1.52	2.63	.04	.10	.29	1.11	2.06	.85	.20

* Data of U.S. Department of Agriculture for 1909–13, including U.S. Department of Agriculture estimates for area within post-war boundaries. Figures for 1928 are preliminary. Dots (...) indicate that data are not available.

[a] Estimate for area sown, not harvested.
[b] Four-year average.
[c] Two-year average.
[d] Excluding Irish Free State.
[e] Lithuania only.
[f] Three-year average.
[g] One year only.

TABLE II.—WHEAT YIELD PER ACRE IN PRINCIPAL PRODUCING AREAS, 1920–28*

(Bushels per acre)

Year	United States	Canada	India	Australia	Argentina	Chile	Uruguay	Hungary	Bulgaria	Jugo-Slavia	Roumania	Soviet Russia	Mexico
1920	13.6	14.4	12.6	16.1	11.8	18.4	11.1	14.2	13.8	12.1	12.3	....	...
1921	12.8	12.9	9.7	13.3	13.5	17.6	12.3	18.3	13.1	14.0	12.8	....	2.2
1922	13.9	17.8	13.0	11.2	12.2	17.6	7.8	15.5	14.2	12.1	14.1	....	5.2
1923	13.4	21.7	12.1	13.1	14.5	18.2	12.6	20.6	12.2	15.9	15.4	10.7	4.5
1924	16.5	11.9	11.6	15.2	12.0	17.1	11.7	14.7	9.9	13.6	9.0	9.0	7.4
1925	12.9	19.0	10.4	11.2	10.8	18.7	10.4	20.3	16.2	18.2	12.8	12.2	8.1
1926	14.8	17.8	10.7	13.8	12.1	15.9	10.3	20.2	14.0	17.1	13.5	11.6	8.0
1927	14.9	19.6	10.7	9.3	12.1	....	13.4	19.0	17.8	12.2	12.6	9.9	9.1
1928	15.6	20.8	9.0	10.7	11.0	....	....	22.3	18.0	23.5	14.6	12.9	9.1
Average													
1909–13	14.7	19.8	12.0	11.9	9.9	20.0	8.2[a]	19.3	15.7	15.6	16.7[a]	10.2	...
1922–26	14.3	17.6	11.5	13.0	12.3	17.5	10.8	18.3	13.3	15.5	12.8	11.0[a]	6.0

Year	Morocco	Algeria	Tunis	Egypt	British Isles	France	Germany	Italy	Belgium	Netherlands	Denmark	Norway	Sweden
1920	9.0	4.7	4.0	26.6	28.7	18.8	24.3	12.5	33.6	39.4	41.1	25.0	28.8
1921	11.9	9.4	6.0	25.4	35.4	24.3	30.3	16.3	42.3	47.6	50.7	23.7	34.3
1922	6.2	5.1	3.4	23.7	31.5	18.6	21.2	14.2	35.4	41.1	39.0	25.7	26.7
1923	8.9	11.3	6.2	26.5	31.8	20.2	29.1	19.6	38.8	40.3	43.2	23.5	30.4
1924	11.7	4.9	4.2	24.1	33.0	20.6	24.6	15.1	38.2	39.9	39.4	23.5	21.1
1925	9.1	9.1	7.2	26.2	34.1	23.8	30.8	20.6	39.7	42.9	49.2	22.3	36.8
1926	6.3	6.3	7.1	24.3	31.0	17.9	24.1	18.2	36.6	41.6	35.4	26.6	31.9
1927	10.7	8.2	5.9	26.9	32.6[b]	21.1	27.6	15.9	41.7	40.8	35.0	30.2	28.2
1928	9.4	9.5	6.9	....	32.9[b]	21.7	29.6	19.2	41.5	50.5	....	....	....
Average													
1909–13	10.0	10.0	4.8	26.0	31.6	19.7	32.6	15.6	37.6	36.1	41.1	25.5	31.8
1922–26	8.5	7.2	5.9	25.0	32.2	20.3	26.1	17.6	37.6	41.1	40.9	23.3	29.6

Year	Spain	Portugal	Switzerland	Austria	Czecho-Slovakia	Poland	Finland	Latvia	Esthonia, Lithuania	Greece	Japan, Chosen	South Africa	New Zealand
1920	13.5	9.4	30.1	14.6	16.8	12.7	12.1	10.0	13.4	10.4	18.9	8.7	31.2
1921	14.0	7.4	32.5	17.3	24.9	17.9	20.7	17.0	15.9	10.8	18.6	8.8	29.9
1922	12.2	8.5	22.7	16.1	22.0	16.5	18.7	13.7	17.0	8.5	18.5	7.4	30.4
1923	15.0	12.5	34.5	18.7	24.0	19.8	17.2	15.5	14.3	8.3	17.0	7.7	24.0
1924	11.7	9.1	29.9	17.6	21.5	12.3	21.4	14.9	15.2	6.7	18.4	9.5	32.6
1925	15.2	....	33.5	22.0	25.8	21.4	25.1	18.2	18.5	9.8	19.7	9.5	30.4
1926	13.6	8.1	33.4	18.9	22.0	17.3	23.7	15.2	13.9	9.7	19.1	9.1	36.1
1927	13.4	10.6	32.4	23.7	25.6	19.3	27.3	18.8	17.8[c]	11.7	19.6	...	36.5
1928	12.1	....	33.6	23.9	25.8	20.2	20.9	....	18.4[c]	12.6	....	...	....
Average													
1909–13	13.7	....	31.6	20.2	22.0	19.0	17.1	17.4	15.5[d]	14.4	18.2	8.4[a]	28.7
1922–26	13.5	9.6[a]	30.9	18.7	23.1	17.4	21.3	15.6	15.7	8.6	18.3	8.7	30.9

* Computed from acreage and production figures in Appendix Tables I and III. Dots (...) indicate that data are not available.

[a] Four-year average.

[b] Excluding Irish Free State.

[c] Lithuania only.

[d] One year only.

TABLE III.—WHEAT PRODUCTION IN PRINCIPAL PRODUCING AREAS, 1920–28*

(*Million bushels*)

Year	United States	Canada	India	Australia	Argentina	Chile	Uruguay	Hungary	Bulgaria	Jugo-Slavia	Roumania	Soviet Russia	Mexico
1920	833.0	263.2	377.9	145.9	156.1	23.2	7.8	37.9	29.9	43.0	61.3	.....	15.0
1921	814.9	300.9	250.4	129.1	191.0	23.6	10.0	52.7	29.2	51.8	78.6	.....	5.1
1922	867.6	399.8	367.0	109.5	195.8	25.9	5.2	54.7	32.6	44.5	92.0	.....	13.6
1923	797.4	474.2	372.4	125.0	247.8	28.1	13.3	67.7	29.1	61.1	102.1	419.1	13.7
1924	864.4	262.1	360.6	164.6	191.1	24.5	9.9	51.6	24.7	57.8	70.4	472.3	10.4
1925	676.4	395.5	331.0	114.5	191.1	26.7	10.0	71.7	41.4	78.6	104.7	729.9	9.2
1926	831.0	407.1	324.7	160.8	220.8	23.3	10.2	74.9	36.5	71.4	110.9	819.6	10.3
1927	878.4	440.0	335.0	109.9	239.2	33.5	13.9	76.9	47.3	56.6	96.7	749.0	11.9
1928	902.7	500.6	289.8	150.0	.....	....	....	92.0	50.7	105.4	115.6	859.8	11.3
Average													
1909–13	690.1	197.1	351.8	90.5	147.1	20.1	6.5[a]	71.5	37.8	62.0	158.7[a]	758.9[b]	11.5[a]
1922–26	807.4	387.7	351.1	134.9	209.4	25.7	9.7	64.1	32.9	62.7	96.0	610.2[a]	11.4

Year	Morocco	Algeria	Tunis	Egypt	British Isles	France	Germany	Italy	Belgium	Netherlands	Denmark	Norway	Sweden
1920	17.9	16.2	5.2	31.7	56.8	236.9	82.6	141.3	10.3	6.0	7.4	1.00	10.3
1921	23.2	28.5	9.0	37.0	73.8	323.5	107.8	194.1	14.5	8.6	11.1	.97	12.3
1922	12.9	18.9	3.7	36.0	65.2	243.3	71.9	161.6	10.6	6.2	9.2	.64	9.5
1923	20.0	35.8	9.9	40.7	58.5	275.6	106.4	224.8	13.4	6.2	8.9	.59	11.0
1924	28.8	17.3	5.2	34.2	53.9	281.2	89.2	170.1	13.0	4.7	5.9	.49	6.8
1925	23.9	32.7	11.8	36.2	53.7	330.8	118.2	240.8	14.5	5.6	9.7	.49	13.4
1926	16.2	23.6	13.0	37.2	52.2	231.8	95.4	220.6	12.8	5.5	8.8	.59	12.2
1927	24.6	28.3	8.3	44.3	57.2	276.1	120.5	195.8	16.3	6.2	9.4	.60	11.3
1928	22.2	34.0	12.1	37.3	49.6	277.7	126.5	228.6	17.8	7.6	9.0	.68	11.3
Average													
1909–13	17.0	35.2	6.2	34.2	59.6	325.6	131.3	184.4	15.2	5.0	6.3	.31	8.1
1922–26	20.4	25.7	8.7	36.9	56.7	272.5	96.2	203.6	12.9	5.6	8.5	.56	10.6

Year	Spain	Portugal	Switzerland	Austria	Czecho-Slovakia	Poland	Finland	Latvia	Esthonia, Lithuania	Greece	Japan, Chosen	South Africa	New Zealand
1920	138.6	10.4	3.6	5.4	26.4	22.7	.27	.39	2.58	11.2	41.1	7.6	6.9
1921	145.1	9.3	3.8	6.5	38.7	37.4	.58	.78	3.34	10.3	39.7	8.7	10.6
1922	125.5	10.0	2.5	7.4	33.6	42.4	.71	.96	4.17	9.0	39.8	6.3	8.4
1923	157.1	13.2	3.8	8.9	36.2	49.7	.69	1.64	3.70	8.8	35.2	6.0	4.2
1924	121.8	8.6	3.1	8.5	32.2	32.5	.79	1.58	3.86	7.7	35.3	7.1	5.4
1925	162.6	12.1	3.5	10.7	39.3	57.8	.93	2.16	6.08	11.2	40.0	9.2	4.6
1926	146.6	8.6	4.2	9.4	34.1	47.1	.92	1.86	5.02	11.2	38.9	8.0	8.0
1927	144.8	11.4	4.1	12.0	40.4	54.2	1.06	2.64	6.35	16.1	40.4	6.6	9.5
1928	129.6	6.6	4.3	12.1	41.4	53.9	.88	2.61	8.28	16.5	41.5	7.0	....
Average													
1909–13	130.4	11.8[c]	3.3	12.8	37.9	63.7	.14	1.48	3.63	16.3[c]	32.0	6.3[a]	6.9
1922–26	142.7	10.5	3.4	9.0	35.1	45.9	.81	1.64	4.57	9.6	37.7	7.3	6.1

* Data of U.S. Department of Agriculture. For 1909–13, including U.S. Department of Agriculture estimates for area within post-war boundaries. Dots (....) indicate that data are not available.

