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SEASONAL ASPECTS OF THE EUROPEAN WHEAT TRADE

M. K. Bennett

Overseas shipments of wheat and flour to Europe in August–December, when North American wheat usually preponderates, have ranged in the past seventeen crop years from 37.40 to 44.55 per cent of the crop-year shipments. A view rather widely accepted in trade circles is that the fraction of the year's total shipped in these months tends to be small when the margin between world export surpluses and world import requirements is large. Under such circumstances, it is commonly supposed that European importers tend to avoid accumulation of stocks in August–December, in expectation of cheaper wheat in the winter when the Southern Hemisphere export movement is at its peak.

The present study indicates that the reverse of this is true. Autumnal accumulation of import wheat stocks appears to be normal behavior of European importers in years of large margin of surpluses over requirements, mainly as the result of export pressure in the autumn. In general, August–December shipments to Europe may be expected to approximate 43.3 per cent of crop-year shipments in years when margins (as calculated in this study) run larger than 250 million bushels.

The current crop year, 1938–39, is one of very large margin between surpluses and requirements. If the political events of mid-March have not prompted Europeans to begin to accumulate wheat stocks, and if intensified war scare or war itself does not eventuate in the next eight months, the principles developed in the following pages suggest three conclusions regarding the outlook for European trade in wheat. August–December shipments may prove to be the largest fraction of the crop-year total recorded in eighteen years. May–July shipments may run larger than usual in relation to January–April shipments. By the end of the crop year, the stage may be set for severe export pressure in the autumn of 1939–40.

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Questions of substantial importance center around the average or "normal" seasonal flow of wheat and flour in international trade, and the departures that occur in particular years. For example, in the early months of a crop year—say in November–January—the trade statistics of the current year are often studied in relation to those of past years in an attempt to decide whether the record gives evidence that the near future will bring a change in rate of flow. Evidence of prospective change in the rate of flow is regarded by many as evidence of prospective change in "import demand"; and change in import demand is regarded as a factor likely to influence wheat prices. Such analysis commonly continues to seem fruitful even as late as March or April, when changing prospects for new crops tend to absorb the attention of those concerned with prospective price developments. Government officials in exporting countries, whose decisions nowadays help to determine the outbound movement of wheat and flour, are also inevitably concerned with the prospects for "broadening" or "narrowing" of the import market within a current crop year.

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Students of international trade in wheat are likely to be particularly concerned to assure themselves, as early as possible in a given crop year, whether or not the year is likely to resemble an "average" year in its seasonal distribution of trade; or whether it will be a year in which trade is exceptionally low or high in the autumn as compared with subsequent months; or, later, whether winter trade will be exceptionally high or low in relation to spring trade.

With these questions in mind, this study deals with the historical record of seasonality in the world wheat trade, over a span of seventeen postwar years beginning with August 1921. But the inquiry is limited to certain aspects of the trade. We do not deal with the trade of non-European countries, which in the aggregate is much smaller than the European and exhibits much less seasonal variation. The full sequence of trade is purchase, shipment, arrival, import, and use. But here, for lack of quantitative evidence, we cannot deal with European *purchases* of wheat or (except by inference) with European *consumption* of imported wheat. Only the flow from exporting countries to the importing countries of Europe, the arrival in Europe, and the net imports by the various countries of Europe, are susceptible of analysis for seasonability.

Attention is centered, moreover upon seasonal aspects of shipments to Europe rather than upon arrivals in or net imports of Europe. The shipments statistics, compiled weekly by the Broomhall organization on different days of the week for different exporting countries, are disseminated by cable and telegraph and published promptly and regularly every week in Broomhall's *Corn Trade News* and in many other periodicals. They are familiar to students and traders and are closely scanned and interpreted as they appear. Statistics of arrivals are not so familiar; statistics of net imports are greatly belated and seldom presented monthly for Europe as a whole. The data on "calculated arrivals" and on net imports are used here largely to assist in interpretation of statistics of shipments. These cannot be broken down so as to show final destinations within Europe, although final destinations need to be known in answering questions about the effect of shifting in the weighted importance of the different importing coun-

tries upon departures from normal in the seasonal flow of wheat to Europe as a whole. Net-import statistics provide information concerning these shifts.

Attention here is further centered upon European trade in three successive periods of the crop year: August–December, January–April, and May–July. In the first period, exports from North America and eastern Europe generally predominate; in the second, exports from the Southern Hemisphere; in the third, there is a mixture of a secondary peak from the Northern Hemisphere with the "tail" of the Southern Hemisphere movement. The problems of most concern to students of the world wheat situation appear to involve the usual and unusual relationships of trade as between these periods. But monthly data on shipments, arrivals, and net imports alike are presented here and used in the analysis.

Aside from presenting new compilations of data bearing upon seasonality in the European wheat trade, the principal objective of this study is to discover, classify, and appraise the relative importance of factors that cause trade in particular years to differ substantially in seasonal aspects from trade "on the average." Throughout the analysis runs the problem of ascertaining, so far as possible, how far circumstances in importing countries ("import pull"), how far circumstances in exporting countries ("export push"), determine unusual seasonal flows of wheat to Europe.

A general conclusion emerges that the size of the margin between export surplus and import requirement is of major significance in determining the relationship between autumn shipments on the one hand, and winter and spring shipments on the other; and between winter shipments on the one hand and spring shipments on the other. Autumn shipments tend to constitute a relatively small fraction of the year's shipments when margins are narrow, and a large fraction when margins are wide; but when the margin exceeds a given size, enlargement of it seems to have little or no effect. With respect to the relationship between winter and spring shipments, size of margin appears to be one of the important determining circumstances; but size of Southern Hemisphere crop and disposition of Southern Hemisphere exporters to hold are also significant. These conclusions are stated more fully on pages 318–20 and 323–24.

Average Seasonality

Data by shipment periods.—The following tabulation characterizes the average postwar seasonal flow of wheat and flour to Europe, in terms of quantities (million bushels) moving during August–December, January–April, and May–July. Data are 17-year averages, respectively of shipments to Europe,[1] calculated "arrivals" of these shipments in Europe,[2] and net imports of the important European importing countries.[3]

Measure of trade	Annual total	Aug.–Dec.	Jan.–April	May–July
Shipments	536.3	222.5	184.3	129.5
Arrivals	538.3	225.5	169.1	143.7
Net imports ...	522.5	221.4	157.4	143.7

Average annual arrivals slightly exceeded shipments, because stocks of wheat afloat to Europe were larger on August 1, 1921 than on July 31, 1938.

Net imports are smaller than either shipments or arrivals, in part doubtless because the net-import statistics take no account of net imports into Spain, Portugal, Bulgaria, Poland, Lithuania, Latvia, or Estonia. None of these countries has been a net importer in all of the past seventeen years, and in only one year, 1924–25, were all of them net importers. The net imports of this group (without deduction for net exports of those that ranked as net exporters) have run from nil (1935–36) to as high as 33 million bushels (1928–29); over the whole postwar period the net imports of the group, thus calculated, averaged about 13 million bushels.

[1] Broomhall's data adjusted to a monthly basis as in Table VIII, here averaged.

[2] For method of calculating "arrivals," see Table II. The word is used here in a somewhat unusual sense. Broomhall publishes direct estimates of arrivals in Europe, based on reports from correspondents in the chief European ports; but since these data have not been consistently collected throughout the postwar period, they are not useful in this study. The "arrivals" here used are merely shipments to Europe adjusted by changes in stocks afloat to Europe, and in some issues of Wheat Studies are called "adjusted shipments."

[3] Averages based on official monthly statistics for most but not all of the European importing countries; see Table III.

This happens to be very close to the amount by which shipments to Europe exceed net imports of Europe in the tabulation above. But such a close reconciliation of data is misleading, for shipments to Europe and net imports of Europe are appreciably different sets of statistical measures of trade. Shipments to Europe purport to represent the gross flow of wheat and flour into a geographical region that shifts in definition from year to year.[1] Net imports of Europe represent gross imports minus gross exports[2] of a specified list of European countries unchanged throughout the period—a list that does not cover all net-importing countries every year. There is in fact no single statistical series that is clearly an entirely reliable measure of the flow of wheat and flour to Europe from month to month.[3]

Hence details of the recorded flow ought not to be scrutinized too minutely, because the data cannot be accurate enough to preclude spurious changes in detail. Discussion is therefore confined to the more prominent developments that can hardly be reflected falsely in the statistical material.

The average rate of flow of wheat and flour into Europe as between the successive periods of the year is better indicated by the next tabulation, wherein the data are expressed both as percentages of annual totals moving in the specified periods, and as average monthly percentages moving in the specified periods:

Measure of trade	Percentage in period			Percentage per month in		
	Aug.–Dec.	Jan.–April	May–July	Aug.–Dec.	Jan.–April	May–July
Shipments ...	41.55	34.24	24.21	8.31	8.56	8.07
Arrivals	41.94	31.41	26.65	8.39	7.85	8.88
Net imports..	42.41	30.14	27.45	8.48	7.54	9.15

A flow of wheat without seasonal variation would involve movement of 8.33 per cent of the annual total each month, aside from differences due to differing numbers of days in the months. The tabulation therefore indicates that, as between the specified periods and on the average, shipments flow more smoothly than either arrivals or net imports, and arrivals somewhat more smoothly than net imports.

With regard to shipments, the flow is on the average relatively largest in January–April, relatively smallest in May–July, and intermediate in August–December. But monthly arrivals and monthly net imports as well average largest in May–July, at the end of the crop year; they are smallest in January–April, and intermediate in August–December. As between the three measures of trade, the more prominent differences in rate of flow occur in January–April and May–July. This would be expected because January–April is a period in which wheat moving from the Southern Hemisphere bulks relatively large. This wheat is transported over greater distances and is longer afloat than the wheat moving during August–December. The rate of arrival or of net import in January–April is relatively low as compared with shipments because most of the wheat shipped in August–December arrives fairly promptly, but wheat shipped in January–April lags in its arrival; and this wheat swells arrivals in May–July, when the wheat actually shipped is again tending to come more from the Northern Hemisphere and to arrive more promptly.

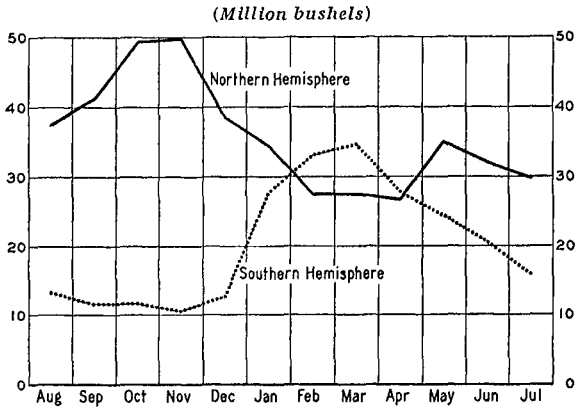
In subsequent discussion it will sometimes be convenient to designate the August–December period as the "autumn" period; January–April as the "winter" period; and May–July as the "spring" period. Chart 1 (p. 300) shows how heavily shipments from the Northern Hemisphere (mainly North America) preponderate on the average over shipments from the

[1] For example, Sweden, Poland, and some other countries are net exporters in some years or parts of years and net importers in others. When they are net exporters, Broomhall apparently records as shipments to Europe whatever they ship out, so that in some periods "Europe" as a destination of shipments does not include these countries, while in other periods they are included as part of Europe.

[2] Net-import statistics of a particular country can be calculated in different ways; see footnote to Table III. The procedure used here is justifiable in a study of flow of trade, but would not be permissible in a study of utilization of wheat.

[3] That shipments statistics understate the flow of wheat and flour in international trade generally, and therefore the flow to Europe, is suggested by the fact that, except in 1934–35, total "world" shipments as reported have run smaller than "world" net exports. See M. K. Bennett and A. F. Wyman, "Official and Unofficial Statistics of International Trade in Wheat and Flour," WHEAT STUDIES, March 1931, VII, 267–93.

CHART 1.—AVERAGE MONTHLY TOTAL SHIPMENTS OF WHEAT AND FLOUR FROM NORTHERN HEMISPHERE AND SOUTHERN HEMISPHERE, AUGUST 1921 TO JULY 1938*



* Computed from Broomhall's data in *Corn Trade News* and *Corn Trade Year Book*. Southern Hemisphere shipments are those reported from Argentina and Uruguay, and Australia; Northern Hemisphere shipments are those from all other countries.

Southern Hemisphere in world trade during August–December. In January–April, Southern Hemisphere shipments exceed those from the Northern Hemisphere, though on the average by a comparatively small margin. In May–July, shipments from the Northern Hemisphere again dominate, though the dominance is much less pronounced than in August–December. The data plotted, for "world" shipments to all destinations, give a useful but only an approximate indication of the relative importance of shipments to Europe by hemispheres of origin.

Net-import statistics indicate that seasonal inflow of wheat differs from country to country in Europe. The following tabulation gives 17-year averages of net imports of specified countries, for August–July years, in million bushels:

Country	Annnual total	Aug.–Dec.	Jan.–April	May–July
British Isles	226.3	98.82	69.40	49.17
Germany	43.2	17.66	11.33	14.22
France	38.7	17.28	8.91	12.47
Italy	56.5	16.60	21.31	18.61
Greece	18.8	7.46	6.27	5.03
Belgium	41.0	18.35	12.17	10.49
Netherlands	26.3	12.07	7.79	6.56
Switzerland	16.9	8.02	5.07	3.81
Others[a]	54.7	25.11	15.17	14.44

[a] Austria, Czecho-Slovakia, Denmark, Norway, Sweden, Finland.

The next tabulation gives net imports for the same areas in terms of percentages of annual total imported respectively in the autumn, winter, and spring periods, and of average percentages imported monthly in each of these periods:

Country	Percentage in period			Percentage per month in		
	Aug.–Dec.	Jan.–April	May–July	Aug.–Dec.	Jan.–April	May–July
British Isles	43.62	30.67	25.71	8.72	7.67	8.54
Germany	40.86	26.23	32.91	8.17	6.56	10.97
France	44.69	23.06	32.25	8.94	5.77	10.75
Italy	29.36	37.71	32.93	5.87	9.43	10.98
Greece	39.77	33.42	26.81	7.95	8.36	8.94
Belgium	44.74	29.68	25.58	8.95	7.42	8.53
Netherlands	45.84	29.59	24.57	9.17	7.40	8.19
Switzerland	47.45	30.00	22.55	9.59	7.50	7.52
Others	45.89	27.71	26.40	9.18	6.93	8.80

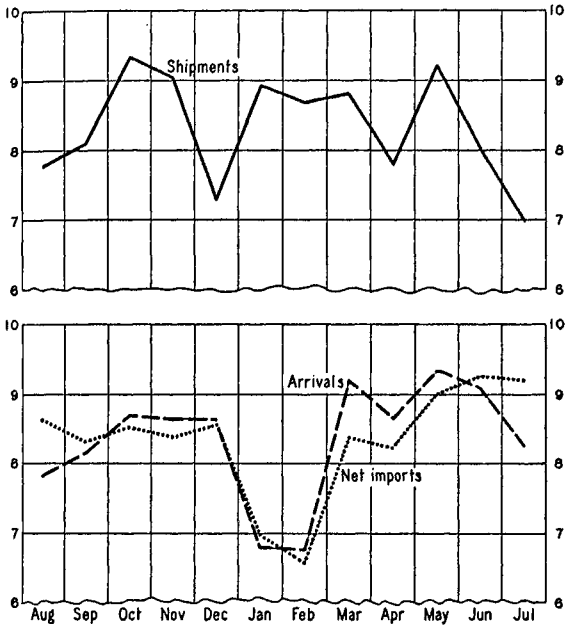
The British Isles import much more wheat than any other country; in the averages, though not in all years, Italy, Germany, Belgium, France, and the Netherlands follow in the order named. The flow of net imports into the British Isles is most rapid in the autumn, slowest in the winter, intermediate in the spring. This is also the general character of the flow into Belgium, Netherlands, Switzerland, and the group "Others." But in Germany and France, the flow is intermediate in the autumn, slowest in the winter, and most rapid in the spring. In Greece and Italy a third type appears: slowest in autumn, intermediate in winter, and most rapid in spring.

On the basis of these characteristic differences in rate of flow of net imports in the different periods of the crop year, we subsequently consider countries by groups: the British Isles; Germany and France; Italy and Greece; and all other countries. For most purposes it serves adequately to combine the data for Germany, France, Italy, and Greece. Difference of seasonal behavior of imports suggests the possibility that relative importance or unimportance of one group or another with regard to total European net imports may help to explain why shipments in a particular year differ from average shipments in their seasonal course. Grouping of the various countries according to their characteristic behavior serves to sharpen contrasts and minimize confusion.

Data by months.—Chart 2 shows monthly shipments averaged for the 17-year period, and also arrivals and net imports. In all curves the average movement of each month is expressed as a percentage of the average annual total.

CHART 2.—AVERAGE MONTHLY SHIPMENTS TO EUROPE, ARRIVALS, AND NET IMPORTS OF WHEAT AND FLOUR, AUGUST 1921 TO JULY 1938*

(Percentage of crop-year totals)



* Basic data in Tables I–III.

Shipments (solid line) show a 2-month peak in autumn, a 3-month peak in winter, and a 1-month peak in spring. There are troughs of one month's duration in December and April, and of three months' duration in June–August, with July the lowest month.

Arrivals (dash line) and net imports (dotted line) resemble each other in seasonal movement. Both curves show a conspicuous trough in January and February, while neither peaks nor troughs are otherwise prominent; and in both series the flow averages appreciably heavier in the closing three months of the year than in the opening three months. The major difference between these two measures of flow lies in the fact that arrivals materially exceed net imports in March–May, but fall far below net imports in July–August. This relationship suggests that arrived wheat may tend to accumulate in European ports in March–May, and to be drawn down by importation in July–August. We are unable, however, to bring specific quanitative evidence to bear upon this inference; and it is possible that incomparability of the two series accounts for the divergence in behavior of the two curves. On the whole, their correspondence is fairly close.

No statistical data have ever been presented that show the average seasonal course of *use* of imported wheat in European mills. It would naturally be assumed that the seasonal peak of use might come just before or shortly after domestic wheat crops are harvested—approximately in June–September, varying from south to north; and that a decline would occur to a trough say in September–November, from which increase would take place until the peak was reached again. The conformation of the curve of net imports, wherein the year's highest levels are reached in May–July, accords with this hypothesis.

