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THE DISTRIBUTION OF GRAIN AND GRAIN PRODUCTS FROM THE CHICAGO MARKET¹

EDWARD A. DUDDY AND DAVID A. REVZAN²

IN A recently published study³ the authors have shown how grain receipts were concentrated at Chicago from a wide area of supply in the central and southwestern states during the crop years 1924-25 through 1932-33. The purpose here is to reveal the disposition of these receipts during the same period.

Figure 1 shows the long-time fluctuations in grain shipments since 1858, based on data from the *Annual Report of the Chicago Board of Trade for 1933*. The shipments of five grains—barley, corn, oats, rye, and wheat—have varied from 13,322,000 bushels annually to 282,800,000 bushels. Three phases of the general movement are apparent: (1) from 1860 to 1880 the greatest relative increase took place, the volume of shipments increasing four-fold; (2) the period 1880-1915 was one of slower growth, shipments doubling during this time; (3) in the period since 1915 grain shipments have declined to 1878 levels, the volume since 1930 varying between 89 and 109 million bushels annually.

Over the period as a whole, shipments of corn have tended to be larger than the shipments of any other grain, although since 1890 shipments of oats have been on approximately the same level as corn. Corn shipments have varied from 4.3 to 130.4 million bushels each year. After increasing in volume six times from 1858

¹ This is the first of two articles on this subject. Readers desiring more complete statistical information on grain shipments may obtain copies of tables omitted from the text by writing to the authors.

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³ Edward A. Duddy and David A. Revzan, *The Grain Supply Area of the Chicago Market*, "Studies in Business Administration," (Chicago: University of Chicago Press, 1934), Vol. IV, No. 4. See also "The Competitive Position of the Chicago Market in the Area of Grain Supply," *Journal of Farm Economics*, October, 1934.

to 1880, the next thirty-five years were marked by irregularly increasing shipments. Except for marked recovery in 1920 and 1921, corn shipments have declined steadily since 1914. Since 1930 from 28.7 to 51.7 million bushels of corn have moved out of the Chicago market annually.

Shipments of oats from Chicago have varied from 1.1 to 122.8 million bushels annually. Four general movements are apparent

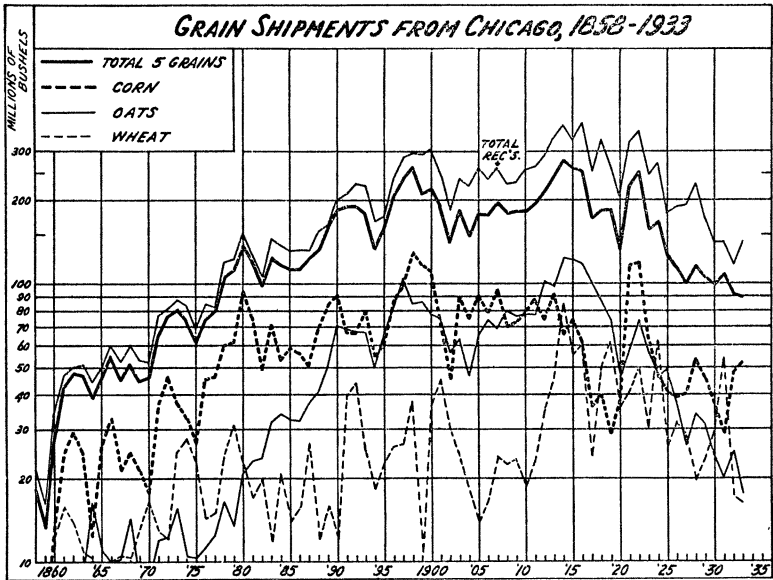


FIG. 1

in the fluctuations of oats shipments: (1) the period 1858-75 was marked by wide fluctuations in volume but saw some increase, particularly from 1858 to 1864; (2) from 1875 to 1897 the volume of shipments increased tenfold; (3) following a 50 per cent decline in volume from 1897 to 1904, the next ten years marked an off-setting increase; (4) since 1914, however, oats shipments have declined steadily and drastically, the volume in 1933 being over 90 per cent less than in 1914-15 and but slightly greater than the 1880 level.

The volume of wheat shipments since 1858 has fluctuated widely from year to year, varying from 7.2 to 85.5 million bushels an-

nually. From 1858 to 1880, despite marked annual fluctuations, the volume of shipments tripled. The following decade saw a 50 per cent decline in volume; but from 1890 to 1901 shipments increased by 100 per cent. Then followed a severe cyclical decline until 1905, after which wheat shipments increased rapidly until 1914, when an all-time peak six times the 1905 level was reached. Since 1914 the decline in volume of shipments has been steady, the 1933 level being less than one-fourth the 1914 peak.

Rye and barley shipments from Chicago are of much less importance than shipments of the three grains analyzed above. From 1858 to 1891 there was a marked rise in the volume of rye shipments from 8,000 to 7,600,000 bushels, the peak for the period. By 1910 this increase had been more than wiped out. The years following saw shipments increase again to 1924 only to have this increase disappear in the years after 1924. Barley shipments have varied from 132,000 to 13.4 million bushels annually. Four tendencies are apparent since 1858: (1) from 1858 to 1892 shipments increased a hundred fold; (2) the volume by 1902 was approximately one-third of the 1892 shipments; (3) in the years following 1902 up to 1919 the volume of shipments doubled; (4) since 1919 there have been drastic declines, the 1932-33 level being but one-tenth as large as the 1919 level.

Traditionally Chicago has been a forwarding market in contrast to Minneapolis and Kansas City, where large processing industries are present. Since 1924, with the exception of 1930-31, one-half or more of the total supply of all grains in the market⁴ has been reshipped. From 1900 on, however, the general tendency has been toward shipping a smaller relative share of receipts. Total receipts have declined and along with them the per cent of receipts shipped out (Table I).

Further light is thrown upon this declining ratio of shipments to market supply by reference to the ratios reported for the separate grains. For wheat, a high ratio of shipments was reached during the war years, and in the early 1920's, when large exports

⁴ "Total supply" available in the market is equal to the stocks in store at the beginning of a calendar year, plus receipts during the calendar year. July 1 has been taken arbitrarily as the beginning of the crop year for all grains.

moved to Europe to make up deficits created in the European supply by the war. In 1924, also, Europe had a short wheat crop while the crop in this country was very large. The drop in the ratio after 1924 is undoubtedly due to the failure of wheat exports. From 1929 to 1931, also, stocks of wheat were accumulating under the price-pegging arrangement of the Federal Farm Board.

Local wheat consumption (see Table II) increased in 1925-26, with expansion in flour milling. After 1928-29, however, the proportion of wheat supply used locally appears to have fallen con-

TABLE I*
PERCENTAGE OF GRAIN AVAILABLE FOR RESHIPMENT ACTUALLY
RESHIPED FROM CHICAGO, FIVE-YEAR AVERAGES,
1900-1933

Five-Year Periods	Wheat	Corn	Oats	Rye	Barley	Total Five Grains†
1900-1904	65.8	80.0	72.7	60.5	22.1	70.1
1905-9	64.2	77.7	78.1	56.0	31.2	71.6
1910-14	72.1	70.1	78.5	49.3	24.8	69.9
1915-19	71.3	53.3	71.4	72.5	34.3	63.6
1920-24	75.3	55.5	62.5	74.0	39.8	61.3
1925-29	60.2	43.1	62.1	33.5	32.5	50.5
1930-33†	59.9	52.4	75.1	36.9	28.5	56.6

* Data from annual reports of the Board of Trade of Chicago.

† Four-year average.

siderably.⁵ Chicago is on an importing basis in terms of flour, but large quantities are reshipped to the East and the Southeast. From 1920 to 1933, 26-50 per cent of the supply of flour in the market was reshipped. Stocks of flour in Chicago warehouses are not adequately reported so that it is impossible to determine with any degree of accuracy the volume of local flour consumption. There was an apparent increase in consumption from 1924 to 1928, after which the decline in consumption appears to have been constant through 1933. This conforms to the changes in per

⁵ For the years 1926 and 1929-33, inclusive, however, flour manufactured in the city in wheat equivalent appears to be above 100 per cent of the wheat reported as used locally. Wheat received directly at the mills from country elevators was recorded in the market receipts but stocks on hand in the mill elevators at the beginning and end of the year are not reported to the Board of Trade. The carry-over of these stocks accounts for the apparent excess of flour manufactured.

capita consumption of flour in the United States over the same period. A loss of population in Chicago of about 100,000 people between 1929 and 1933, as well as a declining per capita consumption, would account for most of the shrinkage.