[a] Four-year average.

[b] Regarded as too low by Soviet officials, whose estimate is 908 million bushels.

[c] One year only.

TABLE IV.—RYE PRODUCTION IN PRINCIPAL PRODUCING AREAS, 1920–28*

(Million bushels)

Year	United States	Canada	Argentina	Hungary	Bulgaria	Jugo-Slavia	Roumania	Soviet Russia	France	Germany	Italy	Belgium	Netherlands
1920	60.5	11.3	0.8	20.6	6.2	6.1	9.4	.....	34.5	194.2	4.5[a]	18.2	14.8
1921	61.7	21.5	1.7	23.2	6.1	6.2	9.1	.....	44.4	267.6	6.5	21.3	15.0
1922	103.4	32.4	3.5	25.1	6.4	4.5	9.2	.....	38.4	206.0	5.6	18.4	17.1
1923	63.1	23.2	4.0	31.3	5.2	5.9	9.6	.....	36.5	263.0	6.5	20.8	14.6
1924	65.5	13.8	1.5	22.1	4.3	5.5	6.0	737.0	40.2	225.6	6.1	20.7	15.6
1925	46.5	19.2	4.7	32.5	7.2	7.9	8.0	877.0	43.7	317.4	6.7	21.7	16.4
1926	40.8	12.2	3.3	31.4	7.1	7.5	11.2	901.6	30.1	252.2	6.5	20.1	13.6
1927	58.2	15.0	6.6	22.4	8.2	5.9	9.3	933.0	34.0	269.0	5.9	21.9	13.6
1928	41.8	14.6	...	32.5	9.0	8.6	11.8	783.4	35.4	303.3	6.5	27.7	17.0
Average													
1909–13	36.1	2.1	0.6	31.4	8.3	9.0	20.6[b]	735.5	52.5	368.3	6.3	23.6	16.4
1922–26	63.8	18.1	3.4	28.5	6.0	6.3	8.8	828.5[c]	37.8	252.8	6.3	20.3	15.5

Year	Denmark, Norway	Sweden	Spain	Portugal	Switzerland	Austria	Czecho-Slovakia	Poland	Finland	Latvia	Esthonia	Lithuania	Greece
1920	14.2	22.4	27.8	5.2	1.6	10.1	32.9	73.7	7.1	4.7	6.2	16.7	1.0
1921	13.2	26.6	28.1	4.6	1.6	13.2	53.7	167.6	11.7	9.8	5.9	21.0	1.1
1922	15.1	22.1	26.3	5.4	1.5	13.6	51.1	197.4	10.5	6.8	5.8	25.4	1.1
1923	15.9	23.4	28.1	5.2	1.6	15.8	53.3	234.7	9.4	10.8	6.5	23.8	0.6
1924	11.1	10.9	26.3	6.8	1.4	16.2	44.7	143.9	11.3	7.9	5.5	18.3	0.9
1925	14.4	26.6	29.9	4.6	1.6	21.7	58.1	257.2	13.7	12.4	7.2	26.1	1.6
1926	13.1	23.0	23.5	3.6	1.6	18.7	45.9	197.3	11.9	6.1	4.5	13.8	1.4
1927	11.0	18.7	26.5	4.7	1.6	20.1	49.3	223.9	12.9	10.2	6.7	21.2	2.4
1928	....	....	24.4	3.4	1.7	19.1	52.7	232.4	10.9	9.0	5.8	19.0	2.3
Average													
1909–13	20.1	24.1	27.6	2.3	1.8	23.8	63.5	218.9	10.5	13.1	8.1	24.3	1.1
1922–26	13.9	21.2	26.8	5.1	1.6	17.2	50.6	206.1	11.4	8.8	5.9	21.5	1.1

* See corresponding footnote under Table III.

[a] Old boundaries. [b] Four-year average. [c] Three-year average.

TABLE V.—POTATOES AND CORN PRODUCTION IN PRINCIPAL EUROPEAN PRODUCING AREAS, 1920–27*

(Million bushels)

Year	Potatoes							Corn (Maize)					
	British Isles	France	Germany	Belgium, Holland	Czecho-Slovakia	Poland	Soviet Russia[a]	Hungary	Bulgaria	Jugo-Slavia	Roumania	Soviet Russia[a]	Italy
1920	238	428	1,024	204	184	665	.....	50.2	20.9	101.1	182.0	.....	89.3
1921	245	305	961	179	159	617	.....	31.7	16.4	73.8	110.6	.....	92.3
1922	322	465	1,494	307	333	1,221	.....	48.7	16.4	89.8	119.8	.....	76.8
1923	221	364	1,197	211	229	973	.....	49.2	21.8	84.8	151.4	.....	89.2
1924	219	564	1,338	208	239	987	1,332	74.1	24.8	149.4	155.5	90.9	105.7
1925	281	558	1,533	230	276	1,069	1,541	88.0	25.8	149.2	163.7	176.6	110.0
1926	249	409	1,103	220	185	914	1,672	76.5	27.3	134.2	239.5	143.4	118.1
1927	275	644	1,380	214	335	1,167	2,009	68.3	20.6	84.3	139.1	148.8	83.9
Average													
1909–13	254	527	1,374	215	245	890	729	60.8	26.3	119.9	140.2	52.2	102.7
1922–26	258	472	1,333	235	252	1,033	1,515[b]	67.3	23.2	121.5	166.0	137.0[b]	100.0

* See corresponding footnote under Table III.

[a] European and Asiatic territory. [b] Three-year average.

TABLE VI.—UNITED STATES WHEAT ACREAGE, 1920–28*

(Million acres)

Crop of	Winter wheat			Spring wheat harvested	Total harvested
	Planted	Abandoned	Harvested		
1920.....	44.9	4.84	40.0	21.1	61.1
1921.....	45.6	2.21	43.4	20.3	63.7
1922.....	47.9	5.57	42.4	20.0	62.3
1923.....	46.1	6.58	39.5	20.2	59.7
1924.....	38.9	3.26	35.7	16.9	52.5
1925.....	39.8	8.61	31.2	21.0	52.3
1926.....	39.9	2.90	37.0	19.4	56.3
1927.....	43.6	5.58	37.7	21.1	58.8
1928.....	47.5	11.36	36.2	21.5	57.7
Average 1909–13..	32.0	3.60	28.4	18.7	47.1
1922–26..	42.5	5.38	37.1	19.5	56.6

* Official data of U.S. Department of Agriculture. See especially *Agriculture Yearbook, 1927*, p. 743, and crop reports.

TABLE VII.—UNITED STATES WHEAT CROP FORECASTS AND ESTIMATES, 1926, 1927*

(Million bushels)

Date	1927 Bryant	1927 Cromwell	1927 Murray	1927 Snow	1927 Official	1928 Official
	WINTER WHEAT					
Apr. 1...	584	576	585	584	.....	.....
May 1...	600	597	603	589	593.9	479.1
June 1...	540	569	563	568	537.0	512.3
July 1...	546	558	576	565	579.4	543.8
Aug. 1...	528	558	562	555	552.8	578.6
Sept. 1...	528	558	547	555	552.8	578.6
Oct. 1...	528	558	547	555	552.8	578.6
Dec. 1[a]..	...	...	...	...	552.4[a]	579.0
	SPRING WHEAT					
June 1...	249	224	226	233	.....	.....
July 1...	278	241	254	256	274.2	256.2
Aug. 1...	274	288	300	309	298.4	312.7
Sept. 1...	284	281	286	294	308.1	322.5
Oct. 1...	288	290	288	300	313.8	325.3
Dec. 1[a]..	...	...	...	...	319.3[a]	323.8
	TOTAL WHEAT					
June 1...	789	793	789	801	.....	.....
July 1...	824	799	830	821	853.6	800.0
Aug. 1...	802	846	862	864	851.2	891.3
Sept. 1...	812	839	833	849	860.9	901.1
Oct. 1...	816	848	835	855	866.6	903.9
Dec. 1[a]..	...	...	...	...	871.7[a]	902.8

* Data from official and commercial crop reports and *Daily Market Record*, Minneapolis.

[a] The figures given are the revisions made as of December 1, 1927. The final estimates for the 1927 crop, published in December 1928, were as follows, in million bushels: 552.7, winter; 325.6, spring; 878.4, total.

TABLE VIII.—UNITED STATES WHEAT PRODUCTION BY GRADES, 1921–27*

(Percentages of total crops)

Crop of	No. 1	No. 2	No. 3	No. 4	No. 5	Other
	WINTER WHEAT					
1921.....	19.7	39.9	25.1	10.2	3.5	1.6
1922.....	13.3	38.0	27.6	13.1	5.2	2.8
1923.....	20.8	42.8	21.7	9.2	3.7	1.8
1924.....	30.3	42.8	16.8	6.7	2.3	1.1
1925.....	28.0	45.4	17.9	6.0	1.6	1.1
1926.....	49.6	33.6	11.5	3.1	1.5	0.7
1927.....	36.3	36.8	16.6	6.4	2.6	1.3
	SPRING WHEAT					
1921.....	24.1	25.6	24.2	15.1	7.9	3.1
1922.....	52.1	26.4	13.5	5.3	2.0	0.7
1923.....	18.8	26.4	24.1	16.3	8.8	5.6
1924.....	62.9	21.5	10.1	3.7	1.0	0.8
1925.....	37.5	28.0	18.8	9.2	4.8	1.7
1926.....	37.4	27.4	18.1	9.9	4.1	3.1
1927.....	46.2	24.8	15.4	7.5	3.7	2.4

* Data of U.S. Department of Agriculture: *Crops and Markets, Monthly Supplement*, December 1925, p. 403; *Crops and Markets*, March 1928, p. 81.

TABLE IX.—UNITED STATES WHEAT PRODUCTION BY CLASSES, 1920–28*

(Million bushels)

Crop of	Hard red spring	Durum	Hard red winter	Soft red winter	Pacific white	Total
1920.....	139	52	303	247	91	833
1921.....	131	57	290	238	99	815
1922.....	170	91	280	248	79	868
1923.....	126	56	242	272	102	797
1924.....	192	66	365	189	52	864
1925.....	156	65	206	170	80	676
1926.....	121	48	360	229	73	831
1927.....	202	83	317	181	95	878
1928.....	195	98	384	140	86	903

* Classification by U.S. Department of Agriculture. See especially *Agriculture Yearbooks*, and *Foreign News on Wheat: World Wheat Crop and Market Prospects*, December 22, 1928, p. 3. These are estimates only, and are made on a basis which does not lead to highly reliable results. Figures for 1928 are preliminary.