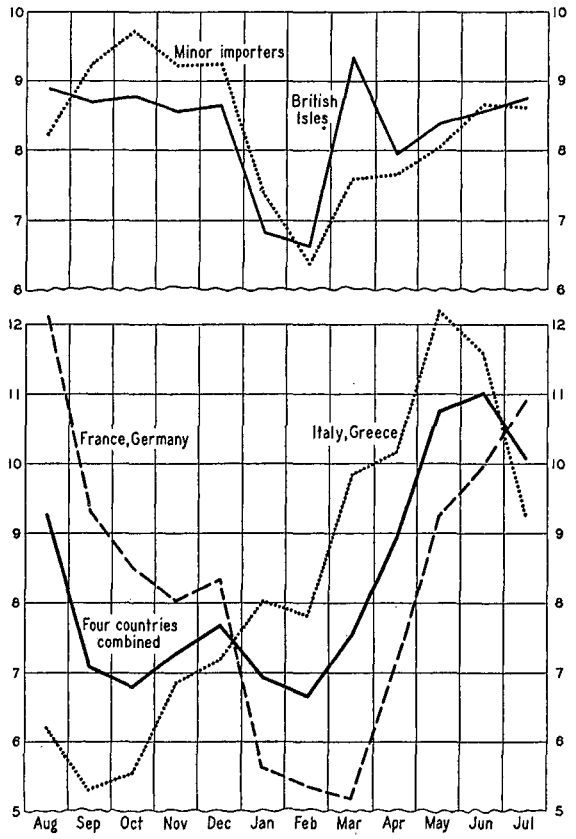
The relative levels of net imports as between October–December, January–February, and March–April suggest that the period October–December must be one in which millers and merchants tend to accumulate stocks of imported wheat, whereas in January–February these stocks are drawn down. This hypothesis also is not susceptible of direct confirmation. In any event, it cannot be supposed to characterize the behavior of millers and merchants in all countries of Europe.

Chart 3 (p. 302) shows net imports into groups of countries of differing average seasonal flow. In the British Isles, where the flow is smoothest, there is evidently a tendency for wheat stocks to accumulate slowly during the summer and autumn, and to be drawn down in January–February; there may again be accumulation in March and some reduction in April. On the unverified assumption that in France and Germany use of imported wheat is at the year's peak in August or September and at the year's low in September or October, it would be reasonable to suppose that wheat stocks are accumulated in October–December and drawn down in January–March, and that the relatively heavy imports of April–August or April–September go into use at once. In

Italy and Greece, however, the import curve gives little suggestion of stock-building and reduction, and the import curve, with a deep trough in August–October and high peak in May–June, suggests that imported wheat may pass into use about as soon as it is imported. With regard to other countries, the "minor

CHART 3.—AVERAGE MONTHLY NET IMPORTS OF WHEAT AND FLOUR OF GROUPS OF EUROPEAN COUNTRIES, AUGUST 1921 TO JULY 1938*

(Percentage of crop-year totals)



* Basic data in Tables IV–VI.

importers" as a group, it seems probable that use of imported wheat may be at its peak in August or September and at its lowest level in September or October, and that stock-building of imported wheat may occur during September – December, stock - reduction throughout January–April; while imported wheat may go directly into use during May–August.

The broad inference that European millers and merchants build up stocks of import wheat at least in October–December and reduce them at least in January–February seems reasonable except as regards Italy and Greece, though in other countries either stock-building or stock-reduction may occur in months other than those specified above.[1]

The conformation of the average course of monthly shipments to Europe (upper tier, Chart 2) with its troughs in December, April, and June–August, is presumably determined mainly by circumstances in the exporting countries. These circumstances include the geographical distribution of export surpluses and the physical conditions for shipments out of exporting countries.

Thus the high level of shipments in October–November represents outflow of new crops mainly from North America, partly from eastern Europe. Some of this wheat is stored in Europe after arrival—a procedure forced upon importers because they must wait until March for Southern Hemisphere shipments to arrive and presumably find it profitable to store considerable wheat in October–December and use it in January–February rather than pay heavier costs of shipment on wheat brought from North America in the latter months. The December trough of shipments represents curtailment of flow from North America and eastern Europe as navigation closes on the St. Lawrence and the Danube in December, with rising cost of shipment if use is made of alternative routes involving longer ocean transport or long rail hauls.

With January, the shipments of new-crop wheat from the Southern Hemisphere become prominent (Chart 1, p. 300), and continue so for two months or more. This movement tapers off in April, and meanwhile North American and eastern European wheat is held back by conditions of shipment. In May, when

[1] The foregoing analysis of probable seasonality in use of imported wheat has been phrased as if import wheat were used solely to manufacture flour. In fact, a small amount of imported wheat goes for feed every year, and feed use of imported wheat is much heavier in some years than in others. There is no good evidence concerning the average seasonality in use of imported wheat for feed. The fraction of imported wheat so used has presumably averaged so small in postwar years, however, that inferences about stock-building and stock-reduction of imported wheat as stated above would not be altered significantly even if all the facts were known about differences in the seasonal curves of use for milling and use for feed.

Southern Hemisphere supplies are normally beginning to run low in relation to import requirements, navigation opens and the flow from the Northern Hemisphere, quickly available to Europe, again attains substantial volume.

The importance of geographical distribution of export surpluses in determining the course of wheat shipments to Europe is easily perceived if one compares the average movement of 1921–38 with that of the 1890's,[1] before the Southern Hemisphere became important in the world wheat trade. In that decade, shipments reached well-defined peaks in October–November and May, while a trough prevailed from January through March.

Only the characteristic June–August trough of shipments seems difficult to explain by reference to circumstances in exporting countries. Perhaps this trough represents the fact that exportable stocks by July have been reduced to the year's minimum. But it seems improbable that aggregate average exportable supplies in July have run so low in postwar years that July shipments could not have been larger if importers had chosen to purchase and to order them shipped. The more credible explanation of the June–August trough seems to be that importers, having already anticipated their heavy summer requirements, order relatively little more wheat put afloat until new-crop supplies are available from the Northern Hemisphere.

Aspects of Variability

No single year of the past seventeen has shown a seasonal movement of shipments duplicating that of the 17-year average. This is clear from Chart 4 (p. 304), which shows monthly shipments in each year of the period, expressed as percentages of annual totals, and an average calculated from these percentages.

[1] See chart in H. C. Farnsworth, "Decline and Recovery of Wheat Prices in the 'Nineties," Wheat Studies, June–July 1934, X, 315.

[2] Another measure of variability (Table VIII, column 11) makes use of data applying not to single months but to groups of months (August–December, January–April, and May–July). Differences in ranking appear under the two methods of appraising variability, as would be expected. But six of the seven most variable years are identical under both measures, and five of the seven least variable.

In the curve of average seasonality, the large and conspicuous month-to-month changes occur between September and October (a rise), November and December (a decline), December and January (a rise), March and April (a decline), April and May (a rise), May and June (a decline), and June and July (a decline). But only one of these changes, the December–January rise, is faithfully reflected as to direction—to say nothing of amount—in all seventeen years of the period. An exception to the November–December decline occurs only once (1926–27). The September–October rise fails to appear twice (1921–22 and 1933–34).

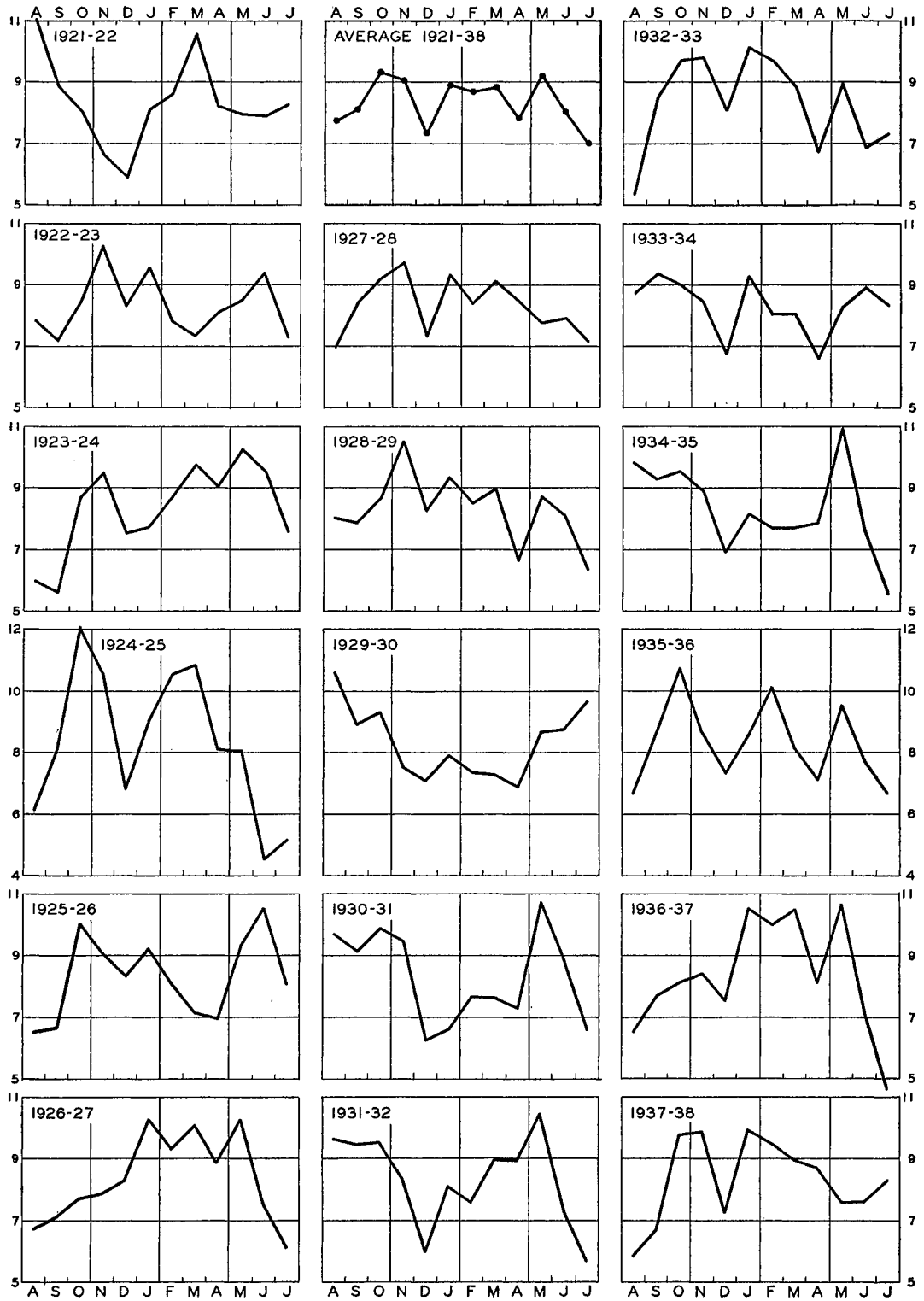
On the whole, however, the large month-to-month changes in average shipments in the autumn and winter periods are fairly well reflected in individual years. In the spring, however, the April–May rise fails to occur in four years (1921–22, 1924–25, 1927–28, 1937–38); the May–June decline is missing in six years (1922–23, 1925–26, 1927–28, 1929–30, 1933–34, 1937–38); and no decline in June–July occurs in five years (1921–22, 1924–25, 1929–30, 1932–33, 1937–38). Prominent departures from average seasonality thus occur more commonly in the spring than in the autumn and winter.

Deviations from the average seasonal course are measurable in several ways. One method is to measure the deviation of each month of a particular year from the 17-year average for that month, sum up the resulting twelve deviations of a year regardless of sign, and compare the sums applying to the several years (Table VIII, column 10). Results are shown below, expressed as percentages of the sum of the deviations in 1927–28, the least variable year.

1924–25.....316	1925–26.....215
1921–22.....276	1937–38.....200
1929–30.....260	1934–35.....191
1936–37.....245	1933–34.....180
1930–31.....236	1922–23.....180
1926–27.....231	1932–33.....180
1923–24.....224	1935–36.....143
1931–32.....218	1928–29.....124

The most variable years, according to this measure of variability,[2] are 1924–25, 1921–22, and 1929–30. The least variable are 1927–28,

CHART 4.—SHIPMENTS TO EUROPE MONTHLY AS PERCENTAGES OF CROP-YEAR TOTALS, FROM 1921–22*



* Basic data in Table I.

1928–29, and 1935–36. Comparisons with Chart 4 will indicate that large variability is of different types. The year 1924–25, for example, was until April a year of exaggerated seasonal movement with peaks and troughs timed in accordance with the average; but the May peak was missing and June–July shipments were extraordinarily low. In 1929–30, autumn and winter peaks were missing and shipments both in August–September and June–July were exceptionally high. In 1936–37, another highly variable year, the course after December was much like the average course, though decline from the May peak was extreme; but the autumn movement failed to show the usual well-defined peak.

In general, large variability in deviation of seasonal movement from average seasonality occurs in years when fluctuations of international wheat prices are wide.[1] Thus, of the five years of greatest variability of shipments in the tabulation above, the extreme range of prices on the British market (lowest month to highest month, Table IX) was wider than in any other years, averaging 15.9*s*. per quarter. On the other hand, the average annual range in the five years of least variability was only 6.6*s*., and in the seven years of intermediate variability, 8.0*s*. But in three of these seven intermediate years (1926–27, 1934–35, and 1933–34), the range of monthly prices was notably small—less than in any of the five years of lowest variability. Wide variability in the seasonal course of shipments thus seems to be associated with wide variability of international prices; but small variability of shipments may or may not accompany small variability of prices, at least if the price ranges are based on monthly averages and expressed in absolute amounts rather than as percentages.

The causes of large or small variability in shipments, however, are not of major importance in the present study, at least if variability is expressed in terms of deviations of monthly data from average. Within each of the three shipping periods, one would expect peaks in different years to shift from one month to another, or to be more or less pronounced; precisely what will occur must depend upon a long list of influences, many of them relatively unimportant, that affect either import pull or export push or both. This sort of short-term shifting and emphasis is not on the whole what constitutes an unusual year. An unusual year in the more significant sense is one in which there is unusually large departure from average seasonality with respect to the flow as between autumn, winter, and spring periods. It is of considerably more importance to ascertain why August–December shipments are sometimes exceptionally low and sometimes exceptionally high in relation to January–July shipments, than to ask why October shipments stand exceptionally high or low in relation to November shipments. It is likewise more important to ascertain why January–April shipments sometimes run low and sometimes high in relation to May–July shipments, than to inquire why May shipments are sometimes low and sometimes high in relation to those of June, or January shipments to those of March.

Table VIII shows percentages of crop-year total shipments to Europe recorded respectively in the three groups of months. August–December shipments constitute on the average 41.55 per cent of crop-year shipments; but they have run as low as 37.40 per cent (1923–24) and as high as 44.55 per cent (1930–31). Taking total shipments to Europe at the 17-year average of 536 million bushels, this would mean that August–December shipments might run as high as 239 million bushels in one year but as low as 200 million in another; and that subsequent January–July shipments might run as low as 297 million bushels in one year and as high as 336 million in another, while average expectations would be 313 million. To students surveying the world wheat situation in January, knowing what volume of trade has passed in August–December, it is of some concern (especially in years of delicate balance between export surpluses and import requirements) whether European trade in January–July

[1] This statement holds under both methods of measuring variability, but better when monthly data are used. It also appears that these same years are ones in which price variability was due in large part to other influences than those within the wheat situation itself.

will run some 20 million bushels larger or 20 million smaller than expectations based on average seasonality would suggest. To students surveying the world wheat situation in May, knowing what trade has passed in August–April, it is of some concern to know what the volume of trade is likely to be in May–July.

Problems of Influence

As indicated in the preceding section, shipments to Europe show substantially different seasonality in different years. The aspects of seasonality to which special interest attaches are year-to-year variations in the percentage of crop-year shipments occurring in the autumn (August–December), and year-to-year variations in the relationship of spring (May–July) shipments to winter (January–April) shipments. The problems are to ascertain the causes of these two types of variation in seasonality.

Current theories.—So far as we are aware, these problems have not hitherto received systematic attention in any published study. But two opposing views seem to be current in trade circles.

The first is that the seasonal pattern of shipments is rather inflexible—that in any year the average pattern prevails, though at lower or higher absolute level of annual shipments. This view finds expression chiefly in more or less casual trade comments upon weekly rate of movement. It is assumed that import requirements are known early in the crop year; that therefore an average weekly rate is known; and that departures of weekly shipments from this average can be only ephemeral and must be counterbalanced later by departures in the opposite direction. This view ignores or minimizes the known fact that early-season forecasts of annual import requirements frequently have to be revised substantially, often in recognition of the existence of flexibility in seasonal movement of shipments; and it does not deal with the factors that may cause the seasonal pattern of shipments to change from one year to another.

The second view seems to be that seasonality in shipments is flexible for reasons of intraseasonal fluctuations in import demand. Commonly it is said that importers, when faced with abundance of exportable surpluses, tend to postpone their takings[1] in considerable degree until the later part of the crop year. The circumstances thought to be most conducive to this postponement are, in general, a low level of import requirements, a large excess of export surpluses over import requirements, and reasonably good prospects for new-crop wheat in the Southern Hemisphere. The argument seems to be that under such circumstances importers have incentives to carry only small stocks themselves in the autumn, to allow exporters to pay carrying charges, and to wait for pressure from the Southern Hemisphere to depress c.i.f. prices in Europe. When, on the other hand, importers are faced with shortage of exportable surpluses in relation to import requirements, the view seems to be that they tend to accumulate stocks in the autumn, thus causing autumn shipments to constitute a relatively large fraction of the crop-year total; but this aspect of the idea is more often implied than expressed. The general theory is one in which change in seasonal pattern for shipments from one year to another is recognized, and is attributed mainly to the behavior of importers, with some importance perhaps attached to the behavior of Southern Hemisphere exporters.

This theory pertains mainly to change in the relationship of autumn shipments to combined winter and spring shipments. It seems not to touch upon the question of change in the relationship between winter shipments and spring shipments. So far as we are aware, no rather widely accepted theory exists with regard to this relationship; it seldom receives attention, perhaps because interest in seasonal behavior is naturally at the maximum early in a crop year. Toward the end of a crop year, the attention of traders turns from volume of trade in the current year to prospective volume of trade in the coming year, and this will depend so heavily on outturn of new European crops that seasonal behavior of

[1] It is difficult to say whether this view refers to purchases, shipments, arrivals, or net imports; our impression is that purchases and shipments are both involved.

shipments in the current year tends to be ignored.