Increased processing of corn in Chicago for corn products and for feed accounts for the striking decline in the corn-shipments

TABLE II*
 RATIOS OF SHIPMENTS AND OF SUPPLY AVAILABLE FOR LOCAL CONSUMPTION AND PROCESSING TO THE TOTAL SUPPLY OF GRAIN IN THE MARKET, 1924-25—1932-33

	ALL GRAINS		WHEAT		CORN		OATS		BARLEY		RYE	
	Ratio of Shipments to Total Supply	Ratio of Local Consumption to Total Supply	Ratio of Shipments to Total Supply	Ratio of Local Consumption to Total Supply	Ratio of Shipments to Total Supply	Ratio of Local Consumption to Total Supply	Ratio of Shipments to Total Supply	Ratio of Local Consumption to Total Supply	Ratio of Shipments to Total Supply	Ratio of Local Consumption to Total Supply	Ratio of Shipments to Total Supply	Ratio of Local Consumption to Total Supply
1924-25..	63.7	27.5	83.1	13.0	44.5	47.2	71.5	16.9	33.4	65.0	64.0	9.8
1925-26..	51.3	33.7	57.1	35.9	37.9	42.9	79.2	11.6	24.4	72.5	36.1	16.6
1926-27..	56.9	31.9	71.4	24.4	45.2	38.5	73.0	18.5	38.3	61.2	51.9	44.6
1927-28..	58.9	34.0	61.5	25.5	51.0	42.2	80.0	16.7	37.8	61.3	34.2	58.8
1928-29..	52.8	33.8	34.5	23.6	50.3	44.2	79.1	15.3	53.5	42.7	16.4	28.9
1929-30..	55.1	32.7	55.9	19.0	47.9	49.7	80.4	11.7	33.5	64.4	26.4	13.8
1930-31..	40.8	34.6	42.2	13.8	40.3	55.1	64.0	33.8	38.3	49.1	58.0	13.7
1931-32..	55.1	26.9	62.1	14.9	42.0	43.6	82.3	9.5	19.7	78.5	11.3	34.6
1932-33..	53.9	29.1	50.2	30.2	53.6	32.5	76.4	9.5	14.2	69.6	15.5	18.0

* Owing to the fact that "receipts" and "shipments" as reported by the Chicago Board of Trade include through-billed cars, the foregoing ratios have been determined by using "inspections in" as a measure of receipts and transit shipments plus movement out by lake as a measure of shipments. The difference between the sum of the two ratios and 100 per cent represents the amount of a particular grain held in store, and afloat in harbor at the end of the year.

ratios. Since corn moves in heavier volume than any of the other grains, the decline here largely explains the drop in relative shipments for the total of all grains (Table I). After 1926, however, the shipments ratio increased. Processing continued to expand the demand for corn locally until 1930-31. Curtailment in processing was especially severe in 1932 and 1933, when the industrial demand for corn declined; shipments correspondingly increased (Table II).

There has been a rather constant decline in receipts of oats since

1922, accelerated to a degree in the last four years. As supplies have contracted, the relative amount reshipped has increased, except in 1930-31. This would indicate the existence of a rather constant demand in the East, with contraction of the amount used in the market locally.⁶ The decline in the demand for processed feeds during the depression years may also help to account for the small ratio of local consumption and processing of oats. The year 1930-31 is a notable exception.

The irregularity of the rye-shipment ratios reflects the uncertainty of supply in the market. Declines in this ratio since 1925 are explained by the scarcity of receipts and the need of rye locally for grinding. The exceptionally high ratio of shipments in 1930-31 was the result of a speculative accumulation of stocks in the fall of 1929. As this is written, rye is being imported into Chicago in considerable quantities from abroad. Stocks of rye on hand at the end of the year are a larger proportion of total supply than for other grains (Table II).

Shipment ratios for barley are interesting in that they show a reverse tendency to those for other grains. While receipts have declined since 1900, the ratio of shipments increased until 1925. Evidently there was less local demand for barley for malting after the adoption of the prohibition amendment in January of 1919. From 1931-32 on, however, local consumption for malting and for mixing with other feed grains has increased while shipments have correspondingly declined. Failure of the export market has affected barley shipments.

The data⁷ upon which this study is based make possible a de-

⁶ Mr. Louis Sayre, of the Rosenbaum Grain Corporation, is authority for the statement that before the operation of the Grain Standards Act in 1916 a large volume of a mixture of oats and barley, classed as oats, moved out of Chicago for feed. This would account for the very high ratio of oats shipments in the early part of the period and likewise for the low ratio of barley shipments.

⁷ Data of shipments by rail are from the records of cars of grain registered for transit with the Central Weighing and Inspection Bureau. Data of shipments by lake and their destinations are from the records of L. C. West, statistician of the Chicago Board of Trade. Data of total shipments by lake and rail as reported in this study do not correspond to shipments as shown in the annual reports of the Chicago Board of Trade. Shipments as reported by the Board of Trade are based on cars loaded out of the market by rail or in cargo lots by water without reference to whether the grain was registered for transit. Thus transit grain may, during a twelve months' period, be greater or less than the total amount reported loaded out by rail.

termination of the geographical destinations of grain shipments from Chicago, and thus a relatively accurate description of the distribution area of the market. This movement out of the market is considered with reference to shipments both by water and by rail and whether for domestic use or for export.

THE DISTRIBUTION AREA OF THE CHICAGO MARKET

When the combined shipments of five grains from Chicago since 1924 (on a fiscal year basis) are averaged, it is found that this market shipped the equivalent of 64,685 cars each year (Table III). Nearly one-half of this amount, 48.9 per cent, moved by lake to 30 ports; 17.4 per cent went to Canadian ports. Rail shipments for domestic consumption accounted for 46.8 per cent of the total shipments, 3.29 per cent going to Canada; while rail shipments to 18 ports for export accounted for the balance, 4.2 per cent.

Two-fifths of all grain shipped from Chicago was corn; 29.2 per cent wheat; 23.8 per cent oats; 2.7 per cent barley; and 3.1 per cent rye. These percentages are based on the record of grain registered for transit.⁸

Lake shipments are not eligible for the transit rate. Again the transit privilege may expire on grain held in an elevator beyond the allowed period without any movement of the grain out of the market.

A check of the data of grain registered for transit against the shipments data of the Board of Trade report for the nine-year period shows the following ratios of transit grain to railroad reported shipments: wheat, 83.5; corn, 97.4; oats, 106.2; rye, 90.6; and barley, 87.2. Carry-over of oats eligible for transit explains the fact that transit shipments in certain years exceeded rail shipments.

A further reason for failure of the two records to check is the fact that the Board of Trade data of rail receipts and shipments include, together with the cars actually unloaded and reloaded at the market, through-billed and reconsigned cars which merely pass through Chicago. The inclusion of such cars tends to inflate the volume of reported receipts and shipments. For an estimate of the volume of through-billed cars see *Report of the Federal Trade Commission on the Grain Trade*, II, 19.

Shipments are shown in car-lots, bushels being converted to cars on the basis of the average contents of cars of each grain received in each year as reported by the Board of Trade weigh-master. For the period considered, the average contents of a car of wheat was 1,444 bushels; corn, 1,517 bushels; oats, 2,113 bushels; barley, 1,596 bushels; and rye, 1,463 bushels.

⁸ Data of the *Annual Report of the Board of Trade* show the following proportions over the same period: corn, 37.1 per cent; wheat, 28.7 per cent; oats, 28.5 per cent; barley, 2.9 per cent; and rye, 2.9 per cent. The greatest variation between the two records was in the case of corn and oats.