TABLE X.—UNITED STATES WINTER AND SPRING WHEAT ACREAGE, PRODUCTION, AND YIELD PER ACRE, 1920–28*

Year	Acreage (*Million acres*)		Production (*Million bushels*)		Yield per acre (*Bushels per acre*)	
	Winter	Spring	Winter	Spring	Winter	Spring
1920.....	40.02	21.13	610.6	222.4	15.3	10.5
1921.....	43.41	20.28	600.3	214.6	13.8	10.6
1922.....	42.36	19.96	586.9	280.7	13.8	14.1
1923.....	39.51	20.15	571.8	225.6	14.5	11.2
1924.....	35.66	16.88	592.3	272.2	16.6	16.1
1925.....	31.23	21.02	401.7	274.7	12.9	13.1
1926.....	36.99	19.35	627.4	203.6	17.0	10.5
1927.....	37.72	21.06	552.7	325.6	14.7	15.5
1928.....	36.18	21.54	579.0	323.8	16.0	15.0
Average 1922–26..	37.15	19.47	556.0	251.4	15.0	12.9

* Data of U.S. Department of Agriculture. See especially *Agriculture Yearbook 1927*, p. 743, and press releases.

TABLE XI.—CANADIAN WHEAT PRODUCTION FORECASTS AND ESTIMATES, 1923–28*

(*Million bushels*)

Date	1923	1924	1925	1926	1927	1928
June 30.....	366	319	365	349	325	...
July 31.....	383	282	375	317	357	...
Aug. 31.....	470	292	392	399	459	550
Oct. 31.....	470[a]	272	422	406	444	501
Dec. 31.....	474	262	411	410	440	...

* Canadian Dominion Bureau of Statistics, *Monthly Bulletin of Agricultural Statistics*, and press releases. See Appendix Table XXXI for evidence respecting apparent errors in crop estimates.

[a] September 30.

TABLE XII.—BROOMHALL'S FORECASTS OF EXPORTERS' SURPLUSES AND IMPORTERS' PURCHASES, 1927–28*

(*Million bushels*)

Date of report	Available for export	Margin over importers' purchases	Importers' purchases		
			Total	Europe	Ex-Europe
Sept. 6	852	104	748	608	140
Nov. 22	864	92	772	632	140
Dec. 20	900	128	772	632	140
Jan. 10	900	128	772	644	128
Apr. 17	900	108	792	664	128
June 12	901	104	797	669	128
July 17	917	120	797	669	128

* Data from Broomhall's *Corn Trade News*.

TABLE XIII.—UNITED STATES IMPORTS OF WHEAT AND FLOUR FROM CANADA, 1920–21 TO 1927–28*

(*Million bushels*)

Crop year July–June	Withdrawn for consumption, duty-paid	Withdrawn for milling in bond, free	General imports[a]		
			Wheat grain	Flour as wheat	Total
1920–21.....	.....[b]	.....[b]	51.00	6.39	57.39
1921–22.....	8.46[c]	6.17[d]	14.46	2.79	17.25
1922–23.....	7.41	9.28	18.01	1.93	19.94
1923–24.....	13.68	13.90	27.28	0.76	28.04
1924–25.....	0.27	5.81	6.17	0.03	6.20
1925–26.....	1.64	13.47	15.60	0.08	15.68
1926–27.....	0.05	13.17	13.24	0.03	13.27
1927–28.....	0.16	15.04	15.71	0.03	15.74

* Data of U.S. Department of Commerce, in part compiled from *Monthly Summary of Foreign Commerce*, and *Agriculture Yearbook, 1925*, p. 761; in part supplied direct.

[a] Practically all from Canada. No deduction made for re-exports, which rarely reach 1 million bushels.

[b] Distinction established by emergency tariff act effective May 28, 1921. Before this date no duties had been in force since April 17, 1917.

[c] Including June 1921.

[d] Nine months only (October–June).

TABLE XIV.—CANADIAN WHEAT AND FLOUR EXPORTS OVERSEAS, 1920–21 TO 1927–28*

(*Million bushels*)

Crop year Aug.–July	Total	Through U.S. ports	Through all Canadian ports	Through Vancouver alone
1920–21[a].....	112.3[a]	63.6[a]	48.7[a]	1.1[a]
1921–22.....	168.0	109.7	58.3	9.4[a]
1922–23.....	263.3	150.8	112.5	21.5[a]
1923–24.....	323.6	164.7	158.8	58.4[b]
1924–25.....	189.5	99.1	90.4	26.0
1925–26.....	314.0	161.3	152.7	58.7
1926–27.....	285.2	150.8	134.4	39.7
1927–28.....	324.5	151.5	173.0	85.7

* Official data from *Reports on the Grain Trade of Canada* and *Canadian Grain Statistics*. These figures do not include exports by lake and rail to the United States; hence the totals do not represent Canada's gross or net exports.

[a] September–August.

[b] Eleven months, September–July.

TABLE XV.—WHEAT RECEIPTS MONTHLY AT PRIMARY MARKETS IN THE UNITED STATES AND CANADA, FROM AUGUST 1924*

(Million bushels)

Month	United States primary markets				Fort William and Port Arthur				Vancouver			
	1924–25	1925–26	1926–27	1927–28	1924–25	1925–26	1926–27	1927–28	1924–25	1925–26	1926–27	1927–28
Aug.	93.0	43.3	71.6	81.6	1.3	1.2	1.5	2.4	.21	.55	.12	.09
Sept.	82.1	57.9	48.7	79.7	7.1	45.7	32.8	8.6	.41	.28	.29	.32
Oct.	88.0	36.1	37.1	73.3	40.9	53.2	56.1	51.4	3.98	7.04	6.37	6.17
Nov.	60.5	34.1	29.8	44.8	42.7	51.5	60.5	71.0	5.05	9.79	7.22	10.78
Aug.–Nov.	323.6	171.4	187.2	279.4	92.0	151.6	150.9	133.4	9.65	17.66	14.00	17.36
Dec.	36.3	34.9	22.4	26.5	20.3	53.5	26.3	41.0	4.21	6.14	6.63	11.81
Jan.	24.7	21.6	24.6	23.5	4.1	10.5	14.0	21.1	3.84	10.03	6.83	16.49
Feb.	19.9	16.2	21.0	22.5	6.2	4.0	8.6	9.5	2.08	7.74	4.27	12.54
Mar.	17.3	15.1	16.6	26.3	8.5	3.2	6.3	3.3	.74	6.98	5.94	10.50
Dec.–Mar.	98.2	87.8	84.6	98.8	39.1	71.2	55.2	74.9	10.87	30.89	23.67	51.34
Apr.	10.4	14.0	14.4	18.0	8.1	1.8	12.6	.9	1.02	3.58	3.58	10.88
May	17.6	15.7	19.2	25.9	7.0	17.2	17.3	17.6	1.54	1.20	1.57	7.43
June	21.9	21.0	20.7	15.6	4.1	13.6	7.3	20.1	.74	.22	.61	3.66
July	41.8	77.0	58.8	72.6	6.7	6.4	10.7	14.4	.11	.27	.14	2.44
Apr.–July	91.7	127.7	113.1	132.1	25.9	39.0	47.9	53.0	3.41	5.27	5.90	24.41
Aug.–July	513.5	386.9	384.9	510.3	157.0	261.8	254.0	261.3	23.93	53.82	43.56	93.11

* United States data are unofficial figures compiled from *Survey of Current Business;* Canadian data are official figures from *Reports on the Grain Trade of Canada* and *Canadian Grain Statistics.* Vancouver figures include receipts at Prince Rupert after October 1, 1926.

TABLE XVI.—INTERNATIONAL SHIPMENTS OF WHEAT AND RYE (BROOMHALL), ANNUALLY FROM 1920–21*

(Million bushels)

Crop year ending approximately August 1	Wheat, including wheat flour									Rye, including rye flour			
	North America	Argentina, Uruguay	Australia	Russia, Danube	India	Other	Total	To Europe	To Ex-Europe	North America	Russia, Danube	Other	Total
1920–21	432.2	63.9	82.1	1.6	11.2	....	591.0	541.5	49.5	40.0	1.3	1.7	43.0
1921–22	404.0	118.4	110.8	5.6	.2	8.1	647.1	546.7	100.4	34.9	.02	1.3	36.2
1922–23	455.2	138.3	47.8	6.9	26.1	2.1	676.4	585.9	90.5	58.7	2.7	1.5	62.9
1923–24[a]	454.4	174.4	77.9	36.0	17.5	15.1	775.3	626.5	148.8	26.8	41.3	....	68.1
1924–25	422.6	121.4	117.1	13.5	31.7	8.9	715.2	639.7	75.5	61.9	.4	.1	62.4
1925–26	413.2	93.9	74.0	32.7	4.9	48.8[b]	667.6	532.3	135.3	15.1	3.9	19.2[c]	38.2
1926–27	484.4	139.0	103.8	48.2	10.2	28.8[d]	814.4	682.4	132.0	32.5	8.1	6.6	47.2
1927–28	489.7	177.7	74.7	8.5	7.2	35.0[d]	792.8	661.8	131.0	35.1	10.0	15.1[c]	60.2
Average 1909–14	206.9	82.5	54.9	225.2	47.1	8.1	624.7	542.7	82.0	.9	24.3	28.8[c]	54.0
1922–27	445.8	133.4	84.1	27.5	18.1	20.7	729.8	613.4	116.4	39.0	11.3	5.5	55.8

* Data from *Corn Trade News.* Figures are Broomhall's cumulative totals, presumably revisions of his weekly shipment figures. The totals do not agree precisely with other figures of Broomhall's, particularly in 1924–25. Dots (....) indicate no shipments reported.

[a] For 53 weeks.
[b] Largely Germany and Poland.
[c] Chiefly Germany.
[d] Apparently includes some shipments from Danube countries.