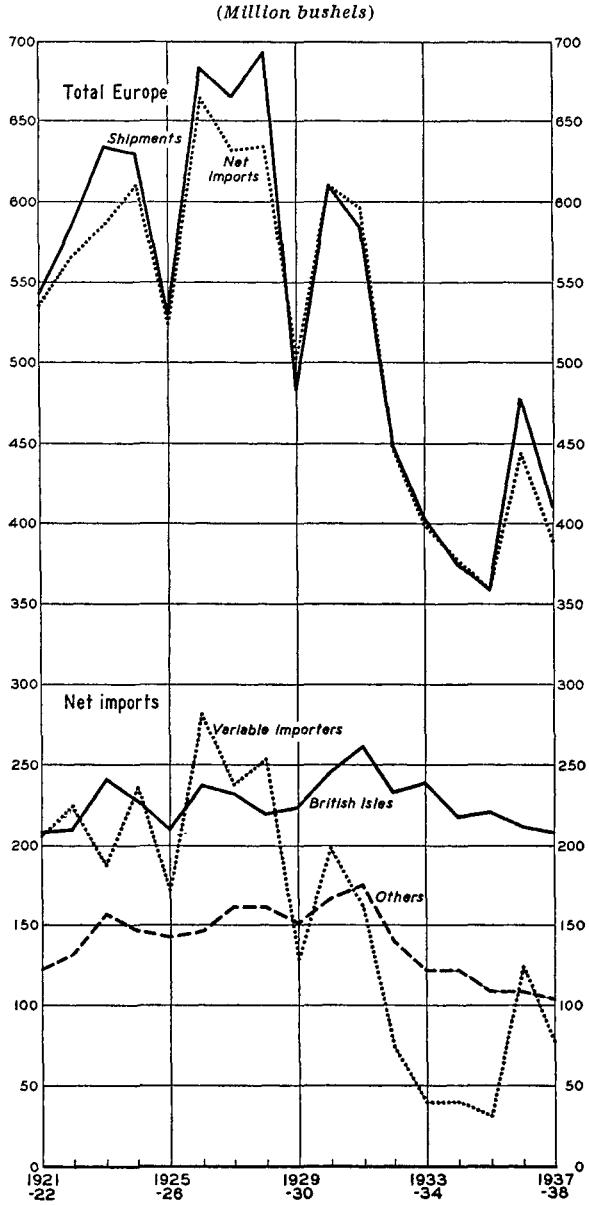
As the preceding section indicated, seasonality of shipments is in fact flexible; hence the first of the two theories summarized above merits no further comment. As will appear subsequently, the second theory is not tenable either as to fact or as to interpretation of causes.

Potential influences.—Within the span of seventeen postwar years here under review, great changes have occurred both in the general features of European trade in wheat and flour and in various factors that might be supposed to have a bearing upon change in the seasonal pattern of shipments to Europe from one year to another. Differences among annual patterns of shipments were shown in Chart 4 (p. 304). Here it is pertinent to present some other data descriptive of trade or of factors that may be supposed, at least on casual analysis, to have a bearing upon seasonal patterns of trade. Of the potential influences listed here, only a few will eventually appear to be important.

Chart 5 shows annual fluctuations in total shipments to Europe since 1921–22. The volume of shipments has sometimes run high, nearly 700 million bushels; and sometimes as low as 360 million bushels. From one year to another, changes in volume sometimes represent large increase, sometimes large decline, sometimes either increase or decline of moderate or small amount. Change in annual volume reflects mainly change in import requirements—roughly, the amount of imported wheat needed to supplement domestic crops so as to bring annual supplies of wheat in Europe to about the level of customary utilization, which is moderately inflexible from year to year. Change in import requirements reflects mainly change in European crop. But, as the lower part of the chart indicates, import requirements and the volume of trade vary broadly in accordance with change in the imports of a particular group of countries—Italy, France, Germany, and Greece.

The question naturally arises whether the seasonal pattern of exports is likely to be the same when total shipments are large and the highly variable importers are heavy takers, as when total shipments are small and the variable importers are practically out of the market. We have seen (Chart 3, p. 302) that the average seasonal behavior of imports by the variable importers is quite different from the average seasonal behavior of other im-

CHART 5.—SHIPMENTS TO EUROPE, NET IMPORTS OF EUROPE, AND NET IMPORTS OF GROUPS OF EUROPEAN COUNTRIES, BY CROP YEARS FROM 1921–22*



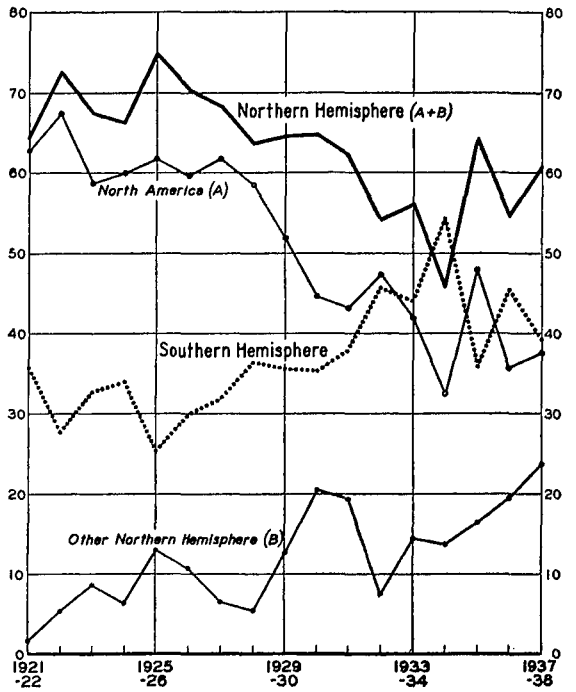
* Data in Tables I–VI.

porters. Hence it would seem possible that years of small total shipments might show a heavier concentration of shipments early in the crop year than would occur in years of large total shipments. On the other hand, it might seem reasonable to argue that there may be greater momentum of shipments in years of large volume than in years of small volume—perhaps a heavy flow is slower to start and slower to end than a light flow. If so, this tendency might tend to offset or reverse the effects of shifting importance of the variable importers in annual trade.

Other questions pertain to change in volume of shipments between successive years. Perhaps a year of heavy trade occurring between two years of lighter trade (like 1936–37) could be expected to show a seasonal pattern with relatively heavy winter movement; on the other hand, the winter movement might be relatively low in years of light trade occurring between two years of heavier trade (like 1929–30). Or years (like 1932–33) following a year of heavy trade and preceding one of light trade might perhaps be expected to show exceptionally light movement in the spring, while years (like 1922–23) following a year of light trade and preceding one of heavy trade might be expected to show exceptionally heavy movement in the spring. In short, it might seem possible that at the beginning of a given crop year there are some hold-over effects from the preceding year, and towards the close of it there may be anticipation of the general situation in the following year.

Conceivably also the seasonal pattern of shipments to Europe is determined partly by shifting sources of exports. Chart 6, based on total world shipments because shipments to Europe are not conveniently divisible according to source, illustrates the variability of sources of European imports from year to year. Sometimes the Northern Hemisphere is a great deal more important than the Southern Hemisphere; sometimes less important or not much more important. For purposes of reference, the so-called Northern Hemisphere shipments are divided into those from North America and those from other countries; but this division presumably has little bearing on the seasonal pattern of total shipments because the seasonal patterns of shipments from these two parts of the Northern Hemisphere are rather similar in conformation.[1] The main peak of Northern Hemisphere shipments comes on the average in the autumn while that of Southern Hemisphere shipments comes in the winter (Chart 1, p. 300). Hence it might be supposed that the seasonal pattern of shipments to Europe would tend to show unusual autumn concentrations when Northern Hemisphere shipments were an exceptionally large fraction of the total, and unusual winter concentrations when Southern Hemisphere shipments were an exceptionally large fraction of the total.

CHART 6.—PERCENTAGE OF TOTAL WORLD SHIPMENTS ORIGINATING IN DIFFERENT EXPORT REGIONS, BY CROP YEARS FROM 1921–22*



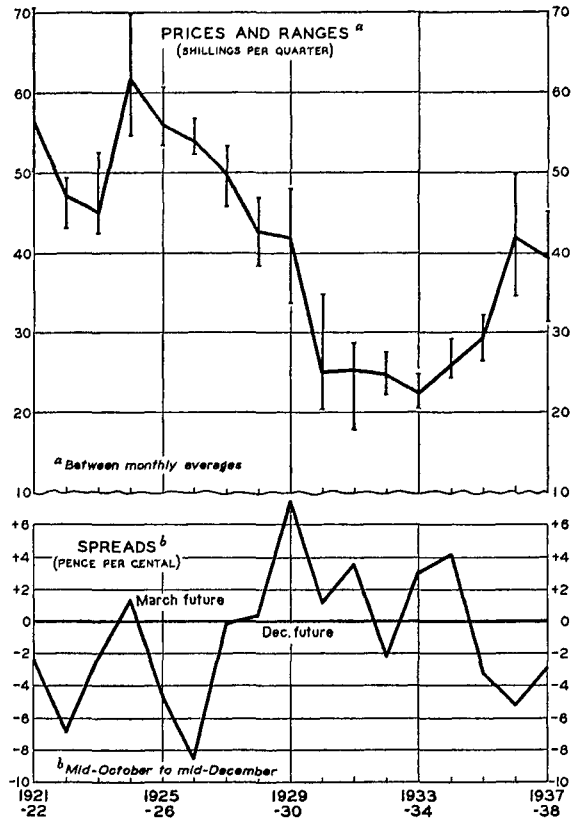
* Basic data in Table X.

Various aspects of price changes and price relationships may also be thought of as possible influences on the seasonal pattern of shipments to Europe. Chart 7 shows, in the

[1] Both show autumn peaks; but only North American shipments show a conspicuous secondary peak in the spring.

upper tier, average annual crop-year prices of imported wheat in Great Britain, with extreme ranges of monthly average prices within each year. Changes in the annual averages have been large. It seems conceivable that

CHART 7.—AVERAGE ANNUAL PRICES AND PRICE RANGES OF IMPORT WHEAT (PARCELS) IN BRITISH MARKETS AND SIGNIFICANT FUTURES PRICE SPREADS, FROM 1921–22*



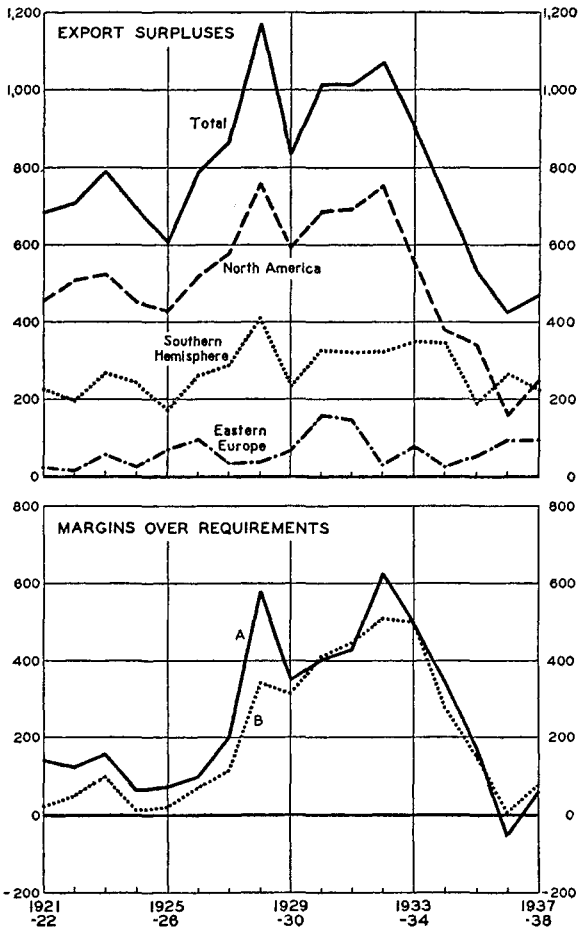
* Data in Table IX.

change in price level, if anticipated by importers, might induce them to accumulate stocks or allow stocks to run low in anticipation of such change. As was earlier indicated, the fact can be established (p. 305) that years characterized by wide range of price tend to be years when month-to-month variability of shipments is large. In the lower part of the chart is shown the average spread, in eight weeks between mid-October and mid-December, between the December and the March futures at Liverpool. It might be supposed that, in years when the March future ruled at a substantial premium over the December, importers would have incentives to accumulate stocks in the autumn, swelling the autumn movement of shipments at least in relation to the winter movement. In years when the March future ruled at a substantial discount under the December, importers on the other hand might conceivably have incentives to keep autumnal imports low.

Perhaps seasonal patterns of shipments are affected by changing levels of world exportable surpluses, or by changing distributions of the total between exporting countries, or by changing size of the margin between world exportable surpluses and European import requirements. Data on these concepts are summarized in Chart 8. The margin between sur-

CHART 8.—EXPORT SURPLUSES IN SPECIFIED AREAS, AND MARGINS BETWEEN EXPORT SURPLUSES AND IMPORT REQUIREMENTS, FROM 1921–22*

(*Million bushels*)



* Data in Tables IX and X.

plus and requirements is undoubtedly a fundamentally important feature of the world wheat situation; a notable degree of inverse correlation exists between level of international wheat price and level of margin, as is apparent from comparison of Charts 7 and 8. Change in size of the margin is regarded in the theory stated above (p. 306) as important in determining the seasonal pattern of European trade; a wide margin is interpreted as associated with concentration of shipments in the latter part of the crop year, and a narrow margin as associated with concentration of shipments early in the crop year. Emphasis falls on the imputed behavior of importers; and because of this, the distribution of surplus among exporters seems to be thought of as not very significant, except that some importance is ascribed to the fraction of total surplus located in the Southern Hemisphere, probably on the widely accepted view that of all exporting countries Argentina and Australia are the "weakest holders."

But quite an opposite appraisal is possible concerning the importance of size of margin between surplus and requirements. If it be supposed that large margins generally involve export pressure, and that importers may adjust to export pressure by building up stocks, then the inference may be drawn that wide margins are associated with concentration of shipments in the early part of the crop year, while narrow margins may be associated with concentrations of shipments later in the crop year. On this interpretation, which is the one accepted in this study, the geographical distribution of surplus between the "weak holders" and the "strong holders" appears to be significant.

Further statistical data need not be introduced at this point, but a non-statistical influence conceivably important in affecting seasonal patterns of trade deserves mention. Approximately the latter half of the postwar period has witnessed introduction and spread of harvesting by combine and delivery by motor truck in the overseas exporting countries, as well as wider use of earlier-maturing wheat varieties. Evidence on farm markets, receipts at primary markets, and visible supplies consistently indicate that post-harvest marketings have tended to come earlier than was true a decade or more ago.[1] Perhaps this change would not affect the relationships between quantities shipped respectively in autumn, winter, and spring; but it might be expected to hasten the peak of shipments within both the autumn and the winter periods, when the peaks usually represent movement of new crops first from the United States and Canada, second from Australia and Argentina.

Other factors also might be supposed to exert more or less influence on seasonal patterns of shipments. Anticipation of a tariff increase, for example, would perhaps cause an unusual spurt of shipments followed by an unusual slump. A bulge in ocean freight rates such as occurred in the autumn of 1926, especially if followed by decline that was foreseen, might cause importers to defer shipments in one part of a year, and enlarge them in another. Disturbances in foreign exchange rates, trade under barter agreements, the operation of quota systems, sales between governments, timing of harvests, war scares, variations in crop quality—all these factors, and others as well, may be thought of as possible influences upon the seasonal course of shipments whether considerable or not.

Thus the problem seems to be a complex one, and analysis of it seems to call for continuing reference to many factors that can be supposed, not irrationally, to affect the seasonal course of shipments. Only a few of these factors, however, prove to be of major significance in the following analysis, which deals specifically first with autumn shipments and the reasons why they are sometimes large and sometimes small in relation to crop-year totals; and second with spring shipments and the reasons why they are sometimes large and sometimes small in relation to winter shipments.

The Autumn Movement

As we have seen, the August–December period (when the Northern Hemisphere shipments preponderate) has in different years

[1] See, for example, Holbrook Working, "The Timing of Wheat Marketing in Western Canada," Wheat Studies, October 1936, XIII, 44–45.

represented as much as 44.55 per cent of crop-year shipments to Europe, and as little as 37.40 per cent.

General relationships.—In a fairly prolonged investigation of the probable influences on the rate of autumn shipment, with due reference to those listed in the preceding section, we have found only two numerically quantitative relationships which seem at once significant in the statistical sense and in accord with general economic reasoning and factual developments in the world wheat situation. Those two relationships are (*a*) between August–December shipments to Europe (as percentages of crop-year total) and the spread between the December and March futures at Liverpool in a period covering eight weeks from mid-October to mid-November; and (*b*) between August–December shipments (as percentages of crop-year total) and the margin between export surpluses available to Europe and European import requirements.

When the March future stands at a premium over the December in eight weeks centering in November, the percentage of European shipments occurring in August–December tends to be large; when the March future stands at a discount under the December, the percentage of shipments occurring in August–December tends to be small. Averages for years grouped on this basis compare as follows:

Number of years	Spread (*pence*)	Shipments (%) in Aug.–Dec.
10	−3.8	40.14
7	+3.0	43.56

When the margin between surpluses and requirements is small, the percentages shipped in August–December tend to be small; while with large margins, the percentages tend to be large. Averages for years grouped on this basis compare as follows:

Number of years	Margin (*million bushels*)	Shipments (%) in Aug.–Dec.
10	64	40.37
7	400	43.24

The two groups of ten years in the above tabulations include nine identical years. But the crop year 1924–25 was one in which the margin was very small, whereas the spread was positive rather than negative. The crop year 1932–33, on the other hand, was one in which the margin was very large but the spread was negative. Aside from these exceptions, years of positive spread were years of large margins, and years of negative spread were years of small margins. On general grounds it might be supposed that price relationships at Liverpool in November ought to reflect prospects for deliverable grades of wheat to be cheaper in the future than in the present if the world statistical position is "easy," as judged by margin between export surpluses and import requirements; and to reflect prospects for dearer wheat in the future than in the present if the world statistical position is "tight." The relation actually observed, however, is the reverse of this. An analysis of the behavior of the December–March spread at Liverpool shows that it depends primarily on the level of British wheat stocks.[1] The price of the March future tends to fall below that of the December when stocks are at a low level in the early winter, and above that of the December future when British stocks are large. The relation between autumn shipments and the December–March spread presumably springs largely from an effect of rate of shipment on stocks and of stocks, in turn, on this spread.