Shipments by lake.—Of the 30 ports receiving grain shipments from Chicago by lake, 17 were located in Canada and 13 in the

TABLE III
AVERAGE ANNUAL CAR-LOT SHIPMENTS OF FIVE GRAINS FROM
CHICAGO, BY DESTINATIONS, JULY, 1924—JUNE, 1933

Destinations	Number	Per Cent
<i>By rail—for domestic consumption:</i>		
Central Freight Association	7,929	12.26
Trunk Line Freight Association	11,845	18.31
New England Freight Association	4,180	6.46
Canadian Freight Association	2,130	3.29
Southern Freight Association	2,997	4.63
Illinois-Western Association	1,206	1.87
Total	30,287	46.82
<i>By rail—for export:</i>		
Baltimore, Md.	1,055	1.63
New York, N.Y.	739	1.14
All others*	950	1.47
Total	2,744	4.24
<i>By lake—for domestic consumption or export:</i>		
Buffalo, N.Y.	17,044	26.35
Cardinal, Ontario	445	.69
Collingwood, Ontario	995	1.54
Depot Harbor, Ontario	2,441	3.77
Midland, Ontario	634	.98
Montreal, Quebec	2,651	4.10
Ogdensburg, N.Y.	561	.87
Owen Sound, Ontario	728	1.13
Port Colborne, Ontario	689	1.07
Port McNicoll, Ontario	501	.77
Tiffin, Ontario	2,805	4.34
Toledo, Ohio	549	.85
All others†	1,611	2.48
Total	31,654	48.94
Grand total	64,685	100.00

* All others—Boston, Mass.; Galveston, Tex.; Halifax, Nova Scotia; Hampton Roads, Va.; Key West, Fla.; Mobile, Ala.; Montreal, Quebec; New Orleans, La.; Newport News, Va.; Norfolk, Va.; Petersburg, Ontario; Philadelphia, Pa.; Portland, Me.; St. John, New Brunswick; Undercliff, N.J.; and Weehawken, N.J.

† All others—Baltimore, Md.; Duluth, Minn.; Erie, Pa.; Fairport, Ohio; Gladstone, Mich.; Goderich, Ontario; Halifax, Nova Scotia; Kingston, Ontario; Milwaukee, Wis.; New York, N.Y.; Oswego, N.Y.; Philadelphia, Pa.; Port Huron, Mich.; Quebec, Quebec; Sarnia, Ontario; Sorel, Quebec; Toronto, Ontario; and Walkerville, Ontario.

United States. Most important of the 30 ports was Buffalo, which received an average of 17,044 cars a year, 26.4 per cent of the total

shipments from Chicago. Buffalo is the eastern terminus of transportation on the Great Lakes and is a major processing and distributing center for New York and New England. The relative importance of the remaining ports may be noted in Table III.

When the lake shipments are grouped according to whether the destinations were on the Great Lakes or on the Atlantic Ocean, and whether the ports were in Canada or in the United States, Table IV shows the distribution for the nine-year period. It is read-

TABLE IV

	RECEIPTS FROM CHICAGO Cars
Lake ports in the United States	18,862
Lake ports in Canada	10,004
Atlantic ports in Canada	2,726
Atlantic ports in the United States	62

Total	31,654

ily apparent that the lake ports received over ten times as many cars of grain moving by water from Chicago as did the Atlantic ports, and that the lake ports in the United States received approximately 85 per cent more grain from Chicago than did the Canadian lake ports.

Data published by the Chicago Board of Trade indicate that from 2.2 to 22.5 per cent of the total lake shipments, 1,467,000-16,664,000 bushels, were for export (Table V).

Rail shipments for domestic consumption.—Shipments of grain by rail for domestic consumption are distributed among six groups of destinations: (1) Central Freight Association Territory; (2) Trunk Line Territory; (3) New England Territory; (4) Canadian Territory; (5) Southern Territory; and (6) Illinois and Western Territory. These are territorial divisions based on freight-rate systems (see Fig. 2).

Trunk Line Territory is the most important destination for grain moving out of Chicago by rail for domestic consumption. This territory received an average of 11,845 cars annually, 18.3 per cent of the total Chicago shipments. The Central Freight Association received 7,929 cars, 12.3 per cent of the total shipments.

TABLE V*
 PERCENTAGE OF TOTAL LAKE SHIPMENTS FROM CHICAGO EXPORTED
 (Bushels—ooo omitted)

GRAIN	1924		1925		1926		1927		1928		1929		1930		1931		1932		1933			
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent		
Barley.....	.....	.....	54	42.5	.....	.....	.....	.....	1,538	86.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Corn.....	650	4.4	504	3.3	1,776	9.9	1,335	6.6	1,932	12.8	2,071	13.1	673	4.5	910	5.8	4,823	11.9	2,667	9.2	.....
Oats.....	.....	.....	3,362	25.3	.....	.....	482	8.4	1,495	22.6	145	1.7	.....	.....	.....	.....	431	2.7	.....	.....	.....
Rye.....	835	24.4	312	10.2	748	54.2	548	39.5	280	36.6	272	70.1	.....	.....	.....	.....	313	38.1	.....	.....	.....
Wheat.....	15,179	31.8	2,428	24.5	6,048	29.9	7,588	39.8	.....	.....	829	8.0	1,157	7.5	557	1.3	.....	.....	.....	.....	.....
Total.....	16,664	22.5	6,660	15.9	8,572	17.1	9,953	21.4	5,245	18.3	3,317	9.4	1,830	4.6	1,467	2.2	5,567	8.8	2,667	5.2

* These are estimates published in the annual reports of the Chicago Board of Trade. Final disposition of grain billed for export from Chicago is not known.

New England Territory received an average of 4,180 cars annually, 6.5 per cent of the total, while the Southern Territory received 2,997 cars, equivalent to 4.6 per cent of the total. Shipments to Canadian Territory amounted to 2,130 cars annually, 3.3 per cent of all shipments. Illinois and Western Territory was the least important of all destinations, receiving an average of 1,206 cars annually, 1.9 per cent of the total shipments (see Table III).⁹

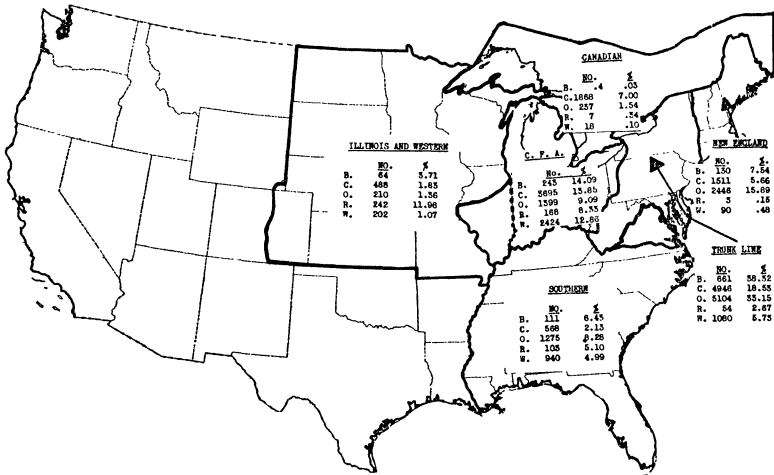


FIG. 2.—Carlot distribution of five grains by rail to freight-rate territories, average 1924-25 to 1932-33.

Rail shipments for export.—Although 18 ports received grain from Chicago for export purposes, but 2 of these ports, Baltimore and New York City, received more than 1 per cent of Chicago's total shipments. The former received an average of 1,055 cars annually, 1.6 per cent of the total, while New York City received an average of 739 cars, 1.1 per cent of the total. None of the remaining ports received as much as 1 per cent of the total shipments (see Table III).

From the foregoing analysis it will be noticed that Chicago sent 57 per cent of its total shipments to three destinations: Buffalo, New York; Trunk Line Territory; and Central Freight Associa-

⁹ For a report of rail shipments of grain from Chicago to destination territories in 1923 see *Transportation on the Great Lakes* (Washington: Board of Engineers for Rivers and Harbors, War Department, 1926), p. 124.

tion Territory. It must be remembered, however, that the two territories mentioned conceal a great number of individual destinations and are not therefore directly comparable with the lake ports. An average of 15.0 per cent of total shipments went into export by rail or via lake.