TABLE XVII.—INTERNATIONAL TRADE IN WHEAT (INCLUDING FLOUR), ANNUALLY FROM 1920–21*

(Million bushels)

A.—NET EXPORTS

Crop year August–July	United States	Canada	India	Australia	Argentina	Chile	Hungary	Bulgaria	Jugo-Slavia	Roumania	Russia	Morocco
1920–21	307.9	165.8	15.1	88.9	64.0	2.2[a]	(.01)	1.77	3.76	1.41	.....	0.3[a]
1921–22	251.8	185.4	(13.8)	114.6	118.1	0.1[a]	9.40	4.52	3.90	3.51	.....	0.7[a]
1922–23	200.2	279.0	28.6	50.3	139.4	1.5[a]	5.15	4.32	1.01	1.64	.....	0.2[a]
1923–24	127.4	346.1	20.1	85.6	172.2	5.6	16.79	2.45	5.84	8.98	21.4[c]	1.7[a]
1924–25	256.4	192.1	38.1	123.6	123.1	7.7	13.54	(1.70)	9.55	3.21	....[bc]	0.7[a]
1925–26	103.4	324.1	8.0	77.2	94.4	1.0	19.79	4.37	11.59	9.93	27.1[c]	0.8[a]
1926–27	198.6	292.5	11.5	102.7	143.0	0.5[d]	21.88	2.25	9.74	11.20	49.2[c]	2.4[a]
1927–28	184.5	332.5	8.5	69.6	178.1	...	21.84	2.00[e]	1.16	7.50	7.0[e]	...
Average 1909–14	110.0	95.6	49.8	55.2	84.7	2.4[a]	43.14[f]	11.27[f]	.....	54.62[f]	164.5[f]	0.3[a]
1922–27	177.2	286.8	21.3	87.9	134.4	...	15.43	2.34	7.55	6.99	.....	1.1[a]

B.—NET IMPORTS

Crop year August–July	Algeria	Tunis	Egypt	United Kingdom	Irish Free St.	France	Germany	Italy	Belgium	Netherlands	Denmark	Norway
1920–21	5.6	1.3	11.21	200.1		68.3	59.8[g]	99.4	32.2	18.9	0.35	3.86
1921–22	(4.2)	(1.3)	6.84	208.2		17.1	69.5[g]	100.5	40.5	19.8	4.01	5.16
1922–23	2.3	0.7	7.68	205.5[h]	4.8[h]	45.6	37.5[g]	115.7	39.5	23.9	6.28	6.90
1923–24	(7.2)	(2.8)	8.52	219.4	20.3	53.3	30.7[g]	69.9	40.0	26.7	9.28	6.11
1924–25	0.5	(0.2)	9.90	208.8	19.1	58.5[i]	80.9[g]	88.7	39.0	26.8	6.55	5.57
1925–26	(4.6)	(2.6)	12.79	191.1	18.8	10.3[i]	57.4	67.9	39.2	27.2	6.00	6.70
1926–27	1.6	(0.3)	8.77	217.3	19.9	62.3[i]	91.8	86.6	39.5	28.5	7.24	6.22
1927–28	(5.3)	(0.6)	6.59	213.6	18.6	46.9[i]	88.5	89.6	41.9	31.0	10.97	6.78
Average 1909–14	(5.3)	0.8	8.32	217.7		43.6[f]	67.8[f]	53.0[f]	50.2[f]	22.6	6.66[f]	3.78
1922–27	(1.5)	(1.0)	9.53	209.1[j]	19.5[j]	46.0	59.7	85.7	39.5	26.6	7.07	6.30

B.—NET IMPORTS (*concluded*)

Crop year August–July	Sweden	Spain	Portugal	Switzerland	Austria	Czecho-Slovakia	Poland	Finland	Latvia	Esthonia	Greece	Japan
1920–21	6.61	19.83	6.6[a]	12.9	14.6	18.3	.....	2.47	0.58	0.61[a]	10.6	5.8
1921–22	3.85	8.02	8.1[a]	13.2	19.0	11.6	1.20	3.39	0.74	0.76[a]	13.7	24.9
1922–23	8.78	(0.18)	6.5[a]	16.6	13.4	10.2	2.52	5.12	1.11	1.18[a]	17.5	14.5
1923–24	12.35	(0.32)	3.2[a]	17.1	18.1	21.2	2.63	5.12	1.80	0.97	18.8	29.1
1924–25	10.58	0.80	5.5[a]	13.9	14.7[e]	21.5	17.10	4.54	1.94	0.86	20.8	12.2
1925–26	6.10	(0.73)	4.3[a]	15.6	14.7[e]	21.7	(4.60)	5.23	1.56	0.97	18.8	22.7
1926–27	6.02	(1.01)	...	16.3	16.9	20.1	8.07	5.14	1.68	0.91	18.1[e]	15.3
1927–28	8.42	(0.23)[k]	...	18.4	16.5	21.4	8.62	6.02	1.50	1.12	8.6[l]	16.3
Average 1909–14	7.07	6.19	3.0[a]	16.9	10.5[f]	....	.....	....	....	....	6.9[a]	4.1
1922–27	8.77	(0.29)	4.9[j]	15.9	15.6	18.9	5.14	5.04	1.62	.98	18.8	18.8

* Data from official sources, in large part through International Institute of Agriculture. Figures in parentheses represent, under *A*, net imports, and under *B*, net exports. Dots (....) indicate that data are unavailable or that comparable averages cannot be computed.

[a] Calendar years 1921 and following; averages for calendar years 1909–13 and 1923–27.

[b] Less than half a million bushels. Broomhall's shipments indicate imports of 9.4 million bushels.

[c] July–June figure.

[d] Gross figure.

[e] Eleven months.

[f] For pre-war boundaries; not comparable with post-war figures.

[g] Data incomplete because of territory occupied by foreign armies.

[h] Irish Free State separated after April 1, 1923.

[i] Statistics for 1924–25 and 1925–26 adjusted for imports of wheat under decree of December 30, 1924, permitting refund of duty. Figure for 1926–27 probably too low, for 1927–28 probably too high. For discussion see WHEAT STUDIES, II, 211 n., III, 427 n., and above, p. 80. From January 11, 1925, French shipments to the Saar region have not been counted as exports from France. These, consisting largely of flour, were 1.5 million bushels in 1922, 2.0 in 1923, and 3.2 in 1924.

[j] Four-year average.

[k] Eight months for wheat; seven months for flour.

[l] Six months.

TABLE XVIII.—INTERNATIONAL TRADE IN WHEAT FLOUR, ANNUALLY FROM 1920–21*

(Thousand barrels of 196 pounds)

A.—NET EXPORTS

Crop year August–July	United States	Canada	India	Australia	Argentina	Chile	Hungary	Bulgaria	Jugo-Slavia	Roumania
1920–21	13,665	6,688	835	2,281	353	138[a]	(2)	83	426	150
1921–22	14,900	7,701	497	3,677	950	100[a]	1,863	242	392	115
1922–23	14,457	10,936	538	4,081	842	151[a]	1,137	166	163	293
1923–24	17,020	11,933	708	5,222	1,772	181	2,333	147	417	936
1924–25	13,882	10,108	892	4,625	1,625	196	2,025	(23)	697	619
1925–26	9,551	10,847	685	5,008	1,648	48	1,817	465	456	849
1926–27	13,378	9,238	717	5,313	1,730	82[d]	1,588	336	311	983
1927–28	12,778	9,794	671	4,141	1,828	...	2,108	113[e]	46	441
Average										
1909–14	10,639	3,898	613	1,802	1,307	67[a]	7,443[f]	502[f]	...	1,092[f]
1922–27	13,658	10,612	708	4,850	1,523	132	1,780	218	409	736

B.—NET IMPORTS

Crop year August–July	France	Italy	Belgium	Spain	Algeria	Tunis	Egypt	United Kingdom	Irish Free St.	Germany
1920–21	(66)	123	(2)	163	205	(4)	2,046	6,552	.....	306[g]
1921–22	(372)	(91)	(237)	(53)	(36)	20	1,478	7,559	.....	61[g]
1922–23	(478)	(393)	24	(43)	80	79	1,636	5,579[h]	607[h]	566[g]
1923–24	(254)	(1,493)	(480)	(66)	(62)	(34)	1,798	2,764	2,126	4,166[g]
1924–25	(393)	(1,246)	(787)	(59)	55	95	1,906	1,465	1,892	5,384[g]
1925–26	(260)	(334)	(151)	(157)	5	...[m]	2,436	2,483	1,748	1,411
1926–27	(28)	(195)	(64)	(218)	36	(24)	1,891	4,045	1,856	491
1927–28	125	(208)	(152)	(57)[n]	(92)	(9)	1,490	3,161	1,907	2
Average										
1909–14	(133)[f]	(793)[f]	(704)	(12)	(126)	189	1,778	5,193		(1,827)[f]
1922–27	(283)	(732)	(292)	(109)	23	23	1,933	2,689[f]	1,905[f]	2,404

B.—NET IMPORTS *(concluded)*

Crop year August–July	Nether-lands	Denmark	Norway	Sweden	Austria	Czecho-Slovakia	Poland	Finland	Greece	Japan
1920–21	592	45	241	272	1,361	3,135	.....	432	229	157
1921–22	560	555	456	34	1,811	2,130	115	724	149	559
1922–23	659	555	603	75	2,016	1,996	535	1,091	1,099	147
1923–24	1,286	476	635	264	2,607	3,584	530	1,098	1,301	37
1924–25	698	201	560	146	1,580[c]	3,094	3,326	973	1,324	(518)
1925–26	1,269	495	775	(17)	1,279[c]	3,252	43	1,115	1,506	(1,016)
1926–27	1,751	690	611	76	1,763	1,691	76	1,098	1,152[c]	(591)
1927–28	2,008	829	754	136	1,821	2,106	84	1,289	271[i]	(1,002)
Average										
1909–14	2,028	586[f]	639	87	.....	.....	.....	.....	92[a,f]	181
1922–27	1,133	483	637	109	1,849	2,723	902	1,075	1,276	(388)

* For footnotes see under Table XVII, except as follows: [m] Net import of 224 barrels. [n] Seven months.

TABLE XIX.—EXPORTS OF WHEAT AND FLOUR AS WHEAT FROM SPECIFIED EXPORTING COUNTRIES TO SPECIFIED IMPORTANT EX-EUROPEAN IMPORTING COUNTRIES, ANNUALLY FROM 1921–22*

(*Million bushels*)

A.—TO JAPAN FROM NORTH AMERICA AND AUSTRALIA

Year July-June	Wheat and flour			Total from			Wheat from			Flour from		
	Total	Wheat	Flour	United States	Canada	Australia	United States	Canada	Australia	United States	Canada	Australia
1921–22	25.39	21.85	3.54	13.96	3.62	7.81	11.00	3.35	7.50	2.96	.27	.31
1922–23	14.08	12.11	1.97	6.50	3.79	3.79	5.35	3.05	3.71	1.15	.74	.08
1923–24	32.12	30.29	1.83	11.06	7.25	13.81	10.26	6.96	13.07	.80	.29	.74
1924–25	14.89	14.55	.34	4.35	3.51	7.03	4.10	3.43	7.02	.25	.08	.01
1925–26	29.66	29.07	.59	5.28	13.48	10.90	5.18	13.03	10.86	.10	.45	.04
1926–27	19.97	19.27	.70	7.34	8.30	4.33	7.34	7.63	4.30	.00	.67	.03
1927–28	20.79	20.09	.70	6.30	11.25	3.24	6.30	10.59	3.20	.00	.66	.04

B.—TO CHINA, HONG KONG, AND KWANTUNG FROM NORTH AMERICA AND AUSTRALIA

Year July-June	Wheat and flour			Total from			Wheat from			Flour from		
	Total	Wheat	Flour	United States	Canada	Australia	United States	Canada	Australia	United States	Canada	Australia
1921–22	10.50	2.17	8.33	9.30	.37	.83	2.03	.00	.14	7.27	.37	.69
1922–23	16.97	1.95	15.02	13.73	2.88	.36	1.11	.80	.04	12.62	2.08	.32
1923–24	50.51	20.21	30.30	32.87	11.95	5.69	8.30	7.40	4.51	24.57	4.55	1.18
1924–25	5.66	.57	5.09	3.29	1.72	.65	.37	.20	.00	2.92	1.52	.65
1925–26	19.91	8.12	11.79	5.29	13.72	.90	.00	7.69	.43	5.29	6.03	.47
1926–27	13.23	4.24	8.99	6.06	6.96	.21	.30	3.94	.00	5.76	3.02	.21
1927–28	15.59	1.26	14.33	9.19	6.11	.29	.00	1.26	.00	9.19	4.85	.29