Variation in the margin between surpluses and requirements is to be regarded as fundamentally more important than variation in price spreads at Liverpool; the margin can obviously govern the spread, but the spread cannot govern the margin. Subsequent analysis is therefore devoted to the relationship between size of margin and percentage of crop-year shipments occurring in August–December.

The margin between export surplus and import requirements can be calculated in many different ways. Chart 8 (p. 309) and Table IX, for example, show the results obtained by two methods. We have tested the data resulting from these and several other methods, with the net result that the relationship between size of margin and percentage of the

[1] This conclusion emerges from a study by Sidney Hoos, in preparation for publication in WHEAT STUDIES.

year's shipments to Europe occurring in August–December remains the same in broad outline but differs in details.

In the present inquiry, the margin ("B" in Chart 8 and Table IX) is defined as outward carryover in excess of an estimated "normal" in the United States, Canada, Argentina, Australia, the four Danube countries, the British Isles, Belgium, and the Netherlands. By and large, these countries absorb most of the annual variations in the supplies of wheat available for international trade. What they carry over at the end of a crop year represents a margin of export surplus over import requirements.

The procedure[1] followed here has at least the advantage that errors of estimate cannot be large in retrospective calculations, because year-end stocks in the more important positions can be verified. Margins involving the use of crop statistics are subject to errors in crop estimates, which are recognized as substantial in some countries in some years.

Detailed relationships.—Chart 9 is a scatter diagram showing the position of each of the past seventeen crop years with reference to size of the margin between export surpluses and import requirements, and to percentage of crop-year shipments made in August–December. On the basis of the curve of "best fit" (least-squares method), the inference would be drawn that, within a range of margins running from 0 to 500 million bushels, August–December shipments to Europe would be expected to range from about 40.2 to about 43.5 per cent of annual shipments, increasing a little more than 0.65 per cent with every increase of 100 million bushels in the margin.

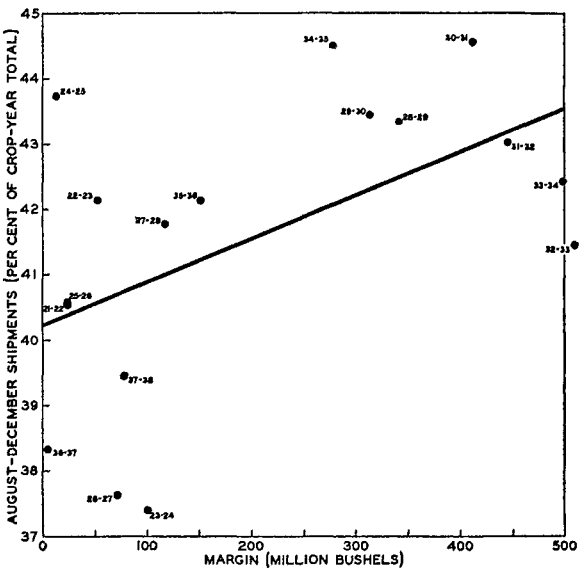
[1] Every method seems to be subject to one criticism or another, either as to what items ought to be included as "export surplus" on the one hand, "import requirements" on the other; or as to the accuracy with which one item or another can be measured. The method here used is admittedly open to criticism: perhaps, for example, one ought to count as part of the margin year-end stocks in Germany, and stocks of Canadian wheat in United States ports and of United States wheat in Canadian ports; and there is room to dispute the procedure, here used, of calculating "carryovers in excess of normal" from norms that remain constant from year to year.

[2] The coefficient of correlation is +.523. There is only about one chance in 100 that so high a positive coefficient could emerge from a chance distribution.

The relationship between margin and autumn shipments, however, is not a close one. Fully half of the years fall far from the line of regression—among them 1924–25, a year of very small margin in which August–December shipments were nevertheless high at 43.72 per cent of the year's shipments; and 1932–33, a year of very large margin when August–December shipments could be expected, on the basis of this correlation,[2] to approximate 43.6 per cent of the year's total but in fact were only 41.46 per cent. Another year of large margin when August–December shipments would be expected to run high but in fact ran rather low, was 1933–34. Years of moderately large margins when August–December shipments ran higher than would be expected were 1934–35 and 1930–31. Four years—1923–24, 1926–27, 1936–37, and 1937–38—were characterized by small margins, but August–December shipments were even smaller than the small margins would lead one to expect.

The correlation is so low and the scatter of observations so wide at certain segments

CHART 9.—RELATIONSHIP BETWEEN AUGUST–DECEMBER SHIPMENTS TO EUROPE AS PERCENTAGES OF CROP-YEAR SHIPMENTS, AND SIZE OF MARGIN OF EXPORT SURPLUSES OVER IMPORT REQUIREMENTS, WITH AVERAGE RELATIONSHIP, FROM 1921–22*



* Basic data in Tables VIII (column 4) and IX (column 5).

of the line of best fit that queries naturally arise concerning the precise nature of the relationship between margin and autumn shipments. Is it probable, for example, that the true relationship changes as size of margin changes, and is not linear throughout the range? The known facts about particular years, as well as the general features of the diagram, suggest this possibility.

The problem involved in ascertaining the fundamental relationship necessitates dealing with questions of "unusual" developments either on the side of supply or on the side of demand. It is obvious, for example, that in years of equal margins, a "normal" eagerness to sell may be coupled with a "normal" eagerness to buy; or a normal eagerness to sell with an abnormal eagerness to buy; or an abnormal eagerness to sell with a normal eagerness to buy. A given degree of export pressure may encounter either an abnormally active, normally active, or abnormally inactive import demand; and a given condition of import demand may encounter either heavy, normal, or light export pressure. It is not easily feasible to ascertain the presence of abnormalities either in import demand or in export pressure, because norms themselves seem not to be measurable with precision. But in many or most instances a crop year can be characterized at least qualitatively with regard to its prominent abnormalities, and inferences can be drawn about the probable effect of abnormalities upon the percentage of crop-year shipments made in August–November.

In the following paragraphs the attempt is made to detect the presence of abnormalities in export pressure and import demand in the years which in Chart 9 lie farthest from the line of regression between size of margin of export surpluses over import requirements and percentage of crop-year shipments to Europe occurring in August–December.[1] If abnormalities can be detected, it will be possible to ascertain on the basis of general reasoning the *direction* in which the position of a particular year would move with reference to percentage of shipments occurring in August–December, if the abnormalities had not been present; but the *amount* by which the position would be altered cannot be determined at all precisely.

At the outset we assume that only a few years were free from significant abnormalities of export pressure or import demand, given the actual margins between surpluses and requirements. Those years we take as 1921–22, 1925–26, 1927–28, 1935–36, 1928–29, and 1931–32, perhaps also 1929–30. The basis for this assumption is not merely the fact that these years lie closest to the line of regression in Chart 9, but also that a review of their characteristics, too detailed to present here, fails to disclose evidence of striking abnormalities in the behavior of either imports or exports as between autumn shipments on the one hand, winter and spring shipments on the other. The years 1927–28 and 1935–36 seem particularly free from abnormalities.

Years of small margins.—Among the ten years when margins between surpluses and requirements were small, 1924–25 is conspicuous as one in which August–December shipments were strikingly large. The year 1922–23 falls in the same class, but less prominently. On the other hand, strikingly small August–December shipments occurred in 1923–24, 1926–27, 1936–37, and 1937–38.

The abnormal feature of 1924–25 seems readily explicable. It was an abnormally active import demand in the autumn (extending into the winter), coinciding with normal eagerness of exporters to sell. The bulk of the wheat supplies available for autumn export were held in the United States, and the outward movement of these supplies was heavy. Europeans, fearing shortage, accumulated heavy stocks in the autumn even at rising prices. Stocks in British ports rose from 10 to 17 million bushels between August 1 and December 31 (Table VII). Toward the end of the period severe congestion appeared in continental European ports. No other year of the past seventeen has witnessed so panicky a demand for imports in the autumn—partly because shortage of European domestic crops in 1924 was initially thought to be considerably more serious than the event

[1] This discussion rests largely on current Survey and Outlook or Review issues of WHEAT STUDIES published since 1924–25.

proved. Late in the crop year, prospects for a large new European crop began to take shape, and this prospect contributed somewhat to a sharp decline of spring shipments from the winter level. Much of this decline, however, would presumably have occurred even with normal crop prospects, in reflection of over-accumulation of stocks made chiefly in the autumn but continued in the winter. The major abnormality of 1924–25 thus appears to have been abnormally active import demand in the autumn, continued into the winter; and the effect of it was to make August–December shipments abnormally high in relation to shipments in January–July and in the crop year as a whole, and more particularly in the spring. No such abnormality of demand appeared in 1925–26, a year of correspondingly high levels of wheat prices. Exporters seem to have been eager to sell in both years; but in 1924–25 importers were much more eager to accumulate stocks in the autumn than they were in 1925–26.

The moderately heavy autumn shipments of 1922–23 are more difficult to explain. In that year British importers seem to have been unusually reluctant to accumulate stocks. Stocks in British ports, low in August, were still lower at the end of November and December—lower, indeed, than in any other postwar year except 1926. In Liverpool, the March future in November stood at a larger discount under the December than in any other year except 1926. These circumstances, taken alone, would lead to the inference that August–December shipments ought to have run low in relation to the crop-year total, whereas in fact they ran rather high. A rational explanation seems to call for evidence either of abnormally active demand from continental Europe, or of abnormally severe export pressure directed toward continental Europe, or of both. In fact, it seems demonstrable that continental European demand was unusually active and pressure from Canadian new-crop wheat exceptionally strong. Net imports of the variable importers in September–January 1922–23 (a period corresponding to the August–December period of shipments) constituted 44 per cent of the annual total, as compared with an average of about 35 per cent. Canadian wheat prices fell nearly 30 cents a bushel between the first week of August and mid-October, while prices on British markets and in other exporting countries fell much less.

Abnormally restricted autumn import demand, on the other hand, seems to explain the low percentage of crop-year shipments recorded in the autumn period of 1926–27. This period witnessed a great bulge in ocean freight rates culminating in November 1926. It resulted from the British coal-miners' strike that began in May but made its effects most apparent in September, when there was a rush for tonnage to transport coal from the United States to Great Britain. European wheat importers seem to have anticipated fairly prompt decline in rates, and therefore naturally tended to forego normal accumulation of wheat stocks in the autumn. There was also physical shortage of tonnage. At the end of December, stocks in British ports were lower than on the corresponding date of any other postwar year. Abnormal reluctance of Europeans to accumulate import wheat seems adequately to explain why autumn shipments of wheat to Europe in 1926–27 were lower than would be expected from the general relationship between export-import margin and autumn shipments. There appears to be no evidence of reluctance of Northern Hemisphere exporters to sell. Wheat moved freely from eastern Europe.

The outstanding peculiarity of 1936–37 seems also to have been on the side of import demand—abnormal inactivity in the August–November period. In this year, however, the behavior may not have been generalized throughout Europe, as it was in 1926–27. British imports and port stocks, at least, show no striking abnormalities. But the variable importers took in a very small percentage of their requirements in the autumn, and a correspondingly large percentage in later months. The combined net imports of Italy, Germany, France, and Greece during September–January were only 19.6 per cent of annual imports, in contrast with the 17-year average of around 35 per cent. Autumn shipments to these countries in 1936–37 were undoubtedly far lower in relation to the crop-

year total than in any other postwar year. This behavior, reflected in the data for Italy and Germany rather than France and Greece, involved governmental rather than commercial motives. Had Italian and German imports been spread more evenly throughout the year, August–December shipments to Europe would presumably have been considerably larger than in fact they were. We find little reason to suppose that exporters were abnormally reluctant to sell; and Northern Hemisphere supplies available for August–December shipment seem to have been large enough to have permitted a heavier autumn movement if circumstances in importing countries had warranted.

The year 1936–37 thus stands sharply in contrast with 1924–25. In both years the margins between surpluses and requirements were narrow and prices high and rising. But in 1924–25 importers tended in the autumn to overestimate their requirements and to accumulate stocks heavily; whereas in 1936–37 requirements were underestimated and stocks of import wheat were not accumulated. For reasons of difference in import behavior, autumn shipments ran exceptionally high in 1924–25, exceptionally low in 1936–37. Another prominent difference between the two years is that in 1924–25 autumn shipments came largely from the United States, whereas in 1936–37 the United States was a net importer. Nevertheless the general excess of surpluses over requirements was about the same in both years; and we take it that, as between these two years of relatively high and rising autumn prices, the change in location of exportable supplies was not significant.

In the autumn of 1937–38, shipments to Europe seem to have fallen somewhat below average expectations for reasons partly of export behavior, partly of import behavior. In August–September 1937, when shipments ran very low (see Chart 4, p. 304), the bulk of the available exportable supplies lay in the United States, and this wheat was held above export parity. In this respect export behavior may be said to have been the dominant reason for the low level of August–December shipments. But at the end of the crop year an unusual development occurred—a sharp increase of shipments from May and June to July. This reflected a step in the process of accumulating "security stocks" at least in Germany and Great Britain. Without this unusual development on the side of import demand, the shipments of August–December would more nearly have approximated what would be expected from the general relationship between export-import margin and percentage of crop-year shipments occurring in August–December.

Just as 1924–25 stands out among the years of small margins as the one in which the ratio of autumn to crop-year shipments was most strikingly high in relation to what would be expected, so 1923–24 stands out as the one in which the ratio was farthest below what would be expected. Little of significance appears on the side of import demand. It is true that financial conditions in Germany early in the crop year would have tended to curtail importation; it is true also that, after moving with little fluctuation nearly throughout the crop year, prices in all markets rose very rapidly and far after mid-June 1924—and this might have tended to stimulate European year-end takings, particularly because the rise in price was partly due to anticipation of a very short European crop in 1924. Yet this rise came rather late to affect shipments, and in fact shipments declined normally from June to July (Chart 4, p. 304). And import statistics indicate that it was British, not continental, autumn takings that were notably small in relation to crop-year totals, and British takings in the spring that were notably large. Explanation of the strikingly low ratio of autumn to crop-year shipments to Europe must therefore be sought on the side of British demand specifically, or else on the side of export behavior.

Circumstances in exporting countries help to explain the situation. Shipments were remarkably low not in October–December, but in August–September (Chart 4, p. 304). August 1 stocks in the Southern Hemisphere were small, and in subsequent weeks little wheat was available from Soviet Russia; consequently the supplies available for overseas shipment lay mainly in North America. In the United States, at prevailing low prices

and with only a moderate-sized crop in prospect, holders of wheat were reluctant sellers. In Canada, with a big crop in prospect, the harvest was a little late, and marketings were delayed.[1] Under the circumstances, there appears to have been for a time abnormal lack of export pressure; and meanwhile British importers had little or no incentive to maintain stocks at normal levels since the big new Canadian crop, though delayed, would shortly begin to be shipped. This explanation, however, may not fully explain the peculiarities of 1923–24.

Conclusions suggested by the preceding discussion are as follows:

1. In general, autumn shipments to Europe tend to constitute a small fraction of the year's total when margins between export surpluses and import requirements are moderate or small.

2. In years of margins ranging from 0 to about 150 million bushels, observed instances of substantial departure of autumn shipments from intermediate values of around 40 to 42 per cent seem satisfactorily explicable in terms of unusual behavior of importers, or exporters, or both.

3. In years when margins are notably small, however, departures of individual years from intermediate values in either direction seem explicable mainly in terms of unusual behavior of import demand.

4. In years when margins are only moderately small, departures from intermediate values are more difficult to explain, and seem to depend largely upon unusual behavior of exporters.

5. A "normal" relationship between ratio of autumn shipments to crop-year total and size of margin of surpluses over requirements, at margins of 0 on the one hand and 150 million bushels on the other, seems not to be precisely ascertainable. On the assumption, however, that the years 1921–22, 1925–26, and especially 1927–28 and 1935–36 were "normal" years free from unusual circumstances either of export push or of import pull, the inference can be drawn that the ratio of autumn to crop-year shipments normally lies not far from 40 per cent in years of 0 margin, and close to 42 per cent in years of margin approximating 150 million bushels.

Years of large margins.—In seven of the past seventeen years, margins of export surpluses over import requirements were large, ranging (as here measured) from 275 to 510 million bushels (Chart 8, p. 309). In general, autumn shipments were heavy in relation to crop-year shipments in these years. In the four consecutive years from 1930–31 to 1933–34, when margins were largest, the ratios of August–December shipments to crop-year shipments ranged from 41.46 per cent in 1932–33 to 44.55 in 1930–31. These, indeed, were the extremes recorded in the seven years of large margins. It would be desirable, if possible, to ascertain where within this range an approximately "normal" percentage would lie; for if this were known, the true general relationship between size of margin and size of percentage of shipments occurring in the autumn would become clearer.

The broad general tendency in years of huge world wheat surpluses is seemingly for export pressure to develop during the autumn, with piling up of import wheat stocks, partly unsold or at least shipped on consignment, in the countries of western Europe where autumnal accumulation is normal behavior. Explanation of unusually high or low autumn shipments (in relation to crop-year totals) probably lies seldom on the side of import demand; for in such years importers can rarely have incentive to accumulate owned stocks heavily, while at the same time they must receive shipments on consignment. The explanation of seemingly unusual percentages shipped in August–December presumably ought to run in terms of export pressure—high percentages if pressure is exceptionally severe, low percentages if pressure is less than normal for a year in which substantial pressure would itself be normal.

"Export pressure" is admittedly an elusive concept. Perhaps it can best be described in terms of eagerness to sell versus willingness

[1] See Holbrook Working, "The Timing of Wheat Marketing in Western Canada," WHEAT STUDIES, October 1936, XIII, 44. The date at which half of the marketings from the 1923 crop were completed was November 15, later than in any other postwar year except 1927.

to hold stocks. As between two years when export surpluses available in August–December exceed import requirements of August–December by identical or nearly identical amounts, something depends upon the holders of the surpluses. There is much less probability of export pressure developing in August–November from 20 million bushels of exportable wheat in the United States than from 20 million bushels of exportable wheat in Argentina. Our opinion is that, during August-December and in years of very large world surplus, Argentina is *always eager to sell* her old-crop stocks; Russia is *always eager to sell* whatever she exports; Australia is *usually eager to sell* her old-crop stocks; Canada is *sometimes eager to sell, sometimes willing to hold;* and the United States is *always willing to hold, but sometimes more tightly than at other times.* An important generalization derivable from these "rules" of behavior is that export pressure is more likely to develop in the autumn than in other seasons of the year, because at that time and no other there may be pressure from several sources simultaneously.