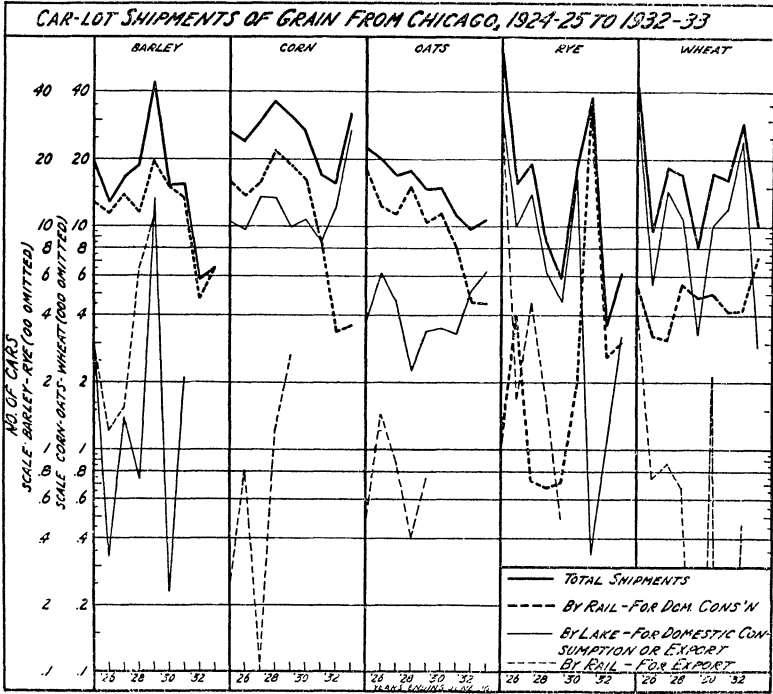


FIG. 3

THE DISTRIBUTION AREA FOR BARLEY

Car-lot shipments of barley from Chicago since 1924-25 have varied from 583 to 4,434 cars annually (see Fig. 3). By far the greater proportion was shipped by rail for domestic consumption. This type of movement accounted for from 482 to 1,964 cars annually, 44.3-100 per cent of the total barley shipments; the average for the nine years was 1,209 cars, 70.1 per cent of the total. The movement by rail for export accounted for from 2 to 1,137 cars annually, and from 0.13 to 34.6 per cent of the total move-

ment. There have been no shipments for export since 1929-30. On an average basis for nine years, this movement amounted to 263 cars, 15.3 per cent of the total movement. From 23 to 1,333 cars moved annually by lake, equivalent to 1.5 to 30.1 per cent of the total. There were no shipments of barley by lake in 1932-33. Over the nine-year period the lake shipments averaged 253 cars, 14.7 per cent of the total movement.

Shipments by rail for domestic consumption.—By far the greater part of barley shipments by rail went to destinations in Trunk Line Territory. This territory received from 248 to 1,145 cars annually, and 25.8 to 54.7 per cent of the total barley shipments. Data available since 1927-28 indicate that from 1 to 7 per cent of the total shipments to Trunk Line Territory moved to the Atlantic ports. The Central Freight Association ranked second, receiving from 87 to 422 cars from Chicago annually, and from 6.4 to 27.6 per cent of the total shipments. Chicago shipped from 17 to 335 cars annually to the New England Territory, 2.9-14.4 per cent of the total shipments. From 10 to 329 cars and from 0.77 to 21.3 per cent of the total shipments went to Southern Territory. Illinois and Western Territory took 36-120 cars and 1.7-20.6 per cent of the total shipments.

Generally, shipments by rail for domestic consumption increased in volume up to 1928-29 but have since suffered a drastic decline. Relative to total shipments, however, there has been a tendency for this type of movement to increase in importance, all of the barley moving from Chicago in 1932-33 being of this type of shipment. The Southern, Illinois and Western territories have tended to profit more, relatively, than have the other territories.

Shipments by rail for export.—Barley moving from Chicago for export was billed to 9 ports. The most important, New York City, received from 98 to 399 cars and from 7.5 to 20.7 per cent of the total shipments. Since 1928-29, however, there have been no shipments to this port. Baltimore was the only other port to receive more than 1 per cent of Chicago's total barley shipments each year. From 3 to 473 cars and from 0.23 to 13.0 per cent of the total shipments were destined to this port. As was the case for New York City, no barley shipments have been consigned to

this port since 1928-29. Philadelphia received 0.99 per cent of the total shipments—on the average, 17 cars of barley per year. Two other ports, Norfolk and New Orleans, received small annual shipments.

After reaching a peak of importance in 1928-29 as far as physical volume was concerned, this type of movement has disappeared entirely, coincident with the disappearance of the greater part of our foreign trade. It was in 1928-29 that a controversy arose with German importers over barley blight on barley from the United States.

Shipments by lake.—Barley shipments from Chicago by lake went to 5 ports: Buffalo, New York; Depot Harbor, Midland, and Port Colborne, Ontario; and Montreal, Quebec. All of these, with the exception of Midland, received more than 1 per cent of the total barley shipments. Montreal, the most important of these ports, received shipments of barley in two years, 1925-26 and 1928-29, amounting to 33 and 948 cars, respectively, or 2.6 and 21.4 per cent of the total shipments. Buffalo received shipments in five years varying from 39 to 360 cars and from 0.88 to 13.6 per cent of the total shipments. There were no consignments to this port in 1925-26, 1926-27, 1929-30, or 1932-33. Depot Harbor, Port Colborne, and Midland received from 21 to 157 cars annually at irregular intervals from 1926-27 to 1929-30.

This type of movement has tended to decrease in importance over the period, owing in part to the disappearance of the foreign market for grain. In 1924, 42.5 per cent of the total lake shipments, or 54,000 bushels, were for export purposes; in 1928, 1,538,000 bushels, 86.4 per cent of the total, were for export (Table V).

THE DISTRIBUTION AREA FOR CORN

Shipments of corn from Chicago in car-lot quantities since 1924-25 have varied from 15,694 to 36,355 cars (see Fig. 3). The volume of shipments decreased by approximately 40 per cent from 1924-25 to 1931-32, but recovered sharply in 1932-33. Shipments by rail for domestic consumption averaged 13,076 cars, 49 per cent of the total. Lake shipments were for all practical purposes as important, with 13,047 cars, or 48.9 per cent of the total

shipments. The remainder, 564 cars, or 2.1 per cent of the total, moved by rail for export. This type of movement was important only from 1924-25 to 1928-29.

Shipments by rail for domestic consumption.—Shipments varied from 3,412 to 21,659 cars annually, and from 11.2 to 60.1 per cent of the total. After reaching a peak in 1927-28, this type of shipment has declined rapidly, the volume in 1932-33 being but one-sixth of the 1927-28 peak. The most important destination was Trunk Line Territory, which received 471-8,638 cars of corn annually, and from 3 to 28.4 per cent of the total shipments. Over the nine-year period the average was 4,946 cars and 18.5 per cent. Through 1929-30 shipments to this territory by rail increased in relative importance only to decline sharply after this date. Corn destined to Trunk Line Territory went east mostly by water to Buffalo after 1929-30. Data available since 1927-28 indicate that 1-17 per cent of the shipments to this territory were consigned to the Atlantic ports.

Central Freight Association Territory received 1,214-6,953 cars annually, and from 4.8 to 19.1 per cent of the total shipments. The nine-year average was 3,695 cars and 13.9 per cent. Shipments to this territory fell off sharply after 1930-31. Canadian Territory points received 337-3,491 cars annually, and from 1.05 to 12.0 per cent of the total shipments, averaging for the period 1,868 cars and 7 per cent of the total shipments. After 1926-27 movement of corn into Canada declined to the low point in 1932-33. Destinations in the New England Territory received 50-2,847 cars annually, and from 0.16 to 9.4 per cent of the total shipments. The Southern Territory received 36 to 1,420 cars annually and 0.11-4.5 per cent of the total shipments. Like the rail movement to other territories, shipments to New England were adversely affected by transportation costs which were relatively much higher after the drop in prices in 1930-31. From 30 to 1,193 cars of corn were shipped from Chicago to Illinois and Western Territory, varying from 0.17 to 6.7 per cent of the total shipments. These latter territories have tended to diminish in importance over the nine years analyzed.

Shipments by lake.—Shipments of corn from Chicago moving by

lake were destined to 23 ports—15 in Canada and 8 in the United States. Six ports—Buffalo, Cardinal, Collingwood, Depot Harbor, Owen Sound, and Tiffin—received shipments over the entire nine-year period. Kingston, Midland, Montreal, Ogdensburg, and Port McNicoll received significant quantities during several of the nine years analyzed. From 504,000 to 4,823,000 bushels of corn and from 3.3 to 13.0 per cent of the total lake shipments from Chicago were for export (Table V).