C.—TO BRAZIL FROM NORTH AMERICA AND ARGENTINA

Year July-June	Wheat and flour			Wheat and flour from		
	Total	Wheat	Flour	United States	Canada	Argentina
1921–22	.....	.....	....	....	....	.....
1922–23	18.38	13.63	4.75	2.24	.11	16.03
1923–24	21.93	15.53	6.40	2.49	.34	19.10
1924–25	20.50	13.16	7.34	3.24	.15	17.11
1925–26	21.94	13.52	8.42	4.06	1.00	16.88
1926–27	24.95	15.91	9.04	4.25	1.20	19.50
1927–28	31.80	22.91	8.89	4.10	.17	27.53

D.—TO EGYPT FROM NORTH AMERICA AND AUSTRALIA

Year July-June	Wheat and flour			Wheat and flour from		
	Total	Wheat[a]	Flour	United States[a]	Canada[a]	Australia[b]
1921–22	9.52	3.29	6.23	.89	.13	8.50
1922–23	8.15	.04	8.11	1.38	.63	6.14
1923–24	11.40	1.34	10.06	.61	.67	10.12
1924–25	11.56	1.89	9.67	.92	.46	10.18
1925–26	12.28	.67	11.61	1.44	.76	10.08
1926–27	15.83	4.62	11.21	1.58	.67	13.58
1927–28	13.68	4.96	8.72	.82	.62	12.24

E.—TO WEST INDIES FROM NORTH AMERICA

Year July-June	Total flour[c]	Flour from	
		United States	Canada
1921–22	11.18	8.18	3.00
1922–23	12.85	8.66	4.19
1923–24	14.40	9.76	4.64
1924–25	12.65	9.23	3.42
1925–26	12.77	8.24	4.53
1926–27	13.10	9.19	3.91
1927–28	13.19	8.93	4.26

F.—TO SOUTH AFRICA FROM CANADA AND AUSTRALIA

Year July-June	Wheat and flour			Total from		Wheat from		Flour from	
	Total	Wheat	Flour	Canada	Australia	Canada	Australia	Canada	Australia
1921–22	2.73	1.35	1.38	.20	2.53	.02	1.33	.18	1.20
1922–23	4.94	2.66	2.28	.51	4.43	.11	2.55	.40	1.88
1923–24	6.72	4.59	2.13	1.19	5.53	.87	3.72	.32	1.81
1924–25	5.60	4.09	1.51	.71	4.89	.42	3.67	.29	1.22
1925–26	4.70	3.37	1.33	.49	4.21	.25	3.12	.24	1.09
1926–27	3.58	2.36	1.22	.66	2.92	.35	2.01	.31	.91
1927–28	8.49	7.09	1.40	.84	7.65	.50	6.59	.34	1.06

* Data from official trade statistics of exporting countries. Exports from Argentina to Brazil in 1921–22 not available.

[a] Australia alone exports wheat to Egypt.

[b] Exports from Australia to Egypt and Sudan.

[c] Flour only, as wheat exports to the West Indies from these two countries never amounted to more than 150 thousand bushels during this period.

TABLE XX.—INTERNATIONAL TRADE IN WHEAT AND FLOUR, MONTHLY FROM JULY 1927*

(*Million bushels*)

A.—NET EXPORTS

Month	United States	Canada	India	Australia	Argentina	Roumania	Hungary	Jugo-Slavia	Poland	Algeria	Tunis	Egypt
July	11.6	8.6	5.12[a]	8.1	9.9	.56	1.26	.06	(.42)[b]	(.26)[b]	(.10)[b]	(.47)[b]
Aug.	27.5	14.5	1.57[a]	4.1	5.9	1.34	2.99	.23	(.08)[b]	.51	(.09)[b]	(.51)[b]
Sept.	39.1	17.1	.81[a]	4.2	5.4	1.88	3.28	.16	(.10)[b]	.26	(.18)[b]	(.56)[b]
Oct.	34.7	23.4	.74	2.3	5.3	1.14	2.57	.15	(.45)[b]	(.19)[b]	(.27)[b]	(.60)[b]
Nov.	24.8	57.9	.79[a]	1.6	5.0	1.24	2.26	.22	(.58)[b]	.56	(.02)[b]	(.64)[b]
Dec.	10.2	49.1	.35[a]	2.3	8.7	.95	1.71	.18	(.64)[b]	.16	.03	(.52)[b]
Jan.	11.1	18.6	.25[a]	9.3	24.1	.29	1.14	.00[c]	(.21)[b]	.34	.00[d]	(.57)[b]
Feb.	5.0	21.8	(.60)[b]	6.4	29.7	.16	1.46	(.09)[b]	(.09)[b]	.54	(.02)[b]	(.59)[b]
Mar.	5.8	23.7	.41[a]	9.1	31.6	.25	1.87	(.13)[b]	(.07)[b]	.52	(.04)[b]	(.60)[b]
Apr.	7.4	11.1	.48[a]	7.3	21.3	.12	1.42	(.16)[b]	(.47)[b]	.70	(.06)[b]	(.49)[b]
May	6.7	34.2	.68[a]	9.5	15.0	.02	1.54	(.12)[b]	(2.47)[b]	.65	(.11)[b]	(.66)[b]
June	7.1	25.2	2.50	8.6	16.6	.07	.96	(.05)[b]	(2.05)[b]	.63	.36	(.41)[b]
July	5.1	35.9	1.19[a]	5.0	9.6	.04	.62	.17	(1.41)[b]	.58	.96	(.44)[b]

B.—NET IMPORTS

Month	Irish Free St.	United Kingdom	France	Germany	Belgium	Italy	Netherlands	Scandinavia	Switzerland	Czecho-Slovakia	Baltic States[e]	Japan
July	1.70	17.33	10.00	10.19	3.62	7.59	2.02	2.06	1.43	1.56	.63	1.16[a]
Aug.	1.10	20.78	7.74	6.48	3.50	3.92	2.10	1.86	1.45	2.26	.57	.27[a]
Sept.	1.82	19.59	7.20	6.96	3.67	2.96	2.80	2.35	1.30	1.62	.70	.34[a]
Oct.	1.70	15.18	5.14	9.23	4.12	3.04	3.39	2.18	1.67	1.82	.78	.24
Nov.	2.24	19.13	5.33	8.96	3.60	4.86	3.60	2.45	2.05	1.80	.81	.89[a]
Dec.	1.93	15.74	3.93	8.06	3.62	6.19	2.96	2.89	1.80	2.83	.42	.89[a]
Jan.	1.34	13.97	3.02	7.84	3.02	7.45	2.30	1.77	2.28	1.35	1.16	1.90[a]
Feb.	1.55	14.85	2.80	6.11	2.95	6.98	2.02	1.89	1.59	1.30	.59	1.55
Mar.	1.54	23.61	2.13	6.99	3.94	9.33	2.96	2.39	1.68	2.12	.77	2.55[a]
Apr.	1.64	16.80	2.02	8.88	3.56	10.98	2.11	2.40	1.43	1.95	.70	2.33[a]
May	.50	17.03	1.82	6.88	2.62	13.74	2.19	2.26	1.05	1.98	.72	3.53[a]
June	1.64	17.59	2.47	6.00	3.64	9.60	2.86	1.94	.70	1.02	.77	1.38
July	1.37	19.36	3.26	6.96	3.68	8.57	1.71	1.78	1.41	1.33	.64	.63[a]

* Data from official sources and International Institute of Agriculture.

[a] Gross, not net.

[b] Net import.

[c] Net export of 500 bushels.

[d] Net export of 3,300 bushels.

[e] Finland, Esthonia, Latvia.

TABLE XXI.—UNITED STATES WHEAT AND FLOUR EXPORTS, ANNUALLY FROM 1920–21*

(*Thousand bushels*)

Crop year July-June	Wheat inspected for export						Unclassified wheat	Total wheat exports	Flour as wheat	Total exports	Total imports (less re-exports)	Net exports
	Hard red spring	Durum[a]	Hard red winter	Soft red winter	White (Pacific)	Mixed[b]						
1920–21	10,081	4,872	132,701	34,281	27,729	68,615	14,989	293,268	76,046	369,314	56,404	312,910
1921–22	20,145	8,697	78,477	18,998	43,652	18,963	19,389	208,321	74,245	282,566	16,852	265,714
1922–23	8,718	12,271	51,654	20,846	13,602	25,047	22,813	154,951	69,949	224,900	19,735	205,165
1923–24	1,022	4,908	19,640	9,810	18,653	5,435	19,325	78,793	81,087	159,880	27,954	131,926
1924–25	16,760	5,945	90,840	6,944	10,063	9,386	55,552	195,490	65,313	260,803	6,106	254,697
1925–26	3,338	4,170	7,358	2,282	16,914	5,944	23,183	63,189	44,846	108,035	15,363	92,672
1926–27	1,829	611	66,874	29,980	26,615	1,398	28,943	156,250	62,910	219,160	13,164	205,996
1927–28	5,209	3,496	41,603	9,915	28,150	1,874	55,752	145,999	60,729	206,728	15,711	191,017

* Data of U.S. Departments of Agriculture and Commerce. See especially *Agriculture Yearbook, 1924*, p. 579, and *1927*, p. 756; and *Crops and Markets* for 1926–27 and 1927–28 data.

[a] Durum exports are materially understated, in earlier years chiefly as explained in note *b*, in later years chiefly because inspections for export are limited to Atlantic, Gulf, and Pacific ports, so that large quantities of durum wheat that are exported from lake ports via Montreal escape classification.

[b] It was estimated that 20,030,000 bushels of durum were mixed with spring wheat in 1920–21. Other mixed wheat exports in 1920–21 were largely soft and hard winter wheat shipped through Gulf ports. In 1921–22 and 1922–23, 70 per cent of the exports of mixed wheat is estimated as durum. See *Agriculture Yearbook, 1924*, p. 578.

