August 1, 1942

To the Committee on Graduate Study:

I am submitting to you a thesis written by Magnus B. Johnson entitled "Grain Marketing in the Knoxville Area." I recommend that it be accepted for eighteen quarter hours credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

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We have read this thesis
and recommend its acceptance:

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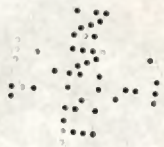
W. C. Smith

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GRAIN MARKETING IN THE KNOXVILLE AREA

A THESIS

Submitted to
The Committee on Graduate Study
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science



---

by

Magnus B. Johnson

August, 1942

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INTRODUCTION

The East Tennessee Valley which has long been an important grain producing area is facing serious marketing problems growing out of competition from other grain producing regions. Cheaper transportation is intensifying this competition, and gradual loss of community flour mills is placing the farmer in a less advantageous marketing position. To assist in meeting this situation a survey of grain marketing outlets in the Knoxville wholesale trade area was undertaken.

Purpose of the Study

The purpose of this study is to analyze the grain situation and related industries and to determine what can be done to develop or improve outlets for grain in the Knoxville trade area. The study deals with the production, disposition, consumption, and demand of grain and grain products grown in the area and problems of competition from grain shipped in from other areas.

In showing the extent to which local demands for grain are being met by local production the study will point the way to adjustments which the farmers of the area might profitably make in the production and marketing of grain and the activities which might be undertaken by the grain dealers to develop better markets for locally grown grain.

The study should primarily be of interest to farmers, local grain dealers, extension workers and students not fully informed on some of the more common problems of grain marketing.

Description of the Area Studied

The area selected for study was that of the Knoxville wholesale trade distribution territory for grain and grain products. The approximate extent of this area is shown in Figure 1. It includes Knox County and twenty-two surrounding counties, an area of approximately 9,758 square miles, containing 481,310 rural people, and 179,952 urban people. It extends into the coal mining sections of eastern Tennessee, eastern Kentucky, and western Virginia. Little grain is grown in the coal mining section, but considerable amount of grain products, such as flour, corn meal, and also feed, is sold and distributed there. Though the extreme northeastern part of East Tennessee and the Chattanooga area are not included, the area studied will be referred to from time to time as East Tennessee.

The limits of the trade area was determined from information given by wholesale dealers in grain and grain products in Knoxville as to the length of truck routes delivering flour, corn meal, feed, and other grain products to retail dealers.

Farming prevailing in the area is of a general type. Small general, part-time, and general farms make up more than two-thirds of

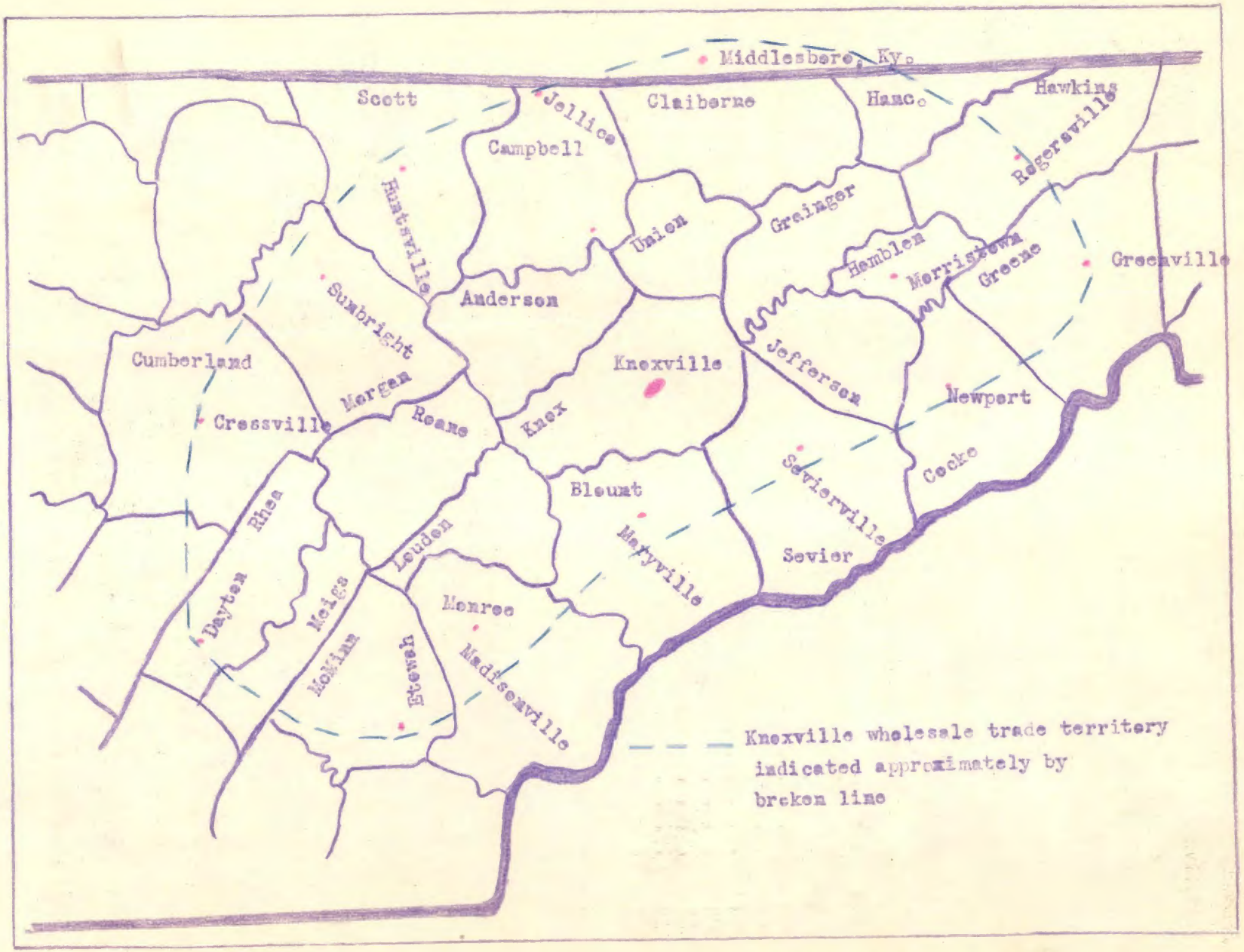


Fig. 1. Knoxville wholesale distributing territory for grain and grain products

all farms of the area.

Small grains and corn are of considerable importance as cash crops on many farms in East Tennessee, and considerable quantities of corn and wheat are sold for milling in this area.

Method of Procedure and Source of Data

During the summer and fall of 1941, visits were made to 45 mills in fourteen of the twenty-three counties. Information was secured from these agencies on the following points:

1. The number, kind and location of all marketing agencies for grain within the twenty-three counties.

2. Milling capacity for flour and corn meal, and grain storage capacity.

3. The extent of a cash market for grain throughout the year.

4. Storage of grain for account of farmers, and for others (mills or commodity credit corporation).

5. Service rendered such as weighing and grading grain with some degree of accuracy.

6. Side-line services, such as feed grinding and mixing feed.

7. The amount of each kind of grain handled during the marketing year, July 1, 1940 - July 1, 1941.

8. Source of supply of grains and problems of procurement.

9. Method of transportation, prices paid to farmers and miscellaneous marketing problems.

Retail grocery stores, wholesale feed stores, and bakeries within the area were also interviewed on their problems of merchandising grain and grain products. The purpose of this was to determine their position as local outlets for local grain products.

To supplement information given by these agencies, schedules were sent out to farmers on disposition of the 1940 corn crop.

CHAPTER I

GRAIN PRODUCTION AND POSSIBILITIES IN EAST TENNESSEE

Importance of Production in East Tennessee

Over 12 million bushels of grain were harvested in East Tennessee area in 1939 which represents one-fifth of the grain produced in the state. This amount was produced on slightly more than one-half million acres or almost one-fifth (19.5 percent) of the total acres in grain for the state (Table I).

The importance of grain production in East Tennessee is manifest by the relatively large proportions of cropland harvested in grain. Slightly over half (51.5 percent in 1939) of the cropland harvested in 23 counties of East Tennessee[1] is in grain.[2] This is 2.6 percent more than the 48.9 percent for the state as a whole.

---

(1) The term "East Tennessee" wherever used in this report refers to the 23 counties in Knoxville trade area, as follows: Hawkins, Greene, Hamblen, Cocke, Grainger, Union, Hancock, Claiborne, Campbell, Scott, Anderson, Knox, Jefferson, Sevier, Blount, Monroe, Loudon, Roane, Morgan, Cumberland, Rhea, Meigs, McMinn.

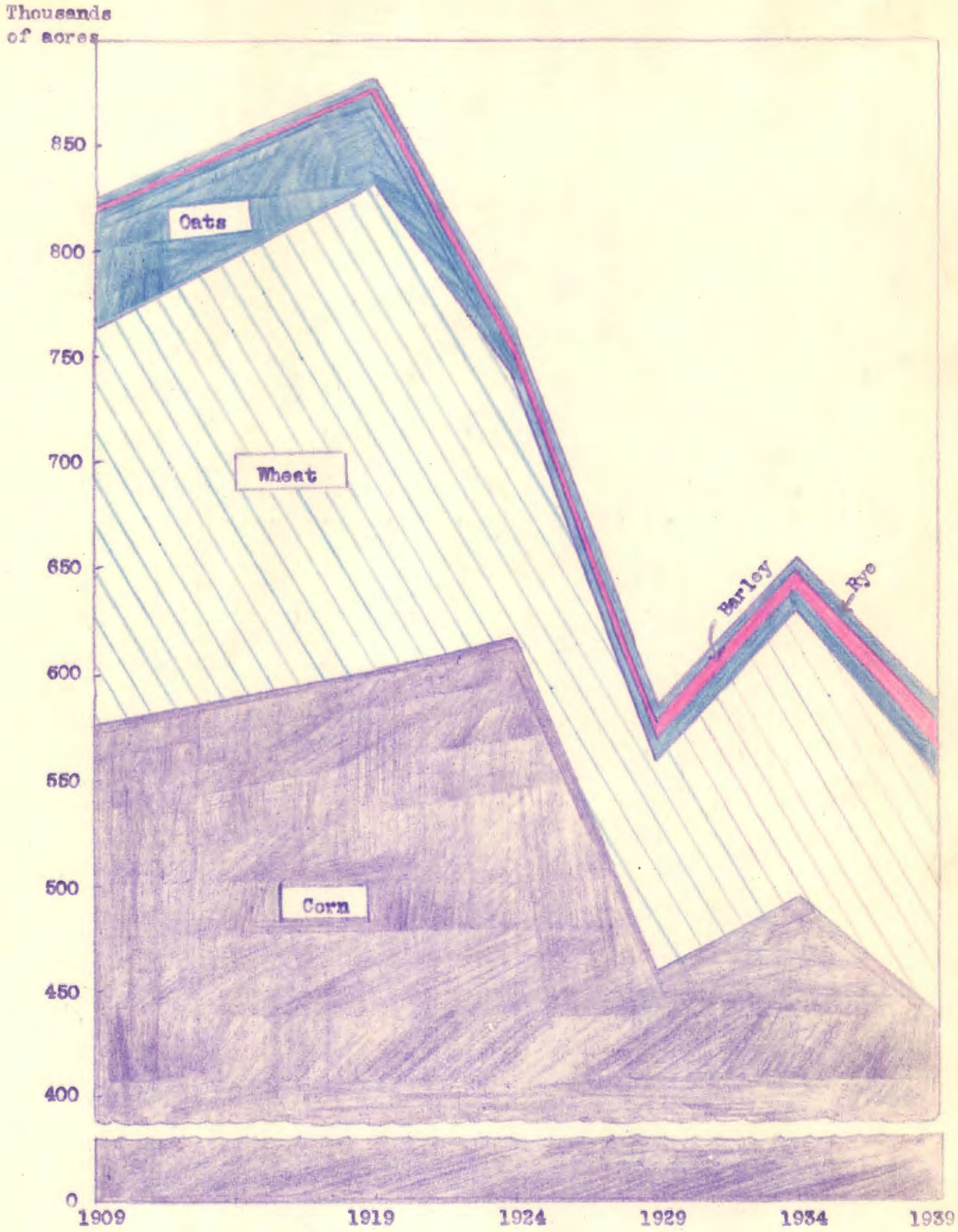
(2) Corn, wheat, oats, barley, and rye.

TABLE I. ACREAGE AND PRODUCTION OF GRAIN IN 23 EAST TENNESSEE COUNTIES COMPARED WITH STATE TOTALS, 1939

Items	Corn	Wheat	Oats	Barley	Rye	Total
Acres:						
East Tenn.	436,918	112,055	13,820	16,551	7,551	586,895
State	2,517,279	338,722	55,196	53,454	44,307	3,008,958
Percent acres in E. Tenn.	17.4	33.1	25.0	31.0	17.0	19.5
Production (Bu.):						
East Tenn.	10,166,155	1,295,025	287,890	371,794	68,236	12,189,100
State	54,904,608	3,886,315	1,046,786	1,029,965	403,561	61,271,235
Percent E.Tenn. is of state	18.5	33.3	27.5	36.1	16.9	19.9
Percent Cropland Harvested						
East Tenn.	38.3	9.8	1.2	1.5	0.7	51.5
State	40.9	5.5	0.9	0.9	0.7	48.9

Source: Based on U. S. Census of Agriculture, 1940.

Figure 2 shows the relative importance of grain crops harvested in East Tennessee from 1909 to 1939. Total acreage of grain has decreased since 1919, but the acreage of some individual crops has fluctuated widely. Corn and wheat have led in importance, and continue to do so. Barley and rye are the only grain crops that have shown an increase; barley has shown the most consistent increase. Corn is by far the most important grain crop in East Tennessee. Of the total acreage in grain



Source: Table I, Appendix

Fig. 2 . Harvested acreage of major grains in East Tennessee, 1909-1939

crops in 1939, 74.4 percent was in corn, 19.1 percent in wheat, 2.8 percent in barley, 2.4 percent in oats, and 1.3 percent in rye.

Corn is of lesser importance in East Tennessee than for the state as a whole. In 1939 there were 436,918 acres of corn harvested for grain, representing 38.3 percent of the total cropland harvested. The proportion for the state as a whole was 40.9 percent (Figure 10). Less than one-fifth (18.5 percent) of the corn produced in the state in 1939 was produced in East Tennessee (Table I).

Wheat ranks next to that of corn as a grain crop, and is of far more importance in East Tennessee than for the state as a whole. In 1939, 112,055 acres of wheat were harvested in the East Tennessee area, representing almost ten percent (9.8) of the total cropland harvested, compared with only 5.5 percent for the state. One-third of the wheat produced in the state was produced in East Tennessee.

In 1939 barley ranked third in acres of grain harvested in East Tennessee, exceeded only by corn and wheat. For the state as a whole oats ranked third, putting barley in fourth place. Acreage in barley was 16,551 acres in East Tennessee, representing 1.5 percent of all cropland harvested, compared with less than 1 percent for the state. Of the total production for the state over one-third (36.1 percent) of the barley was produced in this area.

Oats cut and threshed for grain ranked fourth in acres of grain harvested in East Tennessee and third for the state as a whole. Acreage

in 1939 was 13,820 acres, representing 1.2 percent of all cropland harvested in East Tennessee, compared with 0.9 percent for the state. Over one-fourth (27.5 percent) of the oats produced in the state was produced in East Tennessee.

Only 7,551 acres of rye were threshed in East Tennessee in 1939. This amount represents 0.7 percent of all cropland harvested, which is the same as the proportion for the entire state.

Comparison of East Tennessee With the State and Other Southern States

Only one state being compared, Kentucky, has a larger proportion of cropland harvested in grain than the East Tennessee area (Figure 3).

Corn, however, represents a smaller proportion of the cropland harvested than in any state except Virginia.

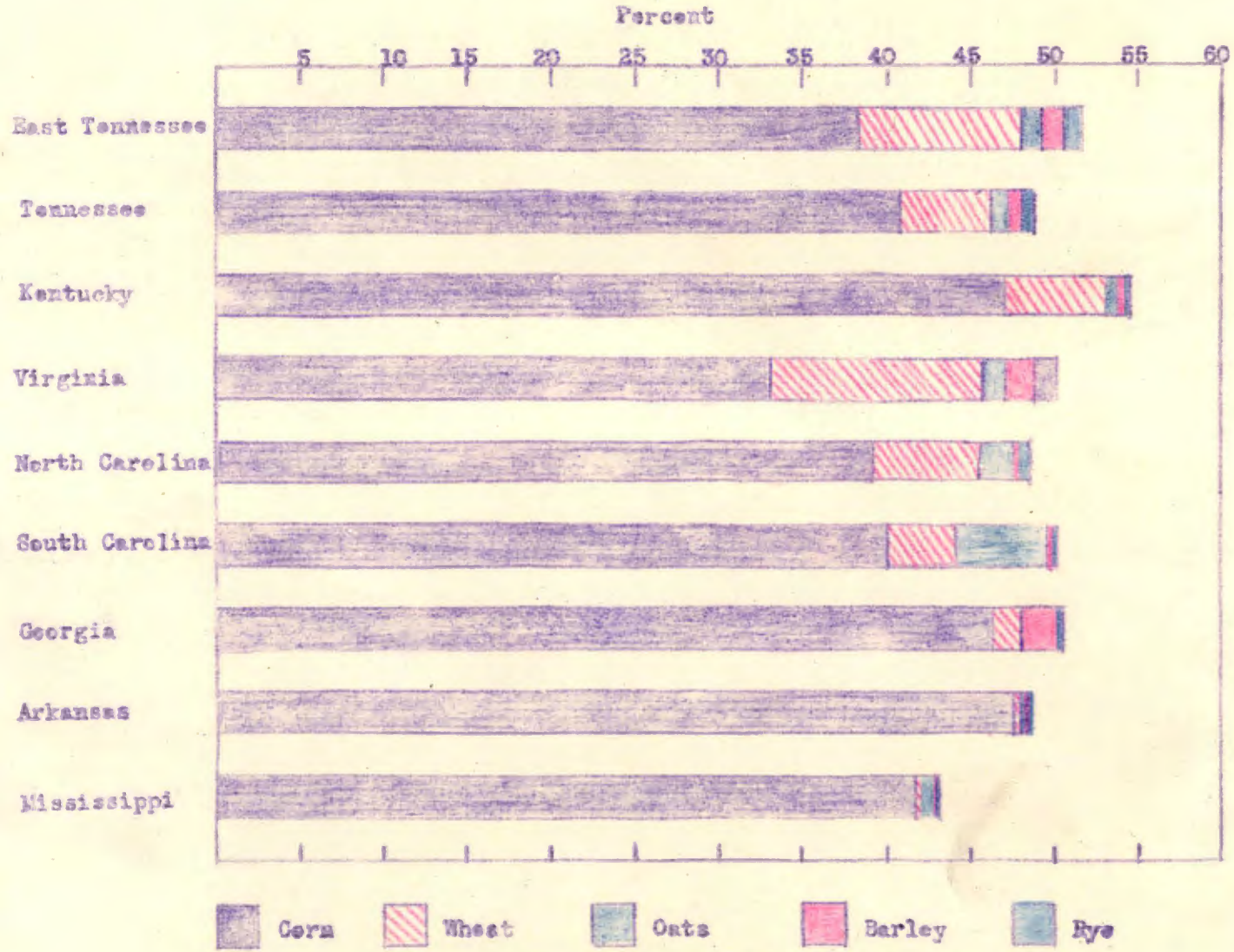
Only one state, Virginia, has a larger proportion of cropland in wheat than East Tennessee.

States with a larger proportion of cropland in oats were North and South Carolina.

The proportion of cropland harvested in barley is exceeded only by Virginia and Georgia, and the proportion of rye is exceeded only by Virginia.

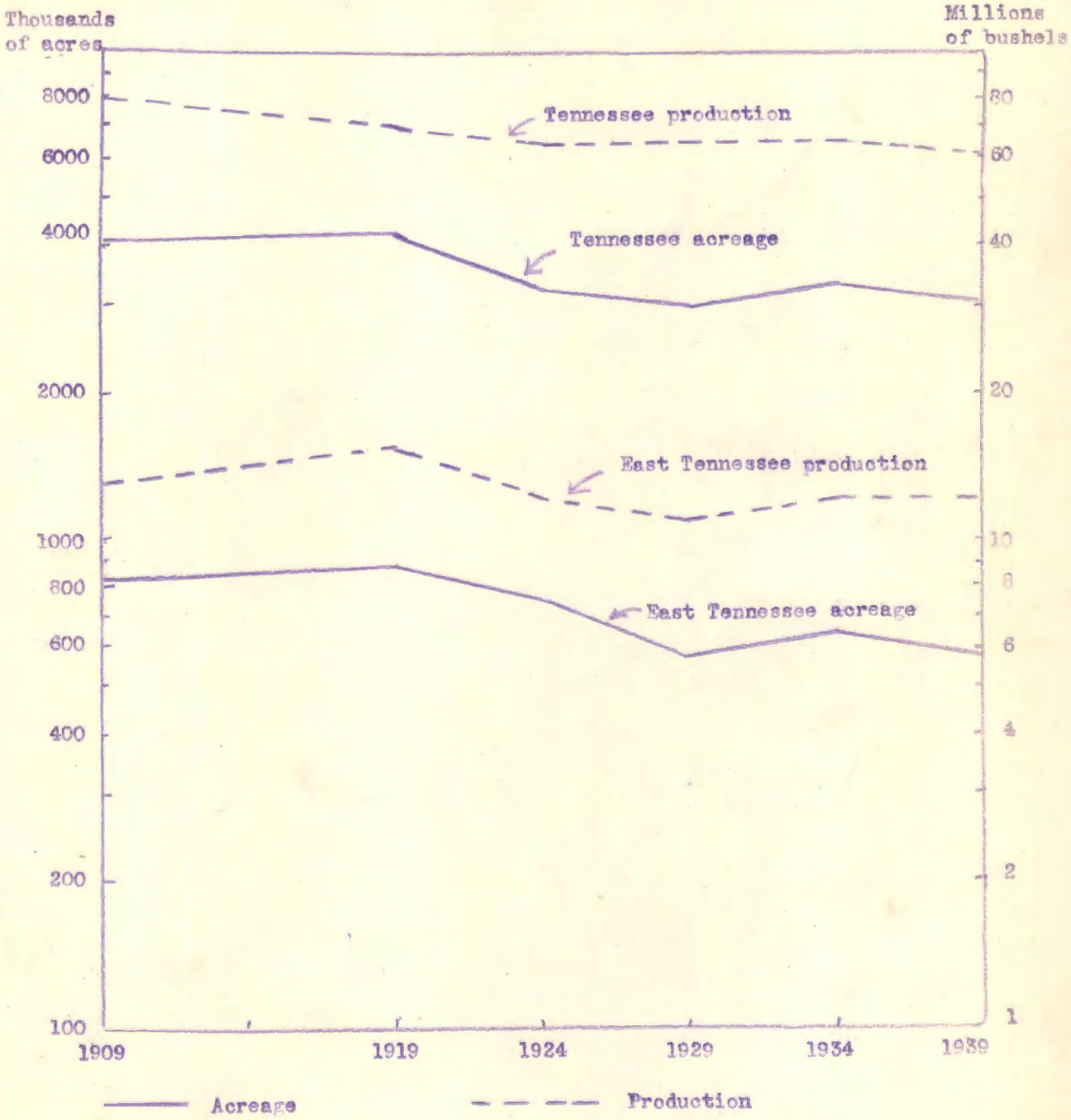
Trend in Production in East Tennessee and the State

The general trend in total acreage of grain crops in East Tennessee



Source: U. S. Census of Agriculture, 1940

Fig. 3. Percent of cropland harvested in major grains in East Tennessee and Tennessee compared with other southern states, 1939



Source: Tables I and II in Appendix

Fig. 4. Ratio chart showing total acreage and production of major grains in East Tennessee and Tennessee, 1909-1939

has been downward since 1909 (Figure 4). Total acreage decreased from over three-fourths million acres in 1909 to around a half million in 1939, which was almost a 30 percent decrease. Production, however, decreased only a little over 5 percent during the same period.

For the state as a whole total acreage decreased during the same period from over 4 million acres to around 3 million, a decrease of around 27 percent. Although acreage decreased relatively less for the state than for the East Tennessee area, total production decreased much more rapidly, being 23 percent compared with 5 percent for East Tennessee.

During this period of a general downward trend, both acreage and production in East Tennessee have been characterized by four distinct changes (Figure 4). The first from 1909 to 1919 was gradually upward, an increase in acreage of almost 6 percent; but the largest increase was in production, around 18 percent. The second, between 1919 and 1929, was characterized by a 35 percent reduction in acreage and a 27 percent reduction in amount produced. From 1929 to 1934, acreage increased almost 14 percent, while production increased around 11 percent. The fourth change was from 1934 to 1939. Acreage decreased more than 10 percent, but production decreased only .5 percent.

Thus, there are two periods of increased acreage and production, 1909 to 1919 and 1929 to 1934; and two periods of decreased acreage and production, 1919 to 1929 and 1934 to 1939.

In general, changes in acreage were greater than changes in production. Accompanying a general decrease in acreage was an increase

in production per acre, resulting in a less rapid decrease in production than acreage.

The general trend for the state was similar to that of East Tennessee, but less fluctuation occurred. This is especially true of production, which showed almost a smooth downward trend (Figure 4).

Possibilities of Production in East Tennessee

At present East Tennessee does not produce sufficient grain to meet the requirements for feed and food, as considerable amount of grain and grain products are shipped in from other states. The feeding of grain is very important and is becoming increasingly important as more livestock products will be required by a growing industrial population.

With molasses put on a rationing basis, curtailing the use of sweet feeds, an increase in all grains for feed, and demand for feed grinding and mixing services are to be expected.

The desirability of increasing the production of the fall-sown grains for winter cover is recognized as a good farm practice from the standpoint of soil conservation. Fall-sown grains have the three-fold advantage of providing a winter soil covering, a grain crop, and some winter pasture.

Truck transportation of grain from the Ohio River Valley to East Tennessee points is lowering prices and making competition from the Ohio River Valley area more effective. Though river barges have not brought

grain up as far as Knoxville in the Tennessee Area they are bringing grain to Chattanooga, which is tending to lower the price level for the area. As a result some corn produced in the Chattanooga area and formerly marketed at Chattanooga is being brought to Knoxville.

Availability of the market to competing areas is in reality a phase of the problem of favorable balancing the supply and demand. The area closer to the market usually has the advantage of cheaper transportation, but this is not always true; cheaper forms of transportation such as waterways can often be used to bring distant areas in competition with those close by.(3)

Market conditions are continuously changing. Shift in the supply and demand balance, additions to or changes in transportation and handling methods, and relative price movements which vary the ratio of market costs to other costs may cause profound changes in the production areas of farm commodities.(4)

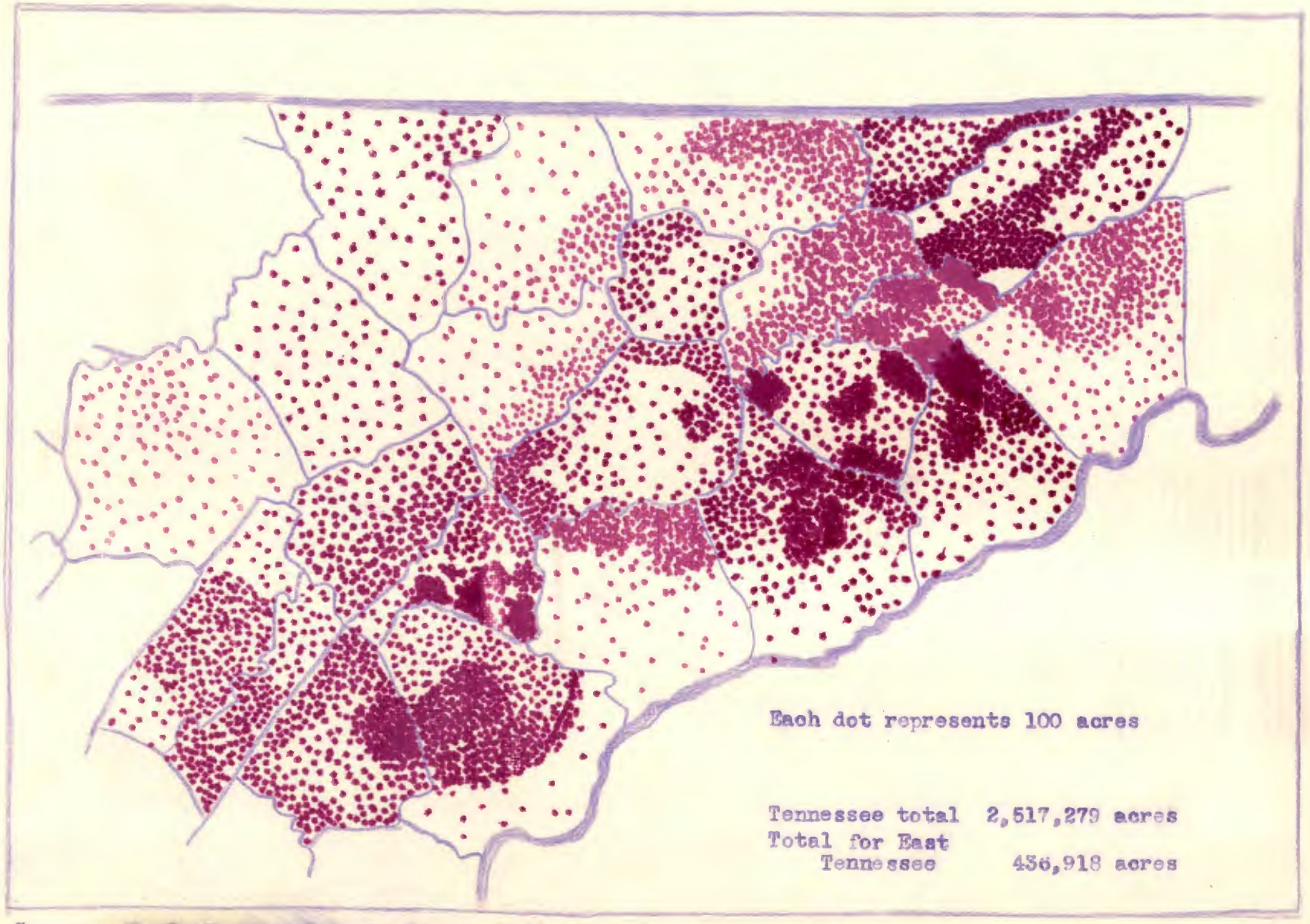
Corn is produced in every county in the state. East Tennessee counties in which production is most concentrated are those along the East Tennessee Valley; namely, Hawkins, Hamblen, Cocke, Jefferson, Grainger, Sevier, Loudon, Monroe, and McMinn (Figure 5).

Distribution of acres of corn harvested for grain in the United

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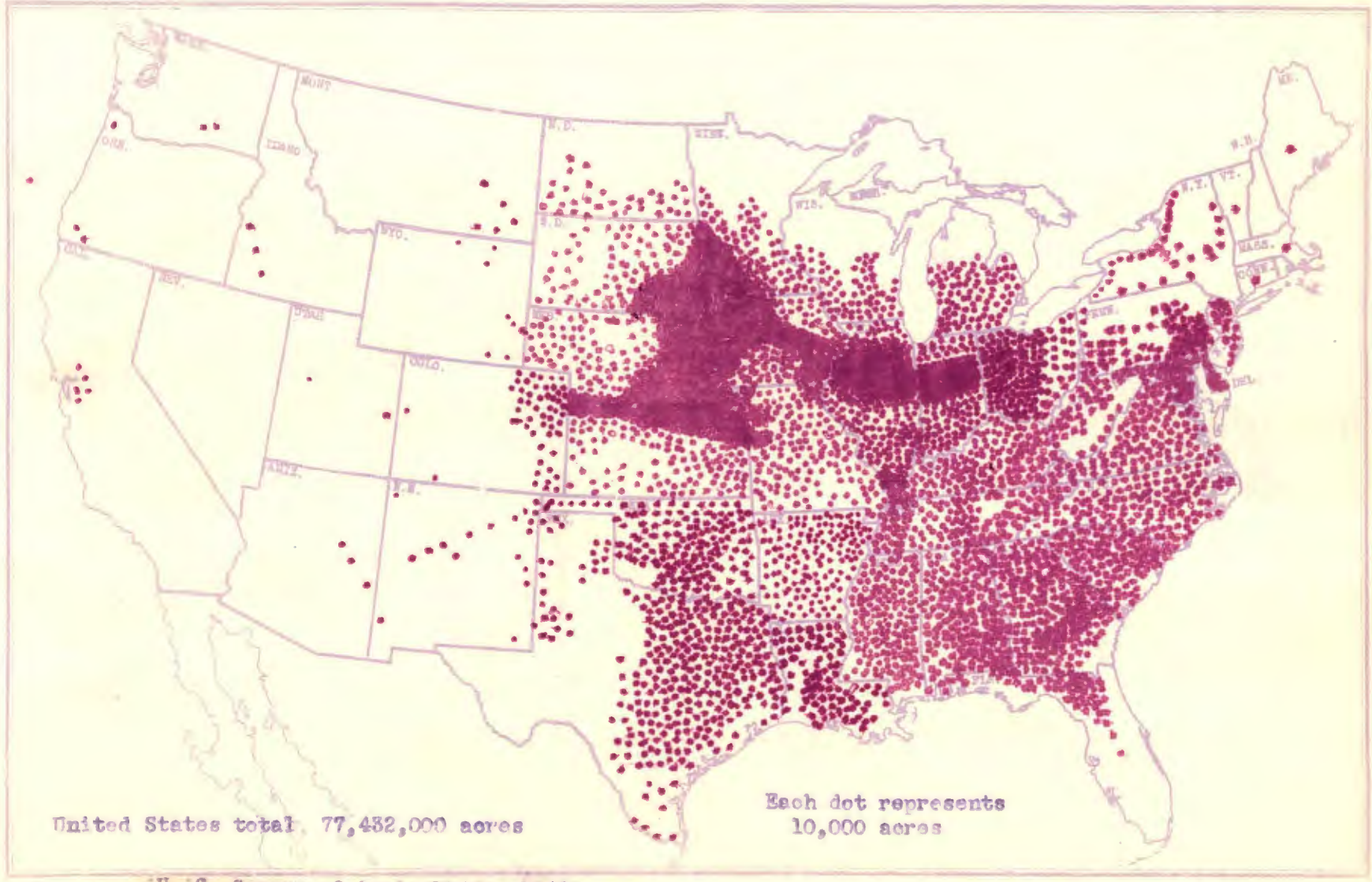
(3) Allred, C. E., and Eary, Dalson H., Factors Determining Production Areas, Agricultural Experiment Station, University of Tennessee, August 1935, p. 14.

(4) Loc. cit.



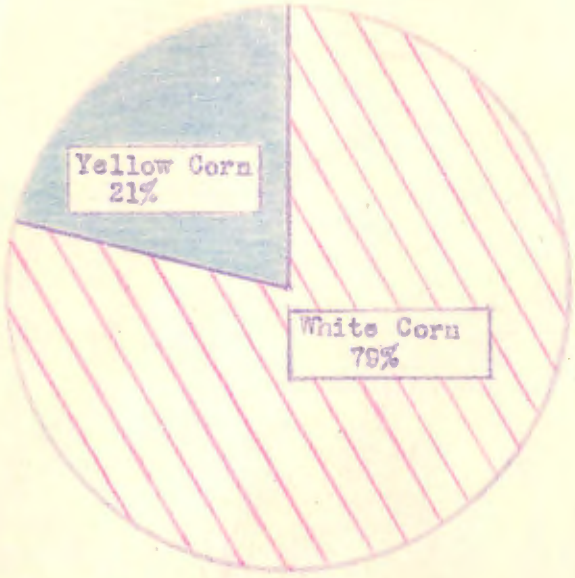
Source: **U. S. Census of Agriculture, 1940**

Fig. 5 . Acres of corn harvested for grain in East Tennessee by counties, 1939



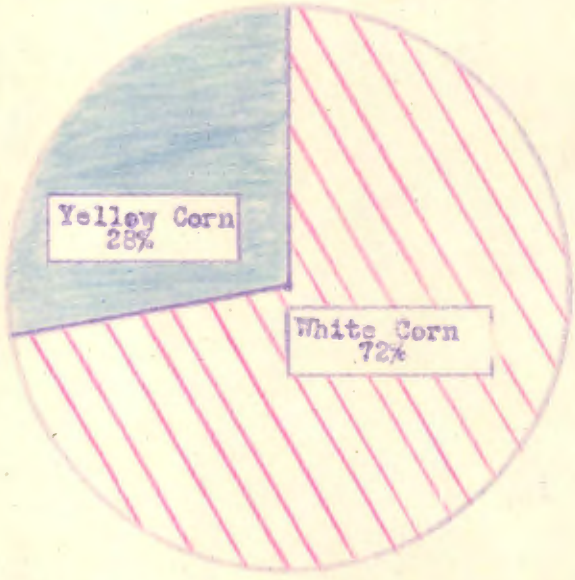
Source: U. S. Census of Agriculture, 1940

Fig. 6. Acres corn harvested for grain in the United States, 1939



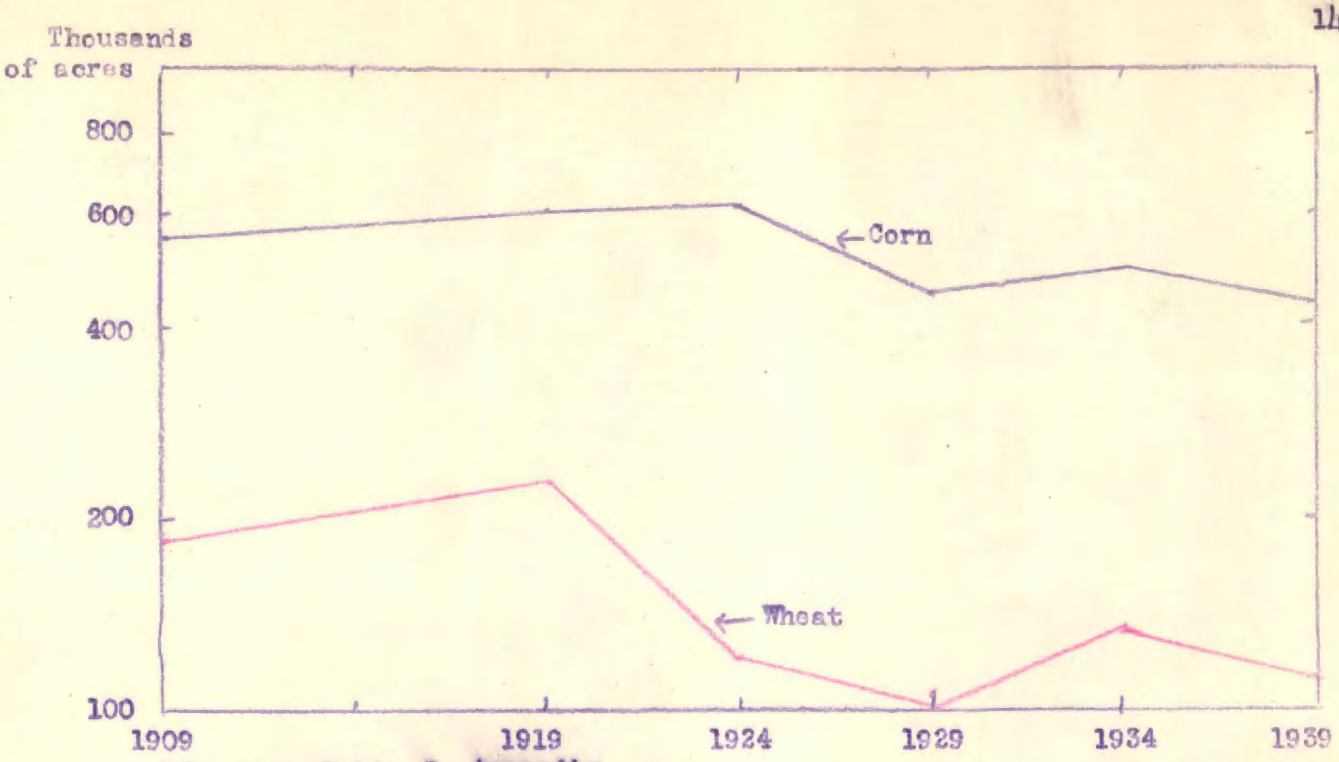
Source: **Based on Corn Disposition Inquiry, 1941**

Fig.7. Production of white corn and yellow corn in East Tennessee, 1940



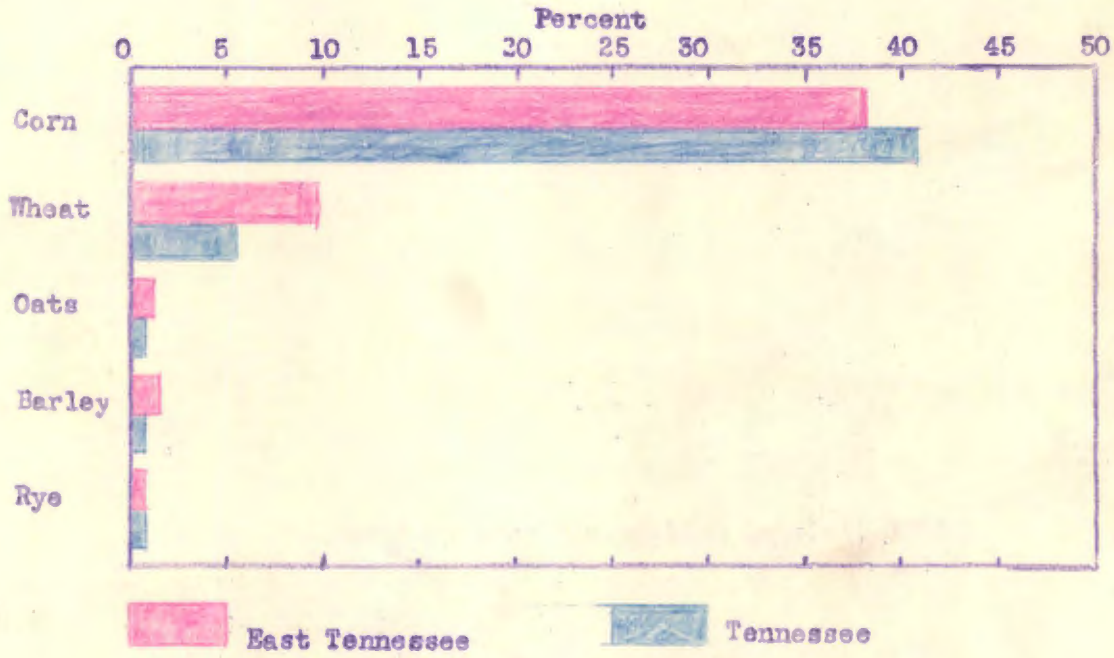
Source: **Based on Corn Disposition Inquiry, 1941**

Fig.8. Production of white corn and yellow corn in Tennessee, 1940



Source: Table I, Appendix

Fig. 9. Ratio chart showing acreage harvested of wheat and corn in East Tennessee, 1909-1939



Source: Table I

Fig.10. Percent of cropland harvested being in these crops, 1939

States in 1939 is shown in Figure 8. Tennessee ranks twelfth in acres harvested and tenth in amount produced.