Detailed analysis of specific evidence concerning degree of export pressure in the four years 1930–31 to 1933–34 is not feasible in limited space. The following tabulation gives the numerical evidence which we regard as most important:[1]

Year	A	B	C	D
1930–31	161	19.7	32.8	44.55
1931–32	166	15.8	26.3	43.01
1932–33	93	7.6	26.7	41.46
1933–34	119	4.7	23.2	42.41

Column A is the sum of wheat stocks available for export in Argentina and Australia on August 1 of each crop year, plus net exports from Russia in August–December. Column B is August–December net exports of the United States as a percentage of the year's domestic surplus available for export. Column C is August–November net exports from Canada (using these months because much of the December exports are not shipped overseas) as a percentage of the year's domestic surplus available for export. Column D shows August–December shipments to Europe as a percentage of crop-year total.

These data help to explain why autumn shipments to Europe, as percentages of crop-year totals, varied as they did in the four years in question. These percentages were relatively high in 1930–31 and 1931–32 because in those years pressure was stronger from the "eager sellers" than it was in 1932–33 and 1933–34; and also because the United States and (in lesser degree) Canada were less willing to hold. There was probably considerably heavier export pressure in 1930–31 than in 1931–32 because the North American exporters were less willing to hold in 1930–31: prices were higher and more attractive in that year, especially in August–October, and the Federal Farm Board did not begin to operate as an effective holder until most of the autumn shipping season of 1930–31 was past. There was probably heavier export pressure in 1933–34 than in 1932–33, because of larger exportable stocks in the hands of the "eager sellers" (Argentina, Australia, and the USSR), and in spite of greater willingness of North American exporters to hold.

These considerations, however, give little indication of what a "normal" ratio of autumn shipments to crop-year shipments would be, other than to suggest somewhere near the middle of the range of the four recorded ratios as an appropriate location. Our guess is that 1931–32 was the nearest to a normal year, 1932–33 more abnormal than 1930–31, and 1933–34 somewhat abnormal also. It seems on the whole improbable that a considerable number of years of huge world surplus would witness more than a few in which the combined exportable surplus available for August–December shipment from Argentina, Australia, and Russia would fall as low as 90 million bushels (as in 1932–33), or even as low as 119 million (as in 1933–34). Accordingly, and also because there is some reason to suppose that the size of these supplies is the dominant though not the only factor in causing autumn variations in export pressure when world surpluses are large, we assume subsequently that in years of large surplus a normal ratio of autumn shipments

[1] See Table XI.

to the year's shipments lies somewhere between 43 and 43.5 per cent.

The three years characterized by large margins of export surpluses over import requirements but not thus far discussed are 1928–29, 1929–30, and 1934–35. Margins in these years ranged from 275 to 340 million bushels, and ratios of autumn to crop-year shipments were respectively 43.31, 43.42, and 44.49 per cent. The first two of these years may reasonably be regarded as normal ones with reference to these ratios, though for different reasons. Exportable supplies available for August–December shipment from the Southern Hemisphere and the USSR were fairly large—136 million bushels, mostly in Argentina—in 1929–30; and in 1928–29, when these supplies were only 95 million bushels, both the United States and Canada were not particularly willing to hold.

But 1934–35 presents a puzzling case. It was a year when the United States was exporting practically no wheat (and was a net importer after August 1934); when Canada was holding rather firmly under the government-sponsored operations managed by J. I. McFarland, and in August–November exported only 23.4 per cent of her exportable surplus; and when practically no exports came from Russia. These facts point towards abnormal absence of export pressure, and therefore are difficult to reconcile with the high ratio of autumn shipments to the year's total—a ratio of 44.49 per cent, the second highest of any in seventeen years. On the other hand, August 1 stocks in the Southern Hemisphere were 164 million bushels, almost as large as combined Southern Hemisphere stocks and Russian exports in 1931–32; France began to subsidize exports in October; prices on British markets declined persistently in August–December; British port stocks rose, though only moderately, from a level on August 1 higher than in any earlier postwar year; shipments "to orders" from the Southern Hemisphere in August–December were a notably large fraction of total shipments; and the premium of the March future over the December at Liverpool in November was the second largest in postwar years. We therefore incline to interpret the high ratio of autumn shipments to the crop-year total as mainly reflecting abnormally heavy export pressure. But there was not so much direct evidence of it in decline of price or in rise of British port stocks as had appeared in the autumn of 1930, possibly because the total volume of trade was much smaller in 1934, possibly because the pressure in 1930 had come largely from Russia and was generally unexpected.

If export pressure had been less abnormally severe in the autumn of 1934–35, the ratio of autumn shipments to the crop-year total would presumably have fallen nearer to 43 than to 44.5 per cent—close to the percentages recorded in 1928–29 and 1929–30.

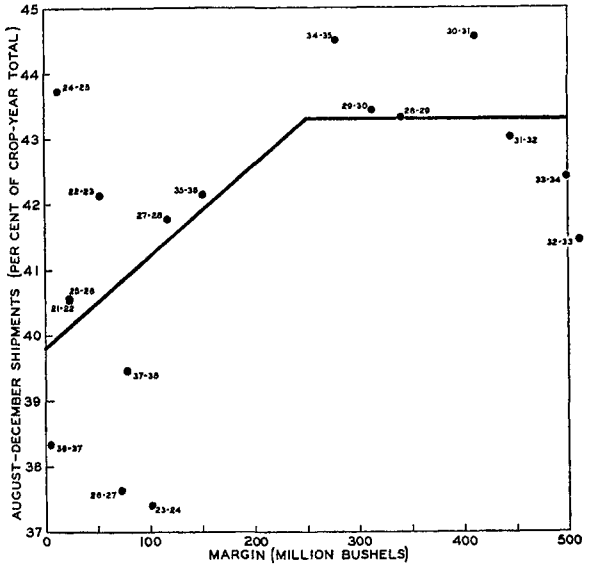
Conclusions.—We are now in a position to reconsider the general character of the relationship between size of margin of export surplus over import requirement and ratio of autumn shipments to Europe to crop-year shipments.

Allowing for abnormalities of export pressure in years when margins exceed 250 million bushels and pressure is normally heavy, the presumption is that ratios of autumn shipments to crop-year shipments would tend, whether the margin was as small as 250 million bushels or as large as 500 million, to run somewhere between 43 and 44 per cent, and probably nearer to 43 than to 44. Autumn export pressure from certain exporting countries, notably Argentina, Russia, and Australia, is likely to increase progressively with increase in size of their exportable surpluses available for August–December shipment; though, tending to offset this, willingness to hold in North America, particularly the United States, is likely to increase with increase in size of exportable surpluses there. An ill-defined upper limit beyond which the ratio of autumn to crop-year shipments cannot go is set by the situation in importing countries. It is a limit partly dependent upon physical limitations of storage facilities, and partly upon economic motives—the absurdity of importers paying high carrying charges upon owned stocks of enormous volume; or of exporters paying the costs of storage in Europe when costs at home would be much lower, or pressing unsold wheat upon Eu-

rope to such an extent that oversupply of import wheat there would cause a wheat-price debacle. So far as the postwar historical record goes, the upper limit to the percentage of crop-year trade ocurring in the autumn is around 44.5 per cent; but it might be higher especially if, in some year of huge world surplus, the usual degree of export pressure should coincide with abnormal eagerness of Europeans to accumulate stocks. Possibly 1938–39 is such a year (see p. 327).

The "normal" relationship of margin of surplus over requirement to ratio of autumn to crop-year shipments to Europe, when margins exceed about 250 million bushels, is thus probably a horizontal line, as drawn in Chart

CHART 10.—RELATIONSHIP BETWEEN AUGUST–DECEMBER SHIPMENTS TO EUROPE AS PERCENTAGES OF CROP-YEAR SHIPMENTS, AND SIZE OF MARGIN OF EXPORT SURPLUSES OVER IMPORT REQUIREMENTS, WITH "ADJUSTED" AVERAGE RELATIONSHIP, FROM 1921–22*



* Basic data in Tables VIII (column 4) and IX (column 5). See accompanying text for the basis of expressing "adjusted" average relationship.

10. This implies that change in size of margin has little or no effect on the ratio in years when margins exceed 250 million bushels; and that the expectation in such years is that the ratio will approximate 43.3 per cent unless attendant circumstances point toward a higher or a lower ratio.

The measurement and explanation of the normal relationship between margin and ratio of autumn to crop-year shipments, as given above, is altogether different from the rather commonly accepted view outlined on page 306. In that view, the interpretation is that in years of large margins, import behavior determines the size of the ratio, and importers tend to avoid autumn accumulations in expectation of cheaper wheat in winter when the Southern Hemisphere movement is at its peak. In our interpretation, accumulation of stocks by importers is normal autumn behavior in years of large margins of surpluses over requirements, mainly as the result of export pressure.

The "normal" relationship between margin and ratio when margins are less than 250 million bushels seems more difficult to establish on the basis of evidence of abnormalities of behavior set forth on pages 313–16. Without question the ratios tend to increase with increase of margin within the range of 0 to somewhere around 250 million bushels; but the indications are not clear regarding the ratio to be expected either at 0 or at 250 million bushels. Enough evidence was perhaps adduced to demonstrate that the normal ratio when the margin is 0 must lie somewhere within the range of 39 to 41 per cent; and that at margins of 275 to 350 million bushels, the normal ratio must lie close to 43.3 per cent.

The two most satisfactory assumptions seem to be that a curve expressing the normal relationships ought to pass through or very close to the four years which we regard as most nearly normal—1921–22 and 1925–26, and especially 1927–28 and 1935–36; or else through the mean point of distribution of the ten years with margins below 250 million bushels. That point lies at 40.37 per cent on the vertical scale, 63.6 million bushels on the horizontal scale. On the first assumption, the curve expressing general relationship between margin and ratio would pass from 40.4 per cent at 0 margin to 43.3 per cent at a margin of 250 million bushels. On the second assumption, it would pass from 39.4 at 0 to 43.3 per cent at 250. Arbitrarily, the curve expressing what seems most likely to be the

normal relationship is drawn on Chart 10 midway between these points—from 39.8 per cent at 0 margin to 43.3 per cent at a margin of 250 million bushels.

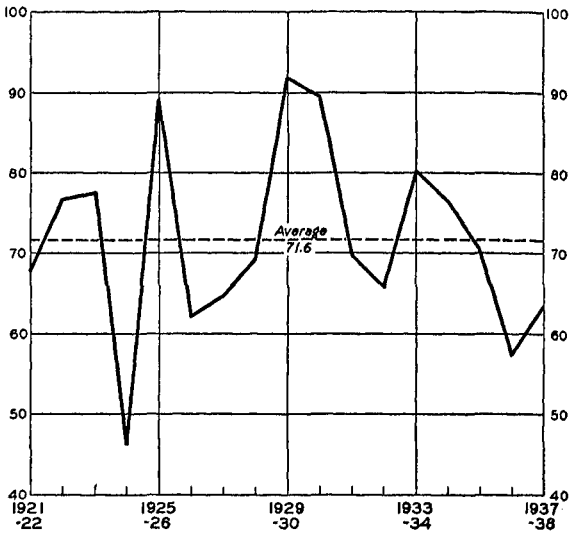
The solid line on Chart 10 thus implies that the normal relationship between margin and ratio is for the ratio to stand close to 39.8 per cent in years of very tight international statistical position; and to increase as the position eases, by about 0.7 per cent with each increase of 50 million bushels in the margin, up to a margin of about 250 million bushels. Thereafter, with an easy international statistical position assured, further increase of margin is normally unlikely to have much effect upon the ratio, which may approximate 43.3 per cent.

Winter and Spring Movements

If an abnormally large fraction of annual European import requirements has been shipped in the autumn, for whatever reasons, then an abnormally small fraction is shipped in the remainder of the crop year—winter and spring together. If an abnormally small fraction has been shipped in the autumn, then an abnormally large fraction is shipped in the winter and spring. But in either case there seems to be no compelling reason for winter shipments to hold a constant relationship to spring shipments. On the average in the past seventeen years, May–July shipments have in fact averaged 71.6 per cent of January–April shipments; but this ratio has ranged from as low as 46.2 in 1924–25 to as high as 91.8 in 1929–30, as shown in Chart 11.

The present section examines the reasons why this ratio of May–July to January–April shipments is sometimes unusually large, sometimes unusually small. The question is phrased in this way because, so phrased, it is a question of practical significance in the problem of forecasting in May of any crop year the probable volume of shipments in the crop year that ends on the following July 31. In May, the record of shipments from the preceding months of August to April is known, while shipments in May–July are uncertain. One of several methods of forecasting May–July shipments is to analyze the data for past years concerning the relationship between January–April shipments and May–July shipments.[1]

Chart 11.—Ratio of Shipments to Europe in May–July to Shipments in January–April Preceding, by Crop Years from 1921–22*



* Data in Table VIII.

Influential factors.—We have found no single factor that seems adequately to explain changes in the ratio of May–July to January–April shipments. There is no consistent simple relationship between this ratio and size of margin of surplus over requirement. There is no consistent simple relationship between this ratio and size of import requirements, or change in size of import requirements, or size of Southern Hemisphere crop, or fraction of crop-year shipments occurring in the autumn.

The ratio of spring to winter shipments, for example, was exceptionally high in 1925–26,

[1] Other relationships, such as those of August–April or August–December shipments to May–July shipments, might repay study but are not considered here. These ratios are given in Table VIII. The ratios of May–July to August–April shipments run lowest in 1924–25, 1927–28, and 1936–37, and highest in 1923–24, 1925–26, 1929–30, 1930–31, and 1933–34. With three exceptions, these are the same years as those in which the ratios of May–July to January–April shipments run lowest and highest. The exceptions are that 1923–24 is not unusual with reference to the ratio of May–July to January–April shipments; 1927–28 is not unusual with reference to the same ratio; and 1926–27, though not unusual with reference to the ratio of May–July to August–April shipments, is somewhat unusual for its low ratio of May–July to January–April shipments.

when the margin between surplus and requirements was narrow; but the ratio was also exceptionally high in 1930–31, when the margin was wide. The ratio was exceptionally high also in 1929–30, although import requirements were much smaller than in 1930–31. The ratio was exceptionally small in 1924–25, when the European crop was small and import requirements large and the following year brought much larger crops and smaller requirements; but in 1930–31, a year like 1924–25 of large requirements followed by a year of smaller requirements, the ratio was not exceptionally small but was exceptionally large. In two consecutive years when the Southern Hemisphere crops were large and differed by only 2 per cent in size, the ratio of May–July to January–April shipments was the sixth lowest in seventeen years in 1932–33, but the fourth highest in 1933–34. In two years in which autumn shipments had exceeded 43 per cent of the crop-year total, the ratio of May–July to January–April shipments was the lowest during the period in 1924–25, but the highest in 1929–30.

Yet, although no single factor seems to be of dominant importance in determining the size of the ratio of spring to winter shipments, it seems possible to ascertain the combinations of circumstances under which the ratios have run uncommonly low or uncommonly high.

Low ratios.—As Chart 11 indicates, the three lowest ratios appeared in 1924–25, 1926–27, and 1936–37.

So far as we can judge, the conditions apparently necessary when strikingly low ratios appear are: (1) a tight international statistical position, reflecting small margin of surplus over requirements and accompanied by a high level of price; (2) rather large import requirements, necessarily involving crop shortage and heavy requirements in the variable importing countries, here grouped as Italy, France, Germany, and Greece; and (3) substantial but not superabundant crops in the Southern Hemisphere, which in years of narrow margin necessarily means shortage of exportable surpluses elsewhere.

Under such a combination of circumstances, a very active demand from the variable importers may develop in the winter. Exhaustion of domestic supplies in these countries may apparently come somewhat earlier than usual, or else year-end shortage of import wheat may be feared. The active demand may be either a mixture of demand for immediate consumption and demand for stock-building, or merely demand for immediate consumption; it is not likely to represent demand for stock-building alone because accumulation of stocks in this period of the year seems not to be characteristic of this group of countries. In 1924–25, when the ratio was lowest, the demand was probably both for stock-building and for immediate consumption; but in 1926–27 and 1936–37, demand for immediate consumption probably predominated.

On this interpretation, the exceptionally low ratios of May–July to January–April shipments can perhaps best be regarded as exceptionally high ratios of winter to spring shipments. The maximum requirement for import wheat in the variable importing countries seems to come earlier than usual, necessitating imports that will be about as large in May as in June or July, instead of smaller as is usual. Thus in these three years net imports in May were larger in relation to those of June and July together than in all other years when the general level of crop-year imports was high. Since the maximum requirement comes earlier but cannot later be lowered, there is an unusual relation of the *ratio* of year-end net imports to imports a month or two earlier; it stands higher than usual, though as usual it does not decline. This interpretation accords with the view that the variable importers near the end of a crop year use their imports for immediate consumption, and do not carry stocks of import wheat beyond a necessary minimum.

If this view is tenable, and if winter shipments exceptionally high in relation to spring shipments are fundamentally due to the behavior of the variable importers, it follows that prospects for new crops in the variable importing countries are not significant in their effect upon the ratio of spring to winter shipments to Europe. For this reason it seems unnecessary to stress change in size of European crop from smaller to larger (as was the case from 1924 to 1925, 1926 to 1927, and 1936

to 1937) as one of the conditions necessary whenever spring shipments run exceptionally low in relation to winter shipments. But a Southern Hemisphere crop of substantial size is seemingly a necessary circumstance, because if that crop were exceptionally small, the variable importers might not be able to obtain the imports needed in a month or two preceding June, and might be forced to curtail mill consumption of imported wheat for several weeks, perhaps drawing down stocks of either flour or domestic wheat to uncomfortably and extraordinarily low levels.

High ratios.—The years when the ratios of spring to winter shipments ran exceptionally high were 1925–26, 1929–30, 1930–31, and 1933–34 (Chart 11, p. 320). A common feature of these four years appears to be some kind of curtailment of winter shipment of new-crop wheat from the Southern Hemisphere. Size of crop cannot be the sole determinant, for the crops were short in 1925–26 and 1929–30 and large in 1930–31 and 1933–34; but in the two latter years the seasonal course of Southern Hemisphere shipments was more heavily concentrated in May–July as compared with January–April than in any other postwar years.