TABLE XXII.—OCEAN FREIGHT RATES ON WHEAT AND CORN, 1913 AND CROP YEARS 1921–22 TO 1926–27*

(Cents per bushel)

Period	Canada to United Kingdom	New York to Liverpool	Northern Range to United Kingdom	Northern Range to Genoa	Northern Pacific to United Kingdom	La Plata down river to United Kingdom	Karachi to United Kingdom	Australia to United Kingdom
1913 (Jan.–Dec.)	8.3	5.8	8.0	11.9	25.7	10.6	12.2	20.4
1921–22 (Aug.–July)	10.7	8.5	10.3	12.5	25.3	14.6	12.8	28.6
1922–23 (Aug.–July)	9.2	5.5	8.0	11.0	22.2	14.3	15.4	23.6
1923–24 (Aug.–July)	9.4	6.8	8.6	10.4	21.2	13.7	15.0	21.8
1924–25 (Aug.–July)	9.4	6.3	8.8	10.5	21.3	12.0	14.7	25.2
1925–26 (Aug.–July)	9.0	7.0	8.0	9.2	20.0	10.9	13.1	22.3
1926–27 (Aug.–July)	12.0	9.7	12.1	13.3	23.9	19.9	15.8	28.5
1927–28 (Aug.–July)	7.7	5.6	7.7	10.1[a]	19.5	13.9	13.2	23.2
1927 July	7.6	4.6	n.q.	8.6[b]	21.0	12.5	12.2	23.1
Aug.	8.5	4.9	n.q.	n.q.	21.2	15.2	12.8	21.8
Sept.	10.1	6.8	10.4	n.q.	22.1	13.5	13.9	24.7
Oct.	9.9	7.4	8.8	11.0[c]	21.4	12.8	13.5	25.1
Nov.	10.3	7.0	7.8	10.9	20.6	15.4	14.0	24.7
Dec.	6.4	5.8	7.2	9.7	20.3	15.6	14.1	24.5
1928 Jan.	6.1	5.5	6.9	9.4	20.1	14.4	14.0	22.7
Feb.	5.5	5.3	7.6	9.4[d]	19.7	11.9	13.4	20.6
Mar.	5.3	5.3	8.1	....	18.7	13.0	13.4	22.1
Apr.	5.3[b]	5.0	7.6	....	17.7	14.6	13.2	24.4
May	7.2[d]	4.6	7.2	....	17.3	13.9	13.1	23.3
June	7.3	4.5	6.9	....	17.3	12.8	12.4	22.9
July	8.4	4.6	6.8	....	17.6	13.8	11.2	21.8

* Averages of Friday rates published in *International Crop Report and Agricultural Statistics*. New York–Liverpool rates are for parcels in liners; others for cargoes.

[a] July–February. [b] One week only. [c] Three-week average. [d] Two-week average.

TABLE XXIII.—UNITED STATES AND CANADIAN CARRYOVERS OF WHEAT, 1919–28*

(Thousand bushels)

Year	United States (July 1)				Canada (August 31, 1919–23; July 31, 1924–28)				
	Total	On farms	In country mills and elevators	Commercial visible (Bradstreet's)	Total	On farms	In elevators	In transit	In flour mills
1919	49,806	19,261	19,672	10,873	.....[a]	2,149	3,305	.....[a]	.....[a]
1920	110,254	49,546	37,304	23,404	.....[a]	2,122	6,930	.....[a]	238
1921	93,840	56,707	27,167	9,966	13,727	2,144	4,831	6,032	720
1922	81,457	32,359	28,756	20,342	20,590	2,360	11,024	4,578	2,628
1923	102,414	35,894	37,117	29,403	11,690	1,441	5,051	2,758	2,440
1924	106,204	30,981	36,626	38,597	45,159[b]	7,363[b]	27,400[b]	5,856[b]	4,539[b]
1925	86,447	29,357	25,287	31,803	26,483	2,709	17,939	3,835	2,000
1926	65,949	20,973	28,490	16,486	35,601	3,987	25,451	3,163	3,000
1927	74,507	27,215	21,776	25,516	50,586	4,264	37,079	5,243	4,000
1928	84,514	23,450	18,856	42,208	76,484	4,186	53,570	13,728	5,000
Average 1910–14	89,411	32,485	31,600	25,326	.....[a]	.....[a]	.....[a]	.....[a]	.....[a]
1923–27	87,164	28,884	29,919	28,361					

* Bradstreet's visible, and official data of U.S. Department of Agriculture and Dominion Bureau of Statistics. See especially *Agriculture Yearbooks, Canada Yearbooks, Grain World*, and press releases.

[a] Not available.

[b] Total includes August 31 figure for stocks on farms, and July 31 figures for other items.

TABLE XXIV.—UNITED STATES CENSUS REPORTS ON CITY MILL STOCKS OF WHEAT AND FLOUR, 1925–28*

(Million bushels)

Date	U.S. flour output represented %	Wheat stocks in						Flour as wheat[c]	Grand total
		Country elevators	Public terminals	Private terminals[a]	Transit	Mills[b]	Total		
1925 June 30	87.4[d]	2.16	3.44		26.72		32.31	15.73	48.04
Dec. 31	88.0[d]	7.55	12.70		82.86		103.11	21.55	124.66
1926 Mar. 31	88.4[d]	4.67	7.10	3.65	3.29	45.93	64.64	18.28	82.92
June 30	87.4[d]	2.52	3.00	1.14	6.73	22.45	35.83	14.67	50.50
Sept. 30	87.4[d]	8.92	12.04	8.57	15.38	79.87	124.77	19.82	144.59
Dec. 31	87.5[d]	8.47	11.95	10.66	13.49	71.84	116.41	20.38	136.79
1927 Mar. 31	90.5[e]	6.06	6.85	5.84	6.45	60.57	85.77	19.40	105.17
June 30	90.1[e]	2.56	3.88	1.61	10.39	34.15	52.59	16.76	69.35
Sept. 30	89.1[e]	6.23	12.15	3.98	16.12	77.25	115.73	20.05	135.78
Dec. 31	89.5[e]	8.84	14.11	3.64	18.59	70.46	115.64	21.34	136.98
1928 Mar. 31	91.2[e]	5.48	9.33	2.11	9.41	59.05	85.38	19.69	105.07
June 30	90.4[e]	1.91	3.68	.55	10.16	29.78	46.08	17.08	63.16

* Data from press releases of U.S. Department of Commerce.

[a] In private terminal elevators not attached to mills.

[b] In mills and elevators attached to mills.

[c] Wheat-flour stocks in wheat equivalent (4.7 bu. = 1 bbl.).

[d] Based on total output (114,438,544 barrels) of wheat flour reported at the census of manufactures, 1923.

[e] Based on total output (114,689,930 barrels) of wheat flour reported at the census of manufactures, 1925.

TABLE XXV.—WORLD VISIBLE WHEAT SUPPLIES, AUGUST 1, 1920–28, AND MONTHLY, 1927–28*

(Million bushels)

Date	United States	Canada	Argentina	Australia	United Kingdom ports	Afloat to Europe	North America	Argentina, Australia	U.K. and afloat	Grand total	Total ex-Australia
1920 Aug. 1	42.7	8.2	3.7	27.5	12.8	76.2	50.9	31.2	89.0	171.1	143.6
1921 Aug. 1	56.2	8.9	3.7	30.0	7.6	57.9	65.1	33.7	65.5	164.3	134.3
1922 Aug. 1	43.1	19.3	2.2	3.0	7.1	48.9	62.4	5.2	56.0	123.6	120.6
1923 Aug. 1	73.3	14.1	4.4	18.0	8.2	39.0	87.4	22.4	47.2	157.0	139.0
1924 Aug. 1	72.1	31.6	6.8	30.0	9.9	41.8	103.7	36.8	51.7	192.2	162.2
1925 Aug. 1	57.3	23.4	7.7	8.4	9.2	33.3	80.7	16.1	42.5	139.3	130.9
1926 Aug. 1	64.2	28.3	4.1	6.2	4.3	38.6	92.5	10.3	42.9	145.7	139.5
1927 Aug. 1	65.9	42.7	5.9	12.7	7.8	46.1	108.6	18.6	53.9	181.1	168.3
Sept. 1	108.7	27.4	4.8	9.7	10.4	44.0	136.1	14.5	54.4	205.0	195.3
Oct. 1	143.7	22.2	4.4	6.8	10.0	50.0	165.9	11.2	60.0	237.1	230.3
Nov. 1	156.0	72.0	3.6	3.0	8.6	56.1	228.0	6.6	64.7	299.3	296.3
Dec. 1	154.7	120.9	3.6	.7	9.6	57.1	275.6	4.3	66.7	346.6	345.9
1928 Jan. 1	143.4	157.8	3.7	41.0	8.0	46.1	301.2	44.7	54.1	400.0	359.0
Feb. 1	128.9	162.8	8.0	51.0	6.4	65.5	291.7	59.0	71.9	422.6	371.6
Mar. 1	118.6	156.5	11.8	43.5	5.8	66.9	275.1	55.3	72.7	403.1	359.6
Apr. 1	110.1	146.6	12.8	36.0	7.7	68.4	256.7	48.8	76.1	381.6	345.6
May 1	97.8	131.1	11.0	24.5	9.8	65.7	228.9	35.5	75.5	339.9	315.4
June 1	75.1	107.3	9.9	26.0	10.1	55.0	182.4	35.9	65.1	283.4	257.4
July 1	61.1	95.6	7.7	19.5	10.4	50.2	156.7	27.2	60.6	244.5	225.0
Aug. 1	88.1	69.2	5.9	9.5	10.1	44.7	157.3	15.4	54.8	227.5	218.0
Average Aug. 1											
1910–14	58.8	10.8	1.3	5.9[a]	15.4	35.2	69.6	7.2[a]	50.6	127.4[a]	121.5
1923–27	66.5	28.0	5.8	15.1	7.9	39.7	94.5	20.9	47.6	163.0	147.9

* A joint compilation by Broomhall, the *Daily Market Record*, Minneapolis, and the *Daily Trade Bulletin*, Chicago, here summarized from Broomhall's *Corn Trade News* and the *Daily Trade Bulletin*. Includes some flour stocks.

[a] For Australia, 4-year average, 1911–14.