The proportion of white and yellow corn produced in 1940 was 79 percent white and 21 percent yellow for East Tennessee, and 72 percent white and 28 percent yellow for the state as a whole (Figures 7 and 8).

Corn acreage for East Tennessee has been definitely on the decline since 1924 (Figure 9). Indications are that corn acreage has increased slightly since 1939 to the present time, and that the increase will be even more for the coming year. Demand for more feed, industrial demand for corn, sugar, starch, and alcohol will increase price and stimulate production. Market quotas will not be imposed in 1942 by the Agricultural Adjustment Administration which will have a tendency to increase corn acreage to meet the demand for feed and industrial use.

Recommended varieties of white corn that are adapted to the more fertile soils are Neal Paymaster, and the Tennessee White Corn Hybrid Numbers 3, 10, 13, 14, 15, and 16 which are similar in characteristics to Neal Paymaster.

There has also been an increased demand for yellow corn for feed, especially for chicken feed. The recommended variety of yellow corn for East Tennessee is the Yellow Paymaster. Characteristics and yielding ability are similar to Neal Paymaster except for yellow color.

According to agronomists it is very probable that within the next three to five years yellow corn hybrids will be available that can be recommended for Tennessee, and probably will have some future in East Tennessee.

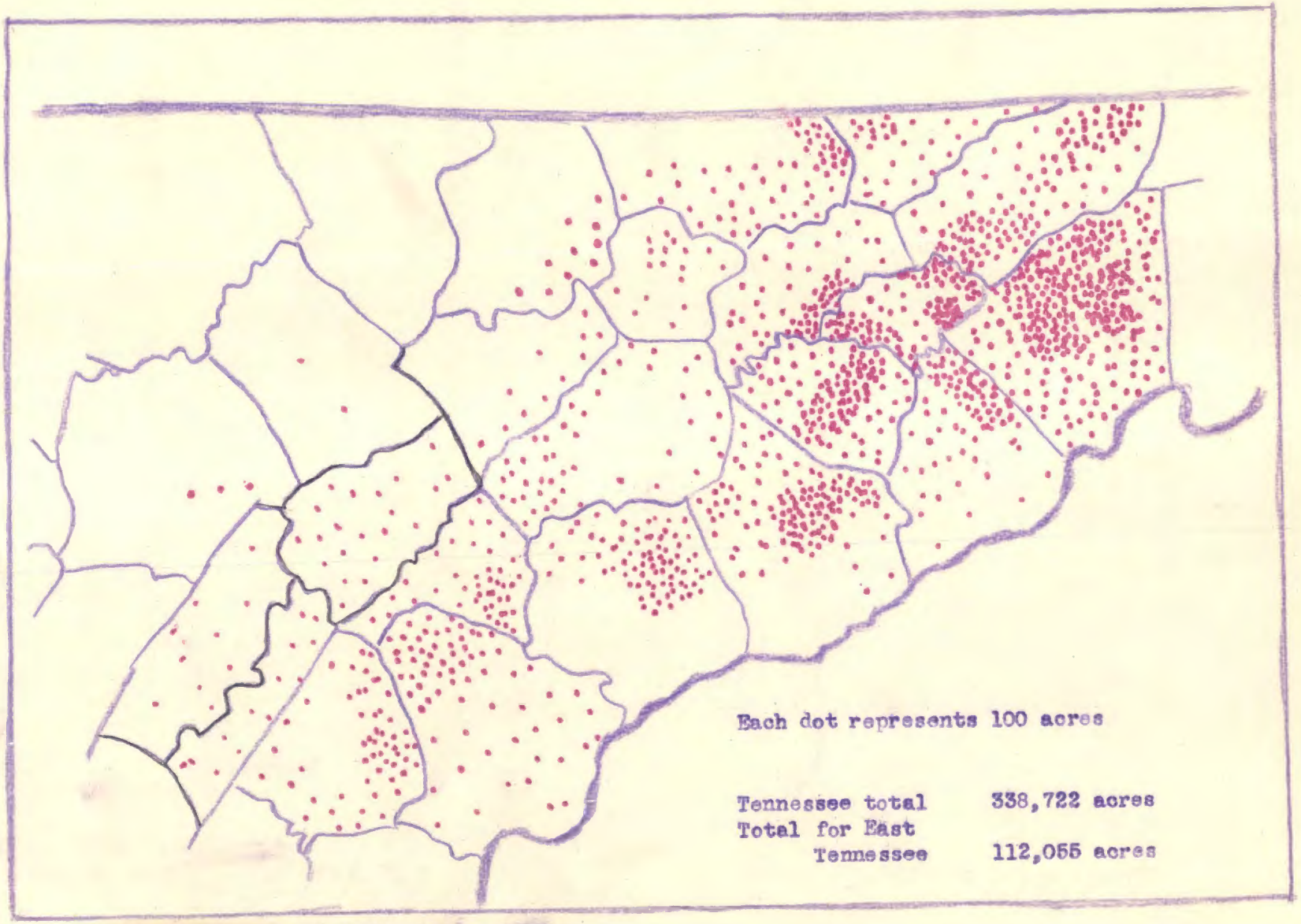
Climate in East Tennessee, abundant rainfall and high temperature during growing season, is favorable towards corn production. A limiting factor, however, is the availability of large amounts of soils especially adapted for corn production, and the large acreage of bottomland being removed from cultivation in the East Tennessee Valley due to construction of dams.

Some soil factors limiting corn production in East Tennessee are nitrogen deficiencies, topography, and erosion.

Wheat production is not so widely distributed as corn, but is grown to some extent in almost every county in the state. Counties in East Tennessee where production is most concentrated are Greene, Hawkins, Hamblen, Jefferson, and Sevier (Figure 11).

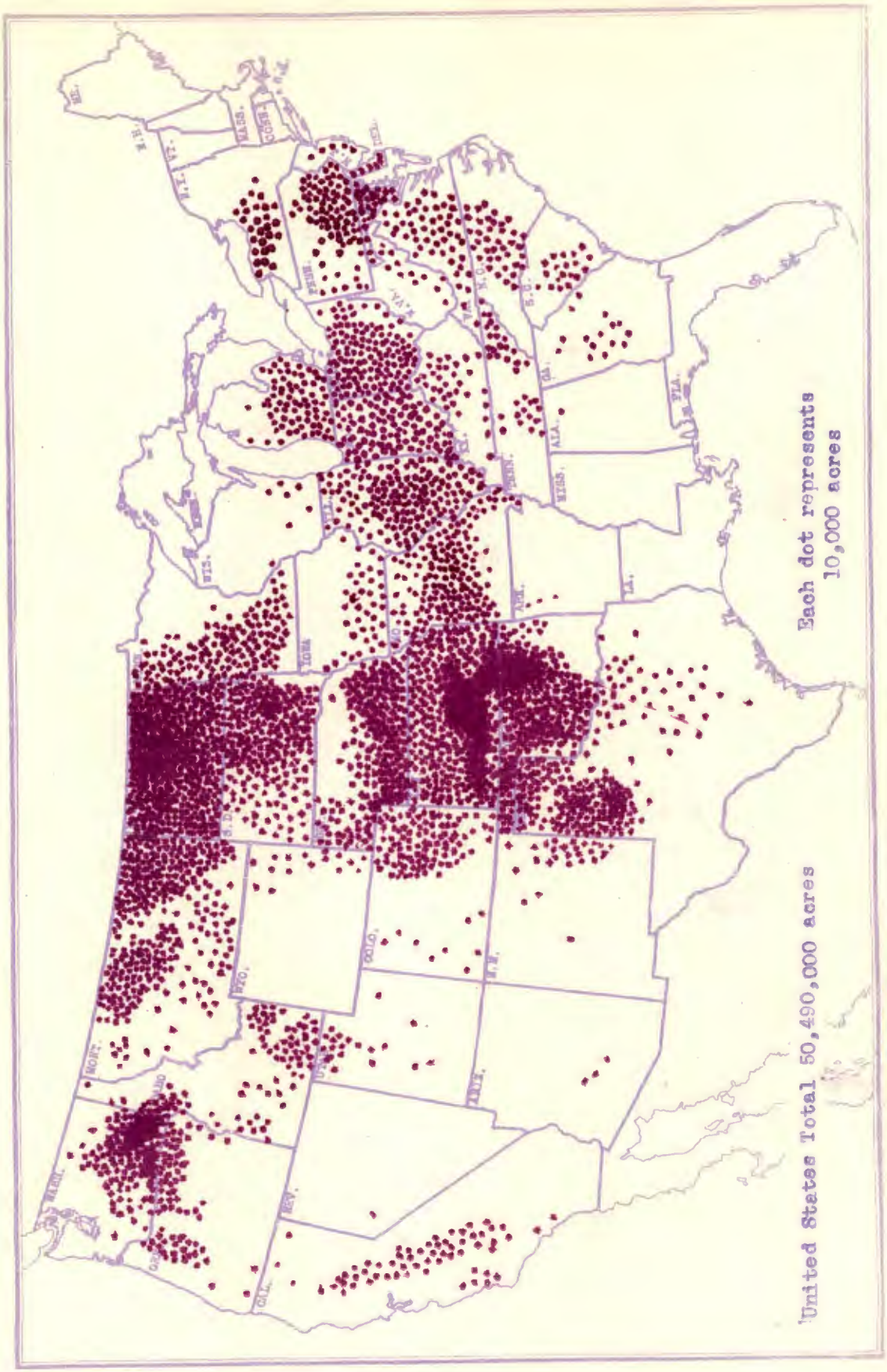
Distribution of wheat throughout the United States is shown in Figure 12. In 1939 Tennessee ranked twenty-fourth in acres harvested and twenty-sixth in amount produced.

From 1909 to 1939 acreage in wheat decreased 41 percent in East Tennessee. The first ten years of this period, 1909 to 1919, showed an increase of around 23 percent in acres harvested, with an even larger increase in production. This period was followed by a very rapid



Source: U. S. Census of Agriculture, 1940

Fig. 11. Acres wheat threshed in East Tennessee, by counties, 1939



Source: U. S. Census of Agriculture, 1940

Fig. 12. Acres wheat threshed in the United States, 1939

decrease until 1924 and then a more gradual decline until 1929, a total decrease in acreage of 56 percent. From 1929 to 1934 acreage increased 23 percent, but decreased 16 percent between 1934 and 1939. Accompanying this 16 percent decrease in acreage between 1934 and 1939 was a 1 percent increase in amount produced (Figure 9).

A major factor contributing to the decrease in acreage and increase in production from 1934 to 1939 was the efforts of the Federal Government to curtail production and stabilize prices. The result was that farmers reduced their acreage, but through better farming practices increased their production.

Future wheat production will be determined largely by the Agricultural Adjustment Administration program. Some limits to future expansion of wheat in East Tennessee are low yields per acre, high moisture content of the wheat, presence of winter weeds like onions and garlic, and topography which limits the use of large machinery.

Millers in the area stated that because of some of the above conditions Tennessee wheat produced poorer quality and less flour than western and northern wheat.

Commercial bakers prefer the flour from hard wheats, but soft varieties have considerable demand for pastries and home baking.

Some of the varieties of wheat which have been recommended and are adapted to East Tennessee conditions are the Fulcaster, Gladden,

Leap, Poole, Currell Prolific, and Forward. Forward is especially adapted to rich fertile soils.

Acreage in rye increased from 1909 to 1939 around 144 percent. The first period of increase was from 1909 to 1919, a 77 percent increase, followed by a corresponding decrease between 1919 and 1924 (Figure 14). Rye acreage has steadily increased since 1924, and indications are that rye acreage will continue to increase due to industrial demand in making alcohol. Rye is also a valuable soiling crop, because it yields well and is ready for use early in the spring when pastures are too young and other feeds are generally scarce. Rye makes a fair nurse crop for legumes because it matures early enough to avoid smothering of legume crop.

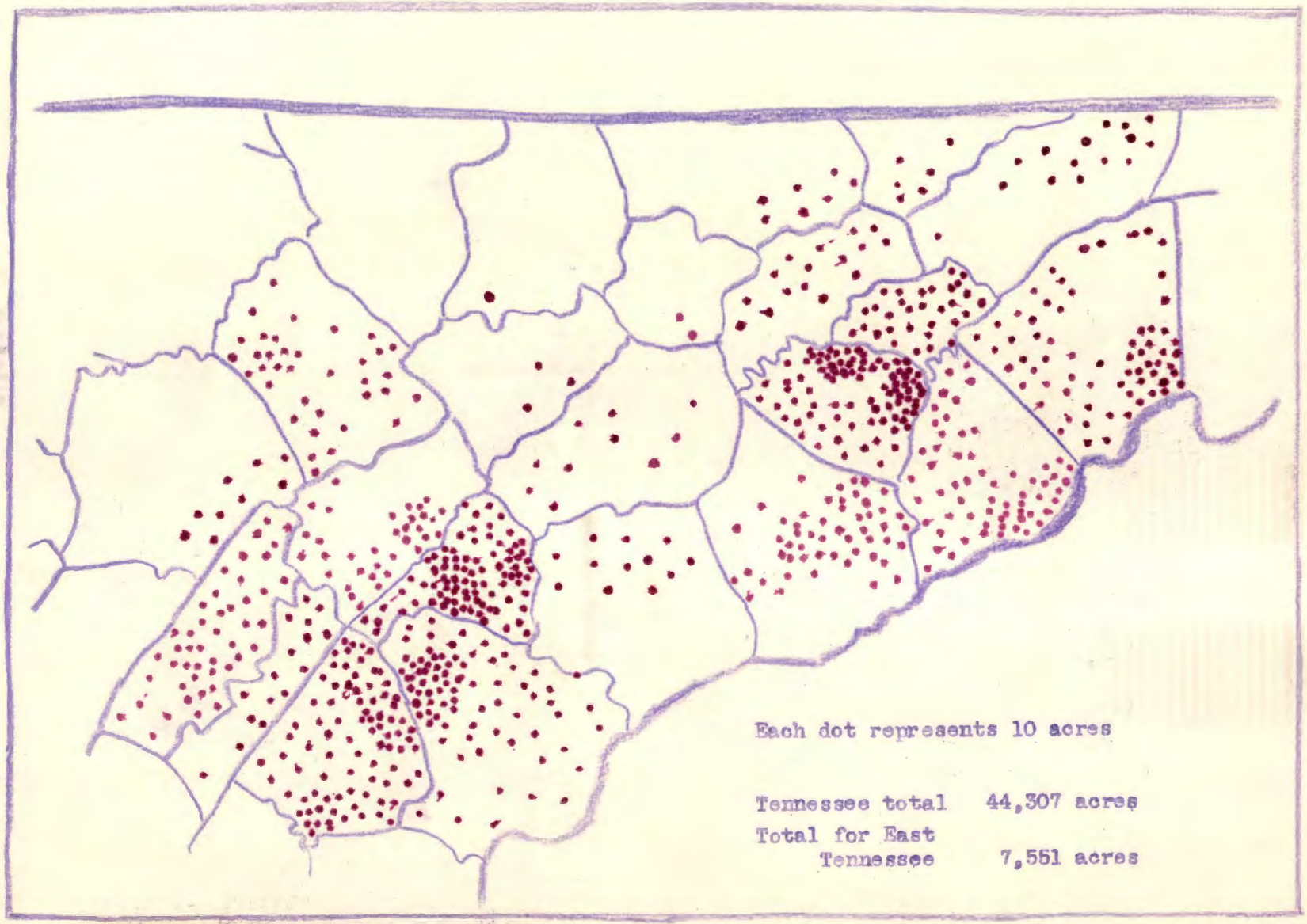
Counties in East Tennessee having the largest acreage are Jefferson, Loudon, McMinn, and Monroe (Figure 13).

Rye will grow on some lands not adapted to wheat. Sandy, exposed poor, poorly prepared, or acid land will usually yield better crop of rye than of wheat.(5)

Rye production deserves consideration because of its ability to utilize labor. If the farmer is delayed too much in getting out his wheat crop, he can fall back on rye as a substitute, or he may expand

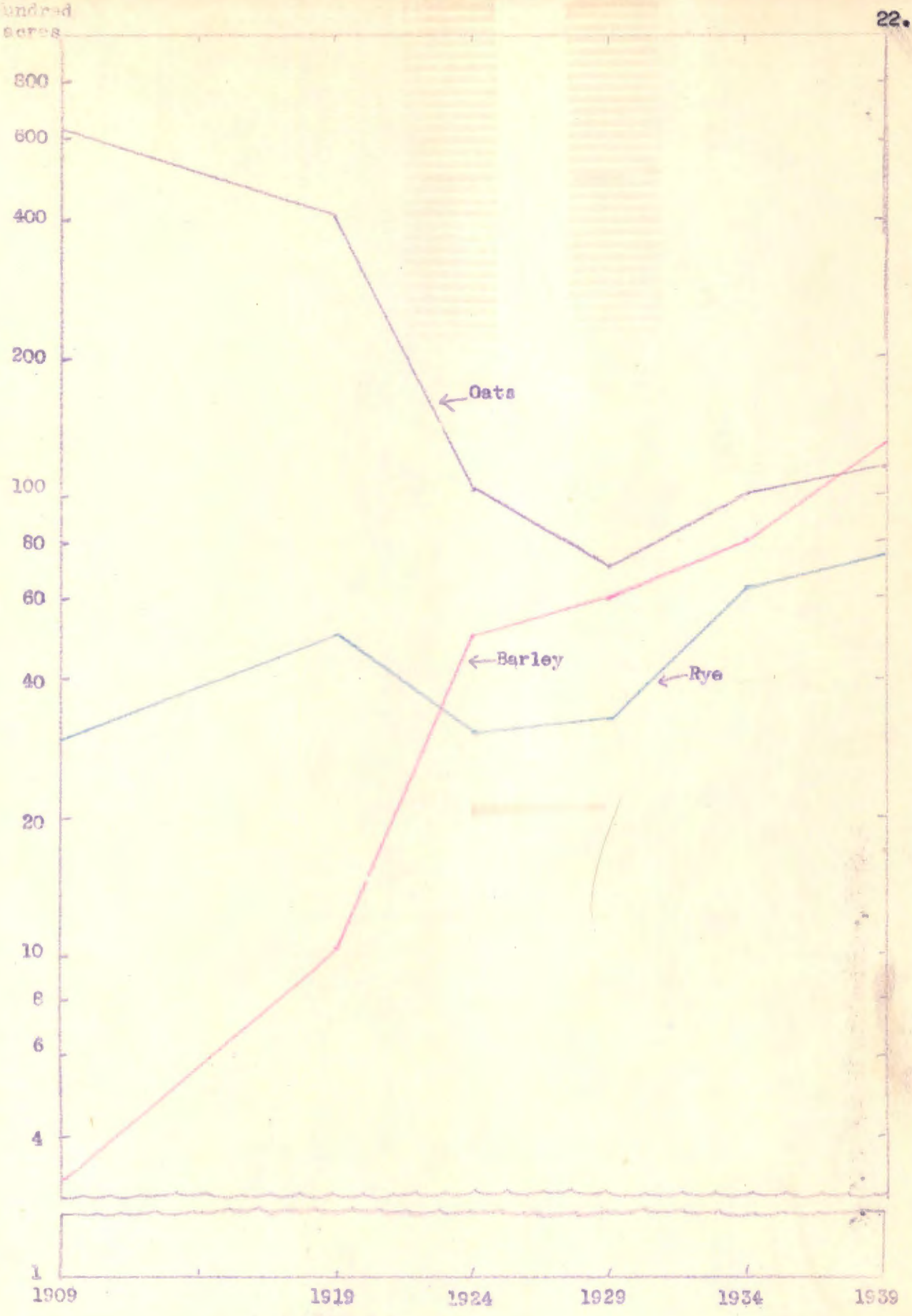
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(5) Leighty, Clyde E., Rye Growing in the Southeastern States, U.S.D.A. Farmers' Bulletin No. 894, p. 1.



Source: **U. S. Census of Agriculture, 1940**

Fig. 13. Acres of rye threshed in East Tennessee, by counties, 1939



Source:- Table I, Appendix

Fig. 14 Ratio chart showing trend in acreage harvested of oats, barley and rye in East Tennessee, 1909-1939

his operations by seeding the rye after the wheat is sown.(6)

There will never be a great outlet for rye as feed for livestock, and with plentiful supplies of wheat, the consumption of rye products is not likely to be largely increased. It is possible, therefore, that the acreage sown to rye will become stabilized within the next few years.

Balbo is the recommended variety. It is valuable for pasture and winter cover crop, and also for grain.

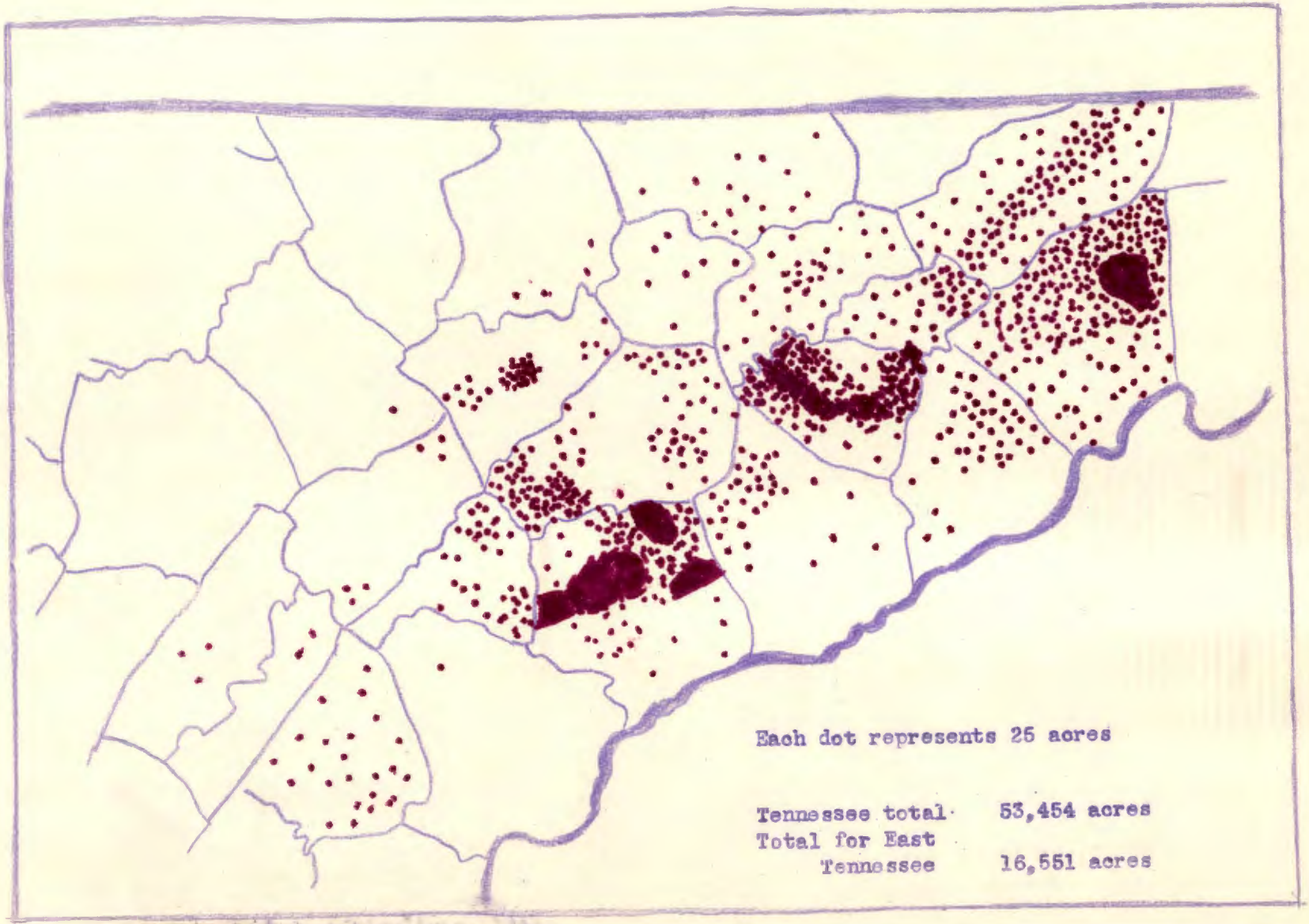
Barley acreage in East Tennessee has shown a substantial increase at each census period since 1909, and indications are that barley acreage will continue to increase. Acreage increased from 368 acres in 1909 to over 16 thousand acres in 1939, more than 400 percent (Figure 14). During the same period total production increased over 800 percent.

The present situation and the future outlook is encouraging. In general, the trend at the present time is towards an increase in the farm use of barley for feeding stock, winter cover crop and some winter pasturage. The climate in East Tennessee is very favorable for winter barley and has been more profitable than oats.

Some of the recommended varieties for Tennessee are the Tennessee winter, a standard winter variety, Five and Six, a beardless winter barley for grain, hay or pasture, and No. 52, which is similar to Tennessee winter, but a little earlier.

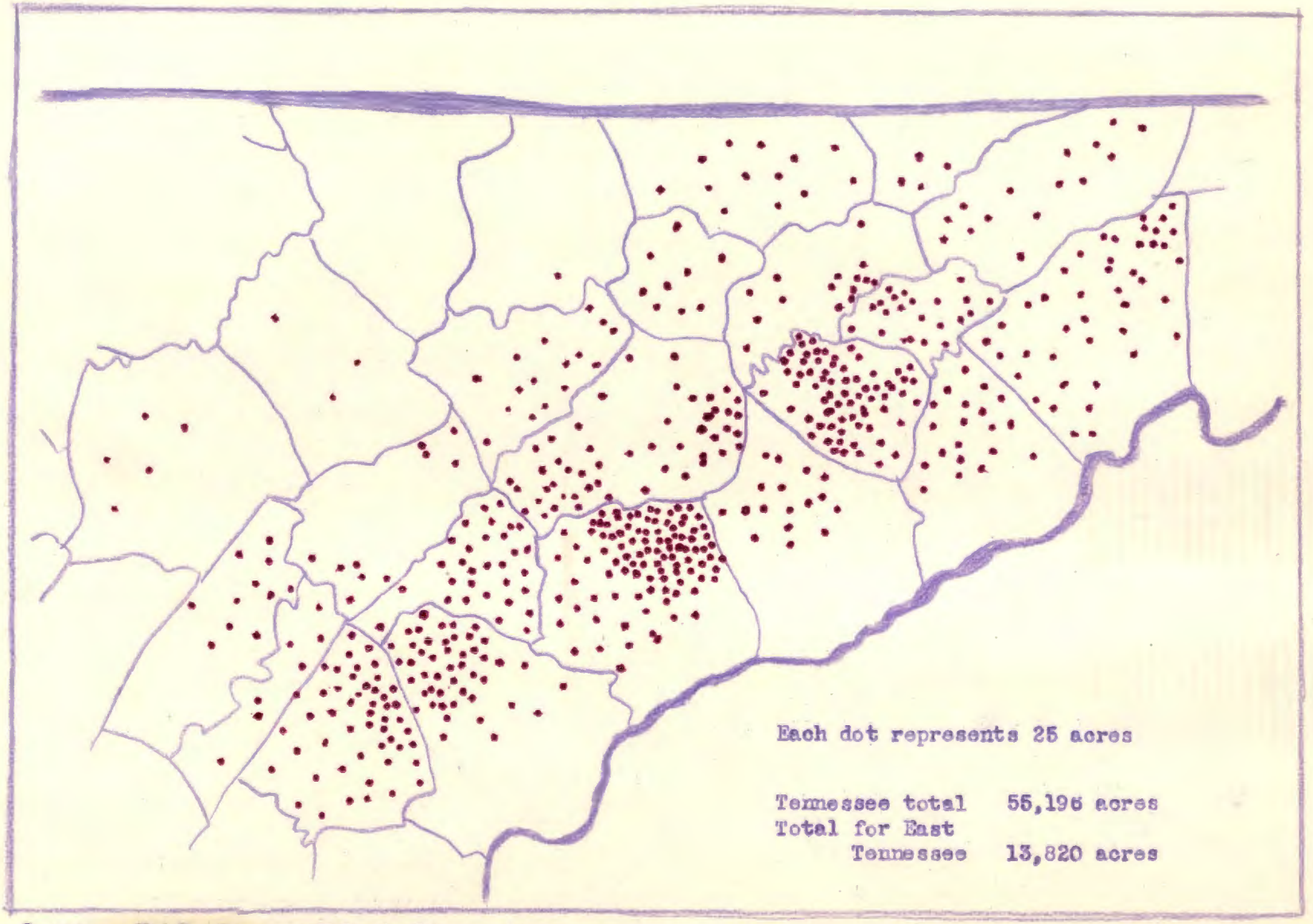
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(6) Ibid., p. 4.



Source: U. S. Census of Agriculture, 1940

Fig. 15. Acres barley threshed in East Tennessee, by counties, 1939



Source: U. S. Census of Agriculture, 1940

Fig.16. Acres oats threshed in East Tennessee, by counties, 1939

Probably the most important factor contributing to the increase in barley acreage was the development of varieties especially adapted to this section, borne out by the tremendous increase in production.

The leading oat producing counties in East Tennessee are Greene, Hamblen, Jefferson, Blount, and Monroe (Figure 16).

There was a sharp decline in oat acreage from 1919 to 1929. However, there has been a slight resumption of oat production since 1929 (Figure 14). Winter oats will probably have some future in East Tennessee, due to the success of the winter hardy oats developed by the Tennessee Experiment Station. The development of hardier, more disease-resistant, and more productive varieties should permit further extension of fall-sown oats.

The oat plant requires comparatively cool temperature for its best development, consequently fall-sown oats usually are more productive, and of better quality because conditions are more favorable for grain development early in the season.(7)

Some of the hardier and earlier varieties of winter oats are the Fulwin, Tennex, and Tennessee No. 092.

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(7) Stanton, T. R., and Coffman, F. A., Fall-Sown Oat Production, U.S.D.A. Farmers' Bulletin No. 1640, p. 3.

CHAPTER II

DISPOSITION OF GRAIN, AND MARKETING FACILITIES

Disposition of Grain on Farms

Corn: Approximately 80.2 percent of the 1940 corn crop in East Tennessee was consumed on the farm. The largest proportion, 76.8 percent, was fed to livestock. About 3.0 percent was used for human consumption and 0.4 percent for planting. Corresponding proportions for the state were 74.8 percent fed to livestock, 2.0 percent for human consumption and 0.5 percent for planting (Figure 17).

The most important market was to mills. Sales of the East Tennessee crop were around 4.0 percent to local mills and 4.4 percent to large city mills. Sales for the state as a whole were 5.5 percent to local mills and 6.3 percent to large city mills.

Other outlets for corn were to merchants, truckers, other farmers, croppers, and miscellaneous sales (Table II). Such sales represented 5.9 percent of the East Tennessee crop and 5.7 percent of the crop for the state.

Corn lost because of weather damage, spoilage, rats, weevils,

and insects amounted to 1.3 percent for East Tennessee and 1.2 percent for the state as a whole. Rats and weevils caused greatest damage.

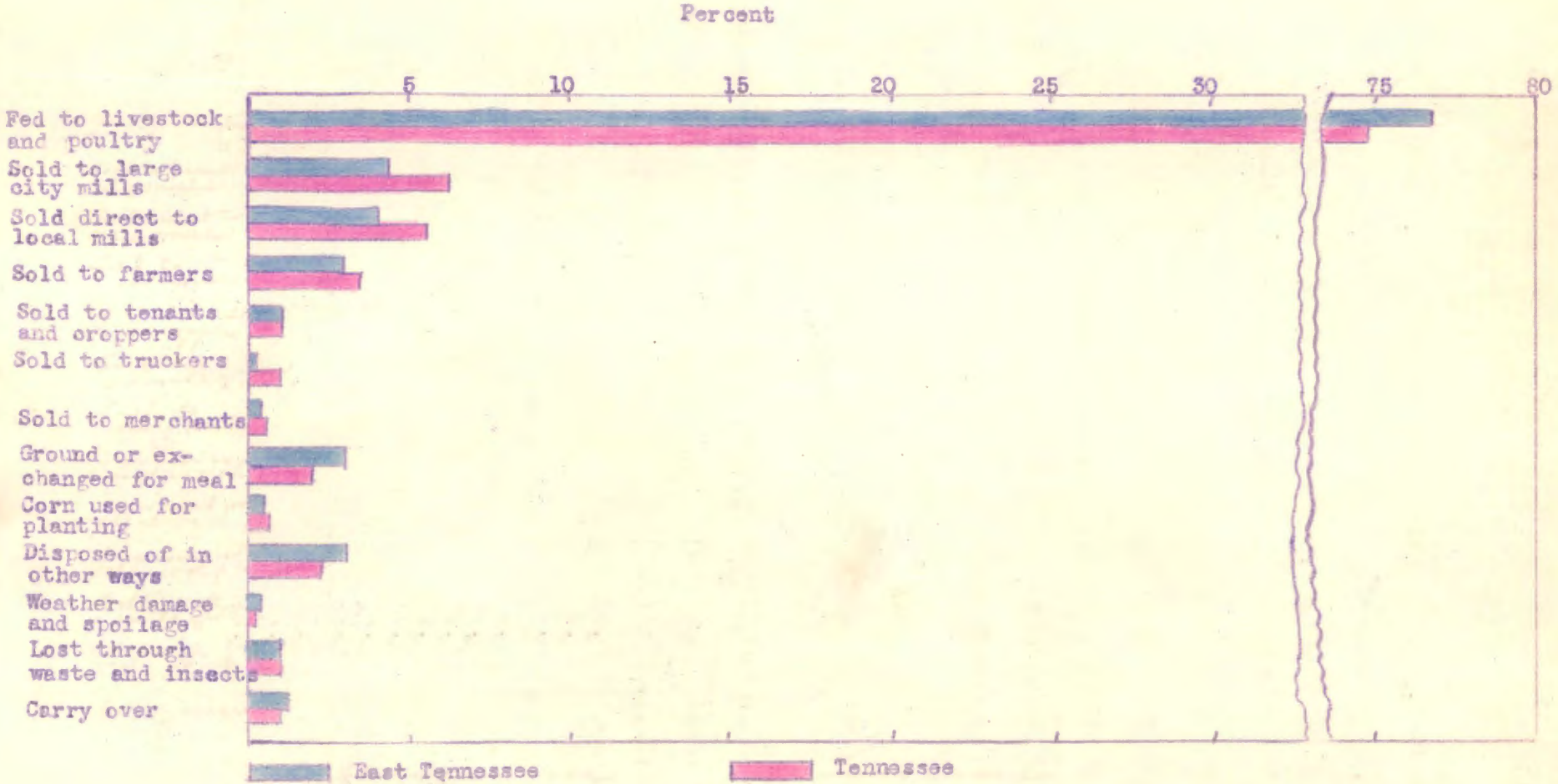
Corn on hand October 1, 1941, amounted to 4.2 percent for East Tennessee and 4.0 percent for the state.

Factors affecting disposition of corn are extent to which home needs are supplied, thus determining amount of surplus to be disposed of; type of power used, whether workstock, or tractors; relation of the price of corn to the price of hogs, corn-hog ratio; the relative importance of livestock feeding in the area; and the types of markets and transportation facilities available to the farmers.

TABLE II. DISPOSITION OF CORN, EAST TENNESSEE AND TENNESSEE, October 1, 1940 - October 1, 1941

Method of Disposition		Percent	
		East Tennessee	Tennessee
Used on Farm	Fed to livestock	76.8	74.8
	Ground or exchanged for meal	3.0	2.0
	Used for planting	.4	.5
All Sales	Sold to large city mills	4.4	6.3
	Sold to local mills	4.0	5.5
	Sold to other farmers	1.6	2.3
	Sold to croppers	1.0	1.0
	Sold to truckers	.1	1.0
	Sold to merchants	.2	.4
	Miscellaneous sales	3.0	1.0
Losses	Weather damage and spoilage	.3	.2
	Rats, weevils, and insects	1.0	1.0
On hand October 1, 1941		4.2	4.0

Source: Based on Corn Disposition Inquiry, Tennessee Agricultural Marketing Service in cooperation with the Department of Agricultural Economics of the University of Tennessee, 1941.



Source: **Table IV**

Fig. **17**. Disposition of corn supplies between October 1, 1940 and October 1, 1941

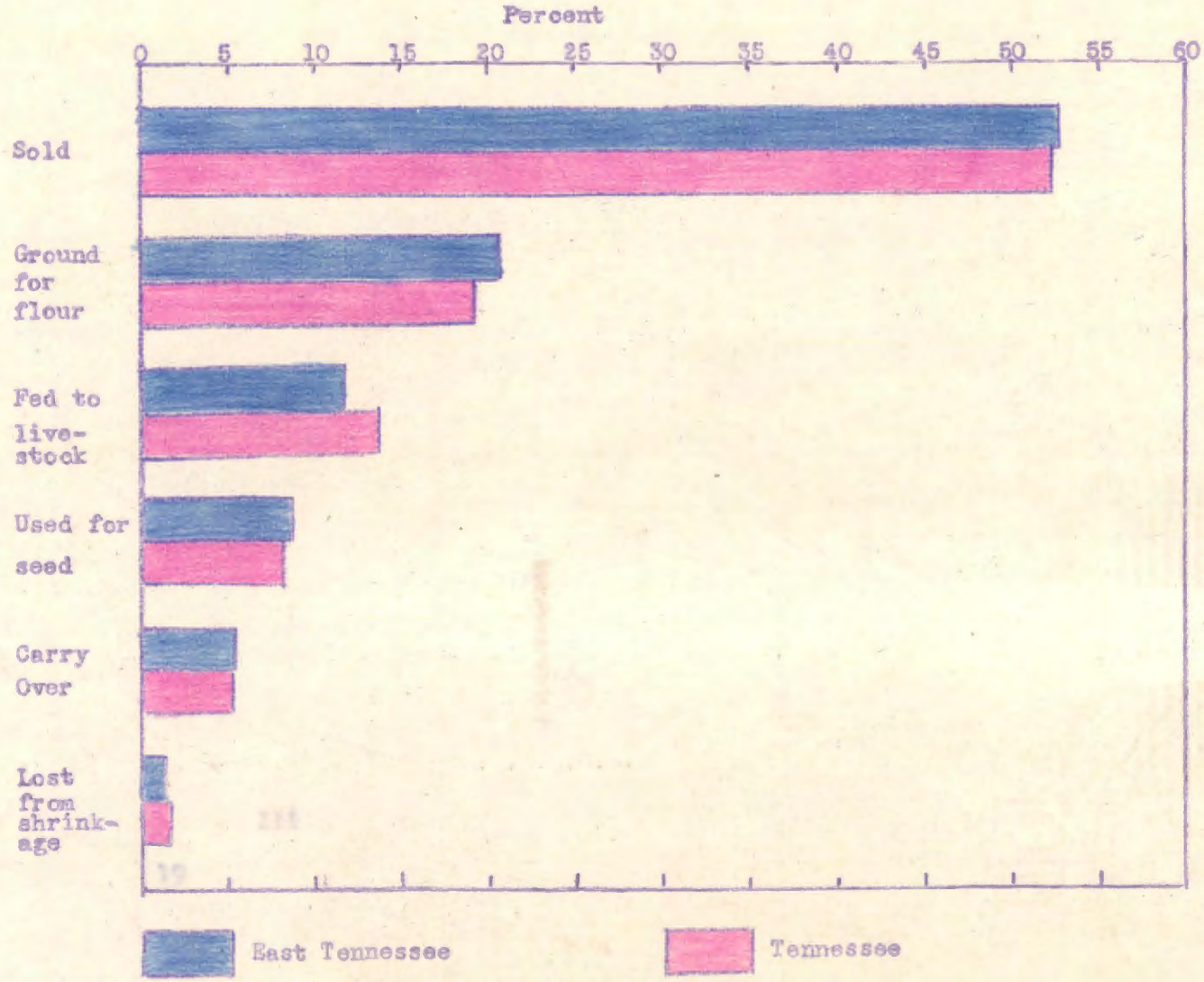
Wheat: In 1940, 52.6 percent of the wheat in East Tennessee was sold, 20.5 percent was ground or exchanged for flour, 11.6 percent was fed to livestock, 8.6 percent used for seed, 1.4 percent was lost from shrinkage, and 5.3 percent held on farms as carryover. The proportion sold was about the same as for the state, but the proportion ground or exchanged for flour was larger, and the proportion fed to livestock was less than for the state as a whole (Figure 18).