Total shipments by lake varied from 8,523 to 28,433 cars annually, and from 31.5 to 88.8 per cent of the total shipments. From 1924-25 to 1930-31 there was a slight decline in the physical volume of shipments, but since 1930-31 lake shipments have more than tripled. This increase in lake relative to all-rail shipment may be attributed to the greater relative burden of an inflexible rail rate on a sharply declining corn price. Lake cargo rates adjusted themselves more readily to the lower corn prices.¹⁰

Buffalo was the most important of the lake ports receiving corn from Chicago. On the average this port received 6,378 cars, or 23.9 per cent of the total shipments. During the nine years, shipments varied from 3,935 to 16,650 cars annually, and from 14.6 to 52 per cent of the total shipments. Tiffin, Ontario, ranked second, receiving 725-3,774 cars and 3.1-14 per cent of the total shipments each year, with an average for the period of 2,097 cars and 7.9 per cent. Other Canadian lake ports which were important destinations for American corn were Depot Harbor, with an average of 962 cars; Collingwood, with 735 cars; Owen Sound, with 448 cars; Cardinal, with 442 cars; Port McNicoll, with 345 cars. Ogdensburg, New York, received shipments from Chicago in 1924-25, 1925-26, 1931-32, and 1932-33, varying from 498 to 1,466 cars and from 2.1 to 8.6 per cent of the total shipments. For the nine-year period, however, the average was but 504 cars, 1.9 per cent of the total shipments. Of the 15 remaining ports receiving corn from Chicago, 12 received from 0.10 to 0.87 per cent of the total shipments, respectively. All the lake ports, with the exception of Depot Harbor, show an increase in relative importance during the period 1924-25 to 1932-33.

¹⁰ The ratio of the all-rail rate on corn to the lake-rail rate rose from 123 in 1927-31 to 161 in 1932-33 (see *The Grain Supply Area of the Chicago Market*, p. 7).

Shipments by rail for export.—From 1924-25 to 1928-29 Chicago shipped 110-2,663 cars and 0.37-8.4 per cent of its total shipments of corn by rail to 12 ports for export purposes. Since 1928-29 there has been no movement into export of any importance, 8 cars being shipped in 1929-30, 3 cars in 1931-32, and 1 car in 1932-33. On the basis of a nine-year average, no port has received as much as one-half of 1 per cent of Chicago's total shipments. In 1928-29, however, 2.7 per cent went to Baltimore, 1.3 per cent to New York City, 1.2 per cent to St. John's (New Brunswick), 1 per cent to Philadelphia, 0.93 per cent to Norfolk, and 0.85 per cent to Newport News.

THE DISTRIBUTION AREA FOR OATS

Chicago shipped 9,774-22,653 cars of oats annually (see Fig. 3). On an average basis, 10,671 cars, or 69.3 per cent of the total movement, were shipped by rail for domestic consumption; 4,281 cars, or 27.8 per cent of the total, by lake for domestic consumption or export; and 445 cars, or 2.9 per cent, by rail for export. There has been a steady decline in the total shipments of oats, the volume in 1932-33 being but 50 per cent of the 1924-25 volume. After 1930-31 shipments by rail contracted, while the movement by lake increased from 30 to over 50 per cent of total shipments. The reason for this was the very favorable ratio of lake-rail to all-rail rates.

Shipments by rail for domestic consumption.—Annual shipments by rail for domestic use varied from 4,488 to 18,364 cars and from 41.7 to 84.9 per cent of the total shipments from Chicago. On an average, 5,104 cars, or 33.2 per cent of the total shipments, were consigned to Trunk Line Territory. During the nine years, however, shipments to this territory varied from 2,151 to 7,364 cars and from 22 to 41.2 per cent of the total shipments. While rail movement to Trunk Line Territory declined sharply after 1929-30, the increase in lake shipments to Buffalo more than made good the loss into the territory by rail. Based on data available since 1927-28, from 4 to 11 per cent of the total shipments to this territory moved directly to Atlantic ports.

From 443 to 5,155 cars and from 4.1 to 22.8 per cent of the total

went to New England Territory each year, with an average for the period of 2,446 cars and 15.9 per cent. Destinations in the Central Freight Association Territory received from 760 to 2,348 cars and from 5.2 to 13.4 per cent of the total shipments annually. The Southern Territory received 33-3,880 cars and 0.34-17.1 per cent of the total shipments. Shipments to New England declined abruptly after 1929-30, and to Central Freight and Southern territories after 1930-31. Oats shipments to Canadian Territory varied annually from 12 to 498 cars and from 0.10 to 4.0 per cent of the total shipments. Illinois and Western Territory points received annually 37-344 cars and 0.25-2.5 per cent of the total shipments.

Shipments by lake.—Seventeen lake ports, 11 in Canada and 6 in the United States, received shipments of oats from Chicago, varying from 2,269 to 6,268 cars and from 12.8 to 58.2 per cent of the total shipments. Buffalo received annually 702-3,545 cars and 5.5-32.9 per cent of the total shipments. Buffalo receipts increased sharply after 1930-31. Depot Harbor received 206-2,129 cars and from 1.2 to 10.6 per cent of the total shipments. Shipments to Tiffin varied from 254 to 855 cars and from 2 to 5.5 per cent of the total shipments; this port, however, received no oats from Chicago in 1924-25 and 1932-33. Toledo has been a receiving port for oats from Chicago since 1929-30, receiving 195-1,533 cars and 1.8-15.7 per cent of the total annual shipments. Shipments to this port helped to make up the decline in rail movement into Central Freight Territory after 1929-30. Montreal received oats from Chicago during six of the nine years, varying from 38 to 936 cars and from 0.17 to 5.6 per cent of the total shipments. Shipments to Owen Sound, Ontario, varied from 27 cars in 1930-31 to 732 cars in 1932-33. All ports except Depot Harbor increased in relative importance as receivers of oats from Chicago from 1924-25 to 1932-33.

Lake shipments of oats in five years—1925, 1927, 1928, 1929, and 1932—were destined for export purposes, varying from 1.7 to 25.3 per cent of the total lake shipments (Table V).

Shipments by rail for export.—Twelve ports, of which 3 were located in Canada, received annual shipments of oats from Chicago varying from 7 to 1,440 cars and from less than one-tenth of

1 per cent to 7.2 per cent of the total shipments. New York City was the only port to receive more than 1 per cent of the total annual shipments. This port received from 3 to 1,111 cars annually and from less than one-tenth of 1 per cent to 5.6 per cent of the total shipments. Over three-fourths of the rail movement for export purposes is accounted for by the movement to New York City. This movement disappeared after 1928-29.

THE DISTRIBUTION AREA FOR RYE

Shipments of rye have fluctuated widely between limits of 362 and 6,671 cars each year, but there has been a downward tendency, the 1932-33 shipments being but 10 per cent of the 1924-25 volume (see Fig. 3). Shipments by lake have averaged 983 cars and 48.7 per cent of the total shipments. Rail shipments for domestic consumption averaged 577 cars, 28.6 per cent of the total shipments, while shipments by rail for export averaged 460 cars and 22.8 per cent of the total shipments.

Shipments by lake.—Chicago shipped rye to 10 lake ports, although some received shipments in but one or two years. Total shipments by lake varied from 34 to 3,273 cars annually and from 0.9 to 89.1 per cent of the total shipments. From 1924 through 1929 and in 1932, 10.2-70.1 per cent of the total lake shipments were for export (Table V).

Buffalo received 34-2,452 cars annually and 0.9-57.6 per cent of the total shipments. Although ranking first in receipts, this port did not receive any rye from Chicago in 1930-32. Montreal received rye from Chicago from 1924-25 to 1929-30 and again in 1931-32. These shipments varied from 31 to 582 cars and from 1.7 to 30.2 per cent of the total shipments. Other Canadian ports receiving important shipments were Depot Harbor, Owen Sound, Port Colborne, Collingwood, Midland, Port McNicoll, and Godrich. The Canadian ports as a group accounted for 19 per cent of total rye shipments over the whole period. Shipments to all lake ports decreased nearly one hundred times from 1924-25 to 1930-31, but have since recovered in relative importance.

Shipments by rail for domestic consumption.—From 67 to 3,738 cars were shipped to destinations by rail for domestic purposes, amounting to 1.5-99.1 per cent of the total shipments. An average

for the period shows 28.6 per cent of total shipments in this type of movement. Illinois and Western Territory received 1-40 cars annually with the exception of 1930-31; in that year, 2,079 cars, 55 per cent of the total shipments, went to destinations in that territory.¹¹ Central Freight Association Territory received from 1 to 925 cars and from 0.10 to 28.5 per cent of the total shipments. Southern Territory received 6-459 cars and 0.19-31.5 per cent of the total annual shipments, except in 1926-27, when no rye shipments were consigned to destinations in this territory. Chicago shipped 3-273 cars and 0.12-10.8 per cent of its total shipments annually to Trunk Line Territory. A few shipments to this territory from 1927-28 to 1932-33 were consigned to Atlantic ports. Minor quantities of rye were shipped to New England and Canadian territories.