TABLE XXVI.—UNITED STATES FLOUR PRODUCTION, NET EXPORTS AND SHIPMENTS, AND DOMESTIC DISAPPEARANCE, MONTHLY FROM JULY 1923*

(Thousand barrels)

Years	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
	A.—REPORTED PRODUCTION, IDENTICAL MILLS												
1923-24[a]	7,672	9,428	9,504	10,673	9,075	7,898	8,605	8,090	8,053	7,428	7,615	7,559	101,600
1924-25[b]	8,323	9,595	10,198	11,070	9,017	8,680	9,576	7,971	7,125	6,617	6,704	7,491	102,367
1925-26[c]	8,763	9,203	9,827	10,562	8,971	8,790	8,535	7,325	8,074	7,465	7,283	7,903	102,701
1926-27[d]	9,513	10,377	10,754	10,563	9,453	8,758	8,478	7,853	8,739	8,088	8,273	8,287	109,136
1927-28[d]	8,172	9,383	10,166	10,519	9,435	8,947	8,844	8,587	9,377	8,178	8,391	7,482	107,481
	B.—ESTIMATED PRODUCTION												
1923-24	9,048	11,239	11,284	12,667	10,558	9,311	10,063	9,454	9,387	8,633	8,871	8,749	119,264
1924-25	9,543	11,014	11,699	12,691	10,299	9,897	11,006	9,211	8,197	7,556	7,809	8,601	117,523
1925-26	9,806	10,413	11,126	12,000	10,190	9,976	9,521	8,180	9,068	8,301	8,099	8,709	115,389
1926-27	10,485	11,430	11,835	11,610	10,368	9,587	9,263	8,559	9,527	8,795	8,987	8,989	119,435
1927-28	8,850	10,179	11,033	11,411	10,199	9,646	9,519	9,222	10,084	8,744	8,967	7,948	115,802
	C.—NET EXPORTS AND SHIPMENTS TO POSSESSIONS												
1923-24	918	1,289	1,592	2,118	1,817	1,853	1,765	1,572	1,450	1,095	1,011	1,227	17,707
1924-25	831	993	1,511	1,909	1,653	1,510	1,060	976	1,425	1,012	746	859	14,485
1925-26	820	910	854	1,062	935	1,048	727	696	733	884	737	699	10,105
1926-27	848	1,403	1,617	1,429	1,400	1,270	1,084	905	929	1,062	1,162	914	14,023
1927-28	836	1,097	1,317	1,558	1,374	1,175	1,289	999	1,053	1,144	905	724	13,471
	D.—CALCULATED DOMESTIC DISSAPPEARANCE												
1923-24	8,130	9,950	9,692	10,549	8,741	7,458	8,298	7,882	7,937	7,538	7,860	7,522	101,557
1924-25	8,712	10,021	10,188	10,782	8,646	8,387	9,946	8,235	6,772	6,544	7,063	7,742	103,038
1925-26	8,986	9,503	10,272	10,938	9,255	8,928	8,794	7,484	8,335	7,417	7,362	8,010	105,284
1926-27	9,637	10,027	10,218	10,181	8,968	8,317	8,179	7,654	8,598	7,733	7,825	8,075	105,412
1927-28	8,014	9,082	9,716	9,853	8,825	8,471	8,230	8,223	9,031	7,600	8,062	7,224	102,331

* Reported production and trade data from U.S. Department of Commerce press releases, *Monthly Summary of Foreign Commerce*, and *Foodstuffs Round the World*. For an explanation of the estimated production figures see *Wheat Studies*, IV, 102.

[a] 955 mills. [b] 949 mills. [c] 975 mills. [d] 968 mills.

TABLE XXVII.—AVERAGE PRICES OF REPRESENTATIVE WHEATS IN LEADING EXPORTING AND IMPORTING MARKETS, MONTHLY, 1926–27*

(*U.S. dollars per bushel*)

Month	United States				Canada		Liverpool						Argentina	Australia
	No. 2 Red Winter (St. Louis)	No. 2 Hard Winter (Kansas City)	No. 1 Dark Northern (Minneapolis)	No. 2 Amber Durum (Minneapolis)	No. 1 Manitoba (Winnipeg)	No. 3 Manitoba (Winnipeg)	No. 1 Manitoba	No. 3 Manitoba	No. 2 Hard Winter	Pacific White	Australian	Argentine Rosafe	Barletta (Buenos Aires)	(Melbourne)
July	1.41	1.36	1.58	1.53	1.62	1.53	1.79	1.67	1.58	1.59	1.66	1.62	1.47	1.34
Aug.	1.42	1.35	1.50	1.40	1.60	1.45	1.79	1.66	1.55	1.58	1.63	1.63	1.47	1.36
Sept.	1.42	1.31	1.37	1.28	1.45	1.31	1.70	1.56	1.49	1.52	1.61	1.54	1.43	1.37
Oct.	1.45	1.28	1.34	1.23	1.44	1.27	1.66	1.54	1.48	1.47	1.57	1.52	1.40	1.39
Nov.	1.41	1.31	1.34	1.28	1.45	1.24	1.73	1.48	1.48	1.46[a]	1.56	1.50	1.39	1.34
Dec.	1.44	1.32	1.37	1.33	1.40	1.24	1.74[b]	1.51	1.51	1.50	1.58	1.50	1.32	1.31
Jan.	1.51	1.33	1.43	1.30	1.43	1.23	1.57[a]	1.51	1.51[a]	1.50	1.56	1.49	1.32	1.29
Feb.	1.56	1.33	1.42	1.29	1.42	1.24	1.59	1.49	1.50[b]	1.51	1.52	1.45	1.29	1.26
Mar.	1.69	1.38	1.47	1.33	1.48	1.30	1.64[a]	1.56	n.q.	1.60	1.60	1.49	1.32	1.32
Apr.	1.96	1.52	1.63	1.41	1.56	1.42	1.70[a]	1.61	1.62[c]	1.64	1.65	1.54	1.39	1.35
May	1.96	1.60	1.64	1.40	1.57	1.42	1.71	1.64	1.60[b]	1.64	1.67	1.60	1.44	1.38
June	1.79	1.47	1.53	1.31	1.43	1.30	1.64	1.48	n.q.	1.61	1.61	1.50	1.36	1.34
July	1.47	1.20	1.47	1.23	1.31	1.20	1.55	1.41	1.46	1.52	1.54	1.48	1.32	1.29

* United States prices are the U.S. Department of Agriculture monthly weighted averages of daily quotations for reported cash sales, compiled from *Crops and Markets*. Canadian prices are monthly averages of daily prices from *Canadian Grain Statistics*. Liverpool prices are averages of Friday quotations from *International Crop Report and Agricultural Statistics*, except Rosafé, No. 1 Manitoba, and No. 3 Manitoba at Liverpool which are averages of Tuesday quotations from Broomhall's *Corn Trade News*. Argentine prices are averages of daily prices from *Revista Semanal*. Australian prices are averages of weekly quotations for export wheat furnished directly by an Australian correspondent. No quotation is signified by "n.q."

[a] Three-week average. [b] One week. [c] Two-week average.

TABLE XXVIII.—PRICES OF DOMESTIC WHEAT IN EUROPE, MONTHLY FROM AUGUST 1925*

(*U.S. dollars per bushel*)

Month	Great Britain			France (Chartres)			Italy (Milan)			Germany (Berlin)		
	1925–26	1926–27	1927–28	1925–26	1926–27	1927–28	1925–26	1926–27	1927–28	1925–26	1926–27	1927–28
Aug.	1.53	1.76	1.63	1.62	1.61	1.75	1.88	1.85	1.75[a]	1.55	1.75	1.78[b]
Sept.	1.48	1.46	1.43	1.57	1.77	1.57	1.94	2.03	1.73	1.38	1.71	1.68
Oct.	1.34	1.48	1.37	1.48	1.88	1.54	1.94	2.21	1.77	1.37	1.72	1.62
Nov.	1.45	1.62	1.32	1.37	1.96	1.48	1.99	2.20	1.90	1.49	1.78	1.57
Dec.	1.60	1.55	1.29	1.33	1.78	1.58	2.12	2.31	1.88	1.62	1.74	1.53
Jan.	1.60	1.55	1.29	1.39	1.88	1.58	2.17	2.13	1.93	1.61	1.72	1.52
Feb.	1.54	1.54	1.26	1.42	1.81	1.56	2.16	2.11	1.94	1.60	1.72	1.49
Mar.	1.51	1.52	1.27	1.39	1.70	1.65	2.14	2.11	2.00	1.66	1.73	1.59
Apr.	1.57	1.50	1.34	1.40	1.82	1.74	2.20	2.02	2.09	1.87	1.76	1.72
May	1.75	1.58	1.43	1.39	1.91	1.87	2.19	2.16	2.14	1.92[c]	1.92	1.73
June	1.77	1.65	1.43	1.52	1.88	1.85	2.20	1.99	2.10	n.q.	1.96[d]	1.66
July	1.84	1.64	1.41	1.53	1.81	1.76	1.98	1.80	1.77	n.q.	n.q.	1.60

* Data for Great Britain are averages of weekly average *Gazette* prices as given in the *Economist;* for France, averages of Saturday prices furnished directly by Federal Reserve Board; for Italy, averages of Friday prices of soft wheat as given in *International Crop Report and Agricultural Statistics;* for Germany, monthly average prices as given in *Wirtschaft und Statistik*. All data are converted, for convenience, from the domestic currency in which they are quoted in the above sources into U.S. money by monthly average exchange rates. No quotation is signified by "n.q."

[a] Three-week average. [b] Second half of August. [c] First half of May. [d] First half of June.

TABLE XXIX.—APPARENT DOMESTIC UTILIZATION OF WHEAT (CARRYOVERS DISREGARDED), ANNUALLY FROM 1920–21*

(Million bushels)

Crop year August–July	United States	Canada	India	Australia	Argentina	Chile	Hungary	Bulgaria	Jugo-Slavia	Roumania	Morocco
1920–21	525.1	97.4	362.8	29.4[a]	90.2[a]	21.0[a]	37.9	28.1	39.2	59.9	17.9[b]
1921–22	563.1	115.5	264.2	44.0	45.4	23.6	43.3	24.7	47.9	75.0	22.9
1922–23	667.4	120.8	338.4	46.5	55.4	24.4	49.6	28.3	43.5	90.4	12.2
1923–24	670.0	128.1	352.3	42.7	77.6	20.9	50.9	26.7	55.2	93.1	19.9
1924–25	608.0	70.0	322.5	44.4	73.9	19.3	38.0	26.4	48.2	67.2	27.1
1925–26	573.0	71.4	323.0	39.3	108.9	25.6	51.9	37.0	67.1	94.8	23.2
1926–27	632.4	114.7	313.2	54.7	56.7	23.5	53.0	34.3	61.7	99.7	15.4
1927–28	693.9	107.5	326.5	....	....	....	55.1	45.2[c]	55.4	89.2	22.2
Average											
1909–14	580.1	101.5	302.1	35.9[a]	63.4[a]	19.0[a]	....	....	....	....	16.7[b]
1922–27	630.2	101.0	329.9	45.5[a]	74.5[a]	22.8[a]	48.7	30.5	55.1	89.0	19.6[b]

Crop year August–July	Algeria	Tunis	Egypt	British Isles	France	Germany	Italy	Belgium	Netherlands	Denmark	Norway	Sweden
1920–21	21.8	6.5	42.9	256.9	305.2	142.4[d]	240.7	42.4	24.9	7.7	4.9	16.9
1921–22	24.3	7.7	42.8	282.0	340.6	177.3[d]	294.6	55.0	28.3	15.2	6.1	16.2
1922–23	21.2	4.4	43.7	275.5	288.9	109.4[d]	277.3	50.3[e]	30.0	15.5	7.5	18.3
1923–24	28.6	7.1	49.2	298.2	328.9	137.2[d]	294.7	53.7[e]	33.0	18.1	6.7	23.4
1924–25	17.7	5.0	44.1	281.8	339.7	170.1[d]	258.8	52.4[e]	31.5	12.4	6.1	17.4
1925–26	28.2	9.1	49.0	263.6	341.1	175.6	308.7	54.2[e]	32.8	15.8	7.2	19.5
1926–27	25.2	12.7	46.0	289.3	294.0	187.2	307.2	53.0[e]	33.9	16.0	6.8	18.2
1927–28	23.1	7.7	50.9	289.4	323.0	209.1	285.4	58.9[e]	36.1	20.4	7.4	19.7
Average												
1909–14	29.8	7.0	42.5	277.3	361.2[f]	219.9[f]	236.3[f]	65.4	27.6	11.8[f]	4.1	15.2
1922–27	24.2	7.7	46.4	281.7	318.5	155.9	289.4	52.7	32.2	15.6	6.9	19.3