TABLE III. DISPOSITION OF 1940 WHEAT CROP, EAST TENNESSEE AND TENNESSEE

Method of Disposition	Percent	
	East Tennessee	Tennessee
Sold	52.6	52.4
Ground or exchanged for flour	20.5	19.1
Fed to livestock	11.6	13.6
Used for seed	8.6	8.2
Lost from shrinkage	1.4	1.5
Carryover	5.3	5.2

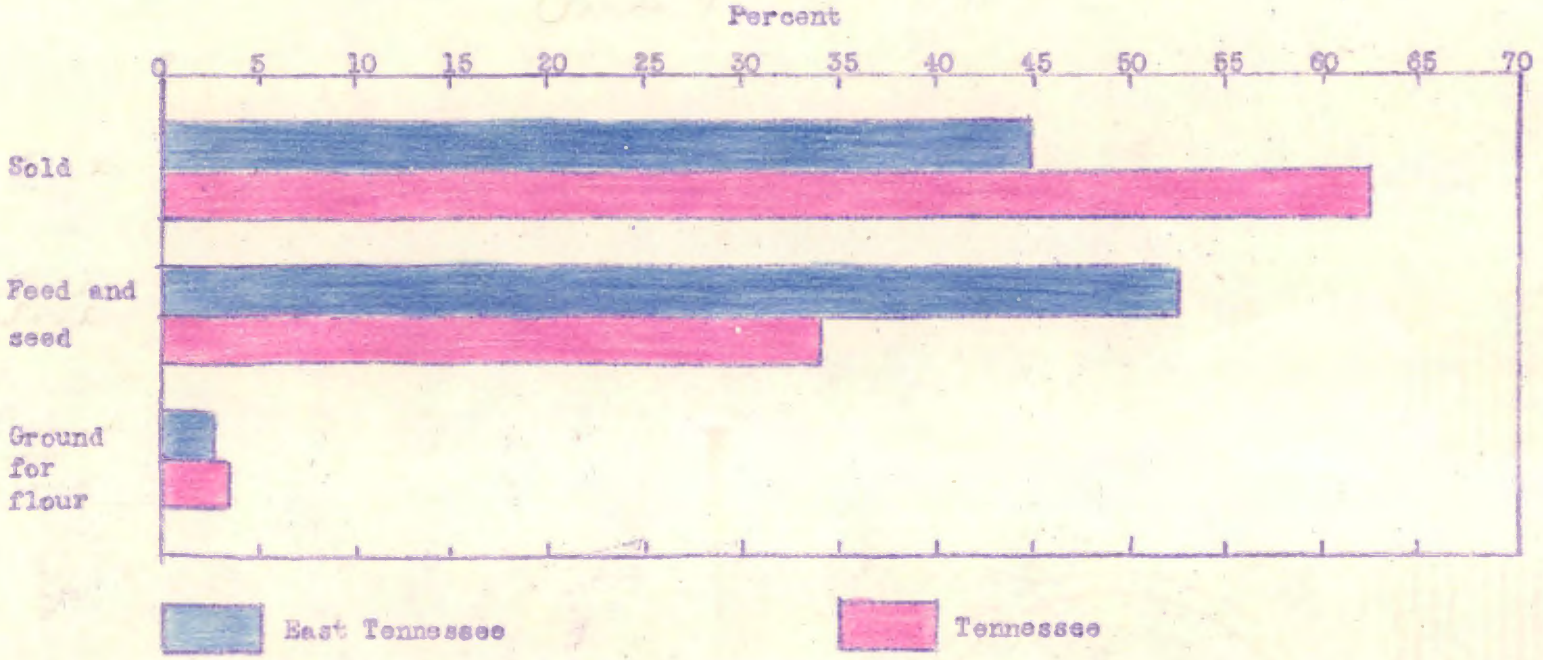
Source: Based on Estimates of the U. S. Department of Agriculture, Agricultural Marketing Service.

Rye: Disposition of 1940 rye crop in East Tennessee was in the following manner: fed to livestock, 52.5 percent; sold, 45.0 percent; and ground or exchanged for flour, 2.5 percent. A much larger proportion of rye in East Tennessee was fed to livestock than for the state as a whole (Figure 19).



Source: Table III

Fig. 18. Disposition of 1940 wheat crop in East Tennessee and Tennessee



Source: Table III

Fig. 19. Farm disposition of 1940 rye crop in East Tennessee and Tennessee

TABLE IV. DISPOSITION OF 1940 RYE CROP IN EAST TENNESSEE AND TENNESSEE

Methods of Disposition	Percent	
	East Tennessee	Tennessee
Fed to livestock	52.5	34.0
Sold	45.0	62.6
Ground for flour	2.5	3.4

Source: Based on estimates of the U. S. Department of Agriculture, Agricultural Marketing Service.

Barley and Oats: A smaller percent of the barley and oats produced in East Tennessee goes to market than for wheat or rye. No data are available as to their disposition in East Tennessee. But for Tennessee as a whole, it was estimated[1] that approximately 82.0 percent of the barley produced in 1940 was used on the farm for feed and seed, and 18 percent was sold. For oats it was estimated that approximately 77.0 percent was used on the farm for feed and seed, and 23.0 percent sold. The writer is of the opinion that somewhat smaller percent of the barley and oats produced in East Tennessee goes to market than for Tennessee as a whole, and that a larger proportion is fed to livestock.

Grain Used for Human Consumption: The two chief grains for human consumption are corn and wheat. Between 15 and 20 bushels of corn and 16 and 20 bushels of wheat were used per family (Table V).

(1) U. S. Department of Agriculture, Agricultural Marketing Service.

This is somewhat above the average amount of each kind of grain per family recommended in Extension Publication No. 207.

TABLE V. AVERAGE AMOUNT OF CORN AND WHEAT CONSUMED PER FARM FAMILY AND PER PERSON

Source	Corn Yearly Amount Used		Wheat Yearly Amount Used	
	Average per Family (Bu.)	Average per Person (Bu.)	Average per Family (Bu.)	Average per Person (Bu.)
Extension Publication No. 207	15.0	3.0	16-18	3.2
Corn Disposition Inquiry, 1941: East Tennessee	20.8	4.1*	-	-
Tennessee	20.1	4.0*	-	-
Based on 30 Business Farm Records in East Tennessee	15.5	3.1*	20.0	4.0*
Department of Agricultural Economics and Rural Sociology, Monograph No. 123 Based on Farm Business Records of 10 Model Farms in Roane County	20.0	4.0*	-	-
Based on records secured from a mill in Clover Hill Community in Blount Co.	-	-	18.0	3.2

* Based on the assumption that the average number of persons per family is 5.

Agencies Buying Grain

Mills are the chief marketing agencies in the area. They bought over 50 percent of the wheat in 1940, the other being used mostly for flour in the home, feed for livestock, and seed. Corn sold to mills represented 8.4 percent of the total crop, whereas total sales represented only 14.3 percent of the crop (Chapter II). Lesser important agencies buying grain were farmers, truckers, and merchants.

There are approximately 99 mills in East Tennessee, 96 grinding flour and corn meal, 2 grinding corn meal and feed, and 1 feed manufacturing plant. In addition there are hundreds of grist mills scattered throughout the area, which do not buy grain and are not active marketing agencies. There are no grain elevators or other agencies in the area that buy, store, or condition grain for farmers or others.

Milling Capacity of Flour and Corn Meal

The total daily milling capacity in terms of 24-hour operation for 1941 was approximately 6064 barrels of flour and 23,496 bushels of corn meal. This capacity in terms of grain would be approximately 28,000 bushels of wheat and 27,000 bushels of corn per day.(2) It is

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(2) Estimate based on daily milling capacity, and on the basis that 1 barrel of flour is the product of 4.7 bushels of grain, and 1 bushel of corn meal is the product of 1 1/7 bushel of corn.

estimated that 3,360,000 bushels of wheat and 3,240,000 bushels of corn could be milled annually in East Tennessee, which is based on 200 day operation, and 60 percent of capacity figures on the basis of 24-hour operation being 100 percent.(3) These figures include only those mills buying grain, which excludes small grist mills.

TABLE VI. DAILY CAPACITY OF MILLS IN EAST TENNESSEE, 1941

Type of Grain	Number of Mills*	Bushels
Wheat	96	28,000
Corn	98	27,000

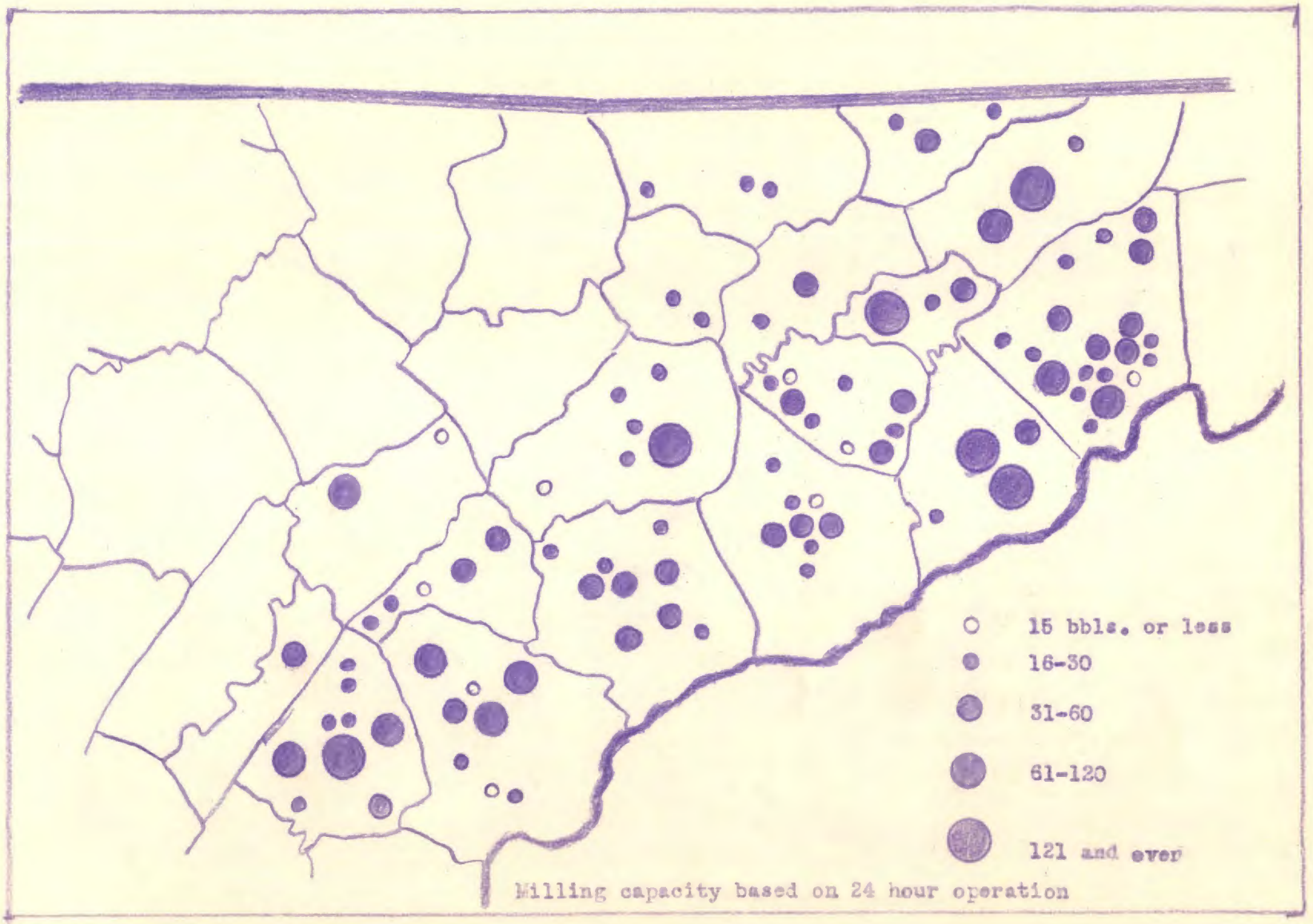
* There were 98 mills, of which 96 ground wheat and all ground corn.

Milling Capacity by Counties: Milling capacity of flour is greatest in Knox County, Greene ranks second, and McMinn third. Capacity for these three counties is greater than for all other counties in the area combined (Table VII).

Milling capacity for corn meal is greatest in Greene County, with Knox ranking second, McMinn third, and Blount fourth. Counties having largest milling capacity corresponds very closely to counties of heaviest production.

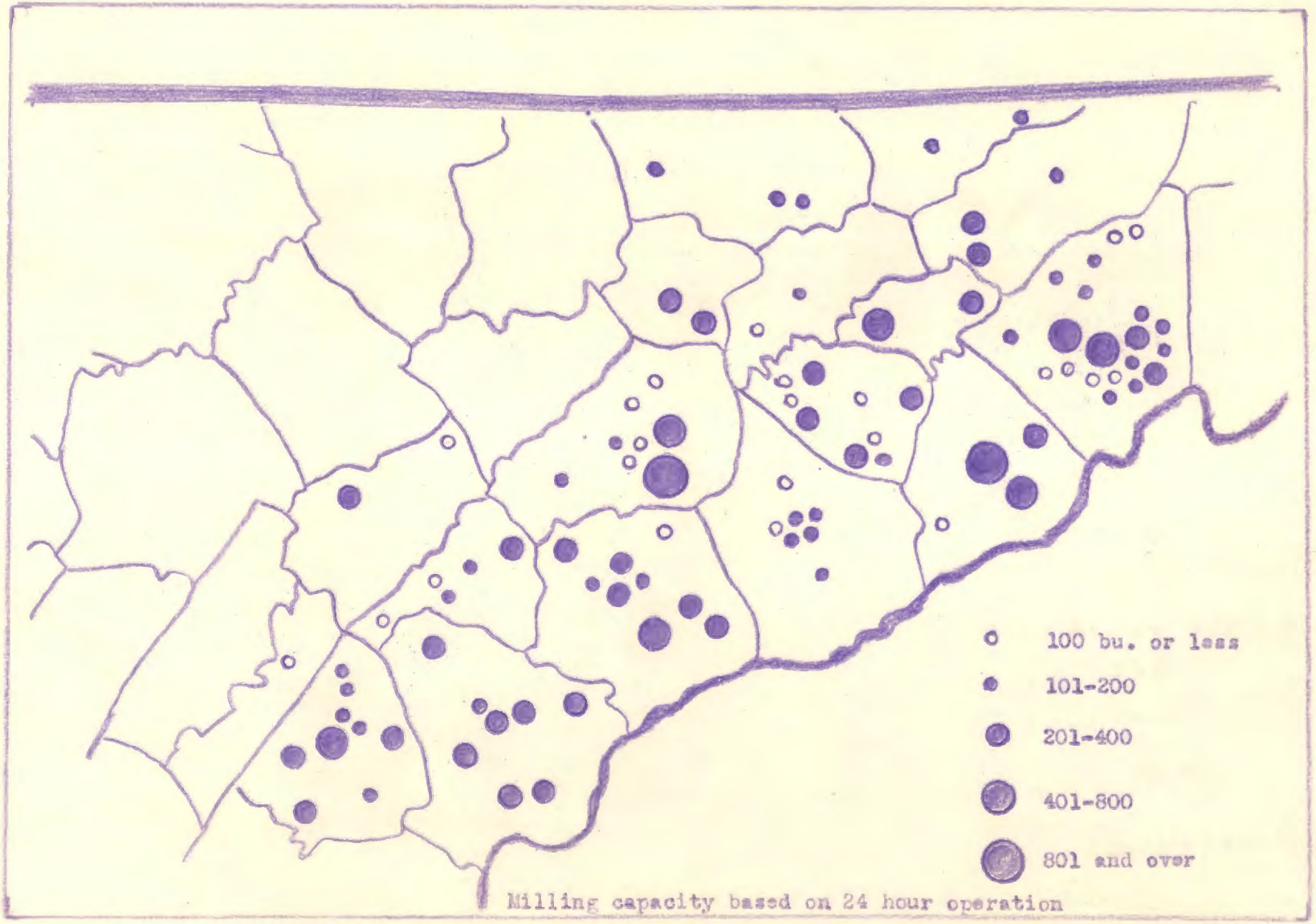
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(3) 200 day operation is considered by many mills a good year's run, and the average running time for commercial flour mills in U.S. is about 60 percent of capacity all the year around.



Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 20. Daily milling capacity of flour in 23 East Tennessee counties, 1941



Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 21. Daily milling capacity of corn meal in 23 East Tennessee counties, 1941

TABLE VII. DAILY MILLING CAPACITY OF FLOUR AND CORN MEAL BY COUNTIES IN EAST TENNESSEE, 1941

County	No. of Plants	Milling Capacity of Flour (24-Hr. Operation) (Bbls.)	No. of Plants	Milling Capacity of Corn Meal (24-Hr. Operation) (Bu.)
Knox	6	2,113	8	3,380
Greene	20	717	20	3,642
McMinn	9	525	9	2,495
Cocke	4	435	4	1,670
Monroe	8	406	8	1,980
Blount	9	324	9	2,470
Sevier	8	265	8	1,105
Hawkins	3	255	3	784
Jefferson	9	240	9	1,850
Hamblen	2	175	2	1,040
Loudon	5	155	5	850
Roane	2	115	2	350
Hancock	3	94	3	420
Claiborne	3	75	3	360
Grainger	2	70	2	300
Union	2	50	2	700
Meigs	1	50	1	100

Source: Grain Marketing Survey in East Tennessee, 1941.

Size and Operation of Mills: The average daily milling capacity of flour mills is 63 barrels of flour per mill. Of the 96 mills manufacturing flour, ten have a daily milling capacity of 15 barrels or less. Over one-half have a capacity of 30 barrels or less. A few extra large mills cause the average capacity per mill to be relatively high. Six

mills have a daily milling capacity of over 120 barrels.

TABLE VIII. DAILY MILLING CAPACITY OF FLOUR MILLS IN EAST TENNESSEE, 1941

Milling Capacity of Flour (24-Hour Operation) (Barrels)	Mills in Each Group	
	Number	Percent
0 - 15	10	10.4
16 - 30	45	46.9
31 - 60	26	27.1
61 - 120	9	9.4
121 and over	6	6.2

Source: Grain Marketing Survey in East Tennessee, 1941.

Corn mills in the area have an average daily milling capacity of 240 bushels of corn meal per mill. As in the case of flour mills, most of the mills are small with a few very large mills. Over 60 percent of the corn mills in East Tennessee have a daily milling capacity of 200 bushels or less, ten have a milling capacity of over 400 bushels, and two have a milling capacity of over 800 bushels.

A large number of mills in East Tennessee are small, and, therefore, handle a small amount of grain. Custom grinding makes up by far the largest share of their business. In such communities farmers are sometimes required to haul their grain 40 to 50 miles or more to market.

TABLE IX. DAILY MILLING CAPACITY OF CORN MEAL IN EAST TENNESSEE, 1941

Milling Capacity of Corn Meal (24-Hour Operation) (Bushels)	Mills in Each Group	
	Number	Percent
0 - 100	24	24.5
101 - 200	37	37.8
201 - 400	27	27.6
401 - 800	8	8.1
801 and over	2	2.0

Source: Grain Marketing Survey in East Tennessee, 1941.

Grain Storage Facilities

Most warehouses storing grain in East Tennessee are operated in connection with mills. However, one warehouse has stored grain in sacks for the commodity credit corporation for the past few years.

Some of the larger mills in the area have elevators or storage bins for storing bulk grain and are equipped with heavy duty wagon and truck scales for weighing, and have pits where bulk grain can be dumped or unloaded and the grain is moved by elevators or conveyors to storage bins and elevators where it is stored (Figure 22).

None of the smaller mills in the area are equipped to handle bulk grain. They have very little if any bin storage capacity for bulk grain and most of the grain has to be stored in sacks. They have only small portable or platform scales, and the sacked grain is weighed by the hand-truck load of 4 or 5 sacks per weighing (Figure 23). It is then piled up in a warehouse where the grain is



Heavy duty wagon and truck scale



Pit for unloading bulk grain

Figure 22. Facilities for weighing and unloading bulk grain





Figure 23. Platform scales used for weighing hand-truck loaded with sacked grain

stored until milled.

Capacity of Facilities: Total rated grain storage capacity for East Tennessee as of March 1, 1941, was approximately 1,074,815 bushels. Storage capacity was reported at 539,140 bushels for bulk grain, 473,650 bushels for sacked grain, and 62,025 bushels capacity of crib storage for ear corn (Table X).

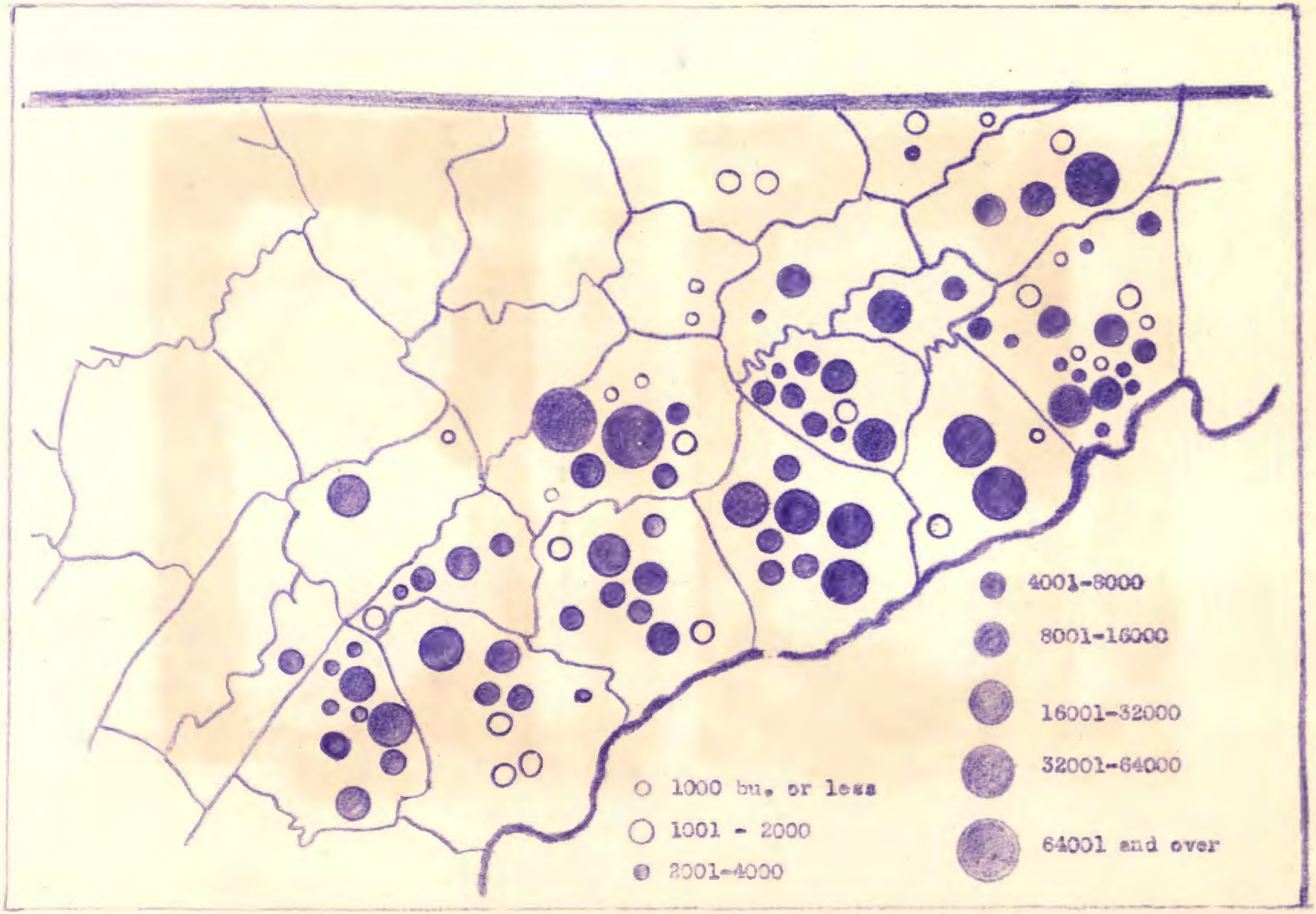
TABLE X. METHOD OF STORING GRAIN IN EAST TENNESSEE, 1941

Kind of Storage	Capacity of Each Kind of Storage	
	Bushels	Percent
Bulk	539,145	50.2
Sacked	473,640	44.0
Crib (ear corn)	62,025	5.8
Total	1,074,815	

Source: Grain Marketing Survey in East Tennessee, 1941.

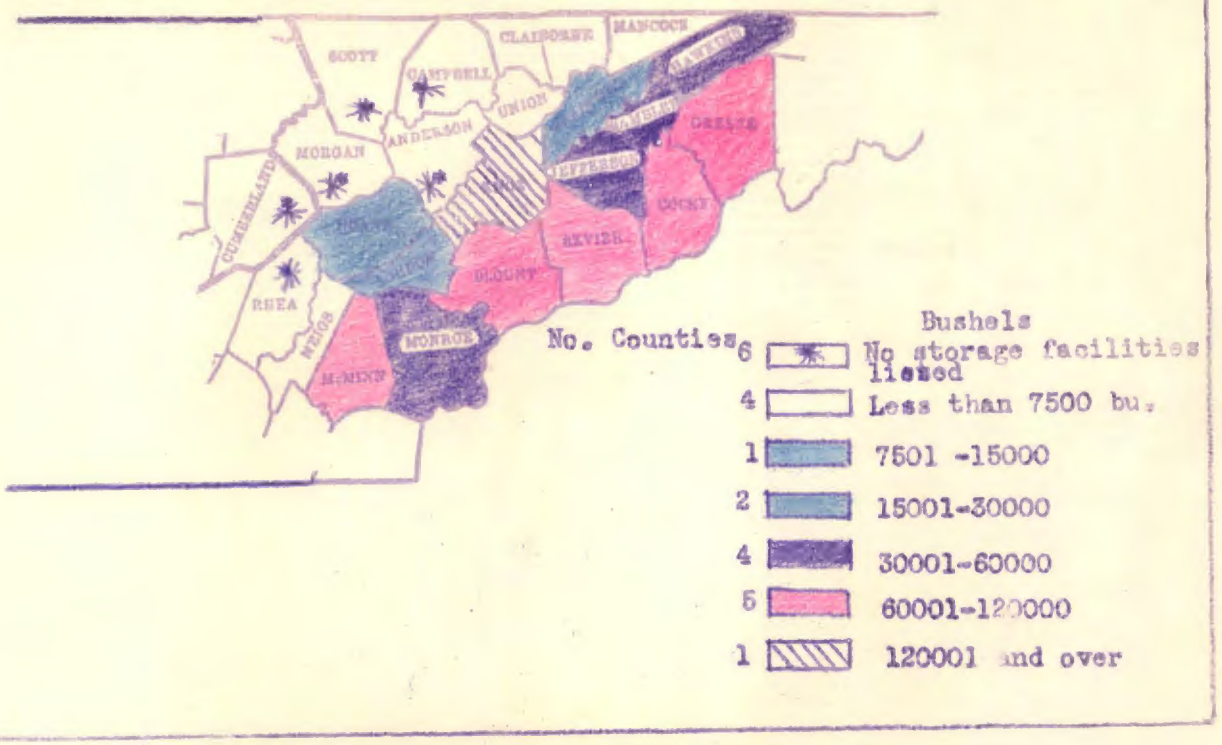
Capacity by Counties: Knox County has by far the largest storage capacity of any county in East Tennessee. Greene and Sevier rank next in capacity. Storage for these three counties is greater than all other counties in the area combined (Table XI). Counties having largest milling facilities also have largest storage capacity (Figures 24 and 25).

Counties having the largest proportion of grain stored in bulk were Union, Knox, and Hawkins, with 100 percent, 82 percent, and 63



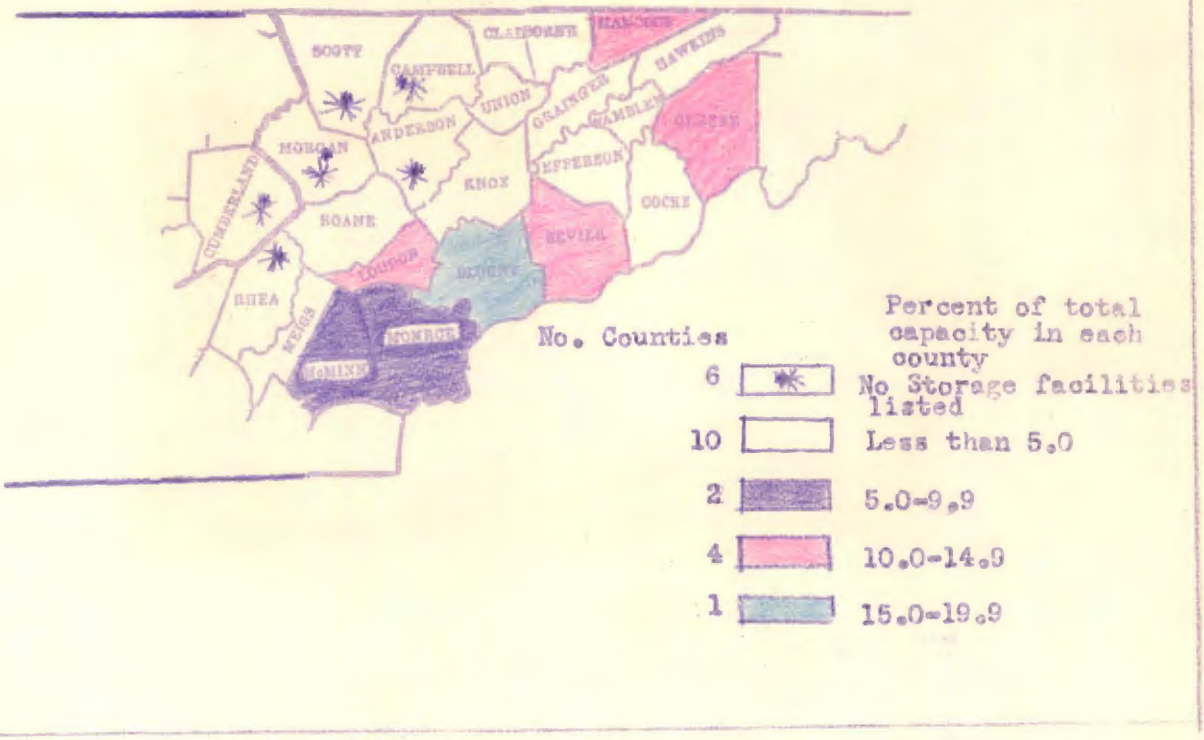
Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 24 Location and capacity of grain storage facilities in 23 East Tennessee counties, 1941



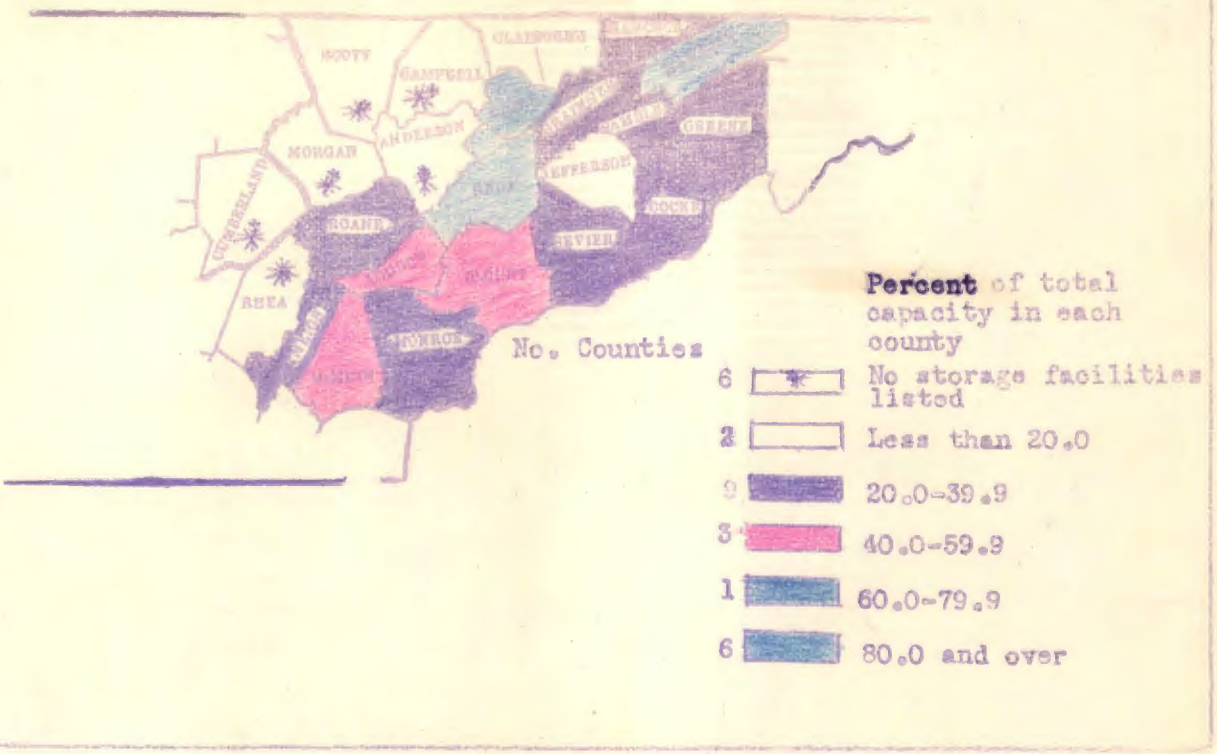
Source: Grain Marketing Survey in East Tennessee, 1941

Fig 25. Grain storage capacity in 23 counties in East Tennessee, March 1941



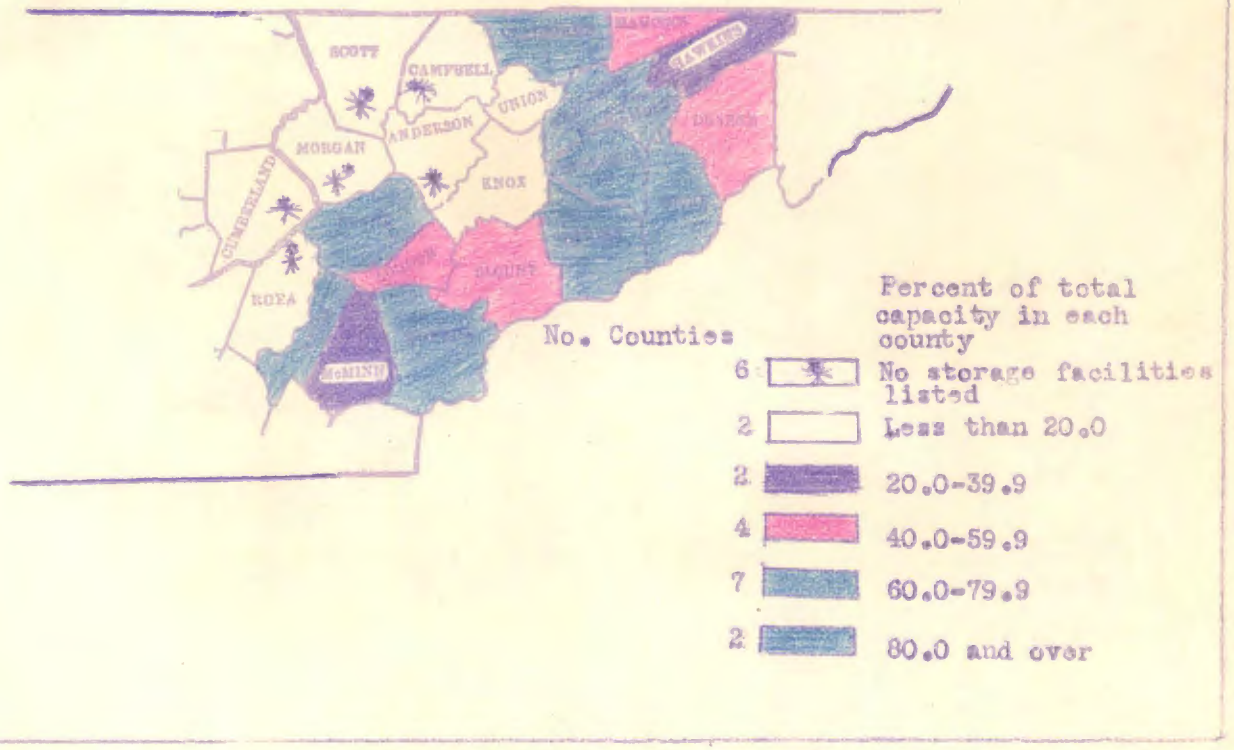
Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 26. Crib (ear corn) storage capacity in East Tennessee by counties, 1941



Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 27. Bulk (bin) storage capacity of grain in East Tennessee by counties, 1941



Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 28. Sacked storage capacity of grain in East Tennessee by counties, 1941

percent each respectively. Claiborne and Jefferson counties had less than 20 percent of their total storage capacity as bulk (Figure 27).

Sacked storage was over 80 percent for Claiborne and Jefferson counties and over 60 percent for Grainger, Hamblen, Cocke, Sevier, Monroe, Roane, and Meigs (Figure 28).

Storage in cribs was highest in Blount County, being 18 percent

TABLE XI. CAPACITY AND TYPE OF STORAGE FACILITIES, BY COUNTIES IN EAST TENNESSEE, 1941

County	Number of Plants	Storage Capacity (Bushels)	Percent of Each Type		
			Bulk	Sacked	Crib (Ear Corn)
Knox	9	350,240	82.0	17.4	.6
Greene	20	107,825	39.6	47.0	13.4
Sevier	8	103,800	25.5	62.7	11.8
Cocke	4	85,500	22.8	76.7	.5
McMinn	9	78,600	58.5	32.2	9.3
Blount	9	68,700	40.2	41.8	18.0
Claiborne	3	65,000	-	100.0	-
Jefferson	9	58,300	13.7	81.8	4.5
Hawkins	3	57,200	62.9	36.2	.9
Monroe	8	49,700	27.2	63.8	9.0
Hamblen	2	38,000	21.1	76.3	2.6
Loudon	5	27,000	40.8	44.4	14.8
Roane	2	20,100	22.1	77.9	-
Grainger	2	13,000	38.5	61.5	-
Meigs	1	5,000	30.0	70.0	-
Hancock	3	4,600	34.8	54.3	10.9
Union	2	750	100.0	-	-
Total	99	1,074,815			

Source: Grain Marketing Survey in East Tennessee, 1941.

of the total. Other counties having over 10 percent of the total capacity as crib storage were Loudon, Greene, Sevier, and Hawkins (Figure 26).

Adequacy of Grain Storage Facilities: Grain storage facilities in this area are fairly satisfactory as to distribution and location, but are not adequate in volume and type of storage. The two main complaints about grain storage are (1) the amount of public storage is too small, and (2) the type and equipment in most cases is inadequate. Practically all the mills are privately owned and do not make a practice of storing grain for farmers and others. Very few of the smaller mills have much bin storage capacity, and do not have facilities or equipment to handle bulk grain. Consequently much grain has to be stored in sacks, which is not a satisfactory method of storing grain for any length of time.

Considerable improvement can and should be made by mills in handling and providing facilities for handling and storing bulk grain. With the shortage of burlap bags, bulk storage may become the only alternative. A large part of the burlap supply, most of which comes from India, is used each year for packing agricultural products. Much of this supply will be used for defense purposes. Two-thirds of it will be set aside over which OPM will have control. The remaining one-third will be used for manufacture of bags for agricultural and chemical products.

Cotton bags would be quite satisfactory substitutes for burlap, but their increased use is limited by war needs.

Bulk and Sack Handling of Grain in East Tennessee

In the early days there were few railroads, and much of the grain was moved in wagons over poor roads to river banks, and there loaded on barges. There were no grain elevators, and the simple means of moving grain was to put it in sacks. Grain in sacks accommodated itself to almost any form of transportation whether on land or water. The use of grain sacks was therefore a natural growth, and the system became thoroughly entrenched.

Conditions that encouraged or necessitated the use of sacks for grain have changed with the years. The improvement in roads, the increased use of trucks, and by improvement in facilities both on farms and mills throughout the area to facilitate handling of bulk grain should result in a considerable saving of handling and marketing costs.

Practically all of East Tennessee grain, however, is handled and marketed in sacks, whereas all out-of-state grain that is shipped or trucked in is in bulk (Figure 29). In the major grain producing states all grain is handled in bulk on the farm, at the country elevators, and at the terminal markets.

The shortage of labor, burlap and cotton bags should stimulate a strong movement in East Tennessee for bulk handling and storage.



Truck No. 1. Local wheat in sacks
Truck No. 2. Out-of-state wheat in bulk



Sampling sacked wheat at a local mill

Figure 29. Trucks loaded with wheat waiting to be unloaded

Advantages of Bulk Handling and Storing: The number of handlings are reduced, both on the farm and on the market, and less labor is involved than when handled in sacks.

There can be a more efficient use of mechanical power. By means of either a stationary or portable elevator, bulk grain can be placed in farm storage bins or granaries (Figure 30). Under favorable conditions hillside bins can be used which eliminates the need for a portable elevator for filling and emptying the bins.