The complex of circumstances that caused spring shipments to Europe to run exceptionally high in relation to winter shipments seems to have been substantially different in each of the four years.

In 1925–26, when the international statistical position was tight, the important factors were probably the small size of the Southern Hemisphere crop and the poor quality of the Argentine fraction of it. Southern Hemisphere supplies were "pulled out" promptly by importers in January–April, but in the aggregate they were too small to satisfy year-end import requirements, and it was necessary in May and thereafter to draw heavily on Canadian wheat.

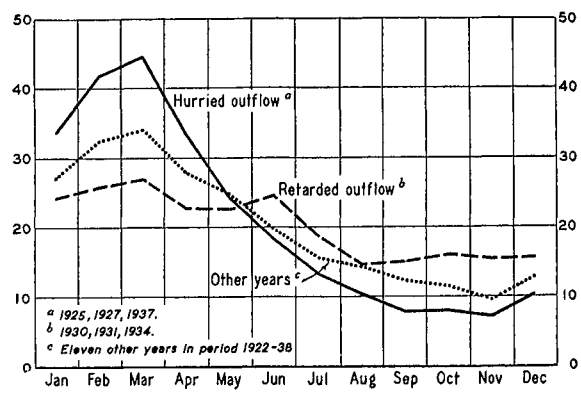
The three years 1929–30, 1930–31, and 1933–34 have the common characteristics that margins between surplus and requirements were large, and that stocks of import wheat had been built up to high levels in Europe during the autumn of each year. But other years, notably 1928–29, 1931–32, and 1934–35, also had these characteristics. The peculiar and distinctive features of 1929–30, 1930–31, and 1933–34—so far as concerns seasonality of trade after January—appear to have been the emergence of an unusual disposition to withhold wheat from export in the Southern Hemisphere at the peak of the new-crop movement, with subsequent weakening of the holding tendency. In one instance, 1929–30, this tendency to hold developed under circumstances of small Southern Hemisphere crop and was not very strong; in the other two instances, it developed with large Southern Hemisphere crops and was strongly in evidence.

The broad facts regarding seasonal behavior of Southern Hemisphere shipments appear in Chart 12, which shows average monthly shipments by calendar years in the three years when the holding tendency was in evidence; in the three years (1925, 1927, and 1937) when import demand pulled Southern Hemisphere wheat rapidly to export; and in the other eleven years of the period. May–July shipments were much larger in relation to January–April shipments in the three years characterized by holding than in the other groups of years.

This behavior of Southern Hemisphere exporters appears to have been the prime cause of the exceptionally high ratios of May–July to

CHART 12.—MONTHLY AVERAGE SHIPMENTS OF WHEAT AND FLOUR FROM THE SOUTHERN HEMISPHERE IN YEARS OF HURRIED OUTFLOW, RETARDED OUTFLOW, AND OTHER YEARS*

(*Million bushels*)



* Broomhall's data from *Corn Trade News* and *Corn Trade Year Book*.

January–April shipments to Europe in the years 1929–30, 1930–31, and 1933–34. European importers, well stocked with autumnal imports, were in a position to play a passive role, permitting (within limits) their stocks to run down in the winter, secure in the knowledge that ample spring supplies could be had from either hemisphere. In other years of similar character, the role played by importers may have been about the same; but in some of these years of general surplus the Southern Hemisphere offered more freely than in others.

The motives and mechanism of Southern Hemisphere holding differed as between the three years when holding occurred. In 1929–30 the Southern Hemisphere crop was small, and the true extent of decline of import demand in the year as a whole not apparent even as late as January. In 1930–31, wheat prices by January had just fallen to a level altogether without postwar precedent. In 1933–34, the Argentine government bought new-crop wheat from producers at fixed prices, and the disturbance of normal seasonality of shipments in January–July reflected the policies and procedures of the Grain Regulating Board. The course of prices toward the end of the crop years seems not to have been of dominant significance. In 1929–30 and 1930–31, prices were falling in May–July; in 1933–34, they were rising.

Conclusions.—To a student who faces in May the problem of forecasting May–July shipments to Europe, the question of immediate importance is whether the ratio of May–July to January–April shipments can be expected in the current year to run exceptionally low, exceptionally high, or about average.

On the basis of the foregoing discussion, one may perhaps assume that the ratio is not likely to run exceptionally low unless the current year is one characterized by distinctly narrow margin between import requirements and export surplus, with import requirements large and a rather large crop in the Southern Hemisphere. These facts can be known in May. It does not follow, however, that such a combination of circumstances will necessarily cause the ratio to run exceptionally low.

The ratio has run exceptionally large under two different sets of circumstances: a narrow margin between surplus and requirements and a short new crop in the Southern Hemisphere; and a wide margin between surplus and requirements, with evidence of autumn stock-building in Europe, and evidence of an exceptionally strong tendency to hold new-crop wheat in the Southern Hemisphere whether the crop is small or large. The first combination would be likely to cause spring shipments to Europe to run high in relation to winter shipments whenever it occurred. But the second combination might or might not have this effect. If European stocks accumulated in the autumn were exceedingly large, even a very strong tendency in the Southern Hemisphere to withhold winter shipments might not force importers to allow their stocks to run so low that spring imports high in relation to winter imports would be necessary in order to satisfy spring requirements for use and for maintenance of normal stocks. If, on the other hand, European stocks accumulated in the autumn were only moderately large, a strong tendency in the Southern Hemisphere to withhold winter shipments would have a better chance of raising the ratio of spring to winter shipments.

It is seldom possible in May to appraise closely either the stocks position in Europe at the end of December, or the strength of Southern Hemisphere tendencies to withhold winter shipments. A "tendency to hold" in an export area is not clearly distinguishable, even in retrospect, from "unwillingness to take" in an import area. "Unwillingness to take"—especially to take as much as there is to be taken—is usually a general feature of a crop year in which export surplus exceeds import requirements by a wide margin. The stock-carrying function is bound to be pressed upon exporting countries in such years, and the only question is which countries will accept it least unwillingly.

Apparently the North American exporters are less unwilling than others to carry stocks from one to another of their own crop years. But North American crop years end roughly in July, Southern Hemisphere in December. In the months of January–April, in years of large margin between surplus and require-

ments, Southern Hemisphere exporters may be said always to face unwillingness of importers to take wheat, so that there is always in such years a tendency for the peak of Southern Hemisphere shipments to be flattened. But in some years of wide margins this tendency may be reinforced by an unusual disposition of Southern Hemisphere exporters to hold wheat (a disposition that evaporates later in the Southern Hemisphere crop year); and it seems to be in such years that May–July shipments to Europe run exceptionally heavy in relation to January–April shipments. One who is attempting in May to forecast May–July shipments will face difficulties in deciding, in years of large margins between surplus and requirement, whether the January–April record of Southern Hemisphere shipments reflects merely the usual damming up of the export flow, or whether it reflects in addition an exceptional but temporary disposition of Southern Hemisphere exporters to hold.

Postwar Changes

As between the earlier and later parts of the postwar period, profound changes have occurred in volume of European trade in wheat, in destination of imports, and in sources of exports. If we divide the postwar period into two parts at the year of onset of general economic recession, including the years 1921–22 to 1928–29 in one period and 1929–30 to 1937–38 in the other, the decline in annual average volume of shipments to Europe was from 620 to 460 million bushels, or more than 25 per cent. The net imports of the variable European importers, whose imports are usually concentrated most heavily in the spring, declined from 225 to 97 million bushels, or more than 55 per cent. On the export side, shipments to all sources from North America fell from 61 per cent of total shipments in the earlier part of the period to 42 per cent in the later part; shipments from other sources in the Northern Hemisphere rose from 7 to 17 per cent; and shipments from the Southern Hemisphere, with an average seasonal concentration quite different from the Northern Hemisphere concentrations, rose from 32 to 41 per cent.

Changes by periods.—Yet these large shifts in volume, destinations, and sources of trade have had relatively little effect upon the seasonal features of the flow of wheat to Europe as between the autumn, winter, and spring periods of the year. The following tabulation indicates what changes have occurred in percentages of crop-year shipments, arrivals, and net imports occurring in stated periods:

Measure and period	Aug.–Dec.	Jan.–Apr.	May–July
Shipments			
1921–29	40.89	35.09	24.02
1929–38	42.13	33.50	24.37
Arrivals			
1921–29	41.28	31.92	26.80
1929–38	42.52	30.95	26.53
Net imports			
1921–29	42.18	30.32	27.50
1929–38	42.62	29.97	27.41

According to all three measures, trade in the autumn makes up a somewhat larger fraction of the annual total in the late period than in the early one; the percentage moving in the winter has declined somewhat; and the percentage moving in the spring has declined slightly. But the changes are small.

Change in destination of net imports has had little effect. Continental importers as a group have taken relatively less in the autumn and more in the spring in late years than in earlier ones, and practically the same fraction of their imports in the winter. But this has been offset by British behavior. British net imports have increased in the autumn, and diminished in both winter and spring, more markedly in the winter.

Since Britain depends mainly on import wheat, this behavior represents some degree of change in practices of stock accumulation. Autumn accumulations, with corresponding winter reductions, have become more prominent in recent years. The recent period contains a relatively greater preponderance of years characterized by large margins between export surpluses and import requirements; such years tend to witness export pressure in the autumn; export pressure forces autumnal import stocks in Britain to maximum levels; maximum levels of stocks in Britain at the end of the autumn period tend to dam up the winter outflow from the Southern Hemisphere,

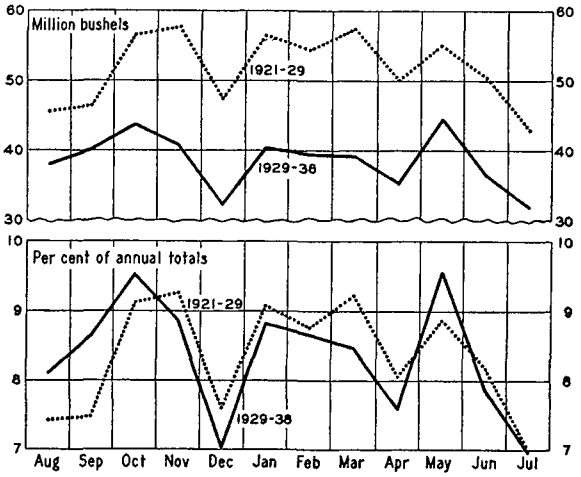
at a time when exporters there are more or less willing to hold; and in late spring and early summer the pressure to export dammed-up stocks in the Southern Hemisphere tends to increase. Thus the increasing relative importance of the Southern Hemisphere as a source of exports has resulted in enlarging the seasonal flow of wheat to Europe not in the winter, at the peak of the normal Southern Hemisphere movement, but at the tail of the normal movement, in the autumn.

There seems little reason to suppose that the indicated changes in distribution of shipments to Europe between autumn, winter, and spring are permanent in nature. They depend fundamentally on the frequency of years characterized by large excess of export surpluses over import requirements. Prevalence of such years, with accompanying low and unremunerative levels of export-wheat prices, cannot be expected to be witnessed indefinitely, though they may recur frequently for a few years to come. In the long run, the seasonal distribution characteristic either of the postwar period as a whole or of the earlier part of it seems likely to be more representative of a "normal" seasonal distribution than does that of postwar years from 1929–30 to 1937–38.

Changes within periods.—Within the autumn, winter, and spring shipping seasons, certain aspects of the seasonal flow of wheat to Europe have differed between the earlier and later parts of the postwar period. As Chart 13 shows, shipments in late years have tended to concentrate more in the earlier months of each period than was true formerly. Thus August–October shipments have run relatively heavier than they formerly did in relation to November–December shipments; January–February shipments have run heavier in relation to those of March–April; and May shipments heavier in relation to those of June–July. The troughs maintain their location in December, April, and July.

It would seem rational to explain this change of concentration in the autumn and winter shipping seasons at least partly in terms of more rapid harvesting and earlier marketing within the principal exporting countries. The same tendency in the spring season, however, would not be subject to this explanation because shipments do not then represent movement of newly-harvested crops. Earlier marketing in the exporting countries can presumably be described correctly as having a tendency to cause shipments to Europe to begin earlier; but it may have had only a relatively weak and unimportant influence. Again the explanation seems to lie mainly in the greater prevalence of surplus years in the later part of the postwar period.

CHART 13.—AVERAGE MONTHLY SHIPMENTS TO EUROPE, AUGUST 1921 TO JULY 1929 AND AUGUST 1929 TO JULY 1938*



* Basic data in Table I.

In such years, "pressure" wheat has been abundant in August–October, either from old-crop stocks in the Southern Hemisphere or from eastern Europe. Newly-harvested crops in North America have had to compete with it for a market upon which British and other importers place a "ceiling." The combined flow of pressure wheat and newly-harvested North American wheat shortly raises import wheat stocks in Europe, notably Britain, close to the ceiling, with the result that subsequently a normal Canadian autumn peak of shipments cannot be reached. Wheat is in effect pushed back upon Canadians, or if not pushed back is held back in fear of further depressing prices that are already low. Thus August–October shipments from North America run high in relation to November–December shipments not because a normal peak is reached earlier, but because a normal peak cannot be absorbed in Europe or is kept from

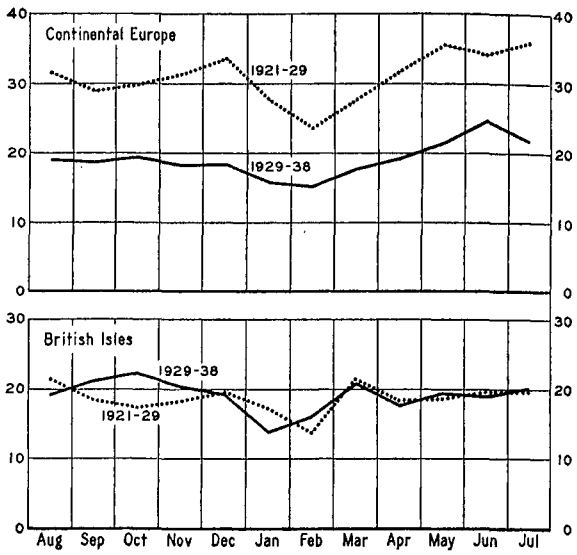
emerging by Canada. In two periods each of eight or ten years in length, and each characterized by moderate-sized margins of export surpluses over import requirements, one of them prior to 1930 and one later, the effects of earlier harvest on autumnal seasonal movement of North American shipments to Europe might well appear.

Somewhat similar reasoning seems to explain the earlier concentration of shipments in the winter period, January–April. In years of general surplus a low ceiling already exists because of European autumnal accumulations of stocks. For a month or so the Southern Hemisphere export movement may develop normally; thereafter it encounters the repressing effects of the ceiling, and a normal peak in March is precluded. Wheat is pushed back upon the exporters, a process sometimes furthered by an unusual disposition to hold; in subsequent months this disposition weakens.

The concentration of shipments in May as compared with June–July in recent years appears to be a different phenomenon. On the export side, it represents movement from Canada at opening of navigation in both the earlier and the later parts of the postwar period. But May is the month in which Canadian exports have suffered least in the general decline in volume of trade. On the import side, the exaggerated May peak of recent years represents not demand from the British Isles, but demand from Continental Europe. Chart 14 shows average monthly net imports into the British Isles and Continental Europe respectively in the two parts of the postwar period. It affords no evidence of appreciable change in behavior of British imports. But, on the assumption that net imports lag about a month behind shipments, the chart suggests that Continental Europe has recently tended to concentrate takings more heavily in May as compared with June–July than was true in earlier postwar years. Since this feature of spring trade seems fairly general throughout Continental Europe, it must in some degree represent winter exhaustion of stocks of superior milling wheat; otherwise heavy May takings might come from other sources than Canadian, whereas they do not. Presumably millers in several continental countries order for shipment out of Canada in May sufficient hard wheat to provide them with some small surplus stocks.

CHART 14.—AVERAGE MONTHLY NET IMPORTS OF WHEAT AND FLOUR INTO THE BRITISH ISLES AND CONTINENTAL EUROPE, AUGUST 1921 TO JULY 1929 AND AUGUST 1929 TO JULY 1938*

(Million bushels)



* Basic data in Tables IV–VI.

APPLICATIONS TO 1938–39

In conclusion, it seems appropriate to apply the findings of this study to the crop year now in progress.

Probable crop-year shipments.—Shipments to Europe in August–December 1938 were 191.5 million bushels. On the basis of the record of the past seventeen years, August–December shipments might represent anywhere from 37.40 to 44.55 per cent of the crop-year total. If this range is used as a basis for forecast, total shipments to Europe in 1938–39 might range from 428 to 512 million bushels. The 17-year average ratio of August–December shipments to crop-year shipments is 41.55. If this average is used as a basis for forecast, crop-year shipments might prove to be 461 million bushels.

Broomhall's standing forecast is 436 million bushels, revised downward in February 1939 from one of 440 million formulated last Au-

gust. Our own forecast, published in January, was 435 million bushels.[1] These forecasts—certainly that of the Food Research Institute, and probably that of Broomhall—rest heavily upon study, country by country in Europe, of probable annual import requirements in the light of past experience and current and prospective developments. Both forecasts imply that the recorded volume of trade in August–December 1938 is likely to constitute a larger-than-average fraction of the crop-year total. They imply that autumn shipments are likely to represent 44 per cent of the year's total—a larger percentage than in other postwar year except 1930–31 and 1934–35.

The discussion in the preceding pages points clearly to a strong probability that autumn shipments will constitute a relatively large fraction of the annual total, because the current year is unmistakably one characterized by a very wide margin of export surplus over import requirements. The margin, calculated by methods used above except that the estimates of year-end carryover are anticipatory rather than retrospective, approximates 500 million bushels. The error in anticipatory calculations cannot be large enough to falsify the assertion that the margin of 1938–39 ranks among—if it does not exceed—the four largest margins of postwar years, those of 1930–31 to 1933–34, which ranged from 425 to 510 million bushels. In our interpretation, the broad expectation in a year of such large margin is that autumn shipments to Europe may be expected to constitute 43.3 per cent of crop-year shipments. This implies probable crop-year shipments of 442 million bushels.

A purely mechanical forecast based merely on the observed general relationship in postwar years between ratio of autumn to crop-year shipments and size of margin of export surplus over import requirement thus corresponds very closely with carefully worked out forecasts in which this relationship is not accorded prominence. This does not imply that similar correspondence would occur every year, or that the mechanical method could appropriately supplant the method of detailed analysis of import requirements.