There was a marked increase in the movement by rail for domestic use up to 1930-31, with an accompanying increase in relative importance. Since 1930-31, however, this type of movement has tended to lose in importance to lake shipments. All territories, excepting Central Freight Association and Trunk Line, follow this trend. The latter two show steady increases in relative importance over the whole period.

Shipments by rail for export.—This type of movement was present from 1924-25 to 1929-30, varying annually from 5 to 3,301 cars and from 0.27 to 49.5 per cent of the total shipments. Although 9 ports received these shipments, but 2 were of any importance. Baltimore received shipments ranging from 1 to 3,277 cars and from 0.17 to 49.1 per cent of the total shipments. New York City received 3-278 cars and 0.27-14.4 per cent of the total shipments. The disappearance of the greater part of our foreign trade has, of necessity, wiped out this type of movement since 1929-30, and the market is now on an importing basis.

THE DISTRIBUTION AREA FOR WHEAT

The period 1924-25 to 1932-33 saw an average of 18,856 cars of wheat shipped annually from Chicago, with a range of 8,113-43,968 cars (see Fig. 3). More than two-thirds of this movement

¹¹ In December, 1929, an eastern syndicate took delivery of all available rye, on December future contracts. In the effort to distribute the large stocks much rye went to downstate Illinois points which were not usually in the market.

on the average, 13,090 cars, or 69.4 per cent of the total, was shipped by lake. Approximately one-fourth (25.2 per cent), 4,754 cars, was shipped by rail for domestic consumption. The remainder, 1,012 cars, or 5.4 per cent of the total, was shipped by rail for export.¹² After an 80 per cent decline in volume from 1924-25 to 1925-26, there has been no definite tendency apparent in the trend of total wheat shipments from Chicago.

Shipments by lake.—Although lake shipments went to 22 ports, but 2 of these, Buffalo and Montreal, received shipments steadily during the greater part of the period studied. Shipments to Buffalo varied from 2,697 to 21,237 cars and from 26.7 to 50.9 per cent of the total shipments. Montreal received shipments from Chicago from 1924-25 to 1930-31, ranging from 36 to 6,414 cars and from 0.44 to 28.3 per cent of the total shipments. Other ports receiving from 1 up to 6 per cent of average total shipments were Port Colborne, Depot Harbor, Midland, and Tiffin in Ontario, and Erie, Pennsylvania. Toledo, Sarnia, Fairport, Owen Sound, and Goderich received shipments during single years, each of which averaged from one-half to 1 per cent of the average annual shipments for the period. Except in 1928, 1932, and 1933, 557,000-15,179,000 bushels of wheat moved from Chicago for export, varying from 1.3 to 39.8 per cent of the total shipments by lake (Table V).

This type of movement maintained its relative importance until 1932-33. In this year shipments were entirely by rail to destinations within the United States. Elevator space at the lake ports was too congested to receive more grain. Total shipments were greatly curtailed in this year. Because of the congestion of elevator space at the ports, the very favorable ratio of lake-rail to all-rail rates failed to stimulate lake tonnage.

Shipments by rail for domestic consumption.—Shipments of wheat for domestic use varied from 3,103 to 7,240 cars annually and from 12.5 to 71.7 per cent of the total shipments. There was a gradual increase in the volume of these shipments from 1924-25 to 1932-33, but rather wide variations in their relative importance, the peak of importance being reached in 1932-33, when lake ship-

¹² Approximately 19.1 per cent of total annual shipments of wheat were exported during the period considered.

ments were at a low point. Only in one other year, 1928-29, did shipments by rail for domestic consumption exceed lake shipments. In both years total shipments were unusually small.

The Central Freight Association Territory ranked first, receiving 1,050-3,590 cars annually, and 5.3-35.5 per cent of the total shipments, with an average for the period of 2,424 cars and 13.9 per cent. Trunk Line Territory received from 385 to 1,871 cars and from 2.4 to 18.5 per cent of the total shipments, the average being 1,080 cars and 5.7 per cent. Atlantic ports in this territory received from 1.4 to 4.4 per cent of the total shipments since 1927-28.¹³ Shipments to destinations in Southern Territory ranged from 317 to 1,708 cars and from 1.7 to 16.9 per cent of the total shipments. Illinois and Western Territory received 30-531 cars annually and from 0.23 to 3.1 per cent of the total shipments. Of the four important territories, all but the Illinois and Western registered increases in physical volume and relative importance in 1928-29 and 1932-33, when lake shipments declined drastically.

Shipments by rail for export.—This type of movement was important from 1924-25 to 1927-28 and again in 1929-30 and 1931-32, ranging from 458 to 4,232 cars annually and from 1.6 to 12.3 per cent of the total shipments. Rail shipments for export show no definite trend, tending mainly to supplement other shipments and disappearing almost entirely after 1929, when the foreign trade of the United States in wheat was drastically reduced.

Baltimore received shipments from 1924-25 to 1927-28 and again in 1929-30, ranging from 102 to 2,845 cars and from 0.55 to 6.5 per cent of the total shipments. In the same years shipments ranging from 91 to 576 cars and from 0.49 to 3.3 per cent of the total were sent to New Orleans. Wheat from Chicago was shipped to Philadelphia from 1924-25 to 1927-28, in 1929-30, and in 1931-32. These shipments ranged from 16 to 676 cars and from 0.10 to 1.5 per cent of the total. Nine ports received shipments in single years, varying from 1 car for St. John, New Brunswick, in 1924-25 to 613 cars for Newport News in 1929-30.

¹³ If lake shipments to Buffalo are added to those going to Trunk Line Territory by rail, this territory much exceeds Central Freight as a destination of wheat shipments from Chicago.

THE DISTRIBUTION AREA FOR GRAIN PRODUCTS

A very large part of the grain processed locally is shipped out in the form of flour and other grain products. The relative importance of grain processed locally was shown in Table II. How these products are distributed to destination areas is shown in Table VI.

Less than 2 per cent of the total shipments of from 26,000 to 37,000 cars moved by rail for export. Trunk Line Territory, including the Atlantic ports, took almost half the total rail shipments over the nine-year period. The volume moving to this territory, however, declined from 57.3 per cent of the total (18,641 cars) in 1924-25 to 36.6 per cent (12,962 cars) in 1929-30. Since the latter date shipments increased to 39.6 per cent (10,334 cars) in 1932-33.

Shipments to Central Freight Association Territory increased as shipments to Trunk Line Territory declined. Starting with 26.0 per cent of the total (8,470 cars) in 1924-25, this area increased its share to 46.7 per cent of the total (16,569 cars) in 1929-30. Then as shipments to Trunk Line Territory increased, the movement to Central Freight Territory decreased from the high point of 46.7 to 36.6 per cent (9,562 cars) in 1932-33.

New England Territory ranked third in importance, but shipments to this area have declined from 10.2 per cent of the total (3,322 cars) at the beginning of the period to 4.5 per cent (1,597 cars) in 1929-30, with the same tendency to increase after this date as shown by Central Freight Association Territory. New England at the end of the period took 7.7 per cent (2,011 cars) of total shipments.

The Gulf Ports and Southern Territory took an average of about 5 per cent of total shipments and there was little variation from this proportion over the period. Closely approximating Southern Territory was Illinois and Western, with from 2.8 to 8.6 per cent of the total. In the last two years of the period shipments to this territory show definite signs of increase. Shipments to Canada were negligible.