It is not usually practicable to clean dockage from sacked grain on the farm because of the expense of unsacking and resacking the grain. Grain in bulk can be cleaned readily which makes it possible to keep the screenings on the farm for livestock feed, and saves the cost of transportation on the screenings.

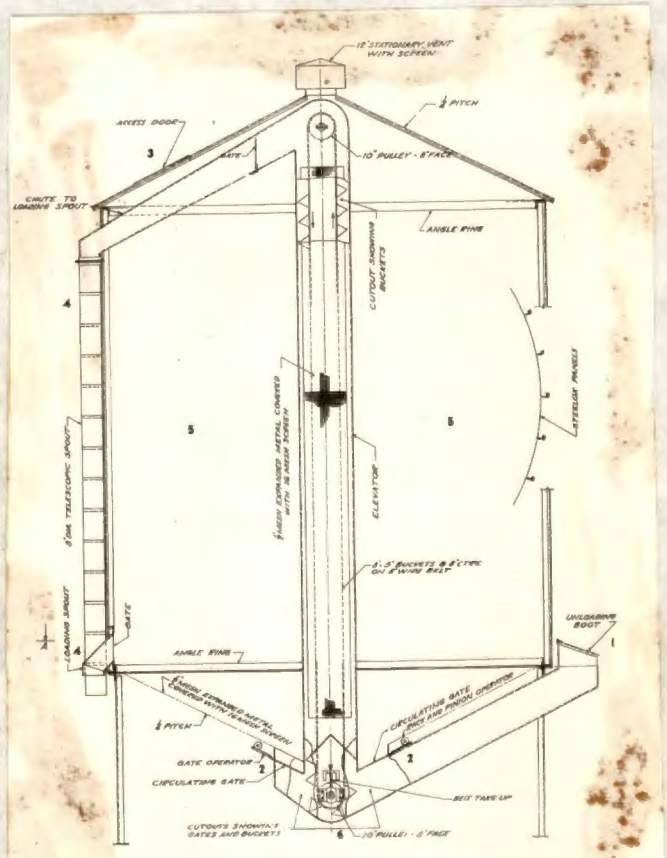
Damaged sacks means extra labor and cost of resacking the grain, as well as loss through leakage. Sometimes weak or torn sacks, when on the base of the pile, cause high stacks of grain to collapse. The use of second hand or damaged sacks is occasionally the cause of such hazards.

Damage from rodents and insects is greater when grain is stored in sacks. Cutting the bags by rats and mice present the same difficulty as weak or torn sacks.

Grain is more readily conditioned when stored in bins. If it is to be cleaned, "smutted", washed, or blended commercially, storage in



Capacity - 2000 bu. of grain



1. **Unloading boot.** Convenient for both truck and railroad.
2. **Individual gates.** Permits turning, unloading from either of the two bins.
3. **Access door.** Provision for inspection, treating.
4. **Loading spout.** Readily accessible for trucks, railroads.
5. **Two separate compartments.** For different grains, if desired.
6. **Power take off.**

Figure 30. Elevator granary designed to meet the needs of farmers, small mills, and feed mills which require grain storage

Source: Thomas, Stone, and French, Inc., Wichita, Kansas.



It takes two to three men to unload and weigh a truckload of sacked grain

Figure 31. Unloading local sacked corn at a mill

sacks greatly retards the operation. If spoiling or heating of grain in bins is noticed, it can usually be arrested by moving the grain from one bin to another.

Bulk grain can be sampled, weighed and stored with greater speed and accuracy then when in sacks. Sacked grain is weighed by the hand-truck load of 4 to 5 sacks per weighing (Figure 31). A 150-bushel truck load of sacked grain would require 15 to 20 hand truck loads.

Advantages of Sack Handling: Special trade requirements sometimes demand that grain be sacked. Occasionally farmers and dealers may have small lots of particularly choice grain that will command a high premium in the market; and to be sure that such grain will not be mixed with other grain they may prefer to handle, store, and sell such lots of grain in sacks.

Sack handling is more suitable for small scale mill and farming operations as it involves less capital equipment.

Grain Storage Facilities in Tennessee

The total rated grain storage capacity of 339 plants in Tennessee as of March 1, 1942, was a little over 16 million bushels. This capacity consisted of about 9 million bushels for bulk grain, 6.5 million bushels for sacked grain and 0.5 million bushels of crib storage (Table XII). Figure 32 and Table III in the Appendix show rated grain storage capacity by counties,



No. Counties	Bushels	No. Counties	Bushels
27	No storage facilities listed	13	30001-6000 bu.
13	Less than 7500 bu.	7	60001-120000 bu.
10	7501- 15000 bu.	6	120001-240000 bu.
7	15001-30000 bu.	12	240001 and over

Source: U. S. D. A. Agricultural Marketing Service

Fig. 32. Total grain storage capacity in Tennessee by counties, March, 1942

and total for Tennessee. Data are not separately shown for individual counties having less than 3 establishments reporting.

TABLE XII. RATED GRAIN STORAGE CAPACITY IN TENNESSEE, 1942

Kind of Storage	Rated Storage Capacity	
	Bushels	Percent
Bulk	9,158,000	60.3
Sacked	5,563,000	36.6
Crib (ear corn)	467,000	3.1
Total	15,188,000	100.0

Source: U.S.D.A., Bureau of Agricultural Economics, Division of Agricultural Statistics.

Suggestions for Market Improvement for Corn

In reply to the question, "How can market conditions for corn in your area be improved?" about 50 percent of the answers were, "Feed more corn to livestock". Other answers were as follows:

Hold corn off the market until demand calls for it.
Get a market closer to us; the only good one is about 50 miles away. (Dyer County).
Establish more markets.
Operate more feed grinding mills to make feed for cattle.
There are no corn dealers here; none hauled in or out. (Hardeman County).
Secure better freight rates to large mill centers.(Madison County).
Use care in harvesting, and grow same color and kind. (Gibson County).

Stop trucks from hauling corn in from the North; use better seed corn. (Hickman County).

Establish a local market. (Montgomery County).

Not much competition here. (Giles County).

Keep that corn in the Corn Belt, and raise our own quota in the South. (Marshall County).

Have better roads and ceiling on corn prices.

We do not have any market but local. (Franklin County).

Get better quality and better grading.

Buy better seed, and all farmers raise white corn.

No market except milling purposes. (Bledsoe County).

TVA took over all land in this part of the county that would produce any corn, so we cannot raise any or at least not enough to keep the necessary livestock. (Hamilton County).

By not having corn shipped in from other sections.

Get a shipping point. (McMinn County).

By sorting the corn and selling good corn.

Secure more buyers.

By farmers organizing. (Union County).

We should get Chicago prices plus freight from that point for our corn. (Hawkins County).

We need cheap freight rates to enable us to use out-of-state corn. (Greene County).

We should produce a more sound, flinty corn for bread.

Not much sold to go out of the state and not much brought into East Tennessee from other states. (Greene County).

Other Comments and Suggestions:

Deep plowing, shallow cultivation.

Deep breaking.

I truck some corn, but haul it to Dyersburg. We do not buy corn but ship it out, some by train, some by truck, and some by barges. (Lauderdale County).

It pays to plant corn only on good land.

Corn crop comes out about even in this locality, but there was a little trucked in last winter which was handled by feed dealers. (Lawrence County).

No corn is shipped into this community from other communities. (Perry County).

More than 85 percent of all corn grown here is fed on the farm on which it is grown. (Bedford County).

We need a place where they pay the market price at all seasons. (McMinn County).

There is never much corn for sale; some farmers raise a little surplus, but most of it is sold to small farmers who do not raise enough for their own needs. (Claiborne County).

There is not much market for corn in this part of the state. (Hawkins County).

I do not know of any corn being trucked in or out. (Hamblen County).

There is not much yellow corn grown here. (Greene County).

CHAPTER III

SUPPLY OF GRAIN FOR EAST TENNESSEE

Amount Handled

It is estimated that approximately 5,743,000 bushels[1] of grain[2] were handled by mills in the East Tennessee area during the marketing year

TABLE XIII. ESTIMATED AMOUNT OF GRAIN HANDLED BY MILLS IN EAST TENNESSEE, JULY 1940 - JULY 1941

Kind of Grain	Estimated Amount* of Grain Handled by 56 Mills Not Visited	Amount of Grain Handled by 45 Mills Visited	Estimated Total for East Tennessee	Percent of Total for Area
	(Bu.)	(Bu.)	(Bu.)	
Wheat	655,560	2,634,075	3,289,635	57.3
White corn	462,534	886,800	1,349,334	23.5
Yellow corn	54,630	631,750	686,380	12.0
Oats	31,564	313,800	345,364	6.0
Barley	8,498	49,800	58,298	1.0
Rye	1,214	1,000	2,214	-
Grain sorghum	-	12,000	12,000	-
Total	1,214,000	4,529,225	5,743,225	-

* Based on milling capacity of flour and corn meal.

Source: Grain Marketing Survey in East Tennessee, 1941.

(1) Estimate is based in quantity of grain handled by mills covered in survey.

(2) Corn, wheat, oats, barley, rye, and grain sorghums.

July 1940 to July 1941. Of this amount around 57 percent was wheat, 23 percent white corn, 12 percent yellow corn, 6 percent oats, 1 percent barley, and less than 1 percent rye and grain sorghums combined (Table XIII).

Origin of East Tennessee Supply

Over one-half the grain handled by these mills (51.5 percent) was shipped in from other states. All grain sorghums were shipped in from other states. The proportion of other grains shipped in were: yellow corn, 87.1 percent; oats, 81.6 percent; wheat, 55.3 percent; barley, 44.1 percent; and white corn, 16.7 percent. All rye handled in the area was obtained in Tennessee (Table XIV).

TABLE XIV. ESTIMATED LOCAL AND OUT-OF-STATE RECEIPTS OF EACH KIND OF GRAIN, EAST TENNESSEE, JULY 1940 - JULY 1941

Kind of Grain	From Tennessee	Percent	From Out-of-State	Percent
	(Bu.)		(Bu.)	
Wheat	1,489,996	44.7	1,819,639	55.3
White corn	1,125,482	83.4	223,852	16.7
Yellow corn	88,859	12.9	597,841	87.1
Oats	63,561	18.4	281,903	81.6
Barley	32,598	55.9	25,700	44.1
Rye	2,214	100.0	-	-
Grain sorghums	-	-	12,000	100.0
Total	2,782,690	48.5	2,960,535	51.5

Source: Based on grain marketing schedules obtained from 45 mills interviewed, 1941.

Of all out-of-state shipments, Indiana led with 17.8 percent of total receipts. Other states ranked in importance in the following order: Ohio,

Missouri, Kentucky, Illinois, Alabama, and Texas. Grain of unknown origin comprised 9.5 percent of total receipts (Table XV and Figure 33).

TABLE XV. ORIGIN, BY STATES, OF GRAIN MARKETED IN EAST TENNESSEE, JULY 1940 - JULY 1941

State of Origin	Percent of Total (5,743,225 bu.)	State of Origin	Percent of Total (5,743,225 bu.)
Tennessee	48.5	Illinois	1.0
Indiana	17.8	Alabama	0.5
Ohio	15.5	Texas	0.2
Missouri	4.0	Unknown *	9.5
Kentucky	3.0		
		Total	100.0

* Western grain purchased from elevator at Nashville, state of origin unknown.

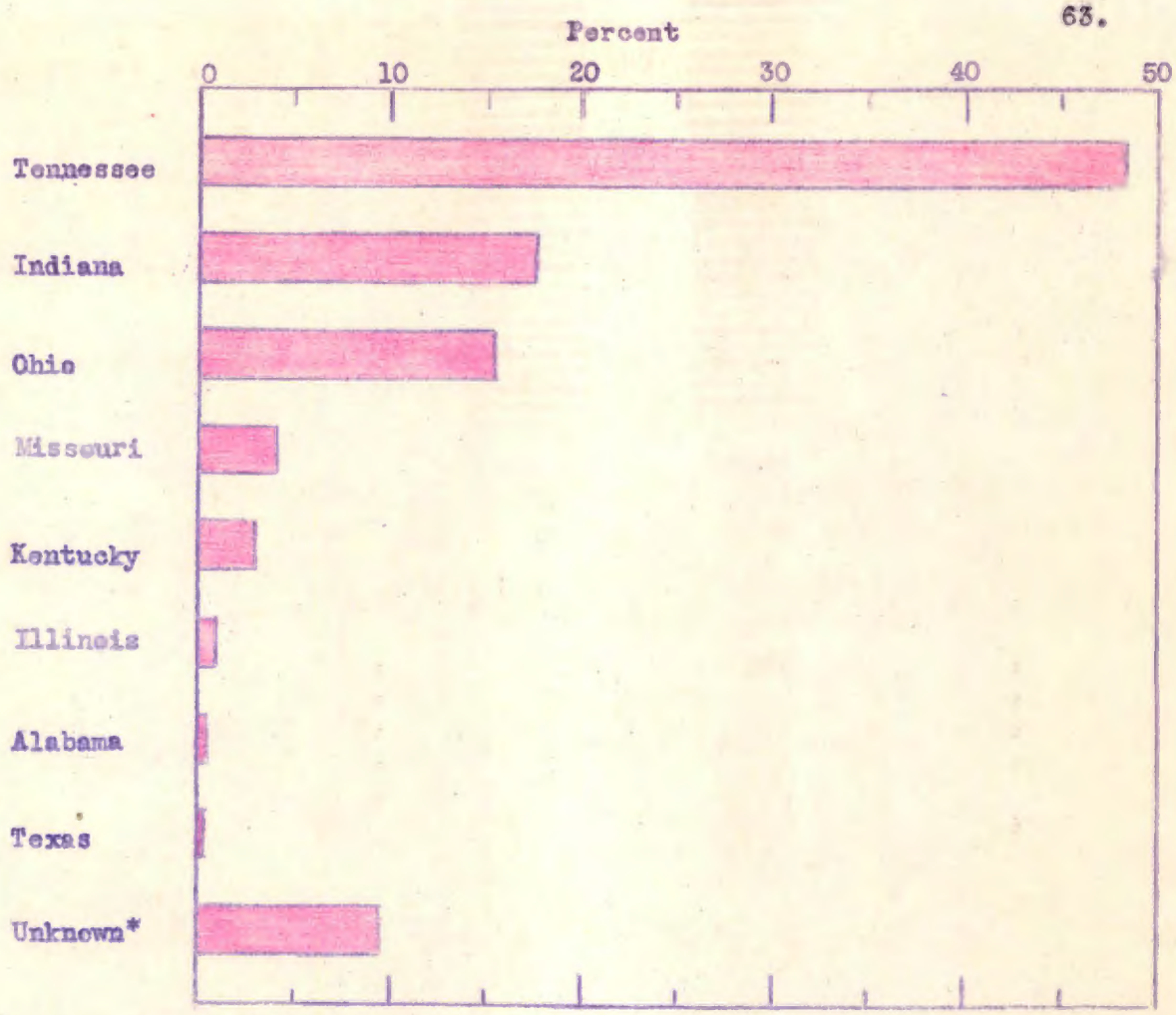
Source: Based on grain marketing schedules obtained from 45 mills interviewed, 1941.

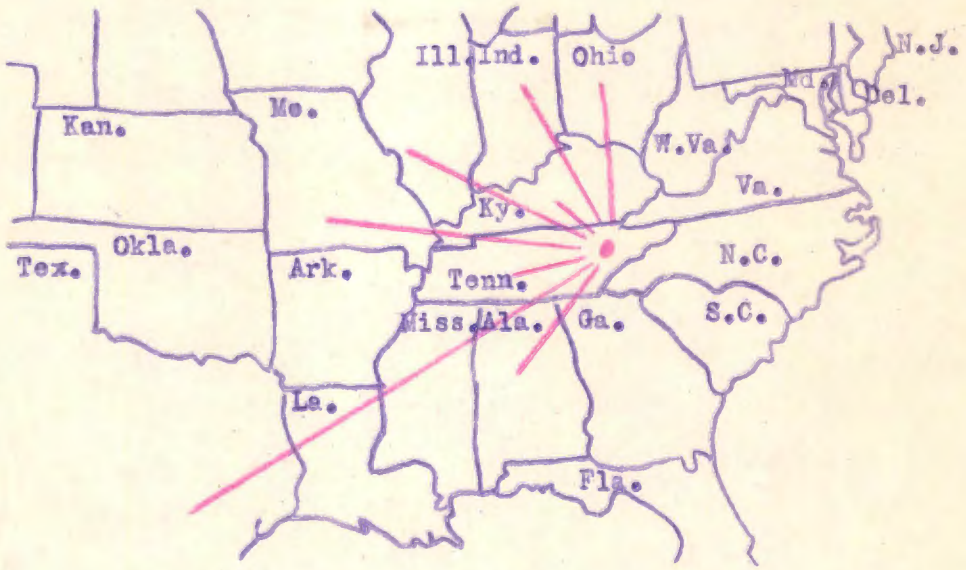
Wheat is shipped in mostly from Indiana, Ohio, and Missouri. Small amounts of white corn is shipped in from Indiana, Ohio, Missouri, Kentucky, and Alabama. Yellow corn is shipped in largely from Illinois. All grain sorghums are shipped in from Texas.

In addition to whole grains, it is estimated that between 2,000 and 2,500 tons[3] of commercial feeds are handled annually by mills in the area. A large percent of this amount is shipped in from other states. Illinois, Ohio, and Indiana are the major sources of commercial feeds.

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(3) This includes commercial feeds handled by mills only.





* Western grain purchased from elevator at Nashville, state of origin unknown

Source: Table XV

Fig. 33. Origin, by States, of grain marketed in East Tennessee, July, 1940 - July, 1941

Origin of Grain for Knoxville Mills

Knoxville mills handled almost 2.8 million bushels of grain, around 49 percent of the total for the area. A much larger proportion of Knoxville's grain supply was from out-of-state shipments than for the area as a whole, the proportions being 90 percent for Knoxville and 51.5 percent for the area.

All grain sorghum for the area was handled by Knoxville mills, of which 100 percent was shipped in from Texas. Out-of-state shipments represented 99.2 percent of all oats handled, 97.6 percent of the yellow corn, 92.8 percent of the wheat, 65.9 percent of the barley, and 26.9

TABLE XVI. LOCAL AND OUT-OF-STATE GRAIN HANDLED BY KNOXVILLE MILLS, JULY 1940 - JULY 1941

Kind of Grain	Total	Pct.	Tennessee	Pct.	Out-of-State	Pct.
	(Bu.)		(Bu.)		(Bu.)	
Wheat	1,750,900	62.6	125,900	7.2	1,625,000	92.8
White corn	167,400	6.0	122,400	73.1	45,000	26.9
Yellow corn	550,300	19.7	13,300	2.4	537,000	97.6
Oats	275,500	9.9	2,166	0.8	273,334	99.2
Barley	39,000	1.4	13,300	34.1	25,700	65.9
Rye	None	-	-	-	-	-
Grain sorghums	12,000	0.4	-	-	12,000	100.0
Total	2,795,100	100.0	277,066	10.0	2,518,034	90.0

Source: Grain Marketing Survey, East Tennessee, 1941.

percent of the white corn. Handling a larger volume, the necessity for a regular supply, development of standard brands which could not be manufactured from local grains, and a better transportation system were all responsible for the large proportion of out-of-state grain handled by Knoxville mills.

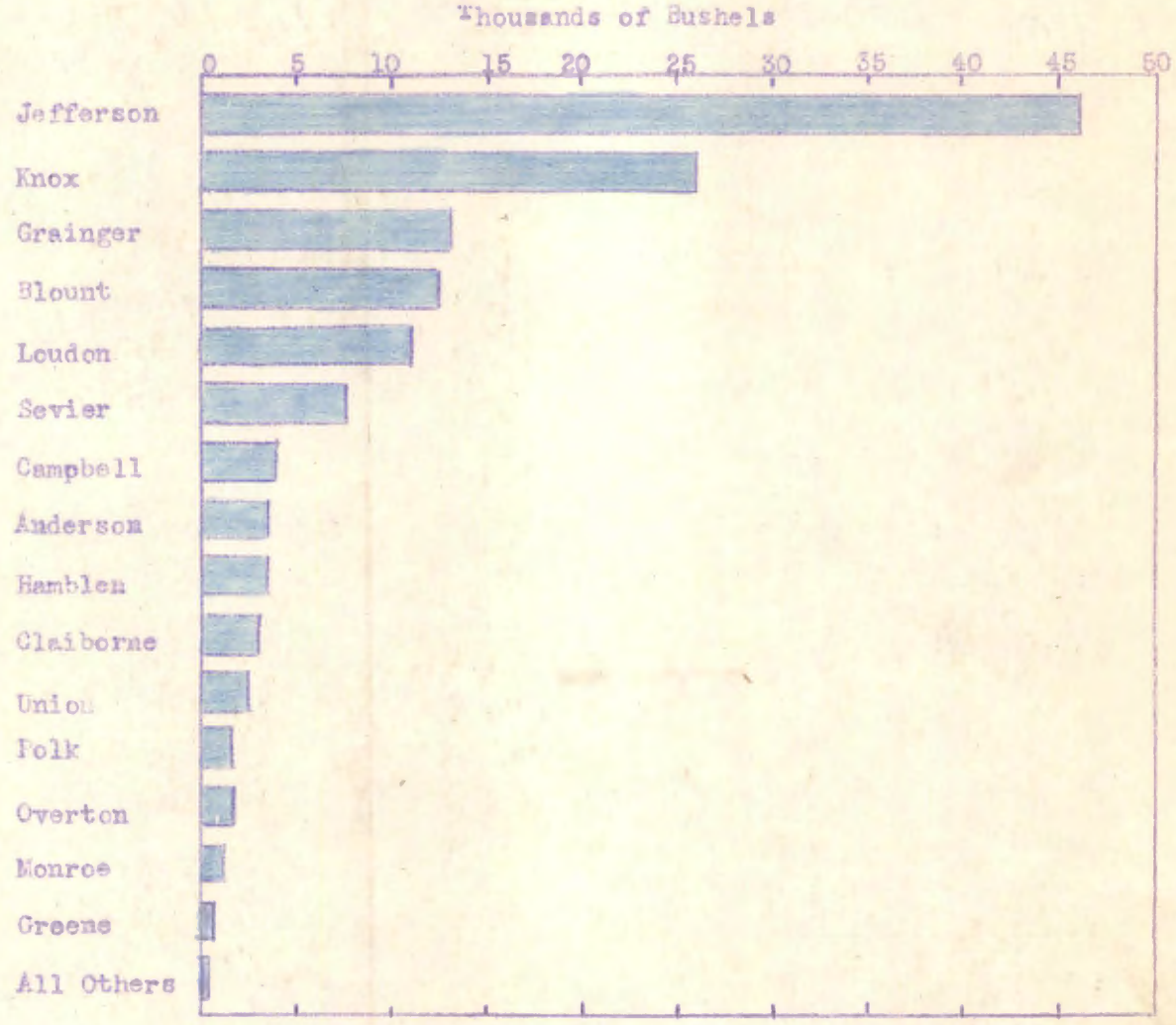
Origin of Local Grain, Knoxville

Wheat: Of all local wheat sold in Knoxville, 99.7 percent was received from 15 East Tennessee counties. One-third was from Jefferson County. Knox and Jefferson counties furnished over half the local supply. Grainger, Blount, Loudon, and Sevier furnished considerable amounts. These six counties furnished over four-fifths (83.5 percent) of the local wheat receipts in Knoxville. None of the other 9 counties selling in Knoxville furnished as much as 3 percent of the local supply (Table XVII and Figure 34).

TABLE XVII. ORIGIN OF LOCAL WHEAT, BY COUNTIES, KNOXVILLE, JULY 1940 - JULY 1941

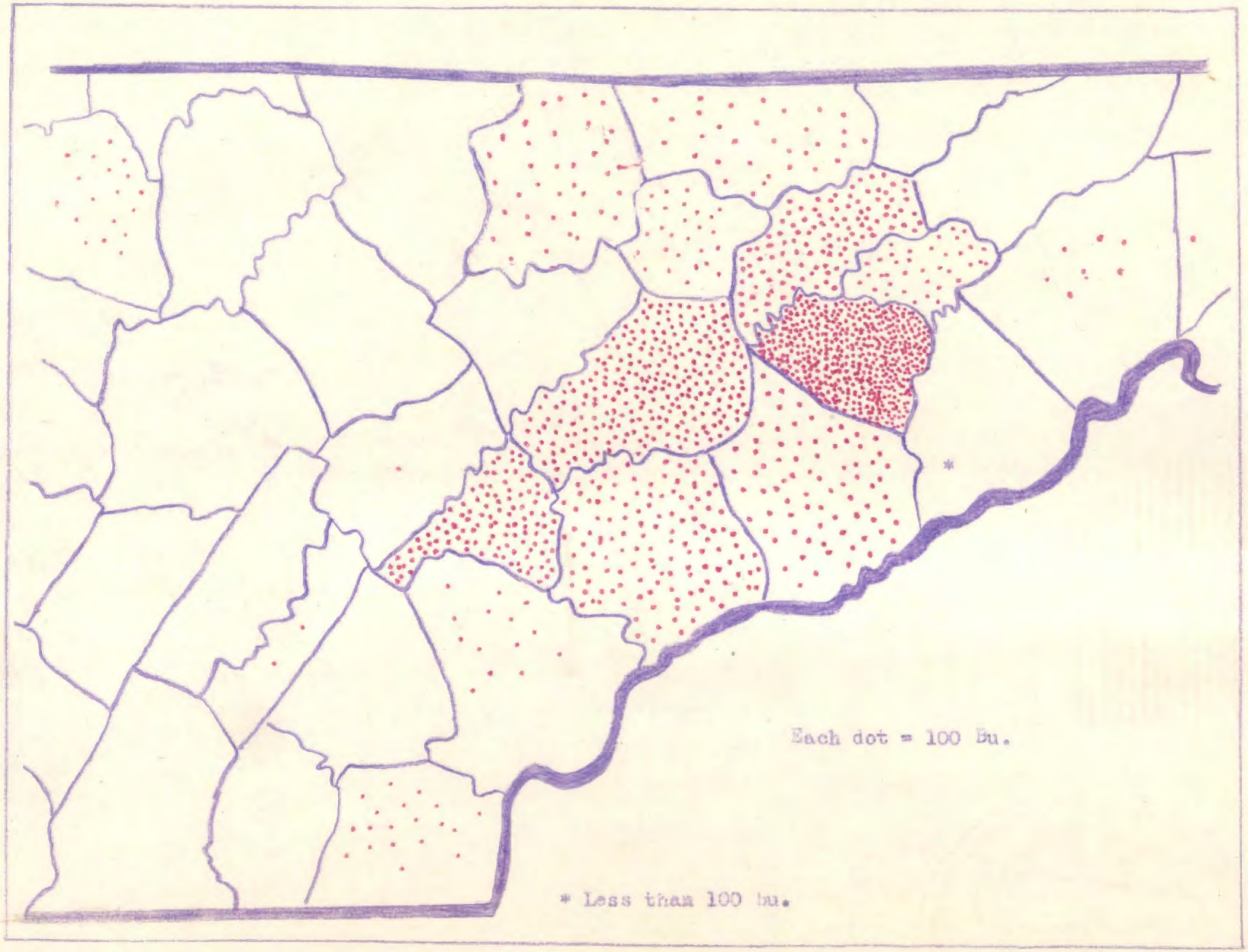
County	Total (Bu.)	Pct.	County	Total (Bu.)	Pct.
Jefferson	46,206	33.0	Hamblen	3,559	2.5
Knox	26,009	18.6	Claiborne	3,201	2.3
Grainger	12,962	9.3	Union	2,749	2.0
Blount	12,728	9.1	Polk	1,872	1.3
Loudon	11,226	8.0	Overton	1,732	1.2
Sevier	7,773	5.5	Monroe	1,499	1.1
Campbell	3,903	2.8	Greene	713	.5
Anderson	3,565	2.5	All others	416	.3
			Total	140,113	100.0

Source: Grain Marketing Survey in East Tennessee, 1941.



Source: Table XVII

Fig. 34. Origin of local wheat, by counties, Knoxville, July, 1940 - July, 1941



Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 35. Origin of local wheat, by counties, Knoxville, July 1, 1940-July 1, 1941

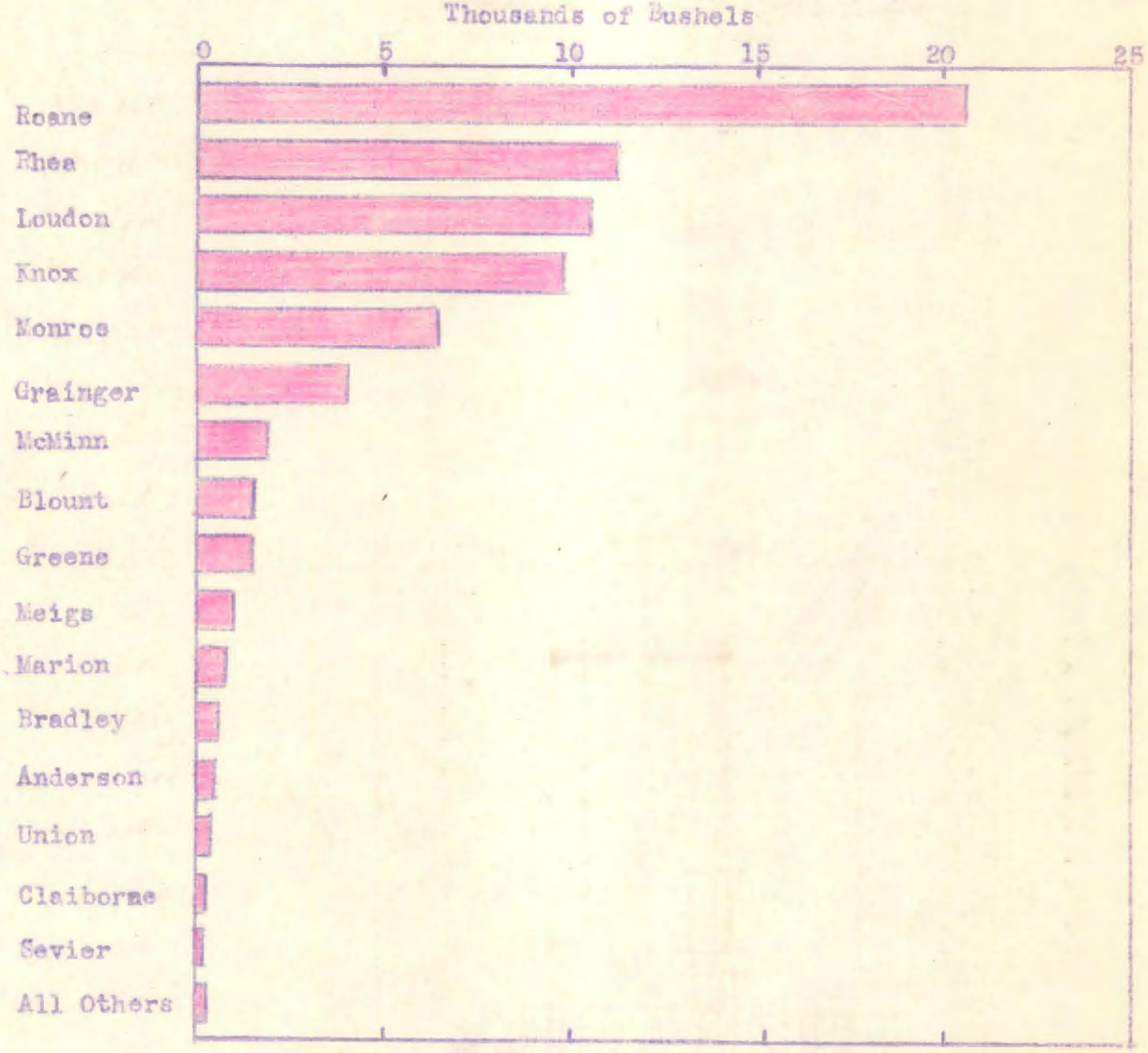
Corn: Local corn was sold in Knoxville from Knox and 17 surrounding counties. Over one-fourth (28.7 percent) of Tennessee corn receipts in Knoxville were from Roane County, 15.6 percent from Rhea, 14.6 percent from Loudon, 13.7 percent from Knox, and 9.0 percent from Monroe. These five counties furnished over 80.0 percent of the local corn received in Knoxville. Only one of the remaining 13 counties, Grainger, furnished more than 3 percent of all local corn (Table XVIII and Figure 36).

TABLE XVIII. ORIGIN OF LOCAL CORN RECEIPTS, BY COUNTIES, KNOXVILLE, OCTOBER 1940 - OCTOBER 1941

County	Total (Bu.)	Pct.	County	Total (Bu.)	Pct.
Roane	20,713	28.7	Meigs	1,092	1.5
Rhea	11,302	15.6	Marion	784	1.1
Loudon	10,550	14.6	Bradley	682	.9
Knox	9,916	13.7	Anderson	529	.7
Monroe	6,479	9.0	Union	334	.5
Grainger	3,897	5.4	Claiborne	238	.3
McMinn	1,916	2.7	Sevier	198	.3
Blount	1,707	2.4	All others	196	.3
Greene	1,695	2.3			
			Total	72,228	100.0

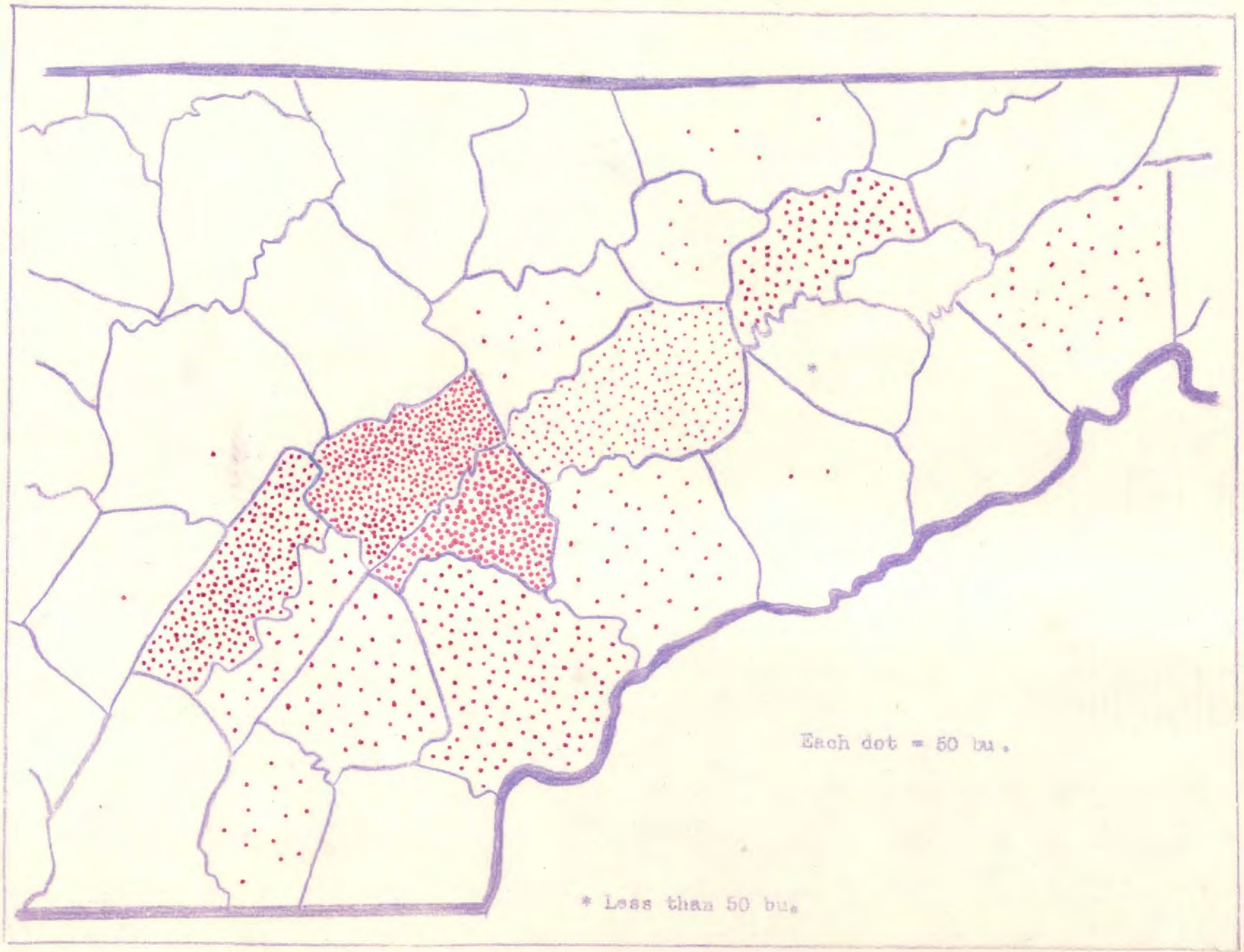
Source: Grain Marketing Survey in East Tennessee, 1941.

Other Grains: No data were available on origin of local oats and barley. No rye or grain sorghums were purchased locally.



Source: Table XVIII

Fig. 36. Origin of local corn receipts, by counties, Knoxville, October 1940 - October, 1941



Source: Grain Marketing Survey in East Tennessee, 1941

Fig. 37. Origin of local corn receipts, by counties, Knoxville, October 1, 1940-October 1, 1941

Out-of-State Grain Received by Counties

The proportion of grain shipped into each county would depend on a number of factors, the number of mills in the county, the amount of local grain produced, the capacity to store the grain for future use, and the alternative uses for the grain produced.

Wheat: Knox County led in proportion of wheat received from other states, with 98.2 percent of the total supply. Knox County also led in milling and storage capacity (Chapter II). Roane and Cocke counties ranked next with 49 and 37 percent each. Monroe received around 16 percent of its total wheat supply from other states. No other county received as much as 15 percent from outside the state (Table XIX and Figure 38).

White Corn: The amount of white corn shipped into East Tennessee counties was comparatively unimportant. Only seven of the fourteen counties in the survey showed out-of-state receipts. These counties were Knox, Loudon, Monroe, Greene, Sevier, Blount, and Cocke, ranking in out-of-state receipts in order named. Knox received the largest proportion of total corn from outside the state, 28.9 percent. Loudon received 13.2 percent while none of the others received as much as 10 percent. Out-of-state receipts in Cocke County was only 4.3 percent of the total (Figure 39).

Yellow Corn: The proportion of yellow corn shipped in from other states was much larger than for white corn. Out-of-state shipments represented over 90 percent of all yellow corn receipts. Two counties

Knox and Roane, shipped in over 95 percent of their total supply. Blount ranked next with 86.5 percent. Other counties receiving considerable amounts were Cocke, Loudon, Hawkins, Monroe, Sevier and Hamblen. Out-of-state receipts by other counties in the area were negligible (Figure 41).

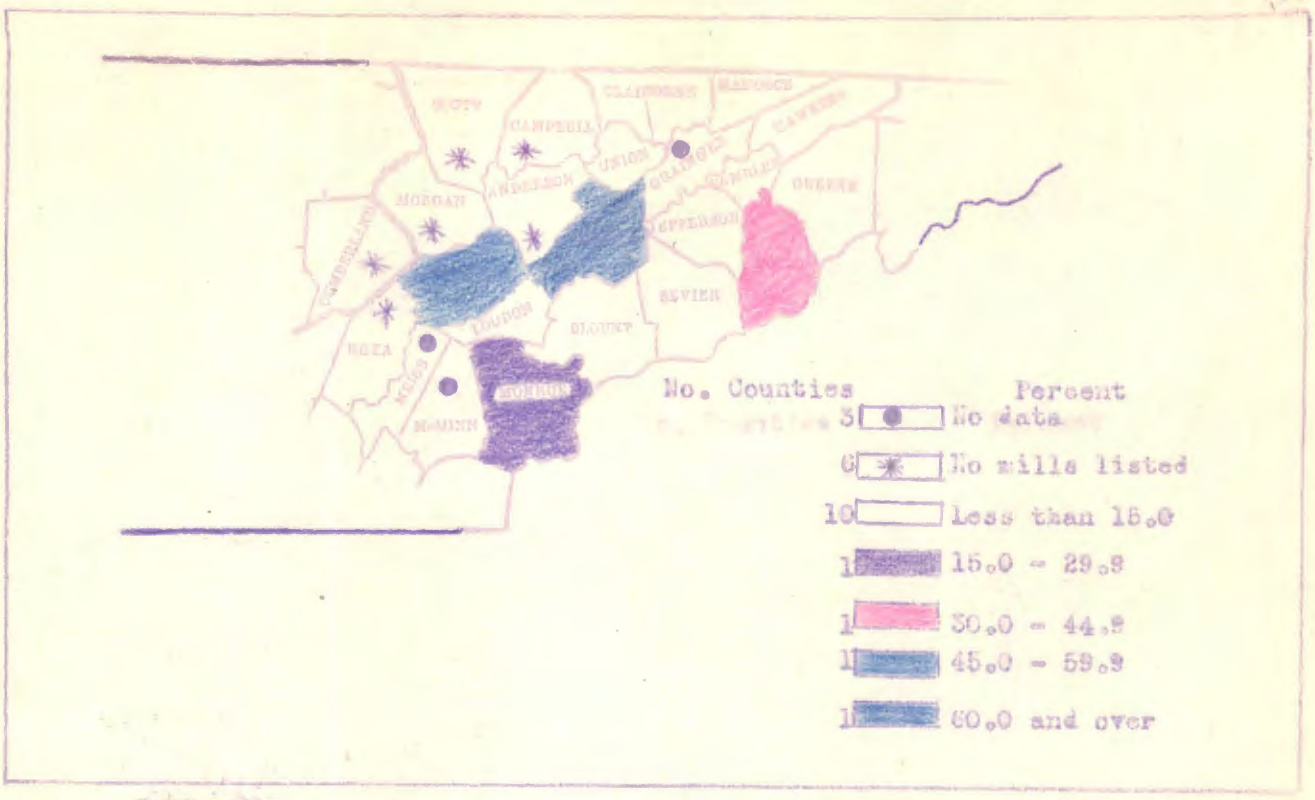
Oats: The only counties having data on oats received from other states were Knox, Roane, and Sevier, receiving 99.2 percent, 75.0 percent, and 35.8 percent each respectively from other states (Figure 40).