A question remains whether there is a basis for refining the general expectation based on the mechanical method. Among the years of large margins, it was shown above that particular years deviate from average expectations with reference to the fraction of crop-year shipments made in the autumn. The deviations, in our interpretation, have tended to rest mainly upon the degree of severity of export pressure exerted in the autumn months. Pressure is characteristic of years when margins are large; but it may be greater or less.

The situation last autumn can hardly be interpreted as representing exceptionally severe export pressure for a year of large margin. More probably, it represented about a normal degree of export pressure, coupled with abnormally active import demand arising from the war scare of September 1938—a combination of circumstances without postwar precedent. In consequence of the September war scare, stocks of import wheat, notably in Germany and in some adjacent smaller countries and in lesser degree in the British Isles, probably stood by the end of last December at levels considerably above what would be regarded as appropriate under more normal political circumstances. Were it not for events in central Europe following German absorption of most of Czecho-Slovakia on March 15, the conclusions could be drawn that accumulated stocks of import wheat would probably be allowed to decline about to normal levels during the winter and spring, and that August–December shipments might prove to be a larger fraction of the crop-year total in 1938–39 than in any other postwar year. Except for these recent political disturbances, the method of analysis developed in this study, coupled with the fact that reported shipments to Europe in January–February 1939 (Table I) were small, would support the conclusion that August–December shipments might reasonably be expected to constitute as much as 45 to 46 per cent of crop-year shipments.[2] This would imply ship-

[1] Helen C. Farnsworth and Holbrook Working, "World Wheat Survey and Outlook, January 1939," WHEAT STUDIES, January 1939, XV, 282.

[2] This interpretation may seem inconsistent with the fact that for eight weeks centering in November 1938, the March future at Liverpool stood at a discount (of 1.1 pence per cental) below the December, whereas it has stood at a premium in other years of

ments of 416–425 million bushels in the crop year, and would suggest that our January forecast might prove a little too high.

If, however, the political developments of mid-March have convinced traders and governments of the imminence of general European war, stocks of import wheat will probably be built up in parts of Europe in subsequent months; and in this event shipments during the remainder of the winter shipping season and in the spring would presumably run higher than under more normal political circumstances. If so, August–December shipments could not be expected to constitute a fraction of the crop-year total exceptionally large for a year of large margin of surplus over requirements, and the total itself might exceed any of the forecasts mentioned above by a quantity not susceptible of prediction.

Winter and spring shipments.—The probable relationship between May–July and January–April shipments is also obscured by uncertainties concerning war scares and war.

On the basis of principles set forth above, it seems unlikely that May–July shipments should run unusually small in relation to those of January–April. Such a relationship has occurred only in years when the margin between surplus and requirements was narrow, and it is very wide in the current crop year.

In years when the margin is wide, spring shipments are sometimes exceptionally large in relation to winter shipments, whereas sometimes a relationship close to average prevails. When spring shipments run exceptionally large in such years as the current one, the significant influence appears to be an unusual tendency for Southern Hemisphere exporters to withhold wheat from export at the peak of their shipping season in January–April. It is difficult to judge when an unusual tendency to hold is present, but it seems to exist in the current crop year. Shipments from the Southern Hemisphere in January–February 1939, already reported, were strikingly small. From Australia, they were the fifth smallest for these months in eighteen years, about the same as in 1934 when the new crop was smaller. From Argentina, they were the third smallest in eighteen years. The smaller January–February exports from Argentina in the other two years corresponded with notably small crops, whereas the new Argentine crop is the second largest on record. The January–February flow from the Southern Hemisphere thus affords some evidence of the presence of an unusual holding tendency. Furthermore, Argentine exports must go through the hands of a governmental agency, which operates with a fixed domestic price now running above import prices plus cost of transportation; circumstances were very similar in 1933–34, when a strong tendency to hold prevailed. Holding tendencies in the Southern Hemisphere are probably strengthened by the present outlook for a rather poor 1939 crop in the United States, and by reports of severe damage to fall-sown wheat that have recently come from France and Belgium.

Thus, if the assumption is made that political events in the near past and immediate future have not prompted and will not prompt importers to order abnormally large shipments put afloat in the remainder of March and in April, the stage would seem to be set for spring shipments to Europe to run exceptionally high in relation to winter shipments regardless of political developments after May 1. They would presumably run all the higher if intensified war scare or war itself should eventuate in May–June. But if political events have prompted or should prompt importers to order abnormally large shipments put afloat before May 1, and if war fears should be dissipated by that date, May–July shipments might run only normally large or even somewhat small in relation to those of January–April, depending upon the volume of outflow in the six weeks preceding May 1. Since futures markets showed little response to political events during March 15–20, and since more than half of the winter shipping period has already passed with shipments to Europe running low, we are inclined to apraise the possibilities as pointing toward

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large margin of surplus over requirements except 1932–33. The position this year, however, may be interpreted merely as a second exception to the rule. As in the other exceptional year, 1932–33, there was last autumn general export pressure without specific pressure from the Southern Hemisphere; and this year the British stocks were partly government-owned and presumably could not affect the December–March futures spread as much as their gross size would suggest.

an exceptionally high ratio of May–July to January–April shipments.

The year-end position.—On the explicit assumption that neither intensified war scare nor war itself supervenes in the next four months, exceedingly heavy stocks of old-crop wheat are bound to lie in the Southern Hemisphere when the crop year closes at the end of next July. If war scare or war is averted for a few months beyond July, there is already a probability that a period of severe export pressure will emerge in August–December 1939, the autumn period of the crop year 1939–40. That crop year may not be characterized by as wide a margin of export surpluses over import requirements as is the current year; but it can hardly be a year of narrow margin unless crop failures in 1939 should be almost unprecedented in severity. The conservative and reasonable expectation at present is for a rather large margin of surplus over requirement in 1939–40. Under such circumstances, and with the stated assumptions, the analysis in the preceding pages points even now toward a relatively heavy concentration of shipments to Europe in the autumn shipping period of the coming crop year.

The author is indebted to Holbrook Working for valuable suggestions.

APPENDIX TABLES

TABLE I.—SHIPMENTS OF WHEAT AND FLOUR TO EUROPE, MONTHLY FROM AUGUST 1921*

(Million bushels)

Aug.-July	Total	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	542.9	60.32	48.07	43.78	36.02	31.94	43.82	46.62	57.40	44.46	43.01	42.71	44.73
1922-23	584.4	45.74	41.98	49.62	60.26	48.63	55.76	45.53	42.70	47.35	49.74	54.77	42.37
1923-24	633.9	37.99	35.59	55.35	60.41	47.76	49.03	55.42	61.86	57.18	64.90	60.34	48.04
1924-25	630.2	38.76	51.21	76.01	66.62	42.94	56.88	66.58	68.32	50.91	50.76	28.58	32.66
1925-26	530.2	34.56	35.06	53.10	48.09	44.37	48.82	42.92	37.90	37.06	49.60	56.10	42.66
1926-27	683.5	45.98	48.70	52.38	53.57	56.55	70.18	63.78	68.70	60.42	70.22	51.27	41.78
1927-28	664.9	46.44	56.26	61.22	64.69	49.08	62.26	55.98	60.60	56.52	51.75	52.56	47.52
1928-29	693.9	55.66	54.66	59.92	72.98	57.26	64.82	59.02	62.38	46.31	60.38	56.43	44.06
1929-30	483.5	51.27	43.02	44.97	36.41	34.30	38.28	35.66	35.24	33.43	41.86	42.47	46.59
1930-31	609.6	59.24	55.93	60.34	57.88	38.10	40.31	46.86	46.58	44.71	65.61	53.78	40.26
1931-32	583.6	56.27	55.17	55.62	48.97	35.00	47.28	44.39	52.15	52.23	60.98	42.61	32.95
1932-33	450.5	24.22	38.28	43.70	44.16	36.42	45.62	43.42	39.77	30.34	40.39	30.90	33.27
1933-34	402.9	35.20	37.81	36.31	34.19	27.35	37.33	32.42	32.50	26.62	33.46	35.95	33.74
1934-35	375.6	36.80	34.90	35.91	33.56	25.94	30.73	29.01	28.98	29.44	40.94	28.58	20.82
1935-36	359.3	23.85	31.35	38.50	31.15	26.50	30.83	36.32	29.30	25.60	34.39	27.68	23.84
1936-37	477.9	31.25	36.95	38.75	40.18	36.09	50.45	47.84	50.25	38.74	50.90	34.26	22.21
1937-38	410.2	23.94	27.59	40.09	40.51	29.68	40.67	38.96	36.79	35.67	31.08	31.13	34.09
1938-39	.....	43.17	33.50	44.16	42.82	27.82	37.39	33.84	.....	.....	.....	.....	.....

* Broomhall's data, from *Corn Trade News* and *Corn Trade Year Book*. These data, reported weekly, are here placed on a monthly basis on the assumption that within each week which falls partly in two months, the daily shipments represent one-seventh of the weekly shipments.

TABLE II.—ARRIVALS OF WHEAT AND FLOUR IN EUROPE, MONTHLY FROM AUGUST 1921*

(Million bushels)

Aug.-July	Total	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	559.3	67.93	55.32	49.16	38.71	40.85	38.55	29.75	47.12	53.88	45.37	45.16	47.51
1922-23	594.5	53.48	48.59	43.00	45.27	61.20	47.64	38.71	48.48	50.86	46.51	56.80	53.92
1923-24	631.4	41.57	35.77	44.85	54.25	66.44	38.72	33.56	61.71	51.11	72.46	68.75	62.24
1924-25	638.5	45.52	43.04	57.05	69.52	63.39	39.72	36.61	70.08	63.92	66.29	41.96	41.45
1925-26	525.0	39.17	36.69	43.94	49.25	40.75	52.79	27.29	42.37	44.87	40.34	54.39	53.17
1926-27	680.8	48.85	48.99	54.74	54.45	50.28	54.28	52.77	63.12	64.44	75.99	66.29	46.56
1927-28	667.3	48.52	50.22	58.13	60.75	60.08	42.82	50.83	62.92	58.52	63.11	57.37	54.06
1928-29	699.9	55.63	57.29	50.74	59.73	66.36	54.44	53.76	61.48	62.09	55.72	63.06	59.60
1929-30	481.9	42.41	47.28	48.19	46.83	34.69	28.86	36.62	37.70	33.04	40.82	40.27	45.21
1930-31	610.9	50.74	60.29	61.47	54.46	56.48	30.31	26.25	56.44	44.68	53.31	64.32	52.18
1931-32	590.1	47.25	64.23	54.98	51.74	40.90	26.41	37.09	51.46	56.05	56.85	56.42	46.74
1932-33	450.2	31.08	33.14	41.48	36.43	39.61	33.12	31.95	47.76	41.85	41.82	38.71	33.29
1933-34	399.7	32.12	37.97	42.15	35.56	34.02	20.20	30.18	35.96	32.72	33.35	33.35	32.15
1934-35	393.5	33.62	40.36	34.78	33.07	34.69	22.62	28.75	33.59	28.43	34.84	37.33	31.39
1935-36	355.6	22.19	26.06	33.71	33.02	33.04	24.83	23.27	31.56	29.42	35.83	32.72	29.97
1936-37	472.9	28.12	31.73	33.73	35.33	39.02	32.15	43.26	51.77	44.94	60.80	41.23	30.82
1937-38	399.2	29.45	25.92	34.71	33.29	32.65	34.99	32.70	37.73	36.04	33.18	35.10	33.47
1938-39	.....	40.12	43.72	41.78	43.29	34.40	22.74	32.94	.....	.....	.....	.....	.....

* Shipments as in Table I adjusted by amount of change in stocks of wheat and flour afloat to Europe, with changes calculated from Broomhall's data for afloat stocks on dates nearest the first of each month. Reductions of these stocks in any month are added to shipments in order to approximate arrivals, and increases in stocks are subtracted.

TABLE III.—NET IMPORTS OF WHEAT AND FLOUR INTO FIFTEEN EUROPEAN COUNTRIES, MONTHLY FROM AUGUST 1921*

(Million bushels)

Aug.-July	Total	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	536.3	56.84	59.48	54.18	44.45	38.17	39.18	23.84	45.26	46.41	43.06	43.53	41.91
1922-23	567.2	47.18	45.15	46.03	45.50	61.66	47.77	39.68	45.37	42.61	44.57	52.29	49.42
1923-24	584.9	53.78	40.85	39.91	45.11	54.04	34.87	34.39	50.93	41.51	64.09	58.70	66.77
1924-25	610.0	52.94	41.62	54.34	58.38	62.50	50.42	39.78	44.72	51.17	54.20	50.09	49.85
1925-26	524.3	53.79	41.69	37.27	41.49	47.91	41.09	27.46	37.11	42.41	45.70	51.11	57.31
1926-27	664.6	55.85	46.79	45.07	52.31	51.78	46.19	51.18	59.67	57.68	65.23	71.58	61.23
1927-28	631.8	52.42	51.68	49.28	59.12	53.06	46.76	44.05	60.09	55.48	53.83	51.74	54.28
1928-29	634.6	49.95	51.18	51.35	49.49	54.66	49.16	38.24	48.79	63.53	61.98	52.77	63.55
1929-30	502.8	50.33	47.64	46.24	44.16	39.11	37.72	33.17	38.08	35.41	42.13	43.59	45.23
1930-31	610.3	44.06	60.57	58.89	54.19	56.37	40.64	32.36	46.04	47.62	47.42	60.47	61.70
1931-32	596.1	48.30	57.56	60.86	50.33	42.56	31.35	38.42	46.14	51.22	51.32	63.74	54.32
1932-33	448.7	44.41	32.79	38.53	32.77	37.68	32.72	29.95	43.40	37.79	41.48	38.85	38.31
1933-34	399.2	35.17	37.59	38.42	37.12	29.79	24.17	27.61	36.08	33.33	33.79	32.22	33.88
1934-35	378.7	31.95	35.79	32.00	29.66	34.23	24.26	27.90	33.09	28.39	34.88	33.99	32.60
1935-36	359.7	26.98	29.16	36.05	33.47	30.60	24.52	22.49	28.93	27.89	34.08	34.85	30.70
1936-37	443.1	26.35	28.07	31.87	33.34	36.78	25.83	37.58	42.62	39.39	49.13	49.64	42.52
1937-38	389.3	35.92	29.41	31.69	33.54	32.45	26.74	31.22	33.21	31.43	32.08	35.13	36.44

* Summation of net imports (official data) of the United Kingdom, Eire, France, Italy, Greece, Germany, Belgium (including Luxemburg), Netherlands, Switzerland, Austria, Czecho-Slovakia, Denmark, Norway, Sweden, and Finland. Omitted countries either import negligible quantities, or are only occasionally net importers. Partly because of these omissions, crop-year totals do not correspond with totals of European net imports published in other issues of WHEAT STUDIES.

Some of the included countries have been net exporters in some months. In calculating group totals here, net exports in any month in any country have been treated as 0 net imports. This procedure, convenient for study of flow of trade, is not appropriate for study of European utilization of imported wheat. It also causes these European totals to differ from totals published in other issues of WHEAT STUDIES.

Official monthly data as here used are sometimes subsequently revised, but in such ways that published crop-year totals are altered but details of revisions by months are not specified. Consequently, even for countries that have been net importers every month since 1921, crop-year totals derived from available monthly data and used here do not correspond precisely with revised official crop-year totals.

TABLE IV.—NET IMPORTS OF WHEAT AND FLOUR INTO THE BRITISH ISLES, MONTHLY FROM AUGUST 1921*

(Million bushels)

Aug.-July	Total	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	208.2	20.54	21.08	20.25	14.67	12.12	11.48	9.42	25.14	22.57	17.41	17.79	15.73
1922-23	210.3	22.07	16.08	14.57	17.91	19.19	20.97	13.82	17.61	15.34	13.43	21.54	17.76
1923-24	240.6	26.14	18.78	15.98	18.90	20.87	11.97	12.27	27.48	14.55	27.87	19.32	26.46
1924-25	227.9	25.69	19.02	21.61	23.16	22.66	15.99	12.90	17.20	16.42	17.62	16.81	18.85
1925-26	210.0	13.97	15.41	17.17	16.71	23.58	22.67	12.25	17.94	16.59	13.01	20.46	20.20
1926-27	237.2	22.49	19.01	16.09	16.39	18.59	18.51	17.41	21.74	20.61	21.04	26.26	19.03
1927-28	232.2	21.88	21.41	16.88	21.37	17.68	15.31	16.40	25.15	18.44	17.76	19.23	20.73
1928-29	219.3	17.86	15.94	15.53	16.65	22.11	19.57	15.73	19.57	21.64	20.41	16.60	17.71
1929-30	223.9	21.14	26.15	25.68	21.30	14.50	14.36	13.10	18.57	13.56	18.67	15.91	20.94
1930-31	245.4	19.13	24.33	22.26	22.28	29.44	16.02	11.71	20.92	18.16	17.44	18.16	25.50
1931-32	260.9	24.94	33.83	30.97	23.62	17.25	11.34	18.40	21.48	19.33	18.55	20.62	20.62
1932-33	234.2	19.50	17.68	21.47	17.67	17.18	16.94	16.31	25.45	21.84	21.95	19.44	18.80
1933-34	238.7	19.24	22.88	23.09	21.90	18.15	13.90	16.31	22.20	20.64	20.45	19.04	20.90
1934-35	217.7	18.23	19.88	18.33	17.12	19.82	11.42	16.54	19.96	17.18	22.28	18.47	18.52
1935-36	220.8	15.60	15.16	20.74	21.77	19.68	14.66	14.75	20.03	18.16	19.64	21.68	18.91
1936-37	211.8	15.96	15.78	19.03	19.80	20.13	11.87	20.95	21.01	15.40	17.04	16.96	17.84
1937-38	207.8	18.48	14.13	18.93	17.83	18.21	14.11	16.16	17.37	14.94	18.42	20.70	18.49

* Official data of United Kingdom and Irish Free State or Eire.