Crop year August–July	Spain	Portugal	Switzerland	Austria	Czecho-Slovakia	Poland	Finland	Latvia	Esthonia	Greece	Japan
1920–21	158.4	16.9[c]	16.5	20.0	44.7	....	2.7	.97	....	21.8	35.9
1921–22	153.1	17.4[c]	17.0	25.5	50.2	38.6	4.0	1.53	....	23.4	53.4
1922–23	125.3	16.5[c]	19.1	20.8	43.9	44.9	5.8	2.06	....	26.5	43.8
1923–24	156.8	16.4[c]	20.9	27.0	57.4	52.4	5.8	3.44	1.70	27.6	55.7
1924–25	122.6	14.1[c]	17.0	23.2	53.8	49.6	5.3	3.52	1.40	28.5	39.2
1925–26	161.9	16.4[c]	19.1	25.4	61.0	53.2	6.2	3.72	1.76	30.1	52.2
1926–27	145.6	15.1[c]	20.6	26.4	54.2	55.2	6.1	3.54	1.75	31.0[c]	43.8
1927–28	144.4[c]	15.4[c]	22.5	28.4	61.8	62.9	7.1	4.14	2.20	32.1[c]	47.6
Average											
1909–14	136.6	....	20.2	71.6[f]	....	....	...	....	....	....	29.2
1922–27	142.4	15.7	19.3	24.6	54.0	51.0	5.8	3.3	1.7[g]	28.7	46.9

* Computed from production and trade data given in Tables III and XVII. Dots (....) indicate that comparable production or trade figures are not available.

[a] Crop of 1920–21 minus exports of 1921, and similarly for other years. Averages are for calendar years 1910–14 and 1923–27.

[b] Crop of 1920 minus exports of 1920, and similarly for other years. Averages are for calendar years 1909–13 and 1922–26.

[c] Trade figures partially estimated.

[d] These figures are too low, as crops in earlier post-war years are underestimated and net imports, at least to 1924–25, are incomplete. See WHEAT STUDIES, December 1924, I, 17–18.

[e] Luxemburg included with Belgium after May 1922.

[f] Pre-war boundaries.

[g] Four-year average.

TABLE XXX.—AVERAGE DAILY VOLUME OF TRADING IN WHEAT FUTURES IN UNITED STATES MARKETS, MONTHLY FROM JANUARY 1921*

(*Million bushels*)

Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Year
1920-21	....	....	....	....	....	....	39.1	44.1	39.5	52.5	46.1	49.8	45.2[a]
1921-22	45.5	39.6	57.1	54.0	53.7	43.3	36.5	67.9	61.3	48.9	37.4	41.8	48.7
1922-23	34.4	36.2	33.5	32.5	37.6	42.1	36.6	37.0	27.9	48.0	41.0	40.9	37.3
1923-24	32.3	31.4	28.3	30.2	27.1	21.1	14.3	18.1	22.8	18.0	14.4	34.0	24.3
1924-25	53.3	50.0	42.7	61.4	60.9	58.8	73.4	81.0	87.4	59.3	60.3	67.6	62.9
1925-26	56.2	60.0	59.0	60.4	65.2	90.3	60.6	58.3	69.0	55.8	48.8	46.3	60.9
1926-27	57.5	47.1	46.2	43.6	53.3	37.4	28.2	26.4	34.1	33.8	50.4	44.8	41.9
1927-28	40.7	42.4	36.9	36.7	34.9	20.9	15.4	22.1	34.2	66.2	56.6	36.2	37.0

* Data of Grain Futures Administration, U.S. Department of Agriculture. Not compiled prior to January 1921.
[a] Six-month average.

TABLE XXXI.—APPROXIMATE DISPOSITION OF WHEAT SUPPLIES IN FOUR LEADING EXPORTING COUNTRIES, 1923–24 TO 1927–28*

(*Million bushels*)

Item	United States (July–June)					Canada (August–July)				
	1923–24	1924–25	1925–26	1926–27	1927–28	1923–24	1924–25	1925–26	1926–27	1927–28
Initial stocks	151	165	135	111	138	29	41	26	35	48
New crop	797	864	676	831	878	474	262	395	407	440
Total supplies	948	1,029	811	942	1,016	503	303	421	442	488
Net exports	135	258	95	209	194	346	192	324	292	332
Seed requirements	79	84	82	88	94	39	38	40	39	41
Consumed for food	477	479	492	492	505	42	42	42	43	44
Unmerchantable, lost in cleaning, fed on farms	92	73	31	15	81	31	22	18	31	39
Apparent error in crop estimate						+4	—17	—38	—11	—43
Stocks at end	165	135	111	138	142	41	26	35	48	75
Total disappearance	948	1,029	811	942	1,016	503	303	421	442	488

* Based so far as possible upon official estimates for the various items of supply and disposition. It is necessary, however, to supply estimates for certain items in all four countries, as well as to adjust official figures in order to place all data on the designated crop year basis. The following notes explain our methods of estimation and adjustment.

UNITED STATES. *Initial stocks.* The figures for 1926–27 and 1927–28 (like the figure for stocks at the end of 1927–28) are sums of official estimates of stocks on farms and of stocks in country mills and elevators, Bradstreet's visible supplies, and wheat and flour stocks in city mills as reported by the Census Bureau. Flour stocks converted at 4.7 bushels per barrel. In order to avoid duplication with stocks in country mills and visibles, the quantities of wheat reported in "country elevators" and "in public terminal elevators" have been subtracted from the Census Bureau's totals. Published figures for country mill and elevator stocks on and prior to July 1, 1925, have been raised by 29 per cent, in accord with the Department of Agriculture's revision of the original estimate for July 1, 1926. In the absence of official data, city mill stocks on and prior to July 1, 1924, have been estimated roughly at 40 million bushels in 1923, and 50 million in 1924. Total initial stocks may be too low in 1923–24, too high in 1924–25; see WHEAT STUDIES, February 1928, IV, 169–70, 180. *New Crop.* Official figures. *Net exports.* Official data for domestic exports, plus re-exports, less imports. Includes shipments to possessions. Flour exports and re-exports converted at 4.7 bushels per barrel; flour imports (almost entirely from Canada) at the official Canadian figure, 4.5 bushels per barrel. *Seed requirements.* Official data. *Consumed for food.* Estimated directly on the basis of population estimates, assumed per capita consumption of flour of .9 barrel, and official data on milling ratios raised 1.5 per cent to account for small mills not reporting to the Census Bureau. *Unmerchantable and lost in cleaning; fed on farms; apparent error in crop estimate.* In the absence of official data on any of these items, the three must be bracketed and calculated as a residual. In our judgment the composite item so calculated is of reasonable size for 1923–24, 1924–25, and 1927–28, though perhaps slightly too high in each of these years. The low figures for 1925–26 and 1926–27 establish the presumption that the crops were officially underestimated in these two years; but numerical expression of the probable underestimates is not feasible in the absence of any dependable method of estimating the quantities of wheat fed and wasted annually.

CANADA. *Initial stocks.* Official data after August 1, 1924. The figures are slightly lower than official estimates of carryovers as shown in Appendix Table XXIII, apparently because certain quantities of wheat in transit are excluded from the former. The figure for August 1, 1923, is obtained by adding to official stocks figures as of September 1 the net exports and domestic consumption in August. *New crop.* Official data. *Net exports.* Official data. *Seed requirements.* Official data. *Consumed for food.* Official data except for 1927–28, which is estimated on the basis of increased population and a high milling ratio. *Unmerchantable, lost in cleaning, fed on farms.* Official data for the first two categories; we assume that wheat fed on farms is included in "unmerchantable." *Apparent error in crop estimate.* Calculated as a residual. The figures may be regarded as fairly reliable in view of the completeness of official disposition figures.

TABLE XXXI.—*Continued*

Item	Argentina (August–July)					Australia (August–July)				
	1923–24	1924–25	1925–26	1926–27	1927–28	1923–24	1924–25	1925–26	1926–27	1927–28
Initial stocks	65	66	56	61	65	42	38	36	30	41
New crop	248	191	191	221	239	125	165	115	161	110
Total supplies	313	257	247	282	304	167	203	151	191	151
Net exports	172	123	94	143	178	86	124	77	103	70
Seed requirements	21	23	25	24	25	11	11	11	12	14
Consumed for food	49	53	54	57	59	28	29	29	30	30
Feed and waste	3	2	10	6	3	4	3	4	5	4
Apparent error in crop estimate	+2	...	+3	—7	—31	...	...	...	...	...
Stocks at end	66	56	61	65	70	38	36	30	41	33
Total disappearance	313	257	247	282	304	167	203	151	191	151

ARGENTINA. *Initial stocks.* Figures for stocks on August 1, 1926 and 1928, calculated from direct estimates of stocks. See text, p. 66. Other stocks figures calculated on the assumption that stocks on January 1 remain constant at 10 million bushels, and that August 1 stocks must equal January 1 stocks plus net exports August–December, plus 5/12 of domestic consumption during the crop year. These estimates are tentative. *New crop.* Official data. *Net exports.* Official data. *Seed requirements.* Based on official data for acreage sown and average seed requirements per acre. The figure for 1925–26 has been made unusually high to allow for increased per acre requirements due to poor quality of seed. *Consumed for food.* Based on official data on flour milled less flour exported in calendar years, adjusted to present data for crop years. The figure for 1927–28 contains a considerable element of estimate, since data for the calendar year 1928 are not available. *Feed and waste.* Rough approximations based on the assumption that feed use of wheat is normally very small in a country exporting large quantities of corn, and introduced chiefly because relatively large quantities were probably fed and wasted in the calendar year 1926, following a crop of poor quality.

AUSTRALIA. *Initial stocks.* Calculated as residuals, on essentially the same assumptions as governed calculations of Argentine stocks. January 1 stocks of old-crop wheat are assumed to remain constant at 5 million bushels. *New crop.* Official data. *Net exports.* Official data. *Seed requirements.* Chiefly official data, but 1926–27 and 1927–28 figures are partially estimated. These figures include wheat sown for hay as well as for grain. *Consumed for food.* Based on official monthly data on flour production, less exports of flour. Figures for 1926–27 and 1927–28 estimated. *Feed and waste.* Based on official estimate of .5 to 1 bushel per capita utilization of wheat for feed, waste, and seed for green forage.

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