TABLE XIX. OUT-OF-STATE GRAIN RECEIPTS, BY COUNTIES AND KIND OF GRAIN, EAST TENNESSEE, JULY 1940 TO JULY 1941

County	Percent Received from Outside the State						
	Wheat	White Corn	Yellow Corn	Oats	Barley	Rye	Grain Sorghum
Knox	98.2	26.9	97.6	99.2	65.9	-	100.0
Roane	49.2	-	100.0	75.0	-	-	-
Cocke	37.3	4.3	68.4	-	-	-	-
Monroe	15.9	9.7	19.4	-	-	-	-
Loudon	13.2	13.2	28.6	-	-	-	-
Greene	5.4	9.6	-	-	-	-	-
Hawkins	4.6	-	28.6	-	-	-	-
Blount	1.5	5.2	86.5	-	-	-	-
Hamblen	-	-	15.0	-	-	-	-
Sevier	-	8.7	17.8	35.8	-	-	-

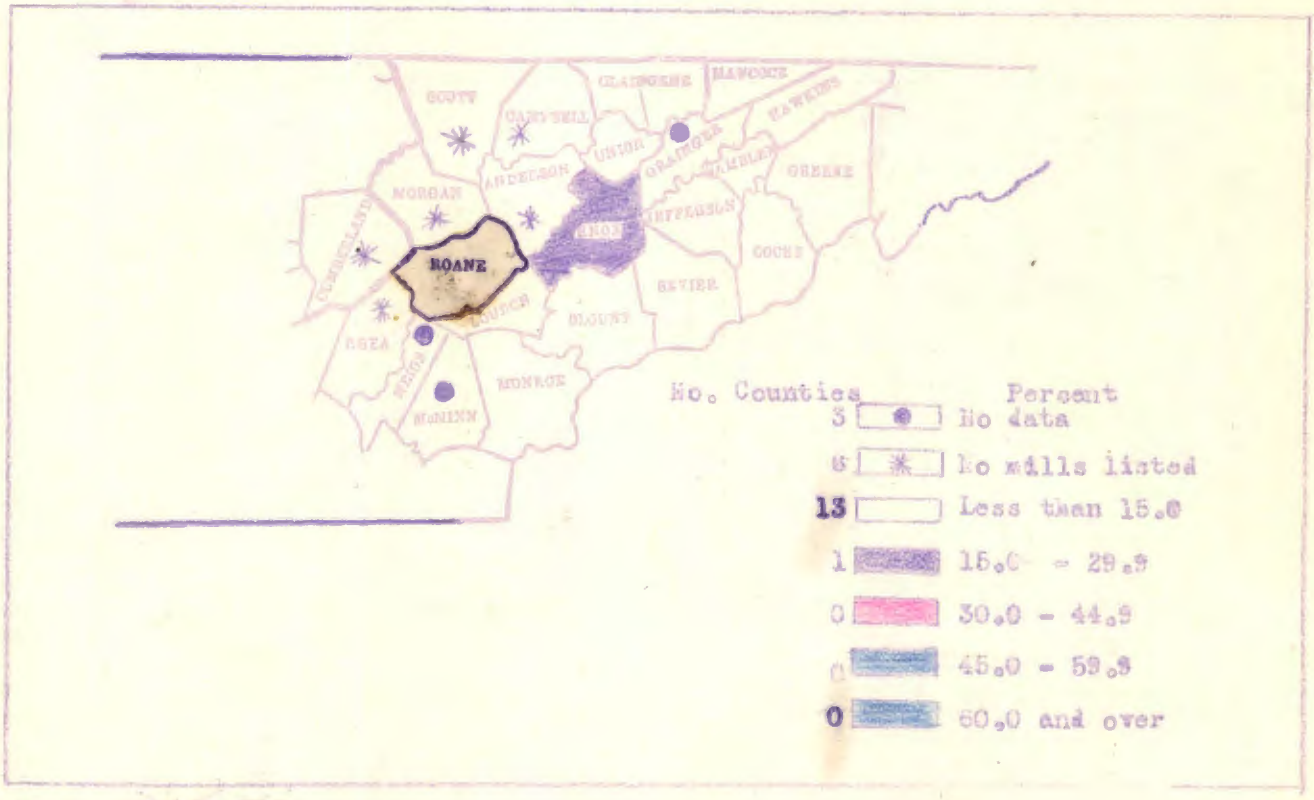
* No out-of-state receipts were reported from other counties in the area.

Source: Based on grain marketing schedules obtained from 45 mills, 1941.



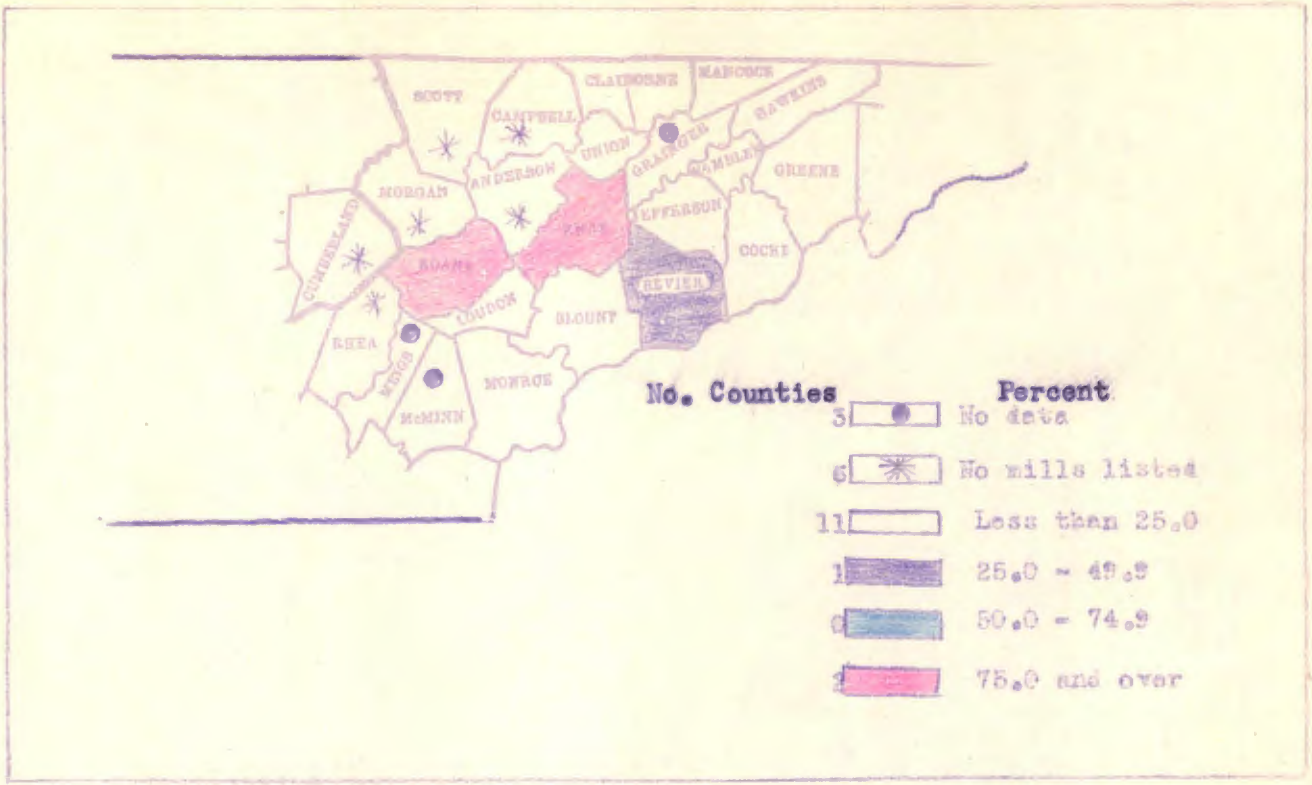
Source: **Table XIX**

Fig. **38.** Percent of wheat shipped in by counties, July, 1940-July, 1941



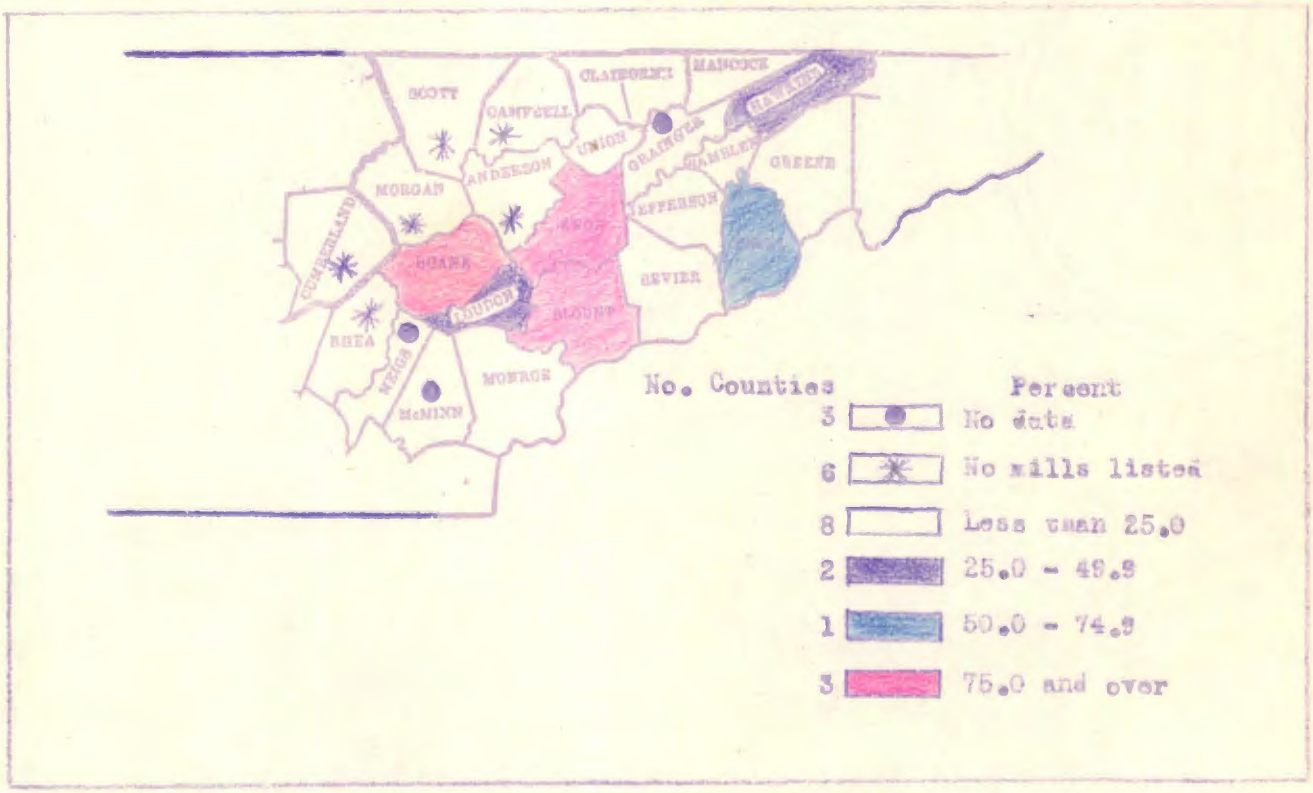
Source: **Table XIX**

Fig. **39.** Percent of white corn shipped in by counties, July, 1940-July, 1941



Source: **Table XIX**

Fig. **40**. Percent of oats shipped in by counties, July, 1940-July, 1941



Source: **Table XIX**

Fig. **41**. Percent of yellow corn shipped in by counties, July, 1940-July, 1941

Seasonal Movement of Grain into Knoxville

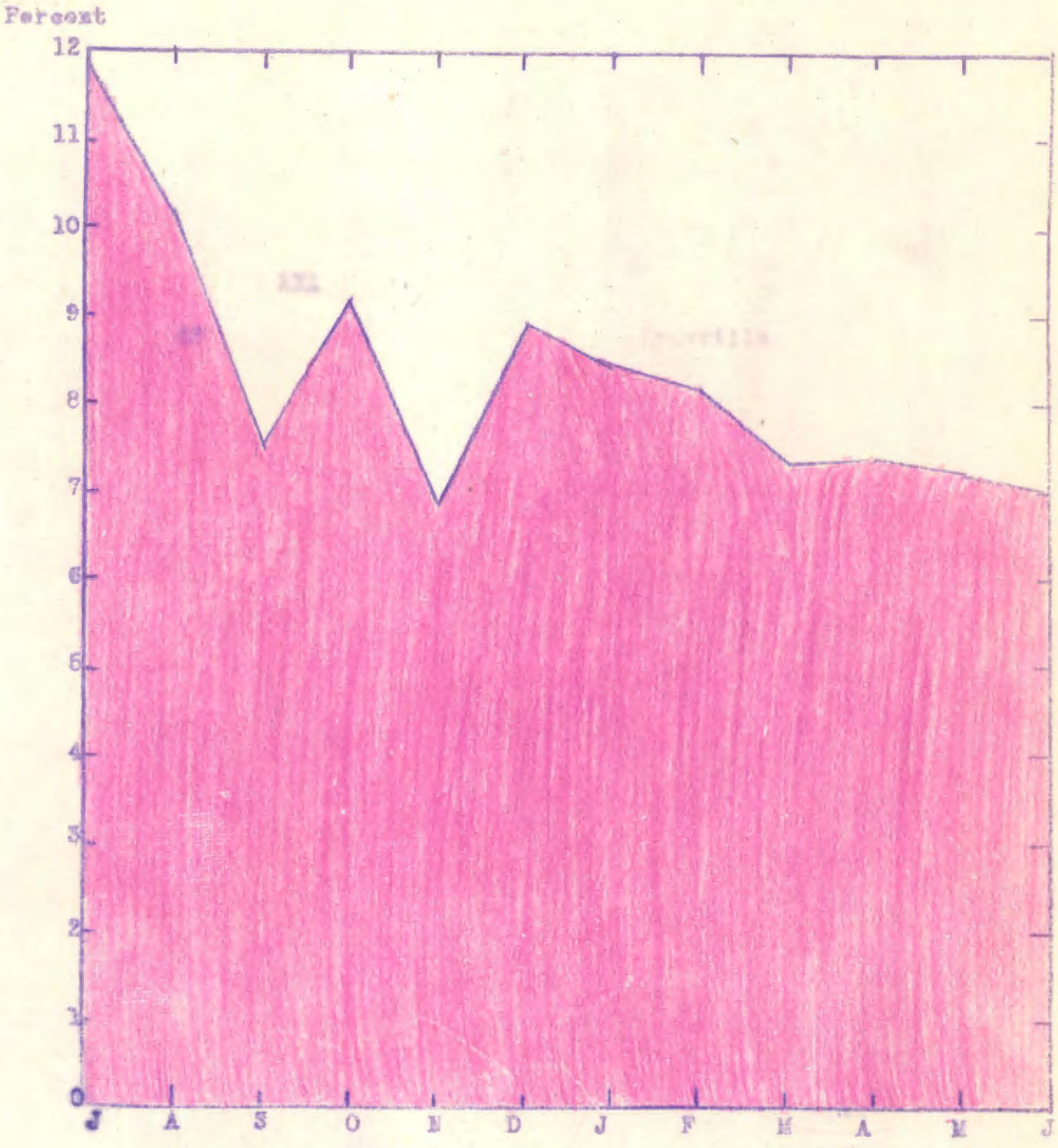
Receipts of grain by Knoxville mills were fairly uniform throughout the year. Heaviest receipts occurred during July and August with little change throughout the rest of the year. Large receipts during July and August are due to the large amount of local grain being marketed during these months. Marketing of wheat is especially large at that time (Table XX, Figure 42).

TABLE XX. SEASONAL MOVEMENT OF ALL GRAIN RECEIPTS, KNOXVILLE, JULY 1939 - JULY 1941

Month	Percent of Total	Month	Percent of Total
July	11.9	January	8.4
August	10.1	February	8.2
September	7.5	March	7.3
October	9.2	April	7.4
November	6.9	May	7.2
December	8.9	June	7.0

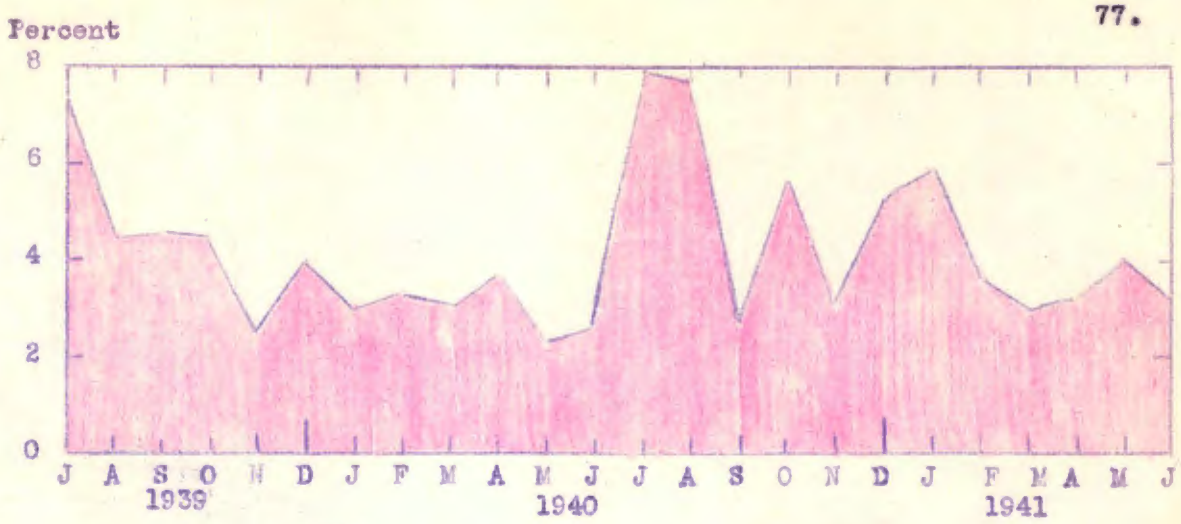
Source: Grain Marketing Survey in East Tennessee, 1941.

Seasonality of Wheat in Knoxville: July showed heaviest monthly receipts of wheat over a 2-year period. Receipts were fairly strong during August, September, and October, with considerable amounts marketed during December, 1940, and January, 1941 (Figure 43).



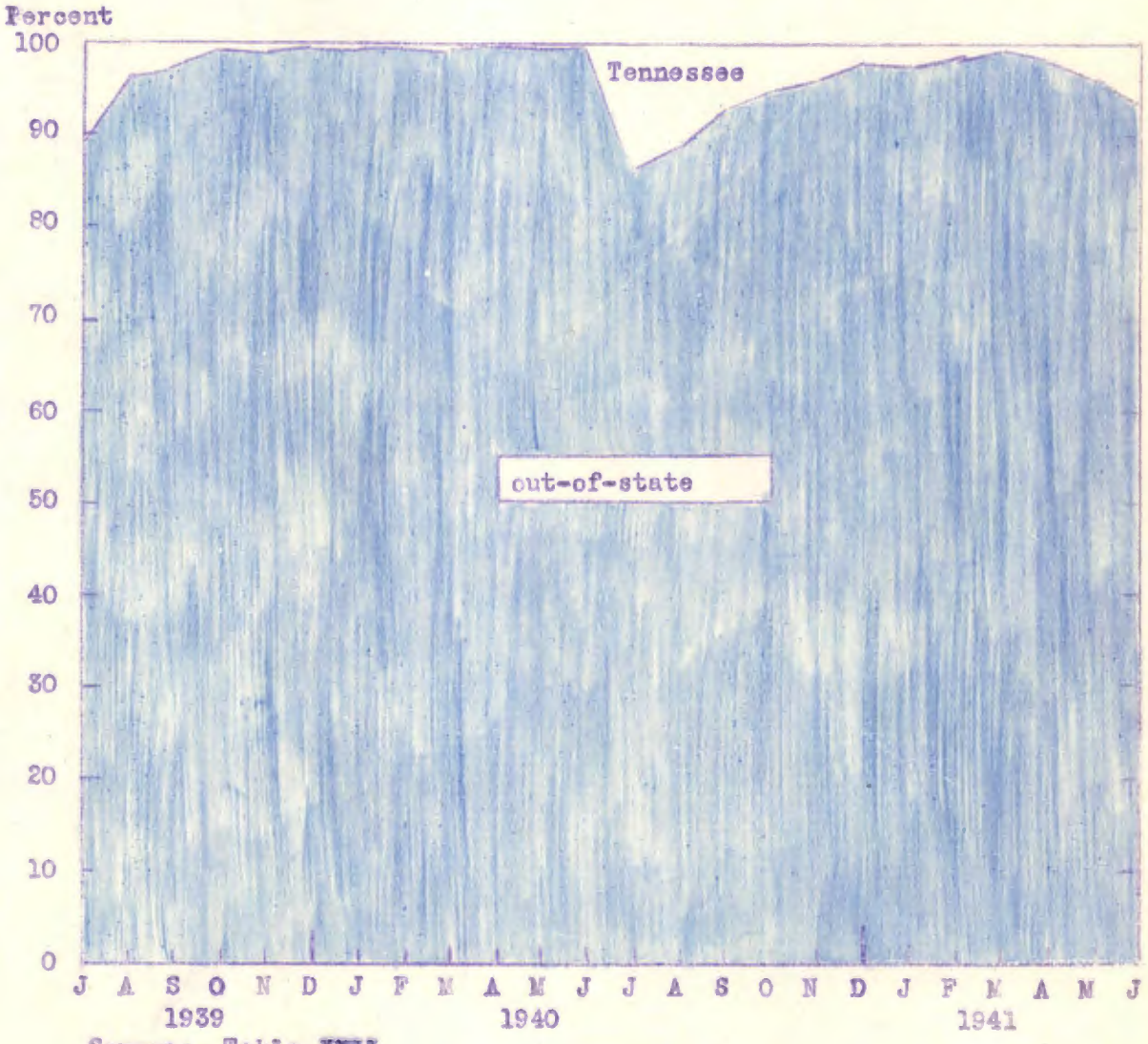
Source: Table XX

Fig.42. Seasonal movement of all grain receipts, Knoxville, July, 1939-July, 1941



Source: Table XXI

Fig.43. Monthly receipts of wheat, Knoxville, July, 1939 - July, 1941



Source: Table XXII

Fig.44. Origin of wheat receipts by months, Knoxville, July, 1939 - July, 1941

Local wheat receipts were exceptionally heavy during July, comprising 10.7 percent of all receipts in 1939 and 13.8 percent in 1940. Local wheat in August 1939 was only 4 percent of total receipts but 11.1 percent in August 1940. In general a larger proportion of total receipts was from local wheat in 1940 than in 1939 (Figure 44).

TABLE XXI. PERCENTAGE OF WHEAT RECEIVED FOR EACH OF 24 MONTHS, KNOXVILLE, JULY 1939-JULY 1941

Month	Percent of Two-Year Total	Month	Percent of Two-Year Total
July	7.4	July	7.9
August	4.2	August	7.8
September	4.3	September	2.7
October	4.2	October	5.7
November	2.5	November	3.1
December	4.0	December	5.3
January	3.0	January	5.9
February	3.3	February	3.6
March	3.1	March	2.9
April	3.7	April	3.2
May	2.3	May	4.0
June	2.6	June	3.3

Source: Grain Marketing Survey, 1941.

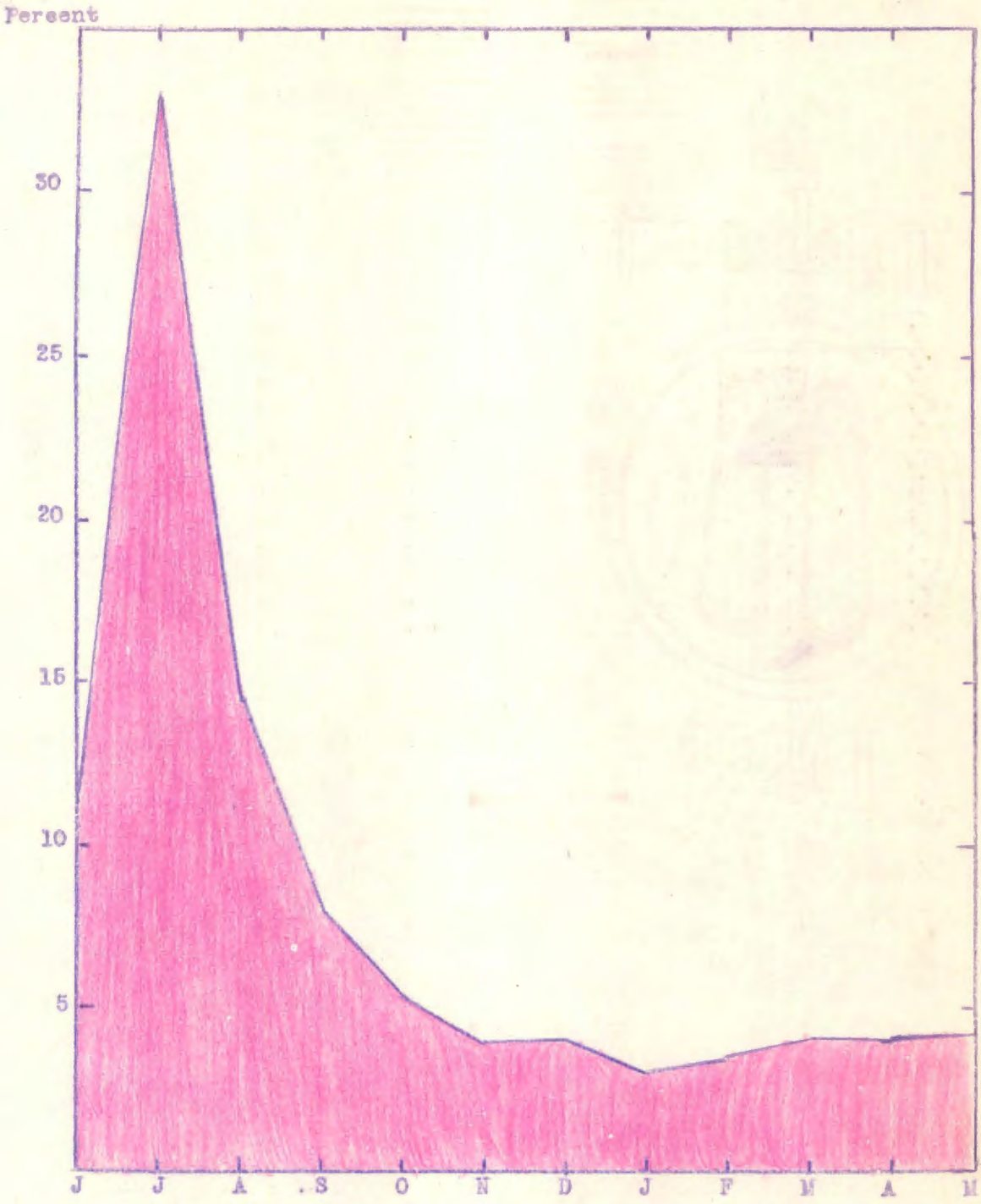
TABLE XXII. ORIGIN OF WHEAT RECEIPTS BY MONTHS, KNOXVILLE, JULY 1939 - JULY 1941

Month	Percent		Month	Percent	
	Out-of-State	Tennessee		Out-of-State	Tennessee
July	89.3	10.7	July	86.2	13.8
August	96.0	4.0	August	88.9	11.1
September	97.2	2.8	September	92.6	7.4
October	99.3	0.7	October	94.6	5.4
November	99.1	0.9	November	95.6	4.4
December	99.6	0.4	December	97.3	2.7
January	99.3	0.7	January	97.2	2.8
February	99.5	0.5	February	97.8	2.2
March	99.2	0.8	March	99.0	1.0
April	99.8	0.2	April	98.8	1.2
May	99.7	0.3	May	96.1	3.9
June	99.6	0.4	June	89.0	11.0

* Each month equals 100 percent.

Source: Grain Marketing Survey, 1941.

Monthly Sale of Wheat by Farmers: Wheat begins to move to market in June. Largest marketings occur in July, and then decreases rather sharply until November. Marketing throughout the rest of the year is fairly uniform. Seasonality of wheat sold by farmers is similar to total mill receipts, but much more concentrated in the harvesting season. Around 59 percent of all farm sales are made during June, July, and August (Table XXIII). Smallest sales occur in January and February (Figure 45).



Source: Table XXIII

Fig.45. Monthly purchases of wheat from farmers in East Tennessee, 1939-1941

TABLE XXIII. MONTHLY PURCHASES OF WHEAT FROM FARMERS IN EAST TENNESSEE, JUNE 1939 - JUNE 1941

Month	Percent of Two-Year Total	Month	Percent of Two-Year Total	Month	Percent of Two-Year Total
June	11.5	October	5.6	February	3.7
July	53.0	November	4.0	March	4.1
August	14.6	December	4.0	April	4.0
September	8.1	January	3.3	May	4.1

Source: U. S. D. A. Agricultural Marketing Service, Knoxville.

Seasonality of Corn in Knoxville: Receipts of corn showed no definite seasonal movement. Months showing heaviest receipts were July, October, December, and March. Smallest sales occurred in January, April, and August (Figure 46).

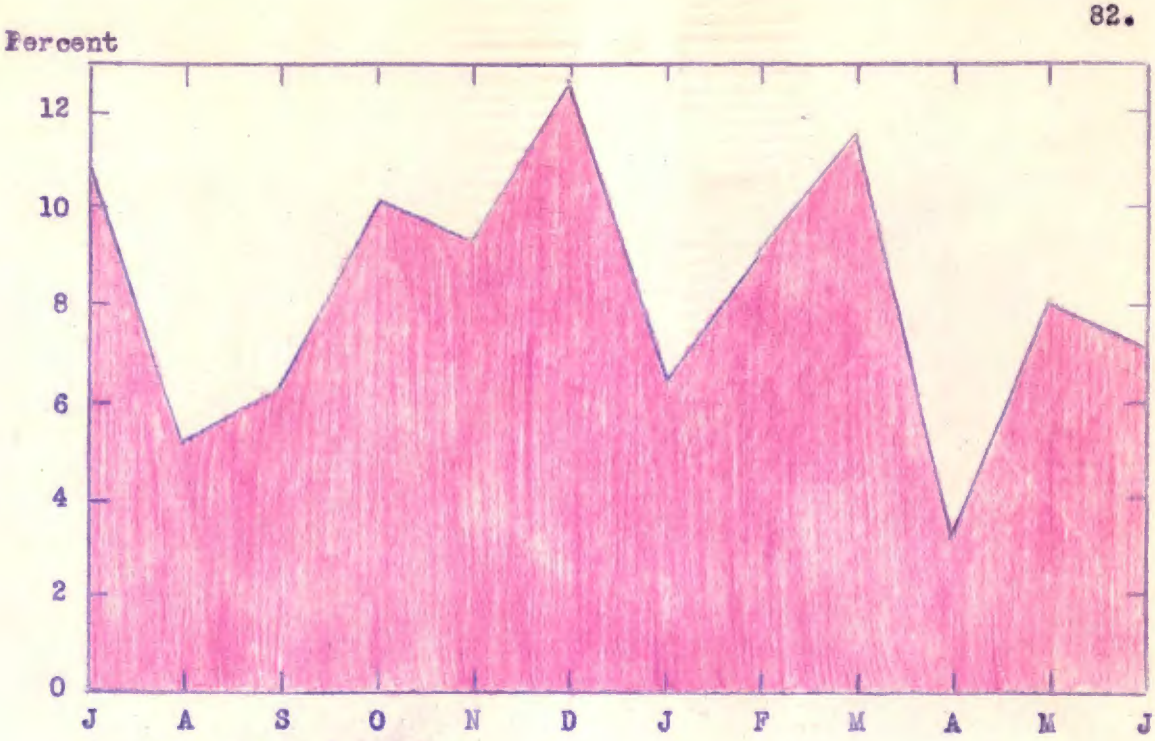
The proportion of corn received from other states was highest in September and lowest in August. It is significant that this is the reverse of local corn receipts (Figure 47).

Local corn was marketed heaviest in July and December, while out-of-state receipts were heaviest in December and March (Table XXVI).

TABLE XXIV. MONTHLY RECEIPTS OF CORN, KNOXVILLE, JULY 1940 - JULY 1941

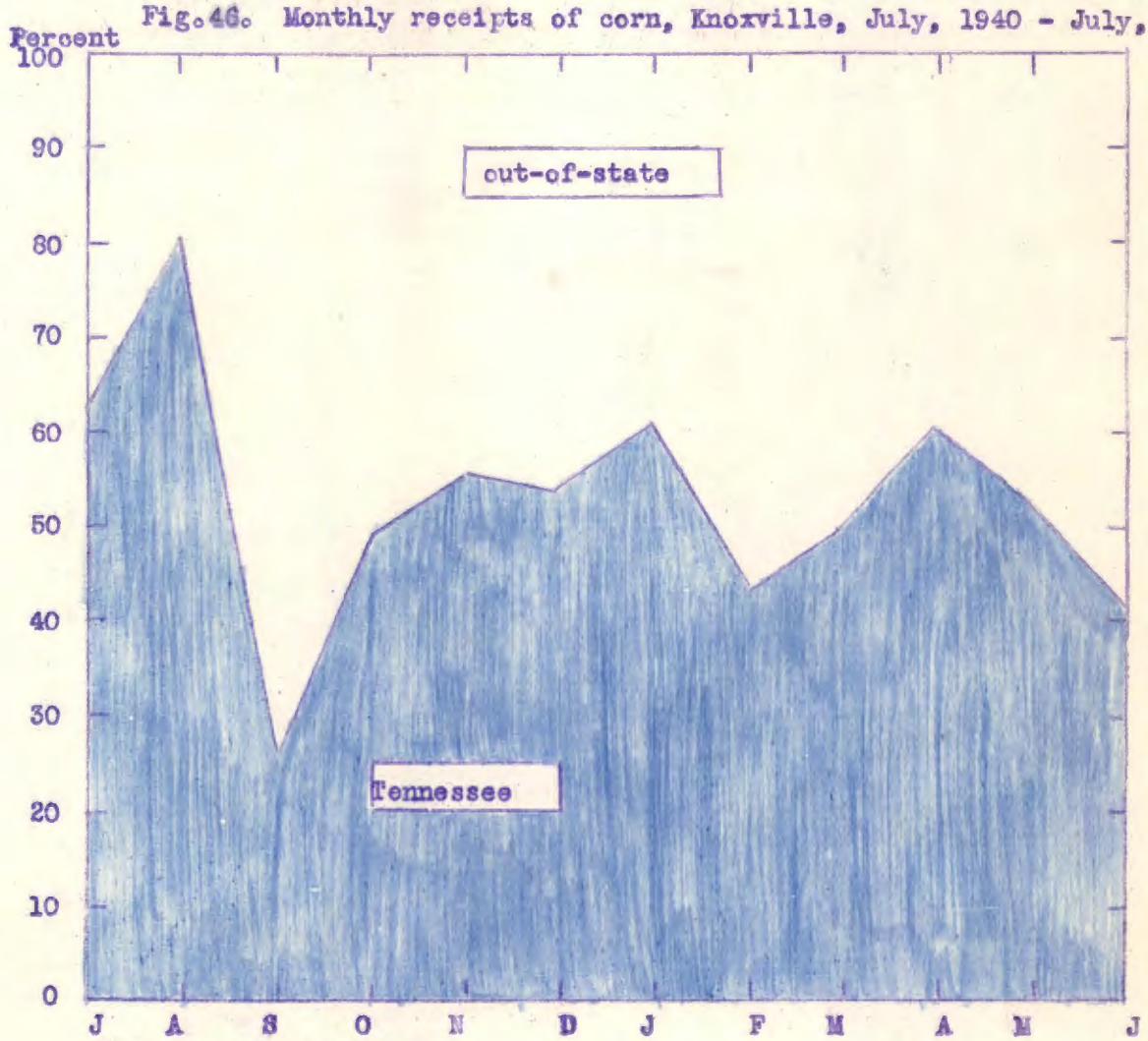
Month	Percent of Year's Total	Month	Percent of Year's Total	Month	Percent of Year's Total
July	10.9	November	9.3	March	11.6
August	5.3	December	12.6	April	3.2
September	6.3	January	6.4	May	8.1
October	10.2	February	9.0	June	7.1

Source: Grain Marketing Survey, 1941.



Source: Table XXIV

Fig.46. Monthly receipts of corn, Knoxville, July, 1940 - July, 1941



Source: Table XXV

Fig.47. Origin of corn receipts by months, Knoxville, July, 1940 - July, 1941

TABLE XXV. ORIGIN OF CORN RECEIPTS BY MONTHS, KNOXVILLE, JULY 1940 - JULY 1941

Month	Percent		Month	Percent	
	Tennessee	Out-of-State		Tennessee	Out-of-State
July	62.4	37.6	January	61.1	38.9
August	80.4	19.6	February	43.4	56.6
September	26.1	73.9	March	49.9	50.1
October	49.8	50.2	April	61.5	38.5
November	55.9	44.1	May	52.9	47.1
December	54.1	45.9	June	41.2	58.8

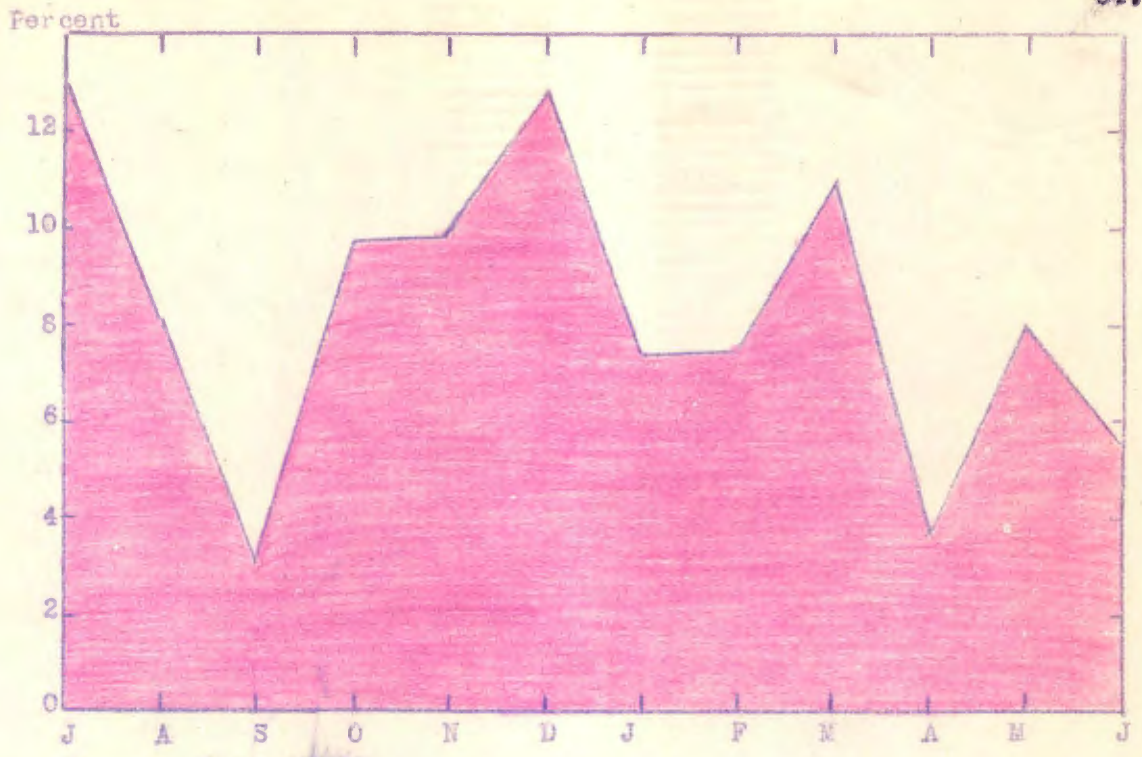
* Each month equals 100 percent.

Source: Grain Marketing Survey, 1941.