TABLE V.—NET IMPORTS OF WHEAT AND FLOUR INTO THE "VARIABLE IMPORTING COUNTRIES" OF EUROPE (ITALY, FRANCE, GERMANY, GREECE), MONTHLY FROM AUGUST 1921*

(Million bushels)

Aug.-July	Total	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	206.0	24.98	22.42	20.07	19.56	17.84	16.07	8.50	12.47	14.88	15.48	16.73	17.04
1922-23	225.4	13.25	18.04	20.66	15.84	28.97	15.66	16.09	17.32	17.86	21.91	19.82	20.00
1923-24	187.4	16.78	11.28	10.04	11.74	15.55	11.59	12.29	12.21	14.25	20.83	24.66	26.20
1924-25	235.9	15.30	10.05	16.29	20.40	22.33	22.23	17.43	17.65	25.05	25.44	23.36	20.34
1925-26	171.7	28.36	13.47	5.45	8.78	9.89	8.67	7.47	10.04	16.79	22.44	17.03	23.30
1926-27	281.4	21.34	13.59	15.87	23.12	21.91	18.47	23.40	26.09	26.15	31.50	30.28	29.63
1927-28	238.3	17.70	16.35	16.67	21.94	19.58	18.65	16.56	20.31	23.94	24.13	20.51	21.96
1928-29	254.0	19.50	19.68	20.78	18.91	18.62	16.94	13.39	17.71	27.16	26.91	22.98	31.42
1929-30	128.4	13.74	9.06	6.45	9.84	12.08	13.97	9.90	7.79	11.04	11.49	12.54	10.53
1930-31	198.5	11.37	17.67	20.37	15.16	11.48	13.37	11.77	15.10	16.44	18.60	26.59	20.57
1931-32	160.2	11.46	7.86	9.90	7.71	7.81	7.87	9.54	12.50	19.08	20.05	26.65	19.76
1932-33	73.8	13.45	5.17	3.93	4.61	7.60	4.71	4.29	6.42	4.44	6.66	6.53	5.99
1933-34	39.4	4.12	2.31	3.16	3.48	3.06	2.91	4.08	4.08	3.25	2.83	2.99	3.09
1934-35	39.7	3.69	4.82	2.04	2.44	2.31	3.01	1.98	2.83	3.02	3.66	6.32	3.58
1935-36	30.8	2.70	2.41	3.78	3.73	2.34	1.47	1.37	1.25	1.87	4.67	3.18	2.04
1936-37	123.3	1.63	2.45	3.77	4.24	5.93	8.01	8.48	12.23	12.54	23.41	23.78	16.84
1937-38	77.3	10.24	6.40	3.94	4.14	4.53	4.85	8.48	6.35	9.04	6.21	5.56	7.57

* Official data, partly through International Institute of Agriculture. For method of handling net exports in months when they occur, see note to Table III.

TABLE VI.—NET IMPORTS OF WHEAT AND FLOUR INTO "OTHER COUNTRIES" OF EUROPE, MONTHLY FROM AUGUST 1921*

(Million bushels)

Aug.-July	Total	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	122.1	11.32	15.98	13.86	10.22	8.21	11.63	5.92	7.65	8.96	10.17	9.01	9.14
1922-23	131.5	11.86	11.03	10.80	11.75	13.50	11.14	9.77	10.44	9.41	9.23	10.93	11.66
1923-24	156.9	10.86	10.79	13.89	14.47	17.62	11.31	9.83	11.24	12.71	15.39	14.72	14.11
1924-25	146.2	11.95	12.55	16.44	14.82	17.51	12.20	9.45	9.87	9.70	11.14	9.92	10.66
1925-26	142.7	11.46	12.81	14.65	16.00	14.44	9.75	7.74	9.13	9.03	10.25	13.62	13.81
1926-27	146.0	12.02	14.19	13.11	12.80	11.28	9.21	10.37	11.84	10.92	12.69	15.04	12.57
1927-28	161.3	12.84	13.92	15.73	15.81	15.80	12.80	11.09	14.63	13.10	11.94	12.00	11.59
1928-29	161.3	12.59	15.56	15.04	13.93	13.93	12.65	9.12	11.51	14.73	14.66	13.19	14.42
1929-30	150.5	15.45	12.43	14.11	13.02	12.53	9.39	10.17	11.72	10.81	11.97	15.14	13.76
1930-31	166.5	13.56	18.57	16.26	16.75	15.45	11.25	8.88	10.02	13.02	11.38	15.72	15.63
1931-32	175.0	11.90	15.87	19.99	19.00	17.50	12.14	10.48	12.16	12.81	12.72	16.47	13.94
1932-33	139.7	11.46	9.94	13.13	9.98	12.41	11.07	9.35	11.53	11.51	12.87	12.88	13.52
1933-34	121.1	11.81	12.40	12.17	11.74	8.58	7.36	7.22	9.80	9.44	10.51	10.19	9.89
1934-35	121.3	10.03	11.09	11.63	10.10	12.10	9.83	9.38	10.30	8.19	8.94	9.20	10.50
1935-36	108.1	8.68	11.59	11.53	7.97	8.58	8.39	6.37	7.65	7.86	9.77	9.99	9.75
1936-37	108.0	8.76	9.84	9.07	9.30	10.72	5.95	8.15	9.38	11.45	8.68	8.90	7.84
1937-38	104.2	7.20	8.88	8.82	11.57	9.71	7.78	6.58	9.49	7.45	7.45	8.87	10.38

* Official data of Belgium (including Luxemburg), Netherlands, Switzerland, Austria, Czecho-Slovakia (old boundaries), Denmark, Norway, Sweden, and Finland, partly through International Institute of Agriculture. For method of handling net exports in months when they occur, see note to Table III.

TABLE VII.—STOCKS OF WHEAT AND FLOUR IN PORTS OF THE UNITED KINGDOM NEAR THE FIRST OF EACH MONTH, FROM AUGUST 1921*

(Million bushels)

Aug.-July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1921-22	7.60	9.92	9.87	12.45	11.05	8.84	6.64	4.08	6.48	9.76	9.08	9.14
1922-23	7.12	7.92	6.32	4.16	4.48	5.88	8.92	8.24	7.82	6.16	4.64	5.28
1923-24	8.12	9.32	9.28	8.88	7.76	8.48	5.20	4.56	8.48	7.28	8.56	8.40
1924-25	9.96	14.80	12.32	12.50	14.36	17.28	16.14	10.96	11.76	10.88	9.20	8.84
1925-26	9.16	5.84	5.12	5.72	3.76	6.16	9.04	7.36	7.72	6.40	4.88	4.24
1926-27	4.32	5.76	5.34	3.76	3.04	4.76	4.72	4.00	4.80	5.68	8.80	8.40
1927-28	8.20	10.40	9.96	8.64	9.20	7.20	6.24	6.96	9.20	8.80	10.00	10.40
1928-29	9.75	9.48	7.44	5.92	5.68	6.16	6.56	6.00	7.44	9.60	9.36	10.08
1929-30	6.16	4.96	11.20	16.76	20.56	15.20	15.12	13.60	11.04	9.60	8.16	6.80
1930-31	6.78	6.04	8.40	9.20	14.24	20.00	17.36	13.04	12.56	9.92	7.24	8.00
1931-32	10.60	12.48	22.08	28.96	29.52	23.88	17.76	17.20	15.36	14.40	10.40	10.96
1932-33	9.12	8.32	7.60	8.84	7.60	7.52	6.80	7.20	10.00	12.56	12.40	12.32
1933-34	11.36	10.24	13.20	16.76	17.20	19.12	12.80	13.28	14.80	14.40	14.56	14.00
1934-35	13.60	12.96	14.00	13.92	15.12	16.12	14.40	12.83	12.20	10.80	10.62	9.80
1935-36	8.76	7.60	5.92	6.24	8.80	10.24	9.04	8.00	8.86	9.84	9.92	9.91
1936-37	9.66	8.00	6.12	7.24	7.40	9.00	7.60	10.70	12.74	12.28	11.04	10.35
1937-38	12.00	11.20	9.76	10.16	10.34	13.00	10.36	10.48	10.20	9.56	11.08	11.99
1938-39	14.08	16.54	16.44	17.64	19.06	18.39	15.55	18.69	.....	.....	.....	.....

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

TABLE VIII.—SHIPMENTS OF WHEAT AND FLOUR TO EUROPE BY SHIPPING PERIODS, AND INDEXES OF VARIABILITY IN SEASONALITY OF SHIPMENTS, FROM 1921–22*

Aug.-July	Million bushels in			Percentage in			Ratios[a] of May-July to			Indexes of variability	
	Aug.-Dec.	Jan.-Apr.	May-July	Aug.-Dec.	Jan.-Apr.	May-July	Jan.-Apr.	Aug.-Apr.	Aug.-Dec.	Monthly basis[b]	Period basis[c]
1921-22	220.13	192.30	130.45	40.53	35.42	24.05	67.84	31.63	87.36	14.96	3.36
1922-23	246.23	191.34	146.88	42.13	32.74	25.13	76.76	33.57	77.71	9.74	2.16
1923-24	237.10	223.49	173.28	37.40	35.26	27.34	77.53	37.62	94.26	12.12	7.30
1924-25	275.54	242.69	112.00	43.72	38.51	17.77	46.15	21.61	88.08	17.12	13.88
1925-26	215.18	166.70	148.36	40.58	31.44	27.98	89.00	38.85	77.47	11.66	6.34
1926-27	257.18	263.08	163.27	37.63	38.49	23.88	62.06	31.38	102.29	12.54	9.50
1927-28	277.69	235.36	151.83	41.77	35.39	22.84	64.51	29.59	84.76	5.42	3.74
1928-29	300.48	232.53	160.87	43.31	33.51	23.18	69.18	30.18	77.39	6.72	5.52
1929-30	209.97	142.61	130.92	43.42	29.50	27.08	91.80	37.13	67.92	14.10	8.48
1930-31	271.49	178.46	159.65	44.55	29.27	26.18	89.46	35.48	65.73	12.80	8.94
1931-32	251.03	196.05	136.54	43.01	33.60	23.39	69.65	30.54	78.10	11.84	3.92
1932-33	186.78	159.15	104.56	41.46	35.33	23.21	65.70	30.23	85.21	9.74	3.18
1933-34	170.86	128.87	103.15	42.41	32.00	25.59	80.04	34.41	75.42	9.76	3.48
1934-35	167.11	118.16	90.34	44.49	31.46	24.05	76.46	31.67	70.71	10.36	6.88
1935-36	151.35	122.05	85.91	42.13	33.94	23.91	70.39	31.42	80.64	7.74	2.18
1936-37	183.22	187.28	107.37	38.34	39.19	22.47	57.33	28.98	102.22	13.26	10.90
1937-38	161.81	152.09	96.30	39.45	37.08	23.47	63.32	30.68	93.99	10.86	6.88

* Basic data on shipments as in Table I.

[a] Calculated from data in columns 1 to 3.

[b] Differences between average postwar percentages of annual average total shipped each month, and percentages of crop-year total shipped each month in each year. The sum of the twelve differences in a year, regardless of sign, represents one measure of relative variability of shipments in that year.

[c] Procedure as in footnote *b*, except that calculations are based upon percentages shipped in each of the three periods August–December, January–April, and May–July.

TABLE IX.—PRICE LEVELS, RANGES, AND SPREADS ON BRITISH MARKETS, AND MARGINS BETWEEN EXPORT SURPLUSES AND IMPORT REQUIREMENTS, FROM 1921–22*

(Price averages and ranges in shillings per quarter; price spreads in pence per cental; margins in million bushels)

Aug.-July	Prices			Margin A, total[d]	Margin B, total[e]	Margin B, components					
	Annual average[a]	Range[b]	Autumn spread[c]			United States	Canada	Argentina	Australia	Danube basin[f]	Western Europe[g]
1921–22	56.3	20.4	—2.4	139	23	0	15	—4	—1	6	7
1922–23	47.0	6.1	—6.8	123	53	22	7	—1	8	16	1
1923–24	45.0	10.2	—2.2	157	101	27	20	1	9	25	19
1924–25	61.7	15.1	+1.4	66	13	—2	2	—7	3	0	17
1925–26	56.0	7.5	—4.6	76	23	—10	11	2	—1	20	1
1926–27	53.9	4.6	—8.5	98	72	0	26	4	10	25	7
1927–28	49.9	7.3	— .1	200	117	2	53	30	11	5	16
1928–29	42.5	8.7	+ .4	575	341	118	79	65	16	55	8
1929–30	41.8	14.2	+7.4	349	313	179	86	0	24	24	0
1930–31	25.0	14.5	+1.2	402	412	203	108	15	35	37	14
1931–32	25.1	10.7	+3.6	429	445	265	105	0	25	29	21
1932–33	24.7	5.4	—2.2	622	510	268	185	10	30	7	10
1933–34	22.3	4.5	+3.1	498	498	164	168	53	60	34	19
1934–35	25.8	4.9	+4.2	343	278	38	177	20	32	0	11
1935–36	29.3	5.7	—3.2	169	151	32	83	0	18	4	14
1936–37	42.0	15.1	—5.2	—53	5	—27	8	—14	16	10	12
1937–38	39.3	13.9	—2.9	60	78	44	—2	0	25	4	7

* Price data compiled from *London Grain, Seed and Oil Reporter* and *Corn Trade News;* data on margins partly official, partly estimated by Food Research Institute and largely published in "Review" issues of WHEAT STUDIES, e.g., December 1938, XV, 257.

[a] Simple averages of monthly average prices of parcels imported into the United Kingdom.

[b] Range between highest and lowest monthly average prices of parcels.

[c] Spreads, measured from December future, between March and December futures at Liverpool in eight weeks centering in November; weekly data averaged.

[d] Export surplus minus import requirements, in million bushels. Export surpluses defined as annual net exports from United States, Canada, Argentina, and Australia, plus or minus year-end stocks in excess or in deficiency of "normal" year-end stocks in those countries, plus net exports from Russia and the Danube countries (Hungary, Yugoslavia, Rumania, and Bulgaria), as in Table X, column 12. Import requirements defined as recorded shipments to Europe, as in Table I, column 1.

[e] Algebraic summation of excess or deficiency of year-end stocks in relation to "normal" year-end stocks in countries specified in the following six columns. "Normal" year-end stocks taken as 110 million bushels in the United States, 25 in Canada, 65 in Argentina, 25 in Australia, 20 in the Danube basin, and 37 in western Europe.

[f] Hungary, Yugoslavia, Rumania, Bulgaria.

[g] British Isles, Belgium, Netherlands.

TABLE X.—WORLD SHIPMENTS OF WHEAT AND FLOUR BY SOURCES OF ORIGIN AND TO EX-EUROPE, AND ESTIMATED EXPORT SURPLUSES OF SPECIFIED COUNTRIES, FROM 1921–22*

(Million bushels)

Aug.-July	Shipments by origin				Shipments to ex-Europe	Export surpluses						
	Total	North America	Southern Hemisphere	Others		United States[a]	Canada[a]	Argentina[a]	Australia[a]	Russia[b]	Danube[b]	Total
1921-22	643.6	403.5	229.9	10.2	100.7	254	200	114	114	0	21	682
1922-23	675.9	456.1	185.1	34.7	91.4	225	286	138	58	1	12	707
1923-24	766.3	450.2	250.5	65.6	132.4	157	366	173	95	22	34	791
1924-25	706.0	423.2	239.1	43.7	75.8	257	194	118	127	0	26	696
1925-26	668.7	413.9	168.3	86.5	138.5	96	335	99	76	27	45	606
1926-27	815.8	485.4	243.0	87.4	132.3	202	319	148	113	50	45	782
1927-28	796.6	492.7	252.9	51.0	131.7	189	386	208	82	2	32	865
1928-29	918.2	536.3	333.4	48.5	224.3	272	485	287	125	0	37	1,169
1929-30	614.0	319.1	217.7	77.2	130.5	324	271	151	87	9	56	833
1930-31	788.7	350.8	277.2	160.7	179.1	319	366	140	187	114	46	1,012
1931-32	772.4	332.4	292.5	147.5	188.8	380	312	140	181	65	82	1,013
1932-33	616.5	290.5	281.7	44.3	166.0	301	449	142	180	17	12	1,072
1933-34	525.5	220.2	231.1	74.2	122.6	193	362	200	146	34	35	901
1934-35	525.9	169.7	285.1	71.1	150.3	34	342	202	141	2	22	719
1935-36	498.1	238.6	178.5	81.0	138.8	1	337	70	120	29	25	528
1936-37	596.8	212.0	270.1	114.7	118.9	—44	203	148	116	5	89	423
1937-38	513.6	192.0	200.6	121.0	103.4	162	85	72	151	43	54	470

* Shipments data from *Corn Trade News* and *Corn Trade Year Book*, here adjusted to monthly basis. Data used in calculating export surpluses official, as published in earlier issues of WHEAT STUDIES.

[a] Export surplus defined as reported net exports of a crop year, plus year-end stocks on August 1 (July 1 for the United States) in excess of normal stocks defined as in footnote *e* to Table IX.

[b] Export surplus defined as crop-year net exports.

TABLE XI.—DATA BEARING ON THE SEVERITY OF EXPORT PRESSURE DURING AUGUST–DECEMBER, FROM 1921*

(Million bushels except as noted)

Year	August 1 surpluses[a]		Autumn exports[b]				Percentage of surplus in autumn[c]	
	Argentina	Australia	Russia	Danube	United States	Canada	United States	Canada
1921	20	38	0	14	163	72	64.2	36.0
1922	31	15	1	7	121	129	53.8	45.1
1923	44	24	6	16	76	126	48.4	34.4
1924	44	25	0	20	174	76	67.7	39.2
1925	35	18	20	23	43	124	44.8	37.0
1926	43	13	38	31	119	109	58.9	34.2
1927	44	25	4	22	137	113	72.5	29.3
1928	70	25	0	19	87	190	32.0	39.2
1929	105	31	0	36	77	70	23.8	25.8
1930	40	38	83	29	63	120	19.7	32.8
1931	54	49	63	63	60	82	15.8	26.3
1932	38	40	15	7	23	120	7.6	26.7
1933	48	44	27	19	9	84	4.7	23.2
1934	90	74	1	9	0	80	.0	23.4
1935	56	46	26	13	0	102	.0	30.3
1936	36	32	2	51	0	109	...	53.7
1937	21	30	31	34	41	42	25.3	49.4

* Based on official trade statistics except for estimates of Argentine and Australian exportable surpluses.

[a] Estimated total stocks on August 1 minus estimated requirements for domestic consumption until new crops are harvested.

[b] August–December net exports except for Canada, which are August–November. Net imports ignored. Early data for Russia and Danube partly estimated.

[c] August–December net exports (United States) or August–November net exports (Canada) as percentages of crop-year surpluses in Table X.

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