On the whole, shipments of manufactured grain products show a much higher degree of stability than do shipments of grain. This is rather to be expected because the very diversity of these prod-

TABLE VI
RAIL CAR-LOT SHIPMENTS OF GRAIN PRODUCTS REGISTERED FOR TRANSIT FROM CHICAGO, 1924-25 TO 1932-33

DESTINATIONS	1924-25		1925-26		1926-27		1927-28		1928-29		1929-30		1930-31		1931-32		1932-33		AVERAGE 1924-25 TO 1932-33		
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	
<i>By rail—for domestic con- sumptions:</i>																					
Central Freight Territory . . .	8,470	26.04	8,621	25.15	10,466	30.48	13,851	36.81	14,402	40.40	16,569	46.74	13,537	44.77	9,722	37.27	9,562	36.63	11,682	36.00	
Trunk Line Territory . . .	18,641	57.32	19,726	57.55	17,721	51.01	17,602	47.02	15,759	44.21	14,056	39.66	12,376	40.93	10,580	40.56	11,717	44.80	15,363	47.34	
New England Territory . . .	3,322	10.21	2,975	8.68	2,424	7.10	2,421	6.43	1,820	5.11	1,597	4.51	1,383	4.57	1,849	7.00	2,011	7.70	2,200	6.78	
Canadian Territory . . .	10	†	4	†	12	†	12	†	15	†	33	†	38	†	11	†	13	†	16	†	
Southern Territory . . .	1,171	3.60	1,832	5.34	1,767	5.18	2,008	5.34	1,705	5.04	1,479	4.17	1,597	5.20	1,466	5.62	1,095	4.19	1,579	4.87	
Illinois Western Territory . . .	907	2.79	1,121	3.27	1,295	3.53	1,235	3.28	1,195	3.35	1,356	3.83	1,038	3.43	2,257	8.65	1,620	6.21	1,326	4.00	
Totals	32,521	100	34,279	100	33,535	98.24	37,219	98.91	34,986	98.15	35,080	98.96	29,969	99.12	25,885	99.24	26,018	99.67	32,166	99.11	
<i>By rail—for export:</i>																					
Baltimore, Md.					08	.20	10	†	00	.25	56	.16	30	.10	16	†	11	†	35	.11	
Key West, Fla.					113	.33	132	.35	127	.36	82	.23	38	.13	18	†	18	†	57	.18	
New Orleans, La.					58	.17	46	.12	70	.22	61	.17	07	.02	32	.09	30	.08	47	.14	
New York, N.Y.					245	.72	194	.52	325	.91	151	.43	55	.15	22	†	14	†	111	.34	
All others*					86	.25	18	†	38	.11	19	†	57	.18	64	.25	15	†	33	.10	
Totals					600	1.76	400	1.00	659	1.85	360	1.04	267	.88	199	.76	87	.33	288	.89	
Grand totals	32,521	100	34,279	100	34,135	100	37,628	100	35,645	100	35,449	100	30,236	100	26,084	100	26,105	100	32,454	100	

* All others—Boston, Mass.; Edgewater, N.J.; Havana, Cuba; Hoboken, N.J.; Jersey City, N.J.; Montreal, Quebec; Newport News and Norfolk, Va.; Philadelphia, Pa.; Weehawken, N.J.; West St. John, New Brunswick.
† Less than one-tenth of 1 per cent.

ucts serves to sustain the demand for them and the amount moving into export was small. Only in the last three years of the period was there a tendency for the total volume to shrink. The tonnage is of impressive size even when compared with the total of grain shipments.

Flour shipments.—A much larger movement of grain products than is reported as shipped under the transit privilege goes out of the Chicago market by rail and lake in the form of flour and mill feed.¹⁴ In part, this is a duplication of cars reported moving out under transit. The destination of flour and feed shipments is known only in a general way. It is probably not far wrong to estimate that rail shipments of these two classes of products are distributed to the different-rate territories in about the same proportion as shown for grain products above. Shipments of flour are mostly by rail; from 10 to 30 per cent of the total went east by lake, most of it to Buffalo.¹⁵ Flour shipments by rail remained around the high point of 30,000 cars,¹⁶ until after 1926-27, when shipments declined irregularly to a low of 16,372 cars in 1932-33. Lake shipments rose from the equivalent of 3,154 cars in 1924-25 to a maximum of 6,772 cars in 1930-31, declining from that point to 4,748 in 1932-33. As was pointed out earlier (p. 64), flour shipments are in large part a re-export of flour received from other milling centers.

¹⁴ The reason for this is the fact that through-billed and reconsigned cars are reported as "receipts" and "shipments" in the *Board of Trade Report* while transit shipments move out of warehouses or plants in Chicago.

¹⁵ Lake shipments of flour in thousands of barrels are as follows:

Destination	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Buffalo	441	573	760	1,034	1,129	1,089	1,332	1,336	980	736
Erie	173	173	240	235	323	270	257	256	178	140
New York										105
Depot Harbor	25	29	12	34	45	125	93	112	116	119
Ogdensburg	60	3	13							
Fairport	47	51	68							
Collingwood	2									
Windsor			5							
Midland				1						
Totals	748	829	1,098	1,304	1,497	1,493	1,682	1,704	1,274	1,100

(Data from annual reports of the Chicago Board of Trade.)

¹⁶ 1 car = 250 barrels.

Shipments of mill feed.—Shipments of mill feed are not wholly reflected in the transit report for reasons already stated.¹⁷ The tonnage of receipts and shipments is shown in the *Annual Report of the Board of Trade*. Converted to carloads of 36,000 pounds, the annual volume is impressive. At the beginning of the period in 1924, total shipments were equivalent to 30,157 cars. This increased to a maximum of 33,386 cars in 1929, from which point shipments declined rapidly to 19,571 cars in 1933.

Until the last two years when prices were declining most rapidly, shipments of mill feed were almost exclusively by rail; in these years one-sixth of the total went out by lake, presumably to eastern destinations. Of the total rail movement, from one-half to three-quarters went to eastern and southern destinations. The proportion moving to the west by rail increased with the decline in total shipments after 1929.

Receipts of mill feed in Chicago from other points averaged about 9,000 cars annually for the period 1924-33. This ranged from one-fourth to one-half of total shipments. No data are available on local consumption.

SEASONAL VARIATIONS OF GRAIN SHIPMENTS

A measure of the seasonal variation of grain shipped from Chicago has been computed by averaging the monthly shipments of each grain for each type of movement over the nine-year period and then relating each of the monthly averages to the total for the year. The results are shown in Figure 4.

Barley.—Total shipments of barley increase rapidly from the low point of the year in July to a peak in August, when approximately one-fifth of the year's shipments leave Chicago. The volume then declines steadily until December. Beginning in January, shipments increase in volume and reach a secondary peak in April, with the following month showing a recession. August, September, October, and March are the months in which the volume of barley shipments is above the normal for the year.

Shipments by rail for domestic consumption show the narrowest seasonal variations of any type of movement. The high month

¹⁷ See p. 89, n. 14.

is August, during which volume increases rapidly from the low month of the year in July. From August to December a moderate

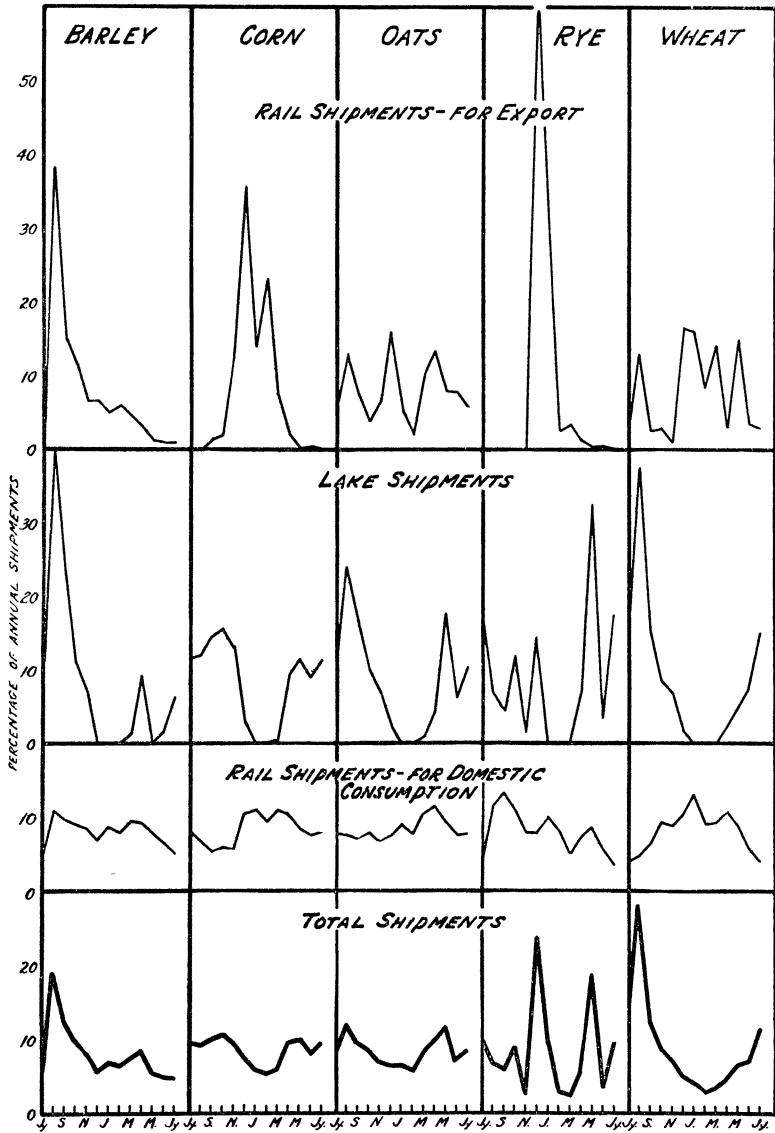


FIG. 4.—Seasonal variations—grain shipments

decline takes place, followed by recovery to a secondary peak in March. The most drastic decline in volume occurs from April to July. Shipments in August, September, October, November, January, March, and April are above the seasonal normal.