TABLE XXVI. LOCAL AND OUT-OF-STATE CORN RECEIPTS BY MONTHS, KNOXVILLE, JULY 1940 - JULY 1941

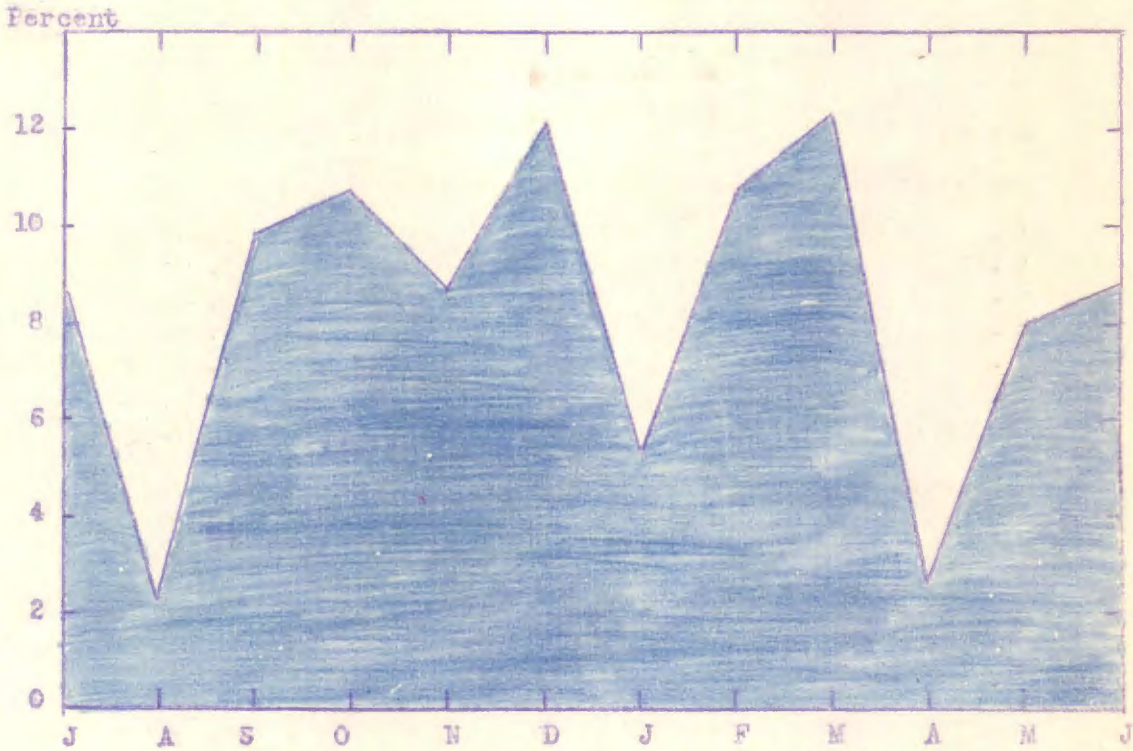
Month	Percent of Total		Month	Percent of Total	
	Local	Out-of-State		Local	Out-of-State
July	13.0	8.7	January	7.4	5.2
August	8.1	2.2	February	7.5	10.8
September	3.1	9.8	March	11.0	12.3
October	9.1	10.8	April	3.7	2.6
November	9.9	8.6	May	8.1	8.0
December	12.9	12.2	June	5.6	8.8

Source: Grain Marketing Survey in East Tennessee, 1941.



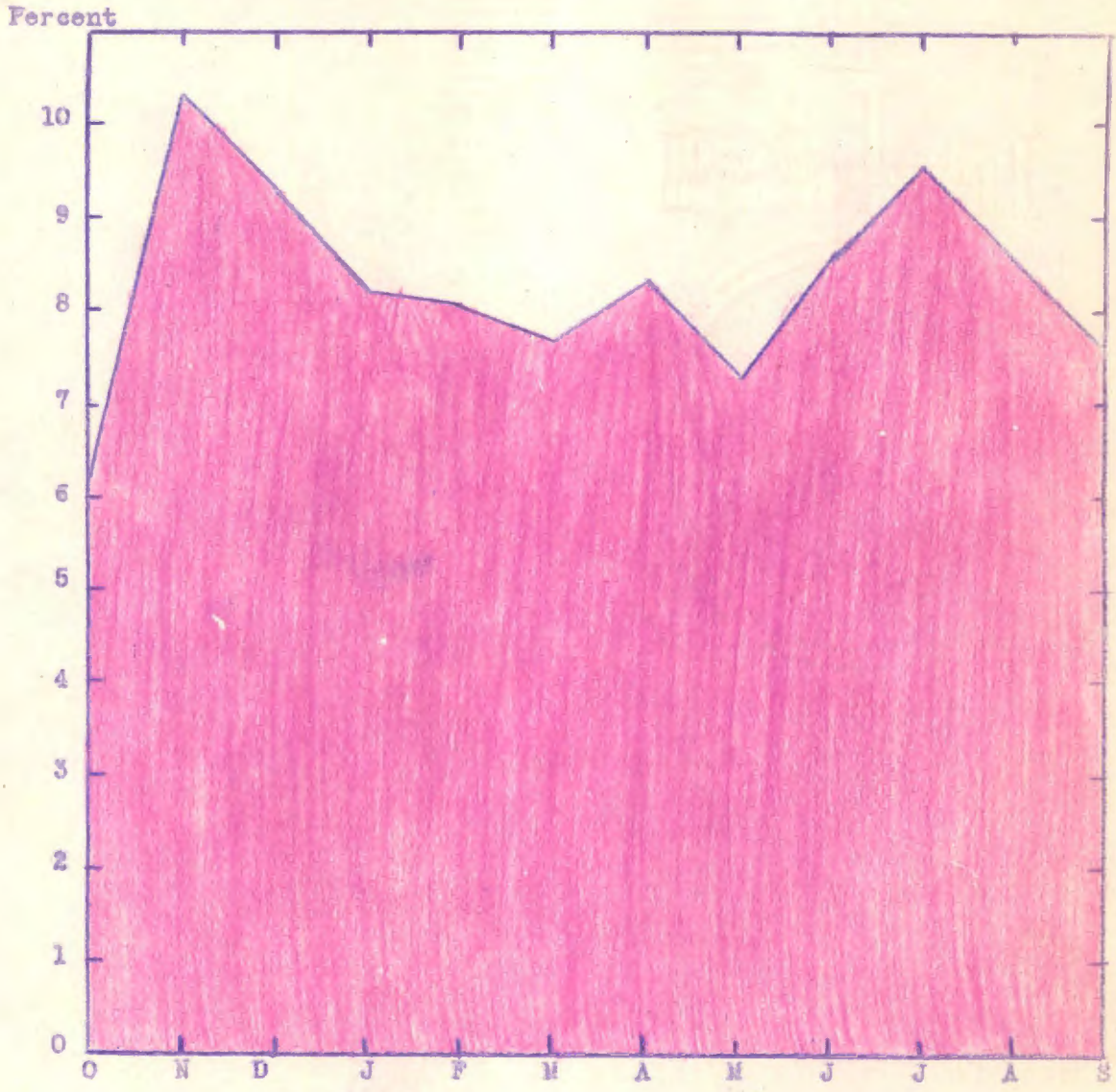
Source: Table XXVI

Fig. 48. Distribution of local corn receipts by months, Knoxville, July, 1940 - July, 1941



Source: Table XXVI

Fig. 49. Distribution of out-of-state corn receipts by months, Knoxville, July, 1940 - July, 1941



Source: Table XXVII

Fig. 50. Monthly purchases of corn from farmers in East Tennessee, 1931-1940

Monthly Sale of Corn by Farmers: Corn begins to move from the farm to some extent as soon as it is harvested. In East Tennessee considerable corn is harvested in September and October, but local receipts in the market are small until around November (Figure 50). Over a nine-year period, 1931 to 1940, sale of corn by farmers was characterized by two marketing seasons, November and July. Purchases were smallest in October. During the remainder of the year the monthly purchases are fairly uniform, although slightly larger in the summer than winter. For any one year the relative monthly marketing of corn may deviate considerably from the averages given (Table XXVII).

TABLE XXVII. MONTHLY PURCHASE OF CORN FROM FARMERS IN EAST TENNESSEE, OCTOBER 1931 - OCTOBER 1940

Month	Percent of Total	Month	Percent of Total	Month	Percent of Total
October	6.3	February	8.1	June	8.7
November	10.3	March	7.7	July	9.6
December	9.3	April	8.3	August	8.6
January	8.2	May	7.3	September	7.6

Source: U.S.D.A. Agricultural Marketing Service, Knoxville.

Seasonality of Rye, Oats, and Barley: Very little rye, oats, and barley enter commercial channels in East Tennessee. The largest outlet is to a few feed manufacturing plants which buy a considerable amount of barley and oats. Monthly purchases of these grains from farmers in the area are shown in Table XXVIII.

TABLE XXVIII. MONTHLY PURCHASES OF RYE, BARLEY, AND OATS FROM FARMERS IN EAST TENNESSEE, JUNE 1940 - JUNE 1941

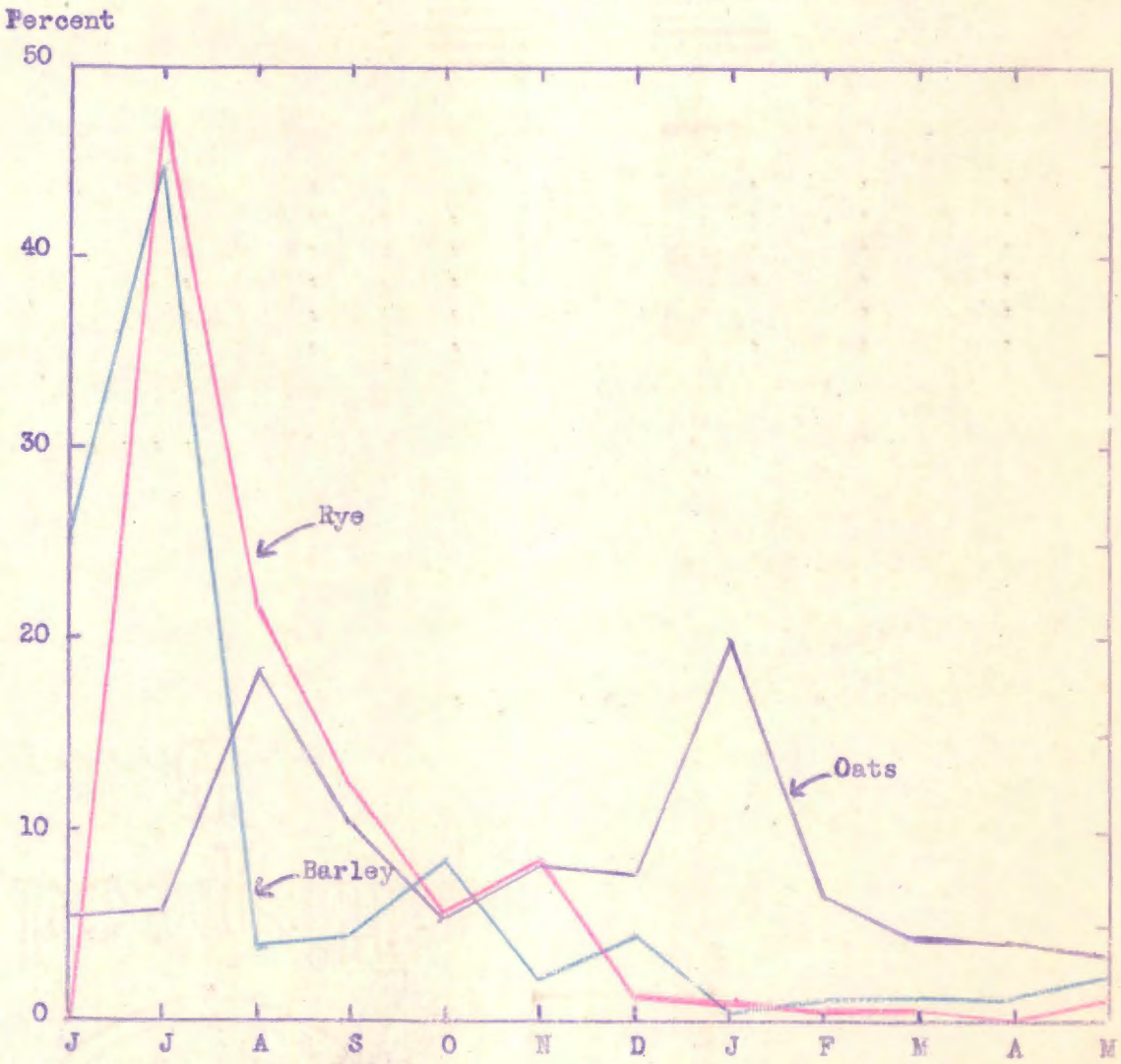
Month	Percent of Year's Total			Month	Percent of Year's Total		
	Rye	Barley	Oats		Rye	Barley	Oats
June	-	25.4	5.3	December	1.0	4.5	7.8
July	47.8	44.9	5.6	January	0.8	0.6	20.0
August	21.7	3.9	18.4	February	0.5	1.2	6.6
September	12.2	4.4	10.3	March	0.5	1.2	4.3
October	5.8	8.4	5.6	April	-	1.1	4.2
November	8.6	2.0	8.5	May	1.1	2.4	3.4

Source: U.S.D.A. Agricultural Marketing Service, Knoxville.

During the marketing year, June 1940 to June 1941, over 95 percent of the rye purchases were made in July through November. Three-fourths was purchased during July, August, and September, with almost 50 percent being bought in July. No purchases were reported during April and June, and less than one percent of the total per month was reported during January, February, and March (Figure 51).

Barley is sold largely in June and July, around 70 percent of the purchases being made during those two months. July is the peak month with almost 50 percent of all purchases. During the remainder of the year the monthly purchases were fairly uniform with a slight increase in October and December.

Oats were marketed more uniformly throughout the year than rye or barley. Largest purchases of oats were in August and September and again in January, with 48.7 percent of all purchases made in these months. The



Source: Table XXVIII

Fig. 51. Monthly purchases of rye, barley, and oats in East Tennessee, June, 1940 - June, 1941

peak month was January, with 20 percent of all purchases. Smallest purchases were during March through July.

Method of Transportation

Improvement in roads and increased use of trucks is increasing the distance that grain and feed can be hauled economically. The development of truck transportation in recent years has facilitated the transfer of grain from surplus to deficit areas. Grain and feed can be secured by truck on a day's notice in just the quantities desired, and as cheaply or cheaper than by rail.

An increasing number of truckers haul grain from the surplus area (Ohio River Valley) to Knoxville and take back coal and lumber from Tennessee and Kentucky. The same situation exists with respect to a number of truckers who live in the Knoxville area and make regular trips to the grain producing area.

There are also possibilities of opening the Tennessee River to barge service, so that bulk commodities like grain can be moved in large-lot quantities. Already shippers of grain are using the Tennessee River as far up stream as Chattanooga, and are finding transportation by water cheaper than any other kind.

Rail, however, is still the most usual method of transportation. According to a survey of 45 mills in East Tennessee, 76.5 percent of all out-of-state grain was shipped in by rail (Table XXIX). Of all out-of-state grain received in Knoxville, around 80.0 percent was by rail.

For the 45 East Tennessee mills covered in the survey the proportion of each grain shipped in by rail was as follows: wheat, 80.5 percent; white corn, 42.1 percent; yellow corn, 71.3 percent; oats, 84.1 percent; barley, 100 percent; and grain sorghum, 100 percent. The remaining out-of-state receipts and all local receipts were by truck (Figure 52).

TABLE XXIX. METHOD OF TRANSPORTATION OF EACH KIND OF GRAIN RECEIVED BY 45 MILLS IN EAST TENNESSEE, JULY 1940 - JULY 1941

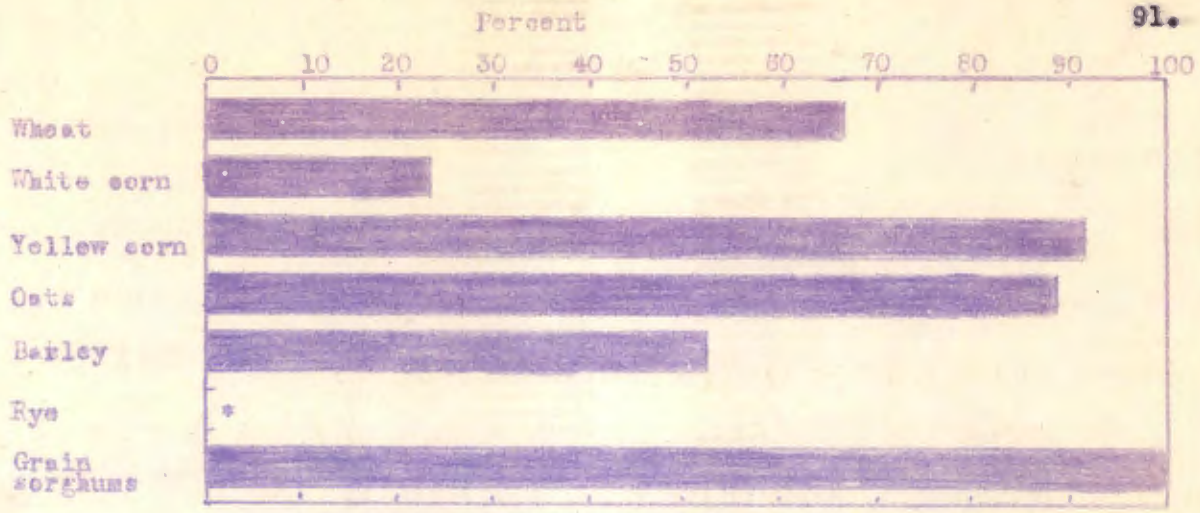
Kind of Grain	Percent by Rail	Percent by Truck
Wheat	80.5	19.5
All corn	63.8	36.2
White corn	42.1	57.9
Yellow corn	71.3	28.7
Oats	84.1	15.9
Barley	100.0	
Grain sorghums	100.0	
All grain	76.5	23.5

a Data were not available on transportation of rye.

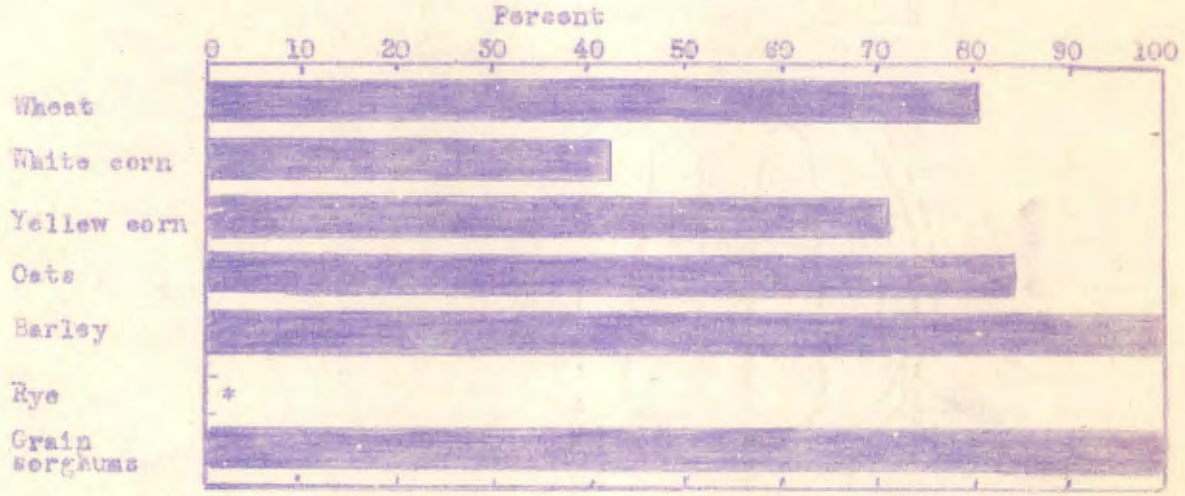
Source: Grain Marketing Survey in East Tennessee, 1941.

During the two-year period July 1939 - July 1940, the amount of wheat trucked to Knoxville increased considerably. Most of the increase in truck receipts was due to the increased amount of wheat being trucked in from the Ohio River Valley (Figure 53).

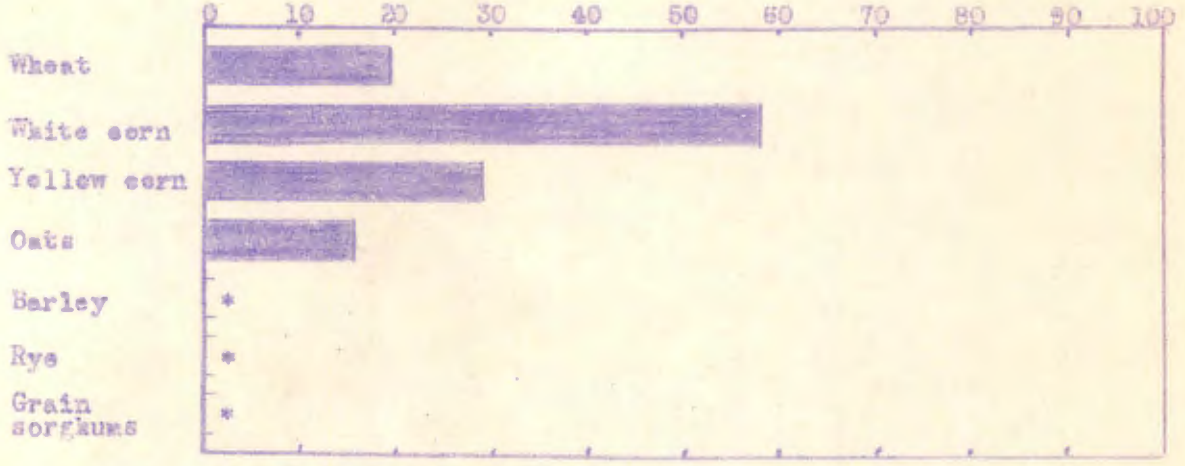
With the development of two-way hauls, trucks should be in a position to haul more cheaply, which is brought out in part by the recent



A. Percent of total shipped in



B. Percent shipped by rail



C. Percent shipped by truck

* None

Source: **Table XXIX**

Fig. **52.** Percent of each grain shipped into East Tennessee and method of transportation, July, 1940-July, 1941

growth of truck transportation. At the same time truckers are in a position to offer more services to small mills that buy grain in less than carlots and also to mills that are not located on a railroad.

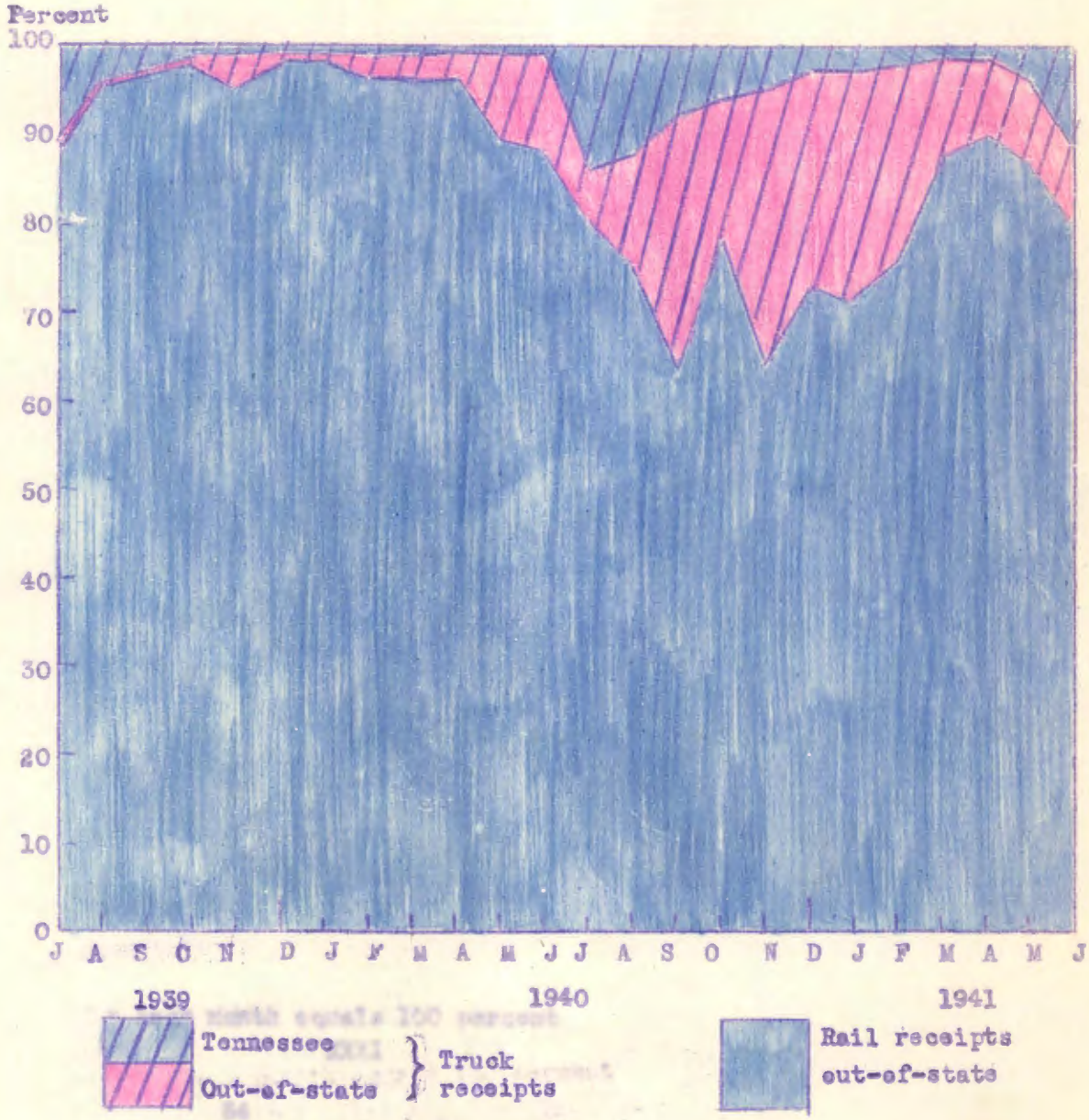
TABLE XXX. METHOD OF TRANSPORTATION OF WHEAT RECEIPTS, KNOXVILLE, JULY 1939-JULY 1941

Month	Rail	Truck		Month	Rail	Truck	
	Out-of-State	Out-of-State	Tennessee		Out-of-State	Out-of-State	Tennessee
1939	Pct.	Pct.	Pct.	1940	Pct.	Pct.	Pct.
July	88.9	0.4	10.7	July	80.4	5.8	13.8
August	95.8	0.2	4.0	August	75.3	13.6	11.1
September	97.0	0.2	2.8	September	63.2	29.4	7.4
October	98.2	1.0	0.8	October	78.1	16.5	5.4
November	95.1	4.0	0.9	November	64.0	31.6	4.4
December	98.0	1.6	0.4	December	73.0	24.3	2.7
1940				1941			
January	98.5	0.8	0.7	January	71.0	26.2	2.8
February	96.8	2.7	0.5	February	75.4	22.4	2.2
March	96.4	2.8	0.8	March	87.9	11.1	1.0
April	96.9	2.9	0.2	April	89.8	9.0	1.2
May	89.2	10.5	0.3	May	87.3	8.8	3.9
June	88.3	11.2	0.5	June	80.3	8.7	11.0

* Each month equals 100 percent.

Source: Grain Marketing Survey, 1941.

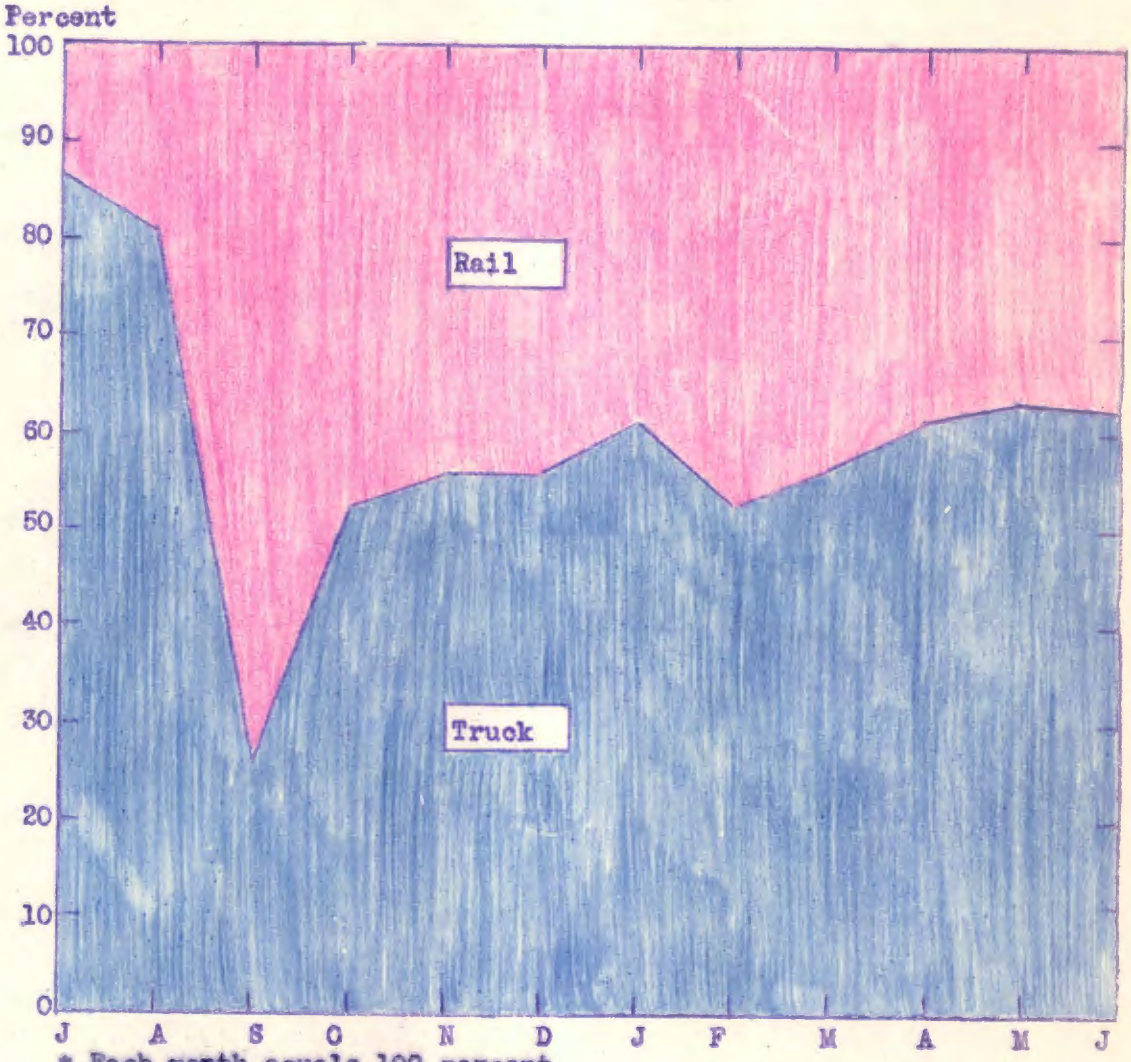
Figure 54 shows the proportion of corn received by truck and rail by months in Knoxville, July 1940 - July 1941. The months showing largest truck receipts were July and August, and the months with lowest receipts was September. Truck receipts correspond closely with local receipts of corn.



* Each month equals 100 percent

Source: Table XXX

Fig.53. Method of transportation of wheat receipts, Knoxville, July, 1939 - July, 1941



* Each month equals 100 percent

Source: Table XXXI

Fig.54. Truck and rail receipts of corn by months, Knoxville, July, 1940-July, 1941

TABLE XXXI. TRUCK AND RAIL RECEIPTS OF CORN BY MONTHS, KNOXVILLE, JULY 1940 - JULY 1941

Month	Truck	Rail	Month	Truck	Rail
	(Pct.)	(Pct.)		(Pct.)	(Pct.)
July	86.8	13.2	January	61.1	38.9
August	80.4	19.6	February	52.6	47.4
September	26.1	73.9	March	56.1	43.9
October	52.1	47.9	April	61.5	38.5
November	55.9	44.1	May	52.9	47.1
December	55.9	44.1	June	52.8	47.2

* Each month equals 100 percent.

Source: Grain Marketing Survey, 1941.

Type of Transportation by Size of Mills: Out-of-state grain received by Knoxville mills and by larger mills in East Tennessee had a smaller proportion delivered in trucks than for smaller mills in the area. Twenty percent was delivered in trucks to Knoxville mills, and 38 percent to other mills handling over 90,800 bushels of grain annually. Mills which handled between 30,000 and 90,000 bushels received 95.4 percent of out-of-state shipments by truck, while those handling less than 30,000 bushels received 63.2 percent by truck (Table XXXII).

TABLE XXXII. TYPE OF TRANSPORTATION OF OUT-OF-STATE GRAIN, BY SIZE OF MILL, JULY 1940-JULY 1941

Volume of Grain Handled	Out-of-State Grain		
	Bushels	Percent	
		Rail	Truck
All mills in the survey	2,842,634	76.5	23.5
Knoxville mills	2,518,034	79.5	20.5
Over 90,000 bushels	273,000	61.7	38.3
30,000 to 90,000 bushels	43,450	4.6	95.4
Less than 30,000 bushels	8,150	36.8	63.2

Source: Grain Marketing Survey in East Tennessee.

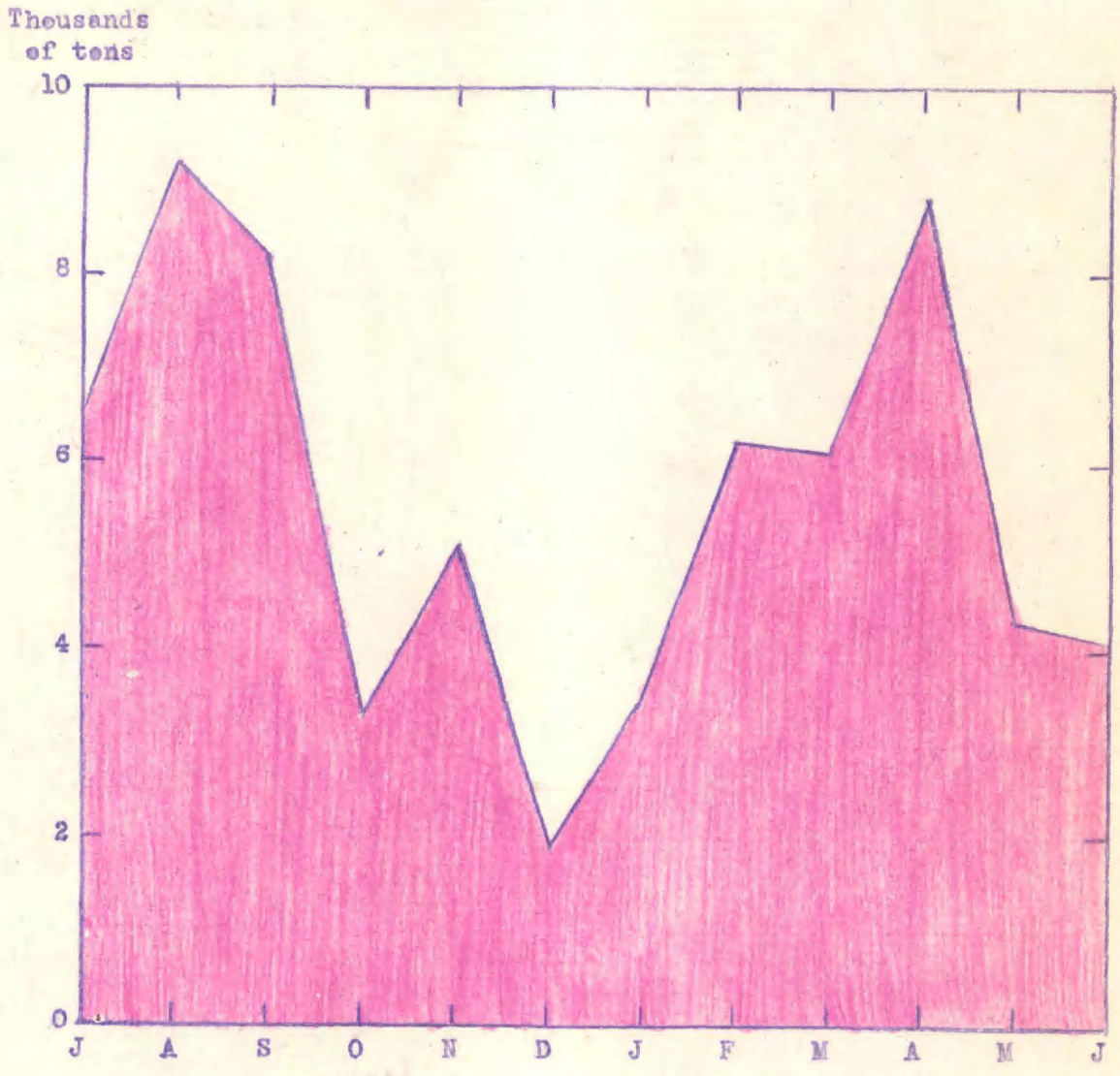
Transportation According to Location of Mills: A larger proportion of the out-of-state grain purchased by mills west and southwest of Knoxville is trucked in than for the rest of the area. This is particularly true of mills in Roane, Loudon, and Monroe counties. During the past two years practically all of the out-of-state grain purchased by those mills was western grain purchased through an elevator in Nashville. Those mills used their own trucks for hauling the grain from Nashville.

Mills located south and east of Knoxville, especially in the eastern part of the area, has a larger proportion of the out-of-state grain shipped in by rail than the rest of the area.

Grain Shipped by Water: A total of 69,537 tons of grain were shipped into Tennessee by water during the marketing year, July 1940 - July 1941. All of this grain moved from states contiguous to the upper Mississippi and Ohio Rivers. Practically all of it came to Nashville and Chattanooga by the Cumberland and Tennessee Rivers. Of the total amount of grain shipped by water over one-half (55.1 percent) was wheat, 35.3 percent corn, 2.8 percent oats, 6.9 percent barley, and 1 percent rye (Table XXXIII).

Figure 55 shows the seasonal movement of grain shipped by water into Tennessee. Largest receipts were in August and April, with lowest receipts in December.

A considerable amount of grain is shipped into Guntersville, Alabama, by water which is sold locally or trucked to Atlanta, Georgia, and other points. This had a tendency to lower the price for those areas.



Source; Table XXXIII

Fig.55. Seasonal movement of grain shipped by water into Tennessee, July, 1940 - July, 1941

Opening the Tennessee River to barge service to Knoxville should lower transportation cost and as a result lower the price of grain in the area.

TABLE XXXIII. GRAIN SHIPPED BY WATER INTO TENNESSEE, BY MONTHS, JULY 1940 - JULY 1941

Month	Corn (Tons)	Wheat (Tons)	Oats (Tons)	Barley (Tons)	Rye (Tons)	Total (Tons)
July	1,650	3,790	-	1,200	-	6,640
August	784	7,420	-	894	-	9,098
September	4,854	1,825	1,420	-	96	8,195
October	799	-	-	1,980	538	3,317
November	1,508	3,600	-	-	-	5,108
December	-	1,980	-	-	-	1,980
January	995	4,500	-	-	-	5,495
February	3,279	3,000	-	-	-	6,279
March	3,114	3,000	-	-	-	6,114
April	6,099	2,250	526	-	-	8,875
May	1,496	2,820	-	-	-	4,316
June	-	4,120	-	-	-	4,120
Total	24,578	38,305	1,946	4,074	634	69,537
Pct. of total	35.3	55.1	2.8	5.9	0.9	100.0

Source: District Engineer, War Department, Nashville.

CHAPTER IV

GRAIN PRICES

East Tennessee Prices

East Tennessee being a deficit grain producing areas, farmers enjoy a comparative price advantage over the rest of the state as well as over central markets like Nashville and Chicago.

In this chapter we shall endeavor to show the price of each grain in East Tennessee over a period of years, a comparison of East Tennessee prices with the State average, a comparison of Knoxville and other markets with Chicago, and a comparison of the price differential of grain on the different markets.

Prices used for East Tennessee are those received by farmers as reported to the Bureau of Agricultural Economics, Division of Agricultural Statistics, on or about the 15th of each month.

Corn: The average monthly price of corn received by farmers from 1925 to 1941 averaged 88.3 cents per bushel. Prices were highest during May through October. September was the peak month, averaging 99 cents per bushel. Lowest prices were in November, December, and January, reaching

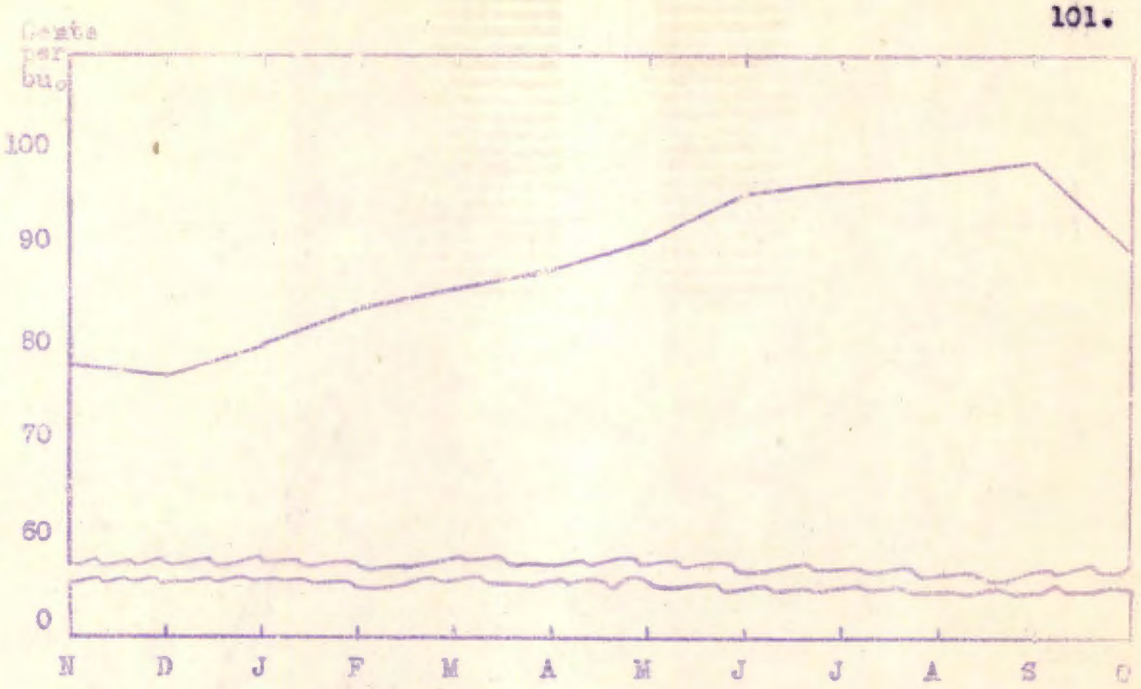
the lowest point in December, 77 cents per bushel (Table XXXIV).

The greatest change in price for any single month was from October to November, a decrease of 12 cents per bushel. A further decrease of 1 cent occurred from November to December. Price increased each month from December to September, the peak month. The greatest single increase was from May to June, an increase of 5 cents per bushel (Figure 56).

TABLE XXXIV. MONTHLY AVERAGE PRICES OF CORN RECEIVED BY FARMERS ON THE 15TH OF EACH MONTH AND DIRECTION OF CHANGES FROM PREVIOUS MONTH IN EAST TENNESSEE, 1925 - 1941

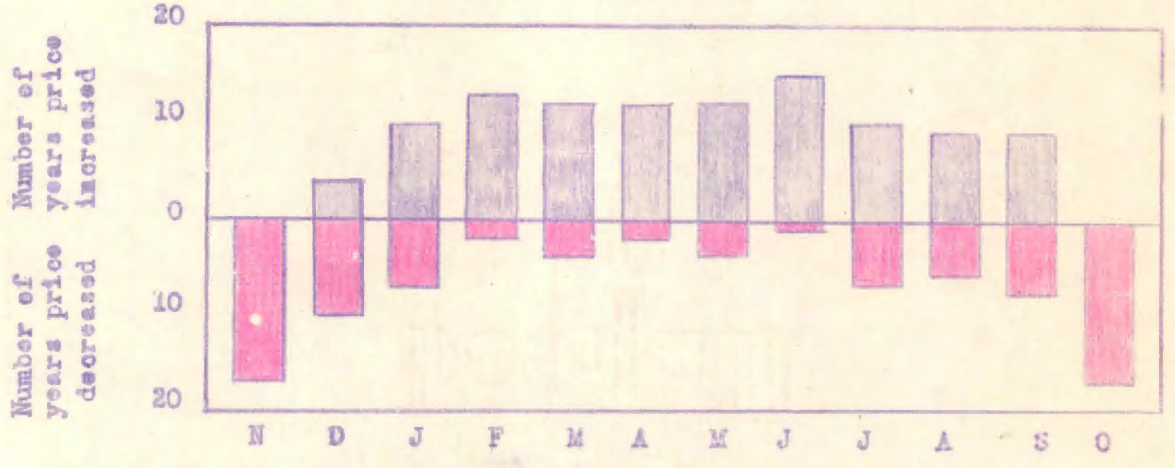
Month	Average Price per Bushel (Cents)	Average Change from Previous Month (Cents)	Number of Years When Price Went		Average Total Change from November (Cents)
			Up	Down	
November	78	- 12	0	17	-
December	77	- 1	4	10	- 1
January	80	+ 3	10	7	+ 2
February	84	+ 4	13	2	+ 6
March	86	+ 2	12	4	+ 8
April	88	+ 2	12	2	+10
May	91	+ 3	12	4	+13
June	96	+ 5	15	1	+18
July	97	+ 1	10	7	+19
August	98	+ 1	9	6	+20
September	99	+ 1	9	8	+21
October	90	- 9	0	17	+12

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, Division of Agricultural Statistics.



Source: Table XXXIV

Fig. 56. Average monthly prices of corn in East Tennessee, 1925-1941



Source: Table XXXIV

Fig. 57. Number of times during seventeen crop years that the monthly price of corn in East Tennessee was higher or lower than that of previous month, 1925-1941

The monthly price changes listed as averages in Table XXXIV of course varied from year to year both in direction and in extent (Table XXXIV and Figure 57). During October and November the average price was lower than in the preceding month. Not one year out of seventeen did corn prices average higher or remain the same as for the preceding month. In December there were only four years of the seventeen when it averaged higher than in November. From January to September the average monthly price of corn advanced beyond that of the previous month much more frequently than it declined.

Wheat: Over a 17-year period, 1925-1941, prices of wheat in East Tennessee averaged $1.15 per bushel. Highest prices were received during February through June. The peak month was May with an average of $1.21 per bushel. Lowest prices were received during July through December, reaching the lowest point in August, with $1.09 per bushel (Table XXXV).

Since the bulk of the crop from the main wheat producing states does not reach the market until July, East Tennessee wheat marketed in June enjoys a favorable price advantage. During 1939 and 1940 an average of 11.5 percent of all wheat sold by farmers in East Tennessee was marketed in June.

Such a price variation is to be expected since the bulk of the crop is harvested and sold during June, July, and August, rather than held for higher price. It is the general opinion of most farmers that the cost of storage and risk of deterioration are too high to be offset by any anticipated rise in price. This idea is reflected in the fact that an average

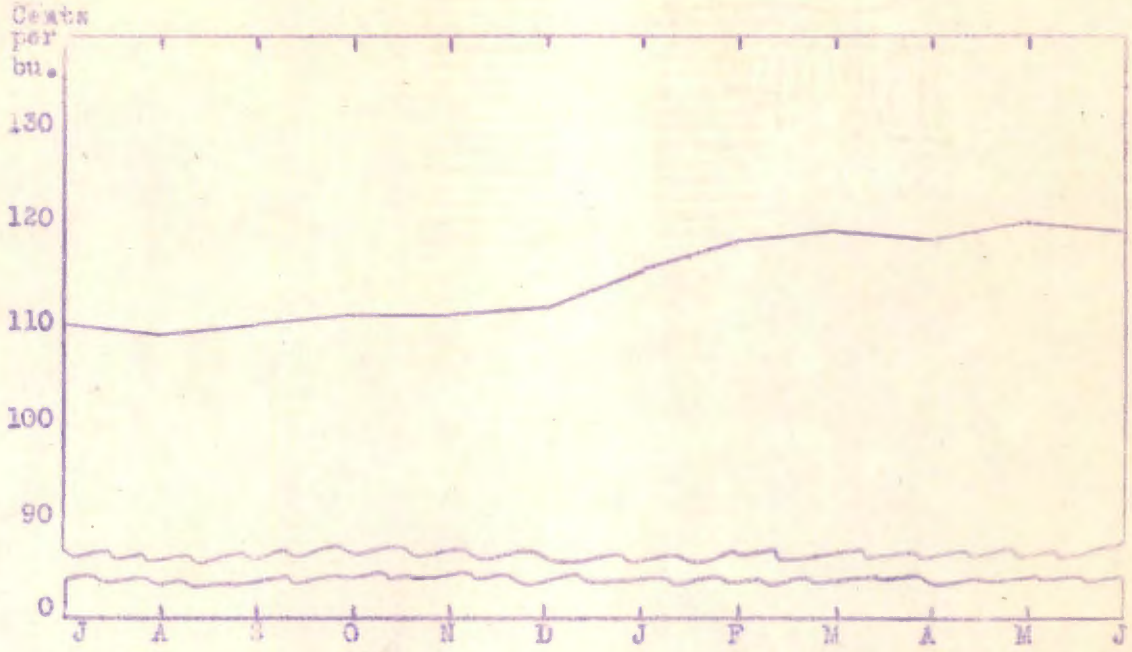
of 59 percent of the 1939 and 1940 wheat sales by East Tennessee farmers were made during June, July, and August (Chapter III).

The greatest change in price occurred from June to July, a drop of 10 cents per bushel. Price declined only 1 cent from July to August. From August to May prices increased or remained steady each month except from March to April, which declined 1 cent. Greatest increase was from December to January, an increase of 4 cents per bushel (Figure 58).

TABLE XXXV. MONTHLY AVERAGE PRICES OF WHEAT RECEIVED BY FARMERS ON THE 15TH OF EACH MONTH AND DIRECTION OF CHANGES FROM PREVIOUS MONTH IN EAST TENNESSEE, 1925-41

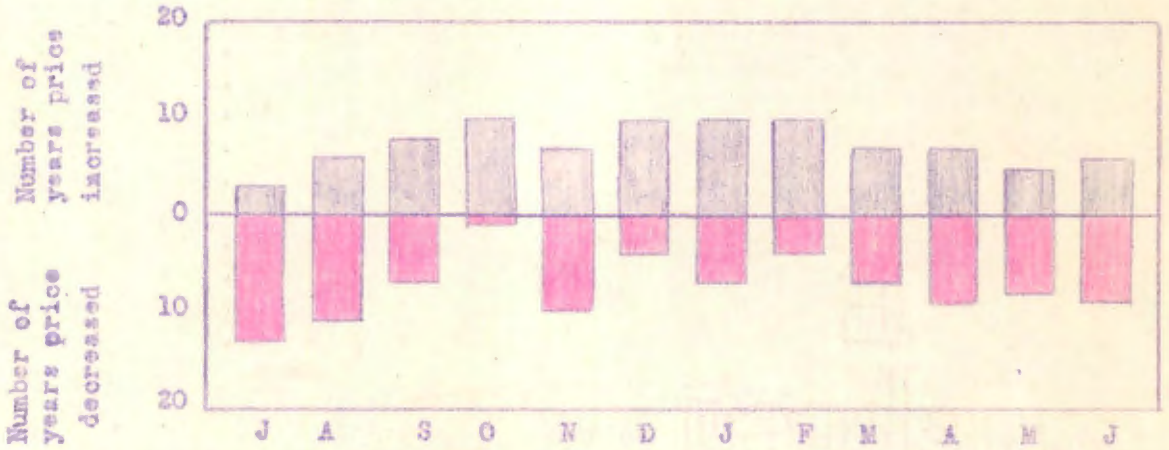
Month	Average Price per Bushel (Cents)	Average Change from Previous Month (Cents)	Number of Years When Prices Went		Average Total Change from July (Cents)
			Up	Down	
July	1.10	- 10	3	13	-
August	1.09	- 1	6	11	- 1
September	1.10	+ 1	8	7	0
October	1.11	+ 1	10	1	+ 1
November	1.11	0	7	10	+ 1
December	1.12	+ 1	10	4	+ 2
January	1.16	+ 4	10	7	+ 6
February	1.19	+ 3	10	4	+ 9
March	1.20	+ 1	7	7	+10
April	1.19	- 1	7	9	+ 9
May	1.21	+ 2	5	8	+11
June	1.20	- 1	6	9	+10

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, Division of Agricultural Statistics.



Source: Table XXXV

Fig.58. Average monthly prices of wheat in East Tennessee, 1925-1941



Source: Table XXXV

Fig.59. Number of times during seventeen crop years that the monthly price of wheat in East Tennessee was higher or lower than that of previous month, 1926-1941

Prices did not always follow the same directional change. Between June and July prices increased 3 out of 17 years. Although there was a general increase in price from August to May, prices decreased 7 out of 17 years from August to December, 10 out of 17 years from October to November, 9 out of 17 years from March to April, and 8 out of 17 years from April to May. Other monthly changes over the same period showed decreases in price from 1 to 7 times in 17 years (Figure 59).

As is indicated in the foregoing discussion, a wide variation in the price of wheat from one year to another and one month to another is to be expected. Some factors affecting the price of wheat in East Tennessee are (1) its position as a deficiency producing area, (2) distance and cost of transportation to market, (3) time of sale in relation to season, (4) the condition of world supply and demand, and (5) financial conditions and prices of other commodities.

Oats: Price of oats was more uniform throughout the year than for other types of grain. Over a 9-year period, 1933 through 1941, highest average monthly price, 58 cents per bushel, was in April, and lowest, 49 cents per bushel, was in July (Table XXXVI). Prices in general were highest during spring and lowest during the summer and early fall. Little change in price occurred throughout the rest of the year (Figure 60).

Barley: The highest price received by farmers for barley in East Tennessee came most commonly in October (Figure 60). During the years

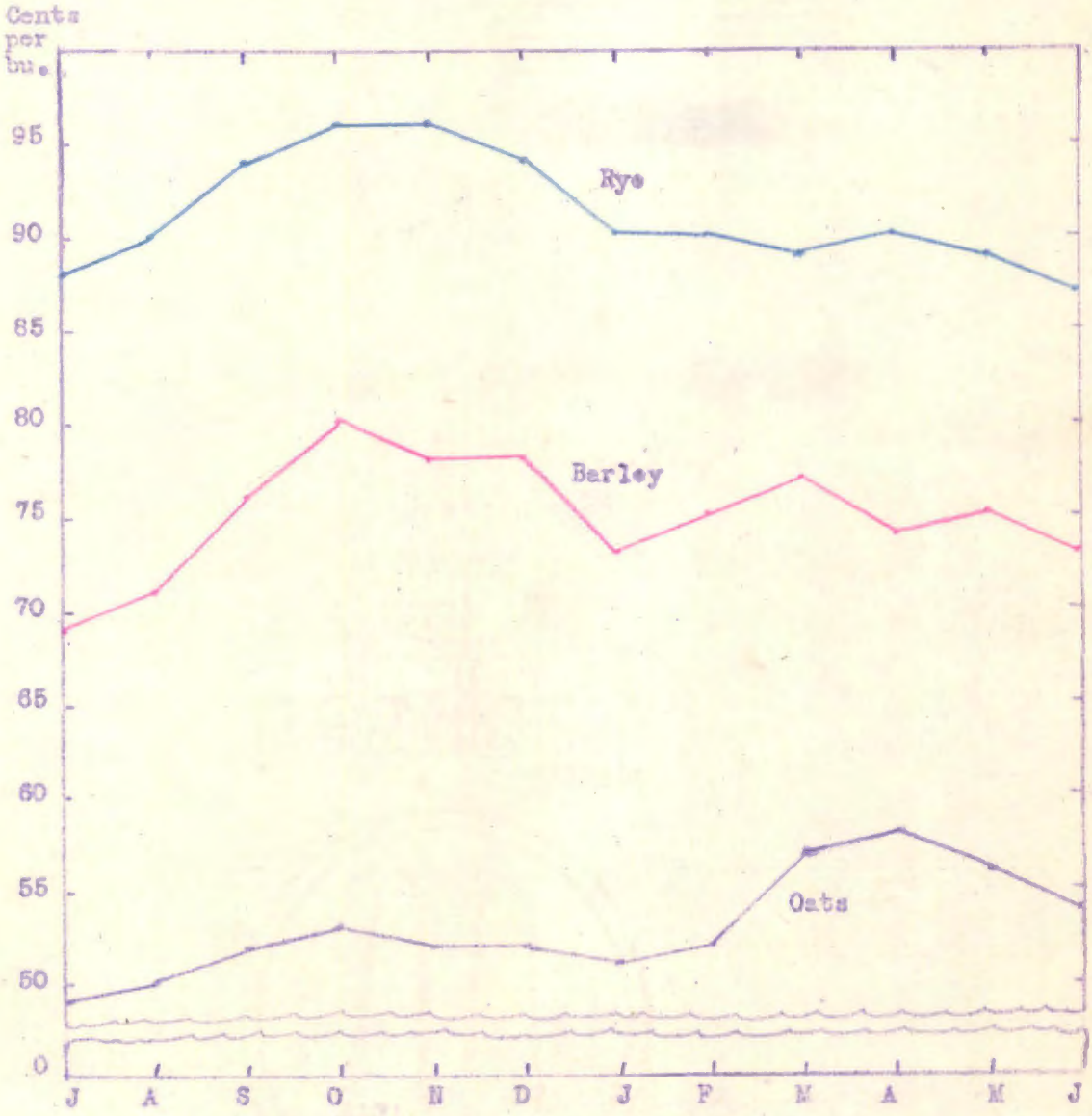
1933-1941 prices increased an average of 11 cents from the low during July until October high. Prices during October, November, and December are quite uniform, and decreased only 2 cents during November and December. During January prices decreased an average of 5 cents. However, from January to March prices increased 4 cents and in April decreased 3 cents. Prices of barley during April, May, and June are quite uniform, but in July barley prices decline 4 cents which carries the price to the low point (Table XXXVI).

Rye: From 1933 to 1941, seasonal variation in price of rye was very similar to the seasonal price of barley. The highest price of the year for rye in East Tennessee occurs during October and November and averaged 8 cents above the average for July, and 9 cents above the lowest priced during June (Table XXXVI). Following this low position

TABLE XXXVI. AVERAGE MONTHLY PRICES RECEIVED BY FARMERS ON THE 15TH OF EACH MONTH FOR OATS, BARLEY, AND RYE IN EAST TENNESSEE, 1933 - 1941

Month	Oats (Cents)	Barley (Cents)	Rye (Cents)	Month	Oats (Cents)	Barley (Cents)	Rye (Cents)
July	49	69	88	January	51	73	90
August	50	71	90	February	52	75	90
September	52	76	94	March	57	77	89
October	53	80	96	April	58	74	90
November	52	78	96	May	56	75	89
December	52	78	94	June	54	73	87

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, Division of Agricultural Statistics.



Source: Table XXXVI

Fig.60. Average monthly prices of oats, barley, and rye in East Tennessee, 1933-1941

the price of rye steadily rises until October's and November's high. A sharp decline occurs during December and January. On the whole, the prices during the next five months from January to May are quite uniform. After this month, a rapid decline takes place which carries the price to the low point in June (Figure 60).

Comparison of East Tennessee Prices With the State Average

Corn: Over a 5-year period, 1937 through 1941, price of corn in East Tennessee averaged 8.8 cents per bushel above the state average. The largest spread was in 1941, averaging 9.6 cents above the state average. The least differential was in 1940, averaging only 6.6 cents per bushel above the state average.

There was no definite season showing greatest spread. During 1937 and 1938 the difference was greatest in October and November. Difference was greatest in February and May for 1939, November and December for 1940, and January and July for 1941.

Considerable fluctuation took place each month. Greatest difference was in October 1937 with a spread of 14 cents per bushel. Least spread was in March 1940 with a spread of only 3 cents per bushel (Table XXXVII and Figure 61).

Wheat: During the period 1937 through 1941, price of wheat in East Tennessee averaged 6.2 cents per bushel above the state average. There was little variation in the average spread from one year to another.

Smallest spread was 5.2 cents per bushel in 1938; largest was 6.6 cents in 1939 and 1940.

Variation from one month to another, however, was greater than for corn, with greatest monthly changes occurring in 1940. East Tennessee price was 14 cents above the state average in May, but just equalled the state average in November 1940. In no month did the East Tennessee price get lower than the state average price. There was a tendency for the difference in price to be greatest during the summer and smallest during the fall. This, however, was not true in 1939 and 1941 (Figure 62).

Oats: The average price of oats in East Tennessee for the years studied, 1937 through 1941, was 4.6 cents per bushel above the state average. The smallest spread of only 3.7 cents per bushel was in 1937, and the largest spread of 5.6 cents was in 1938.

Small monthly fluctuations occurred throughout the period. The greatest spread was in January 1941, a spread of 10 cents per bushel. In September 1937 the East Tennessee price was 1 cent above, and in February 1940 it was 2 cents below the state average price. In no other month did the East Tennessee price get as low as the average for the state (Figure 63).

Barley: Over the 5 years studied (1937-1941) price of barley in East Tennessee averaged around 4.9 cents above the state average. The largest spread, 5.6 cents, was in 1940, while the smallest, 4 cents, was in 1938. Differences in price for other years were 4.6 cents in 1937,

5.4 cents in 1939, and 4.9 cents in 1941.

Monthly fluctuation in relation to the average for the state was greater for barley than any other grain. Although the average price in East Tennessee was well above the state average, the East Tennessee price dropped below the state average one or two months each year included in the study except 1940. These months were November 1937; January and February 1938; January 1939; and October 1941 (Figure 64).

Rye: There was a smaller difference between the price of rye in East Tennessee and the state average price than for any other grain, averaging only 3.5 cents per bushel above the state average. The greatest difference was in 1941, averaging 4.8 cents above the state average. The smallest was in 1939, averaging only 2.2 cents above the state average.

Monthly variation was greatest in 1938, ranging from 3 cents below the state average in January to 12 cents above in September. Months in which East Tennessee price dropped below the state average during the 5-year period were December 1937; January 1938; February and June 1939. During 1940 and 1941 East Tennessee price failed to drop as low as the state average price (Figure 65).

TABLE XXXVII. AVERAGE PRICE PER BUSHEL RECEIVED BY FARMERS ON THE 15TH OF EACH MONTH, 1937 - 1941

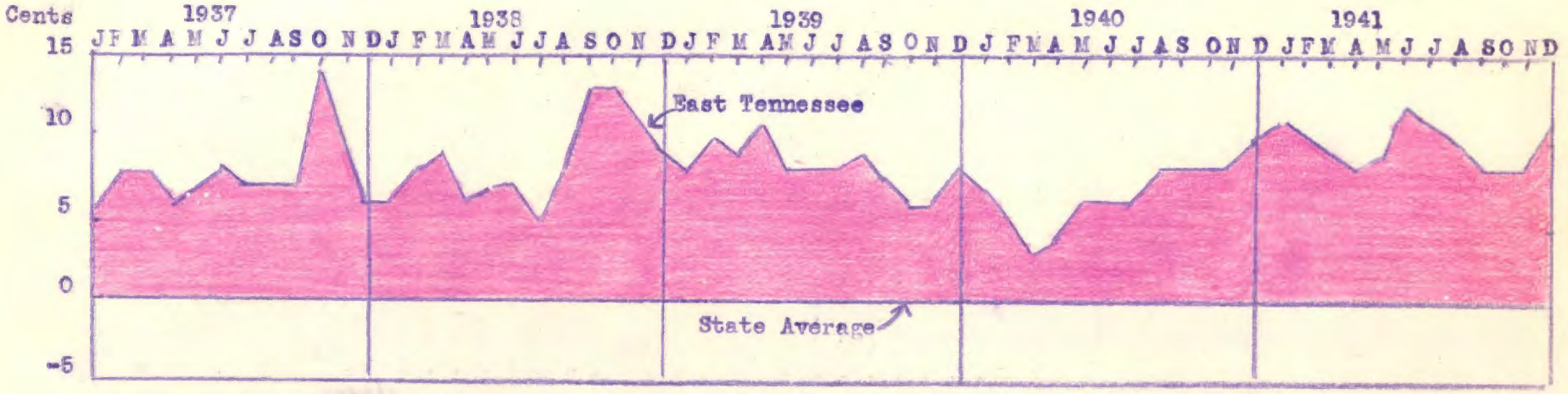
Month	Corn		Wheat		Oats		Barley		Rye	
	East Tenn.	State Ave.	East Tenn.	State Ave.	East Tenn.	State Ave.	East Tenn.	State Ave.	East Tenn.	State Ave.
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols
1937										
January	1.03	.97	1.35	1.31	.67	.64	.98	.95	1.14	1.15
February	1.10	1.02	1.36	1.30	.70	.68	.97	.93	1.16	1.08
March	1.16	1.08	1.42	1.36	.76	.74	1.00	.86	1.10	1.06
April	1.26	1.20	1.46	1.39	.78	.74	.94	.90	1.05	1.05
May	1.31	1.24	1.43	1.37	.72	.69	.89	.97	1.09	1.06
June	1.32	1.24	1.36	1.24	.70	.64	.97	.85	1.08	1.03
July	1.29	1.22	1.22	1.15	.60	.57	.87	.81	1.08	.99
August	1.16	1.09	1.16	1.11	.55	.50	.83	.81	1.03	.99
September	1.05	.98	1.11	1.06	.54	.53	.88	.87	1.03	1.03
October	.92	.78	1.11	1.07	.59	.51	.92	.87	1.03	1.02
November	.65	.56	1.04	.99	.52	.47	.79	.80	1.00	.99
December	.59	.53	1.00	.96	.45	.43	.81	.78	.98	.96
1938										
January	.63	.57	1.02	.98	.49	.45	.74	.76	.93	.96
February	.67	.59	1.03	.98	.55	.51	.77	.78	.97	.96
March	.70	.61	1.02	.97	.53	.50	.76	.73	.97	.94
April	.67	.61	.99	.93	.56	.49	.72	.70	.93	.90
May	.68	.61	.96	.89	.51	.48	.74	.70	.85	.81
June	.67	.60	.90	.84	.51	.44	.70	.66	.89	.83
July	.66	.61	.78	.74	.46	.38	.61	.54	.79	.71
August	.68	.60	.76	.71	.42	.37	.66	.58	.77	.73
September	.69	.56	.75	.70	.45	.39	.66	.60	.82	.70
October	.64	.51	.82	.74	.46	.39	.72	.66	.87	.82
November	.58	.47	.76	.73	.44	.37	.69	.66	.87	.81
December	.56	.47	.78	.73	.44	.38	.74	.66	.87	.82
1939										
January	.59	.51	.79	.74	.46	.41	.67	.69	.81	.77
February	.65	.55	.82	.75	.46	.41	.71	.65	.78	.79
March	.68	.59	.83	.76	.50	.46	.76	.65	.77	.77
April	.71	.60	.84	.77	.52	.45	.69	.65	.84	.82
May	.72	.64	.87	.81	.50	.45	.69	.69	.81	.81
June	.75	.67	.89	.83	.48	.44	.65	.60	.78	.80
July	.77	.69	.85	.77	.42	.39	.64	.55	.80	.75
August	.76	.67	.80	.74	.47	.39	.66	.59	.80	.76
September	.86	.79	.96	.89	.50	.46	.72	.67	.90	.87
October	.75	.69	.98	.90	.52	.47	.77	.70	.95	.88
November	.70	.64	1.00	.92	.52	.46	.76	.69	.93	.90
December	.72	.64	1.04	.98	.51	.48	.81	.73	.92	.88

(continued)

TABLE XXXVII. AVERAGE PRICE PER BUSHEL RECEIVED BY FARMERS ON THE 15TH OF EACH MONTH, 1937 - 1941 (cont.)

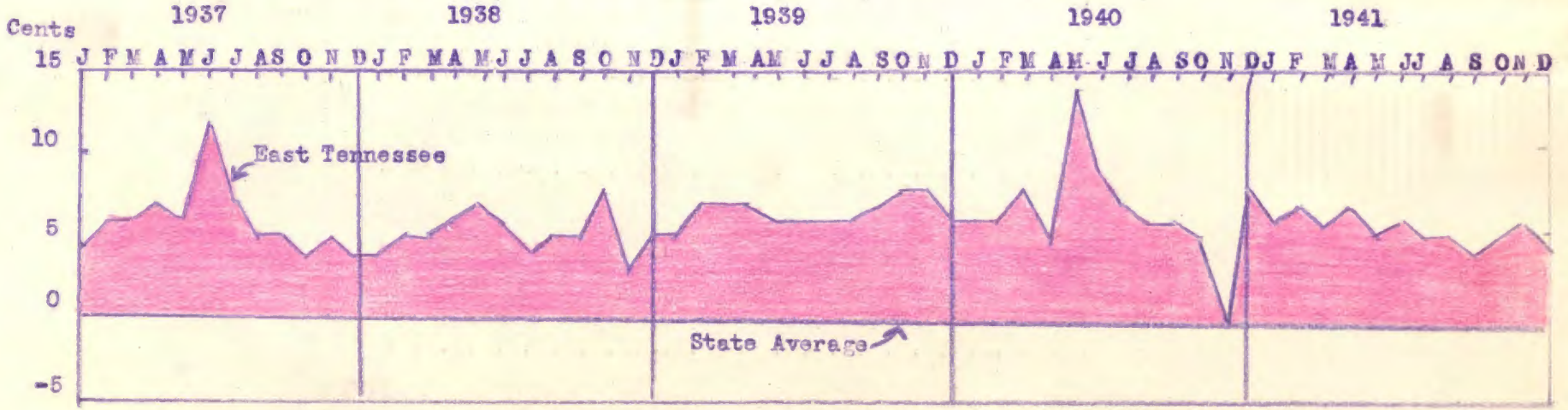
Month	Corn		Wheat		Oats		Barley		Rye	
	East Tenn.	State Ave	East Tenn.	State Ave.	East Tenn.	State Ave.	East Tenn.	State Ave.	East Tenn.	State Ave.
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
1940										
January	.75	.68	1.09	1.03	.55	.49	.82	.73	.92	.87
February	.77	.72	1.08	1.02	.47	.49	.77	.77	.91	.88
March	.81	.78	1.14	1.06	.58	.50	.85	.79	.95	.90
April	.83	.79	1.11	1.06	.57	.53	.78	.76	.90	.90
May	.89	.83	1.16	1.02	.57	.53	.80	.71	.92	.88
June	.91	.85	1.07	.98	.57	.53	.76	.68	.89	.88
July	.90	.84	.91	.84	.47	.44	.66	.57	.83	.80
August	.90	.82	.89	.83	.48	.43	.65	.59	.84	.79
September	.89	.81	.88	.83	.48	.45	.66	.61	.87	.83
October	.87	.79	.92	.87	.52	.48	.73	.68	.90	.87
November	.76	.68	.87	.87	.51	.48	.73	.69	.91	.85
December	.74	.64	.98	.90	.53	.47	.74	.68	.87	.84
1941										
January	.75	.64	.99	.93	.51	.41	.77	.67	.91	.84
February	.76	.66	.99	.92	.55	.53	.73	.65	.89	.85
March	.78	.69	.99	.93	.58	.53	.73	.65	.87	.84
April	.80	.72	1.01	.94	.61	.56	.78	.68	.90	.84
May	.84	.75	1.01	.96	.58	.53	.74	.67	.90	.84
June	.90	.78	1.05	.99	.56	.49	.68	.62	.89	.81
July	.91	.80	1.05	1.00	.50	.46	.67	.61	.90	.81
August	.89	.79	1.07	1.02	.50	.46	.64	.64	.89	.83
September	.86	.78	1.08	1.04	.58	.52	.69	.69	.92	.89
October	.79	.71	1.11	1.06	.57	.53	.72	.73	.92	.92
November	.75	.67	1.12	1.06	.60	.55	.74	.71	.95	.94
December	.80	.69	1.15	1.11	.61	.56	.71	.71	.96	.92

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, Division of Agricultural Statistics.



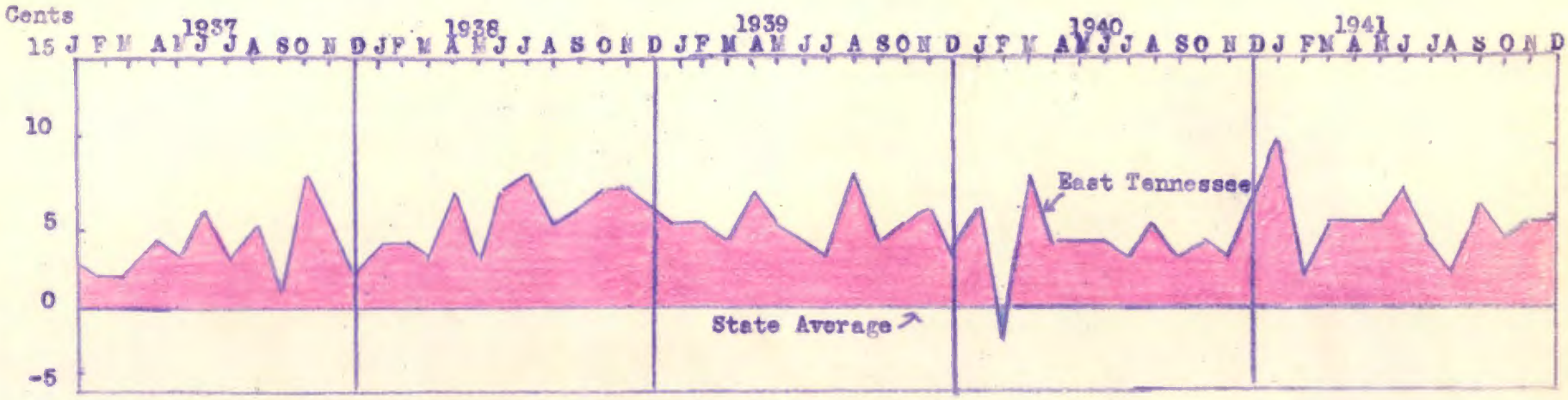
Source: Table XXXVII

Fig. 61. Corn prices in East Tennessee compared with the state average, 1937-1941



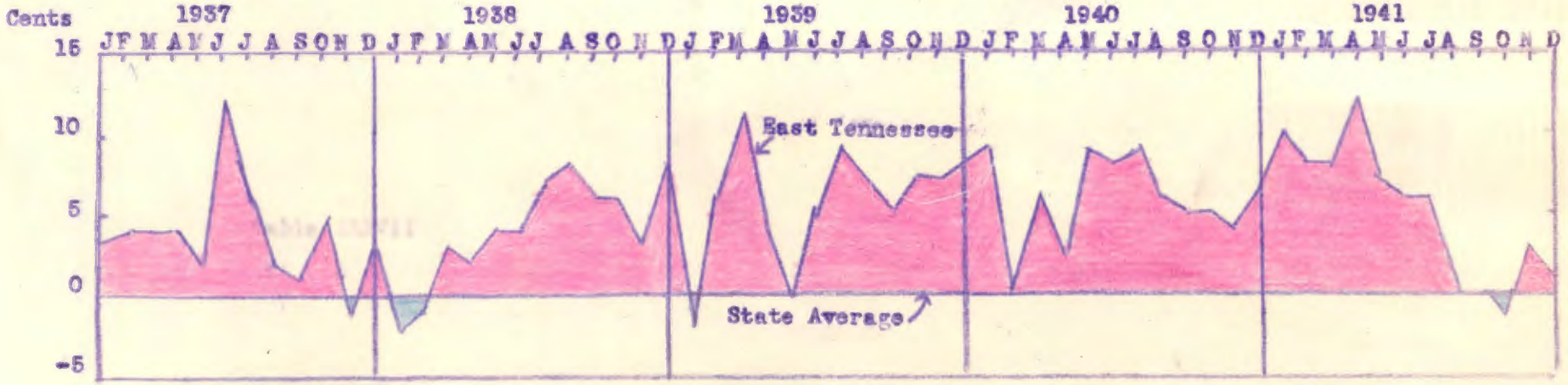
Source: Table XXXVII

Fig. 62. Wheat prices in East Tennessee compared with the state average, 1937-1941



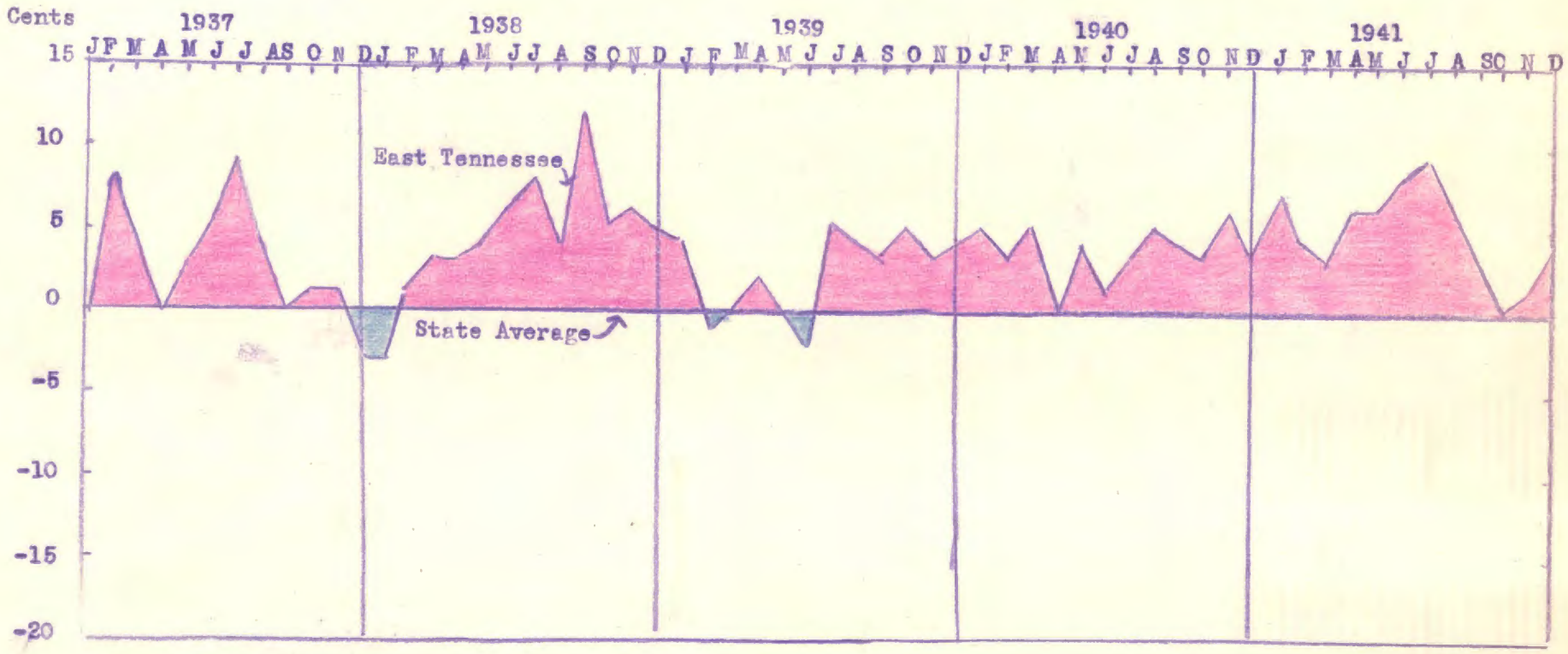
Source: Table XXXVII

Fig.63. Oat prices in East Tennessee compared with the state average, 1937-1941



Source: Table XXXVII

Fig.64. Barley prices in East Tennessee compared with the state average, 1937-1941



Source: **Table XXXVII**

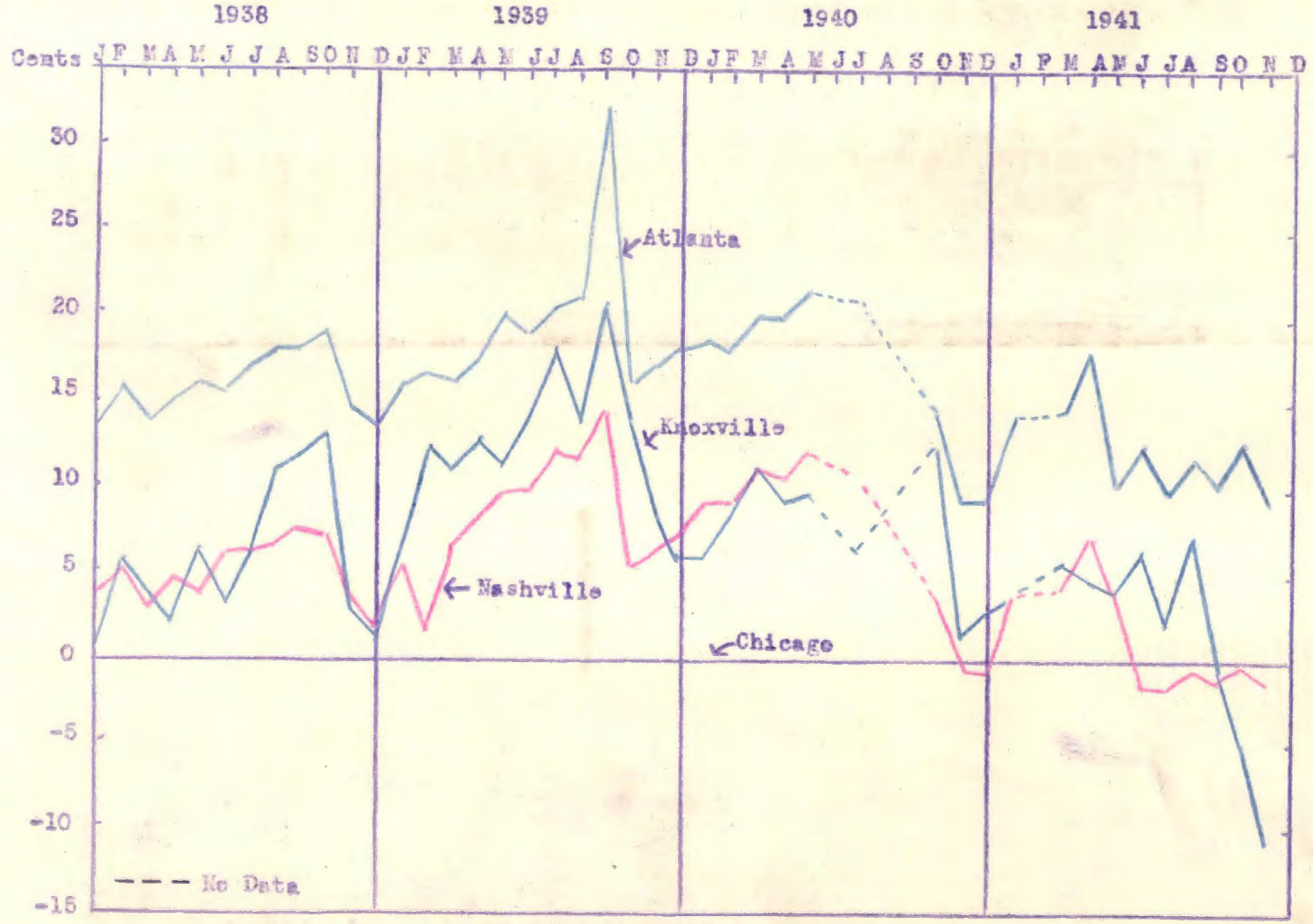
Fig. **65.** Rye prices in East Tennessee compared with the state average, 1937-1941

Comparison of Knoxville and Other Markets with Chicago

No. 2 White Corn: Price of white corn was higher over a 4-year period, excepting the latter part of 1941, at Atlanta, Knoxville, and Nashville, than at Chicago. The years studied were 1938 through 1941. The largest spread in price was in September 1939, and least in November 1940. The Nashville price was below the Chicago price in November and December 1940, and in June through November 1941. Knoxville price was below Chicago during August, September, October, and November 1941. The Atlanta price was above Chicago throughout the period. Markets showing highest average prices were in the following order from highest to lowest: Atlanta, Knoxville, Nashville, and Chicago (Figure 66).