Lake shipments show the widest seasonal variations, owing in no small measure to the fact that lake navigation ceases during the winter season. Shipments increase in volume by four times from July to August, the volume in the latter month accounting for two-fifths of the total shipments by lake for the year. The drop from August is continuous to December. There are no shipments of barley by lake from December through February. By April, however, shipments move in large-enough volume to register a secondary peak. No shipments take place in May, and but 1.6 per cent of the year's total in June. Shipments are above normal in August, September, October, and April.

Barley moving by rail for export increases rapidly in volume from July, when 1 per cent of the year's total is shipped, to August, the peak month, when 38.2 per cent of the annual shipments moves. From the August peak shipments decline steadily to June, the latter month ranking with July as the low period for the year. Three months—August, September, and October—show shipments above the normal for the year.

Corn.—Shipments of corn show less seasonal variation than shipments of any other grain. From July to October shipments increase each month until the peak is reached in October; the low point is reached in February. Volume then increases steadily until a secondary peak is reached in May. Shipments are above normal from July through November, in April and in May.

Corn shipments moving by rail for domestic consumption vary between 5.5 per cent of the annual total in September and 11.1 per cent in January. The volume of shipments declines from July through September and then recovers abruptly, reaching a peak in January. Then follows a gradual decline to June. The months from December through May have shipments above normal.

Corn moving by lake reaches a peak in October, followed by a secondary peak in May. Shipments increase slowly from July to October and then fall off steadily, there being no shipments in

January. The volume increases steadily thereafter until the secondary peak is reached in May. Shipments are above normal from July through November and from April through June.

The widest seasonal variation takes place in corn moving by rail for export. The volume of shipments builds up steadily from July until a peak is reached in December, when 35.7 per cent of the annual movement takes place. By January shipments have declined markedly, but they recover sufficiently by February to register a secondary peak. From February shipments decline steadily until by June they have almost disappeared. The period of November through February finds shipments above normal.

Oats.—Monthly shipments vary from 5.5 to 12.2 per cent of the total annual movement. There is a steady falling-off from the peak in August to the low month, February. The volume of shipments then recovers, reaching a secondary peak in May, and then falling off slightly in June. Shipments from July through October, and in April and May, tend to be above normal.

Oats moving by rail for domestic consumption show the least seasonal variation of any of the types of movement, fluctuating from 6.6 per cent of the yearly total in November to 11.6 per cent in April. After decreasing slightly from July through November, shipments build up gradually to the April peak and then recede to a level approximately equal to that in July. A movement above normal takes place in January and from March through May.

Lake shipments of oats show two periods of importance: July through October and in May. There is no movement in January and February. Shipments fluctuate from 0.9 to 23.9 per cent of the annual total. The volume falls off rapidly from the August peak until the close of navigation in December. Beginning in March, the volume builds up to a secondary peak in May. The volume shipped from July through October, and in May, is above normal.

Monthly rail shipments for export vary from 2.1 to 15.9 per cent of the total shipments for the year. The peak occurs in December, with secondary peaks in April and August. February's shipments are the lowest for the year, with a secondary low in October. Marked variations from month to month are common. The vol-

ume shipped increases from July to August, then falls off to the secondary low point in October. By December shipments have reached the high point for the year, but then recede once more to the low in February. A recovery to the secondary April peak follows, only to be offset by a recession to June. Shipments in August, December, March, and April are above normal.

Rye.—Monthly shipments of rye fluctuate from 2.2 to 23.7 per cent of the total shipments for the year. After a decline from July to the secondary low point for the year in November, shipments mount rapidly to a peak in December. By March, shipments have reached the lowest level for the year, but recover rapidly to a secondary peak in May. July, October, December, January, and May are months in which shipments tend to be above normal.

Shipments of rye moving by rail for domestic consumption vary monthly from 3.9 to 13.3 per cent of the total shipments for the year. July is the month of low and September the month of high shipments. Shipments decline generally from their peak in September through the following June, with some minor recovery in January and May. The level of shipments from August through October, in January and in May, tends to be above the normal for the year.

Rye moving by lake shows a wide variation from no volume in January through March to 32.7 per cent of the annual shipments in May. The movement shows a tendency to be relatively high one month and low the next. Shipments in July, October, December, and May tend to be above normal. The bulk of rye moving by rail for export does so in two months, December and January, when 63.2 and 28.2 per cent, respectively, of the annual movement takes place.

Wheat.—Monthly shipments of wheat show the widest seasonal variation of any of the grains studied, fluctuating from 2.8 to 27.9 per cent of the total annual movement. August is the month in which the largest volume of shipments takes place, following which there is a steady decline until the low point is reached in February. The volume of shipments increases steadily from February through July and is above normal from July through October.

Wheat moving by rail for domestic consumption varies each month from 3.9 to 12.9 per cent of the total for the year. Shipments increase steadily from the low point for the year in July until the peak is reached in January. Then shipments fall off steadily, with the exception of a secondary peak in April. The movement from October through May tends to be above normal.

Seasonal variation in shipments by lake corresponds closely to that indicated for total shipments. Month-to-month changes vary from no movement in January and February to 37.4 per cent of the annual movement in August. Shipments are above normal from July through October.

Rail shipments for export vary monthly from 1.0 to 16.5 per cent of the total shipments for the year. The volume tends to reach peaks in August, December, January, March, and May. Although the month of lowest shipments is November, the volume is also very low in July, September, October, April, and June. In addition to the peak months mentioned, February tends to be a month in which shipments are above normal.

For all grains the widest seasonal fluctuation takes place in rail shipments for export; lake shipments are almost as irregular, while rail shipments for domestic consumption show the least seasonal variation.

SEASONAL VARIATION IN MOVEMENT OF GRAIN PRODUCTS

Compared with grain, the seasonal variation in shipments of grain products is very small. When the total movement is considered, there is only a 1 per cent range between the low month, November, when 7.8 per cent of the average annual shipment takes place, and March, the high month, when 8.9 per cent of the annual movement occurs. Within this narrow range there is a fall and spring peak, shipments in August and October being above normal, as are also January, March, and April. The late winter and early spring movement is most sustained.

In the breakdown by destination territories some slight differences appear, though all are alike in showing a fall and spring peak except Illinois and Western. Shipments to Central Freight Association Territory are at a peak in May and reach a low point in

November. Shipments above normal occur in August and October, and again in January and from March through June.

The high point of shipments to Trunk Line Territory comes earlier, in January, when 9.0 per cent of the annual movement takes place, while May is the low month, with 7.6 per cent of the annual total. August and October again show shipments above normal while the heavy winter movement begins in December and stays above normal through April.

To New England Territory shipments are again at a minimum in May, when 7 per cent of the annual total goes forward. March is the peak month, accounting for 10.2 per cent of the annual movement. Only August shows shipments above normal in the autumn, while January through April is again a period of sustained heavy shipment.

Shipments to Southern Territory show a type of seasonal movement closely resembling that to Central Freight Association Territory, August and October being months of characteristically heavy shipment, with a movement above normal again from January through May. Shipments into Illinois-Western Territory have the greatest seasonal range and depart most widely from the seasonal pattern of shipments to eastern destinations. July is the low month, with 6.6 per cent of the annual total. Volume increases rather uniformly until April, the peak month, when 11.8 per cent of annual shipments leaves the market.