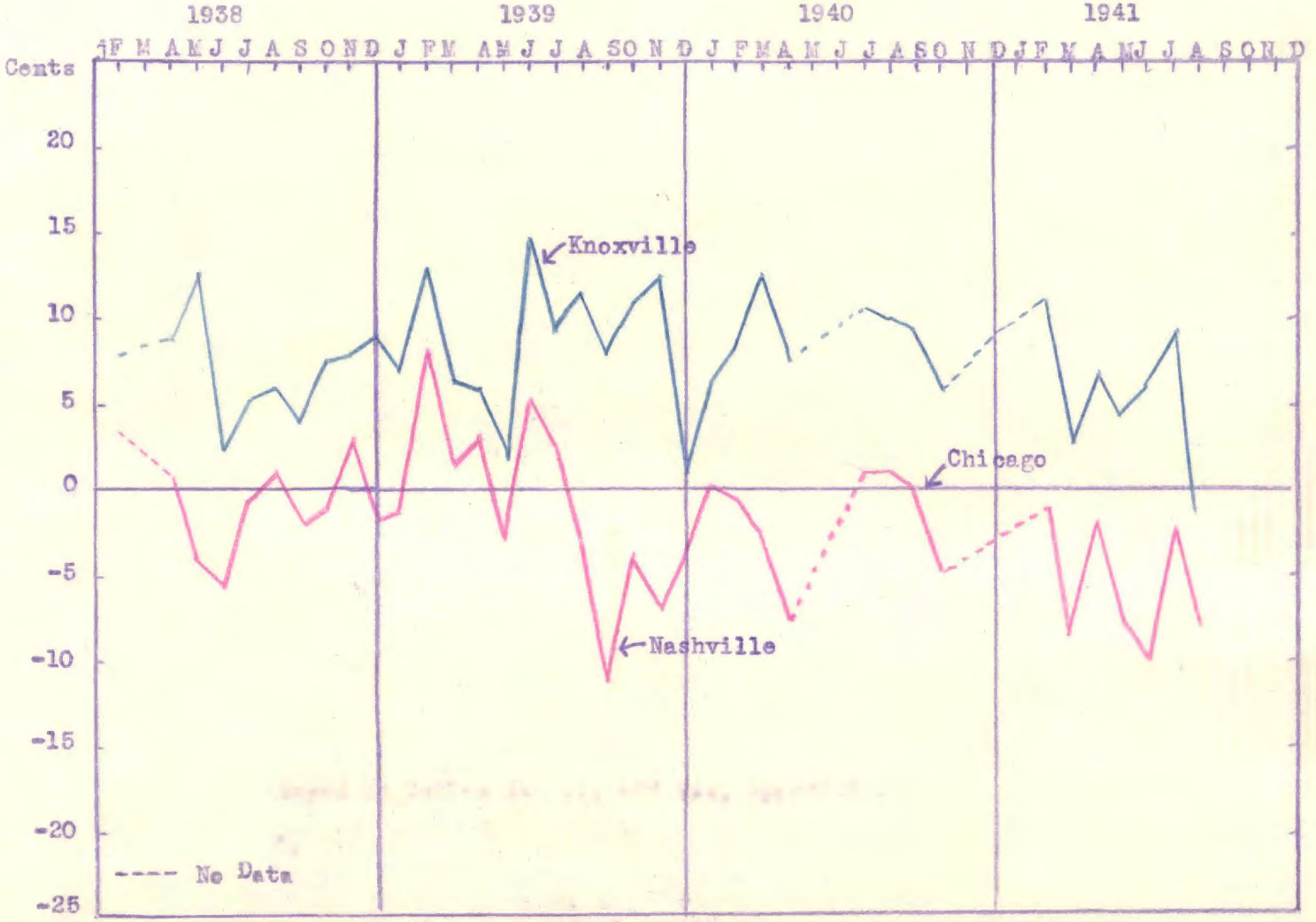
No. 2 Red Winter Wheat: Prices of wheat were compared on the Knoxville, Nashville, and Chicago markets. Prices were highest at Knoxville. The Nashville price fluctuated above and below Chicago, being below most of the time except February through July 1939. Greatest variation in price was in 1939 when Knoxville was almost 15 cents per bushel above Chicago in June, and Nashville price was a little over 10 cents below Chicago in September. The Knoxville price dropped below Chicago price only once, August 1941 (Figure 67).

No. 2 Yellow Corn: Prices of yellow corn were compared only on the Atlanta, Nashville, and Chicago markets. Atlanta price was highest, Nashville next, and Chicago was lowest. There was little variation in



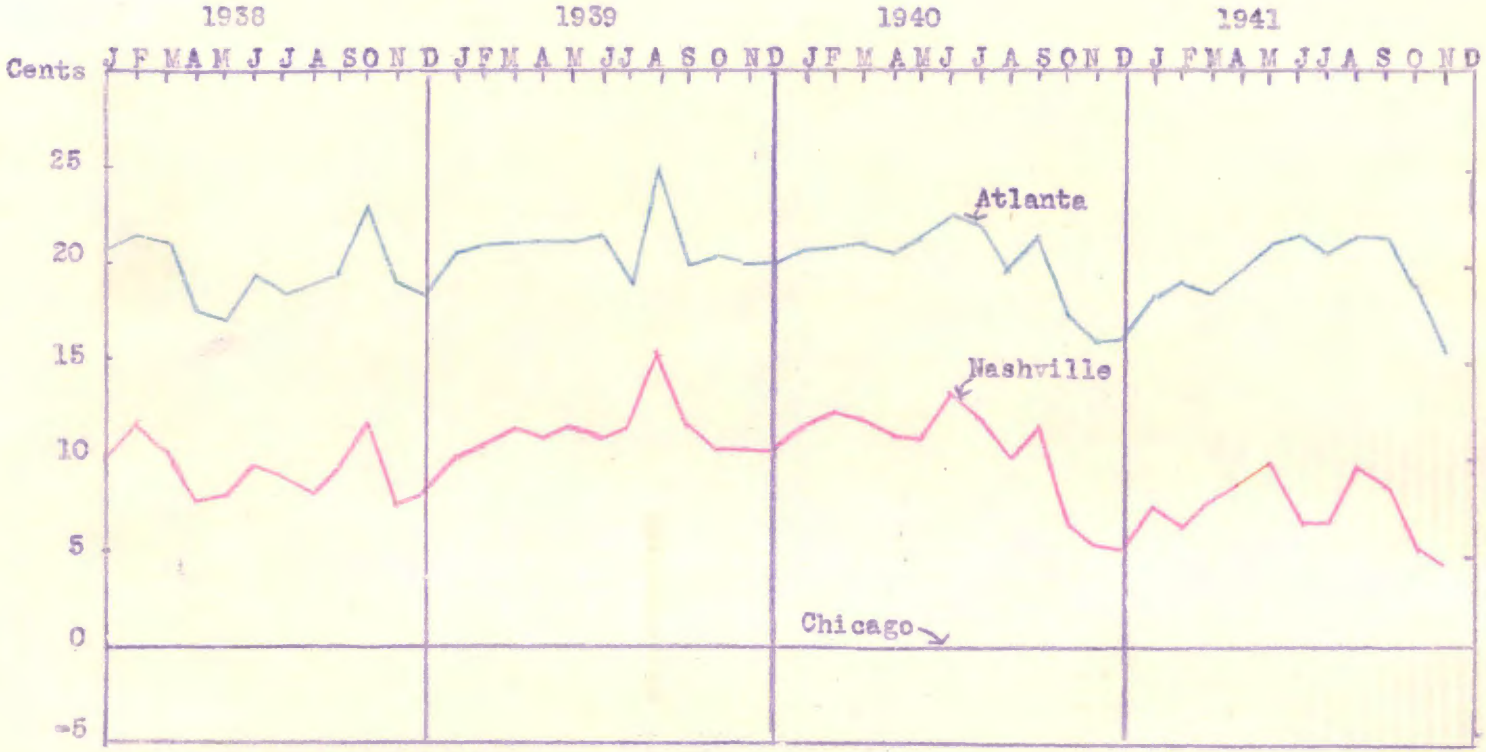
Source: Based on Tables IV, V, VI, and VII, Appendix B

Fig. 66. Price of No. 2 white corn at Atlanta, Knoxville, and Nashville compared with Chicago, 1938-1941



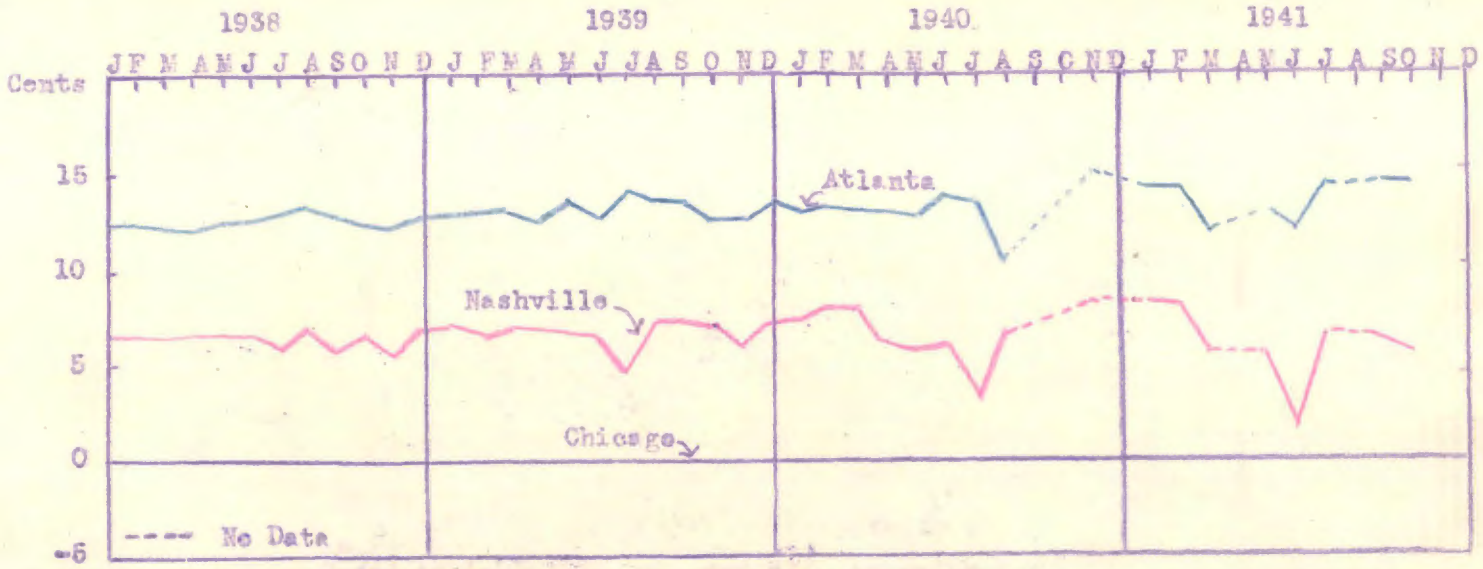
Source: Based on Tables V and VII, Appendix B

Fig. 67. Price of no. 2 soft red winter wheat at Knoxville and Nashville compared with Chicago, 1938-1941



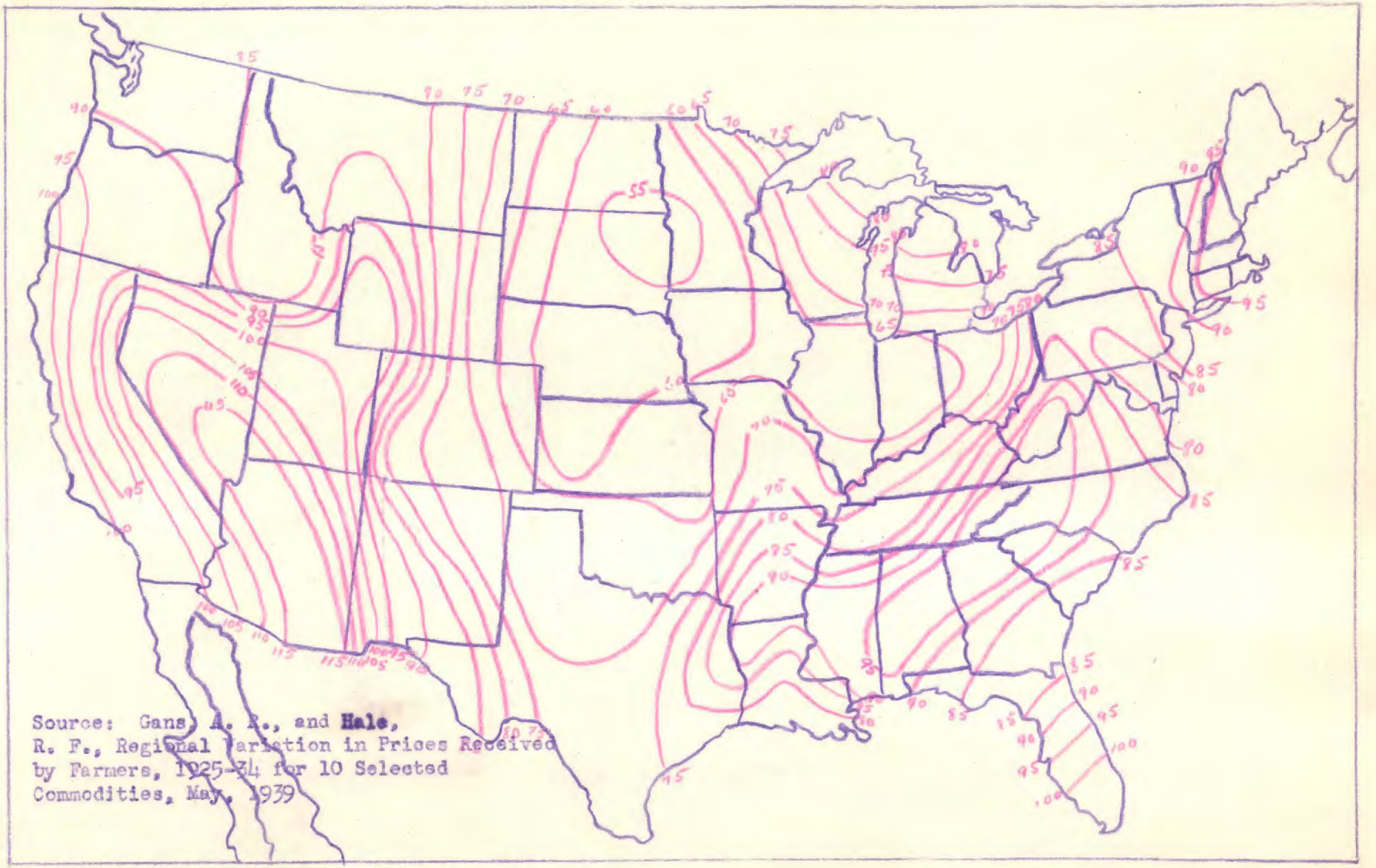
Source: **Based on Tables IV, VI, and VII, Appendix B**

Fig. 68. Price of no. 2 yellow corn at Nashville and Atlanta compared with Chicago, 1938-1941



Source: **Based on Tables IV, VI, and VII, Appendix B**

Fig. 69. Price of No. 3 white oats at Atlanta and Nashville compared with Chicago, 1938-1941



Source: Gans, A. R., and Hale, R. F., Regional Variation in Prices Received by Farmers, 1925-34 for 10 Selected Commodities, May, 1939

Fig. 70. Average prices received by farmers for corn, 1925-34 (cents per bushel)

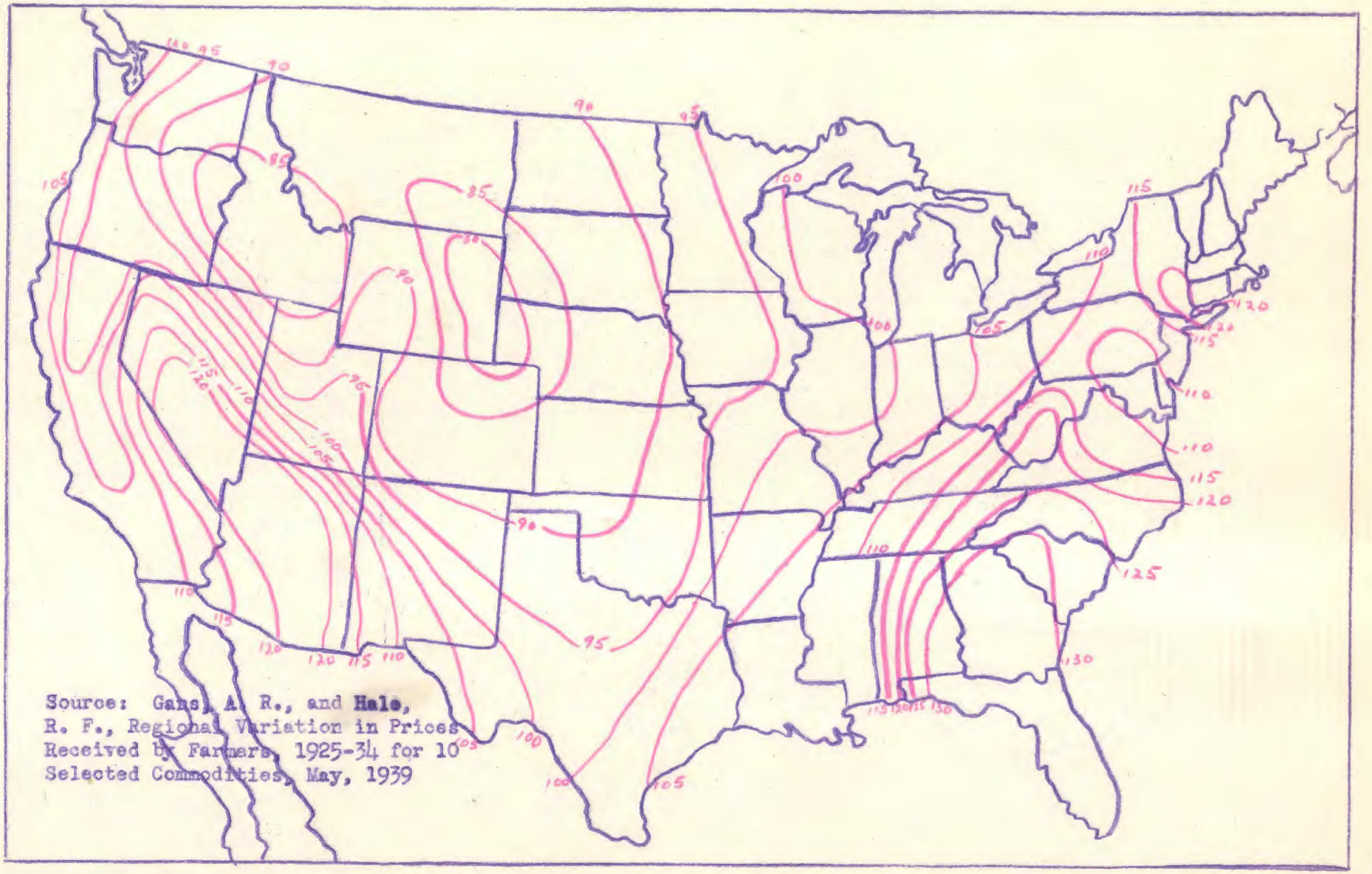


Fig.71. Average prices received by farmers for wheat, 1925-34 (cents per bushel)

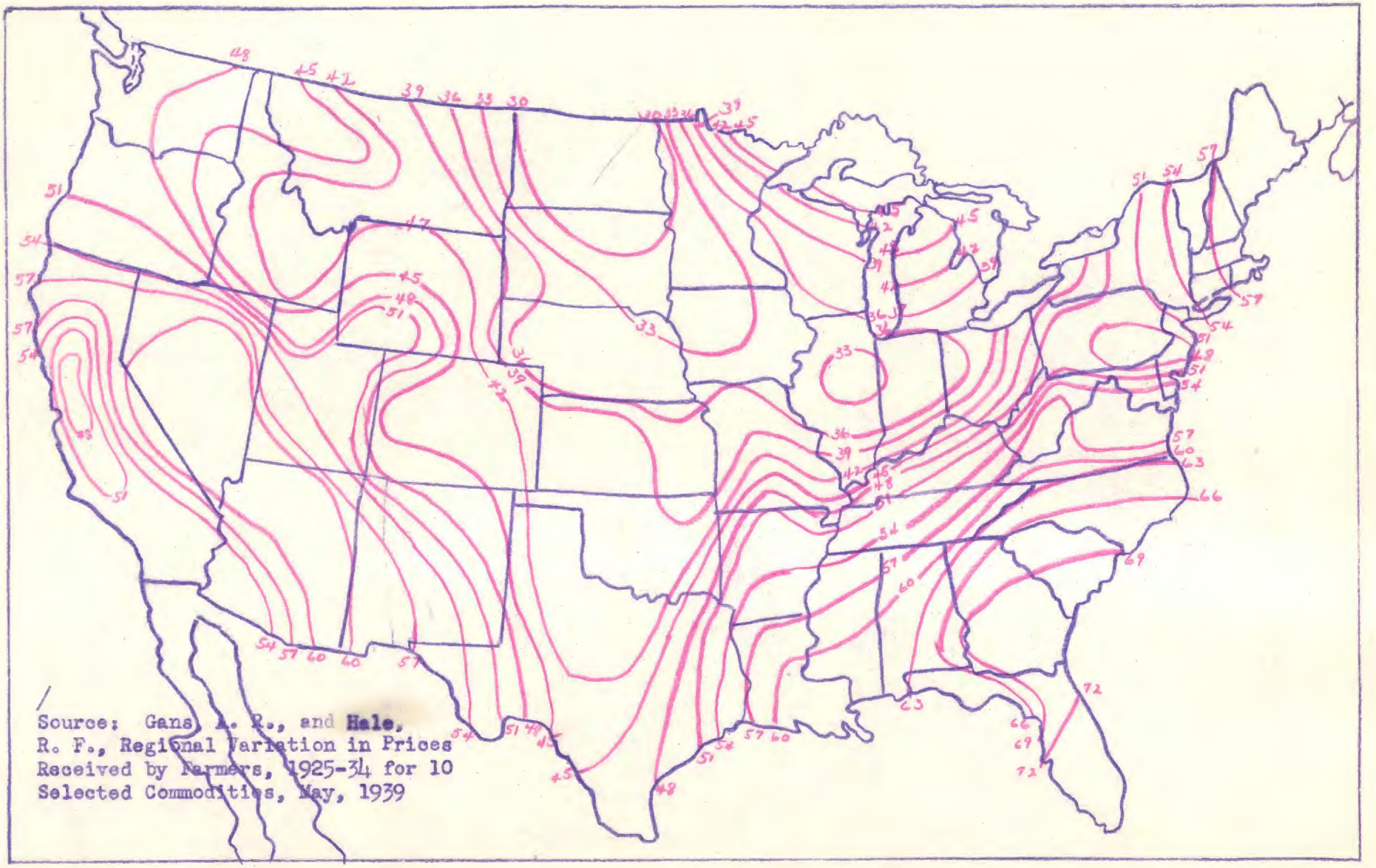


Fig.72. Average prices received by farmers for oats, 1925-34 (cents per bushel)

price relationships, with the largest spread in August 1939, and the least in November 1941 (Figure 68).

No. 2 White Oats: The price of oats were compared only on the Atlanta, Nashville, and Chicago markets. The price of No. 3 white oats was highest at Atlanta, next highest at Nashville, and lowest at Chicago. There was less variation in price relationships of the three markets than for any other grain (Figure 69).

Comparison of Transportation Costs from the Central Markets

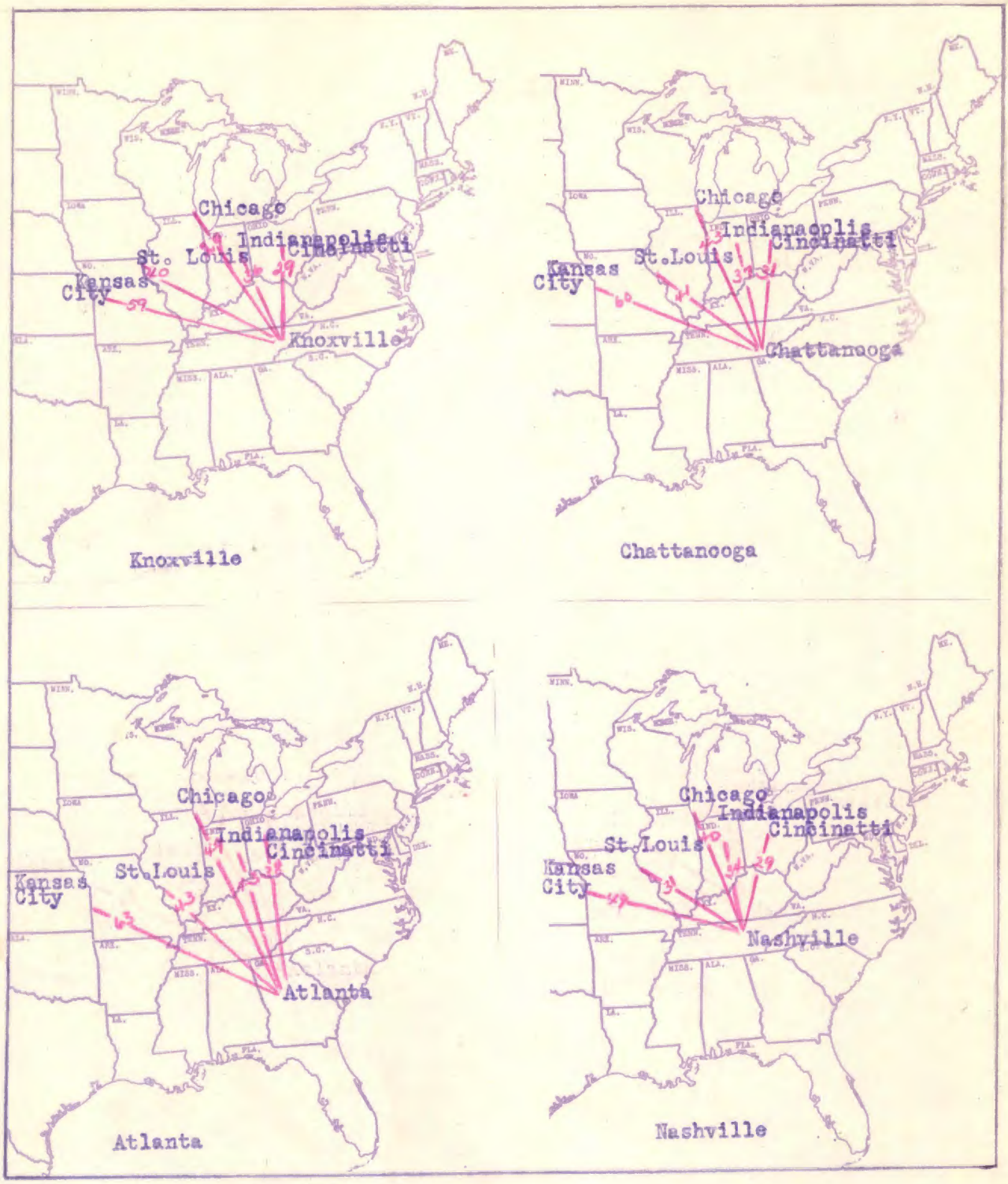
The difference in transportation cost from the central markets to Knoxville and Nashville is largely responsible for the difference in price of grain at the two markets. Nashville has lower freight rates from all important central markets except Cincinnati, which has the same freight rates to Nashville and Knoxville. Rates to Nashville from other markets range from 2 cents per hundred pounds under Knoxville from Indianapolis and Chicago to 10 cents under Knoxville from Kansas City (Table XXXVIII and Figure 73).

TABLE XXXVIII. RAILROAD FREIGHT RATES ON GRAIN FROM POINTS OF ORIGIN TO KNOXVILLE, CHATTANOOGA, ATLANTA, AND NASHVILLE, JUNE 1942

(Cents per Cwt.)

Points of Origin	Knoxville	Chattanooga	Atlanta	Nashville
Cincinnati	29	31	38	29
Indianapolis	36	37	43	34
Chicago	42	43	49	40
St. Louis	40	41	48	31
Kansas City	59	60	63	49

Source: Southern Railway System, Freight Traffic Department, Knoxville.



Source: Table XXXVIII

Fig.73. Railway freight rates on grain from points of origin, June, 1942 (cents per cwt.)

Rates from the central markets to Atlanta are higher than to Knoxville. Difference in cost varies from 3 cents over Knoxville from St. Louis to 9 cents over Knoxville from Cincinnati.

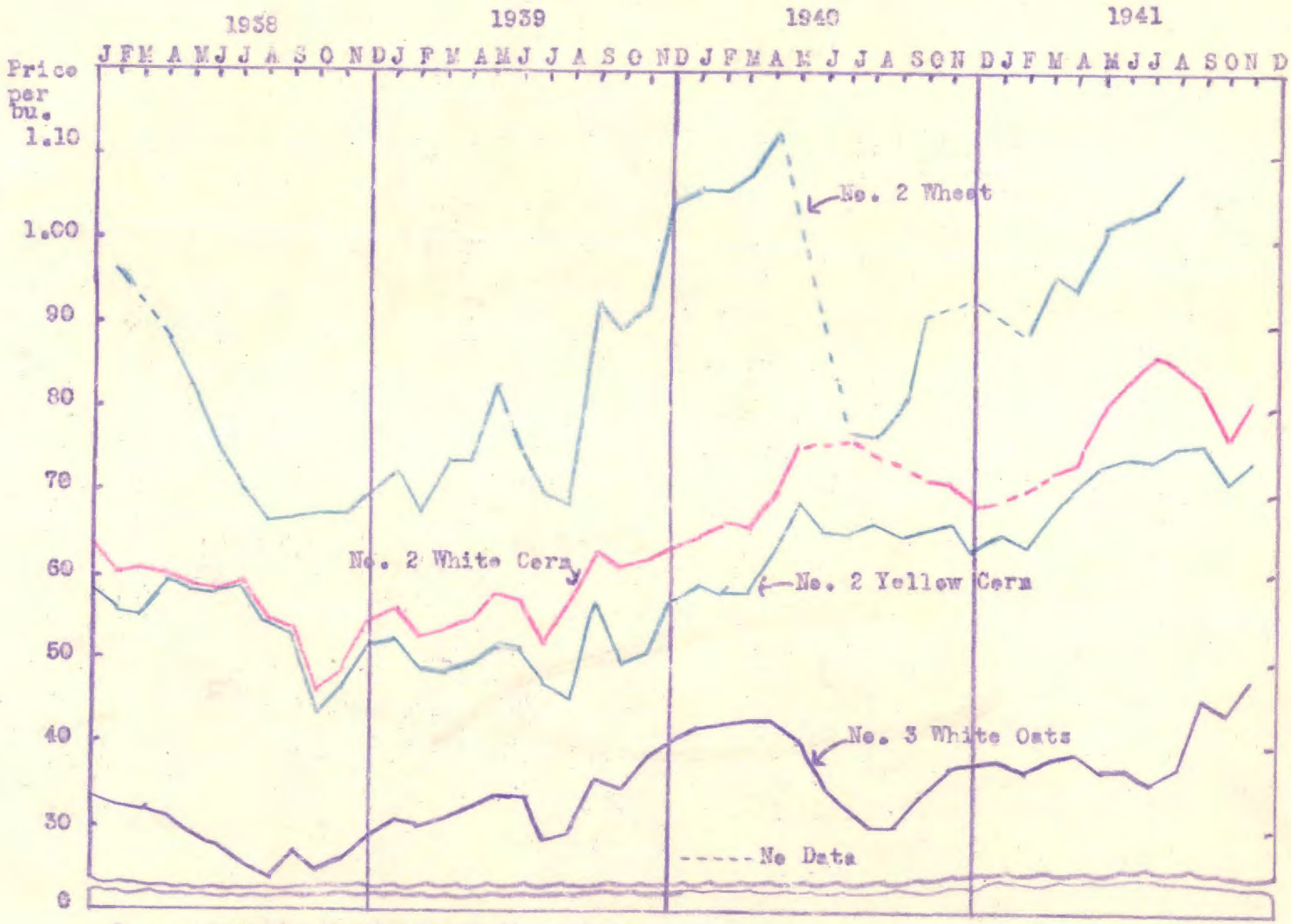
Rates to Chattanooga are higher than to Knoxville or Nashville, but lower than to Atlanta. Chattanooga rates, however, are only 1 to 2 cents over Knoxville.

Comparison of Prices of Different Grain

Chicago: Prices of wheat, white and yellow corn, and oats are compared on the Chicago market for the 4 years, 1938 through 1941, ranking in price in order named. Wheat was the highest and oats the lowest (Figure 74).

There was a general increase in price of all grain from 1938 through 1941. Greatest fluctuation was in price of wheat, ranging from around 40 cents above the price of corn in April 1940 to almost equal to the price of corn in July 1940.

Little variation occurred between the price of white and yellow corn, white corn being higher throughout the period. During April through September 1938, white corn was less than 1 cent above yellow corn. The spread in price increased during 1939, 1940, and 1941. In July 1941 white corn was around 12 cents above yellow corn, the largest difference for the entire period.



Source: **Table VI, Appendix B**

Fig. **74.** Average monthly prices of grain at Chicago, 1938-1941

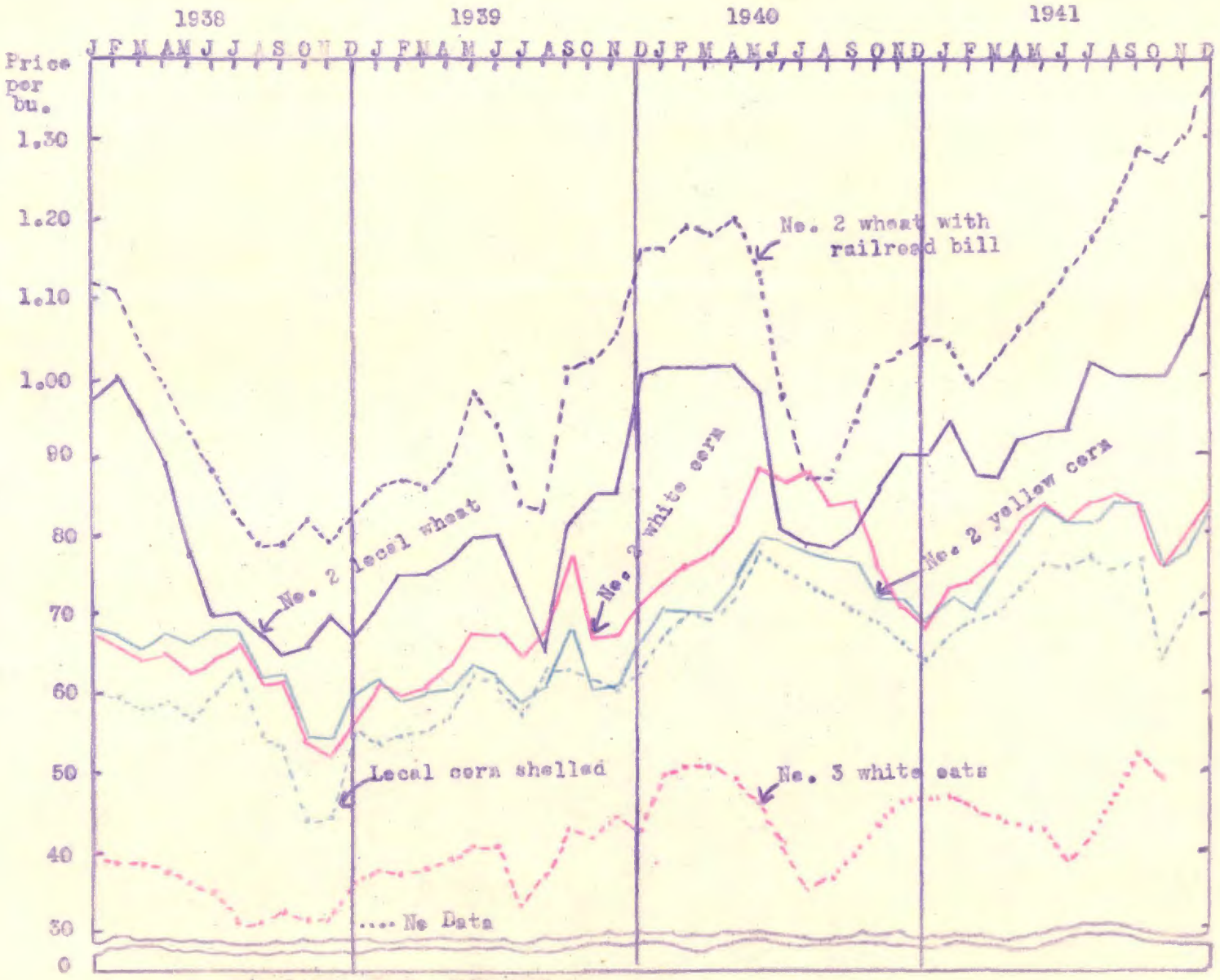
Price of oats was only around 12 cents under yellow corn in November, 1939. Price difference increased during 1940 and 1941. In July 1941, price of oats was around 39 cents below yellow corn.

Nashville: Prices compared at Nashville are for Number 2 wheat shipped in including transportation cost, Number 2 local wheat, Number 2 white corn, Number 2 yellow corn, local corn, and Number 3 white oats, ranking in price in order named (Figure 75).

Wheat shipped into Nashville including freight cost was higher than local wheat. Difference in price increased as price of wheat increased. Smallest price difference was in March and November 1938, when shipped-in wheat was only 9 cents above local wheat. In September 1941, shipped-in wheat, including transportation cost, was 29 cents above local wheat. As was true of the Chicago market, price of wheat fluctuated more than any other grain.

Price of corn showed less fluctuation than any other grain. Number 2 white corn averaged highest, Number 2 yellow next, and local corn was lowest. During 1938 and January 1939, however, price of yellow corn was above white corn. Again in September 1941, price of yellow corn was higher than that of white corn. During the rest of the period price of white corn was above yellow corn. In July 1940 white corn was 10 cents above yellow corn, the largest difference for the entire period.

Price of local corn averaged below white corn or yellow corn shipped in from other states. Price difference was less in 1939 and 1940 than in 1938 and 1941. Price of local corn was above yellow corn in August and October 1939. In October 1938 the spread was 10 cents, and in



Source: **Tables IV and V, Appendix B**

Fig. 75. Average monthly prices of grain at Nashville, 1938-1941

October 1941 the spread was 12 cents.

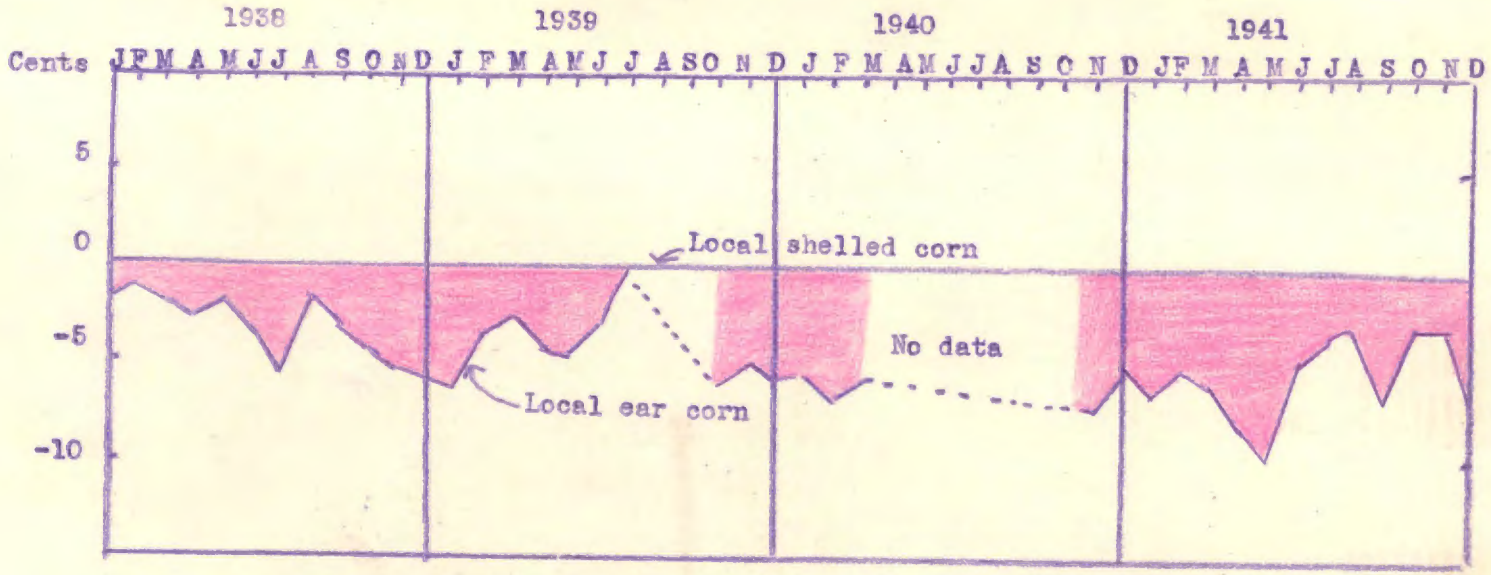
Oats was the lowest priced per bushel of any grain being compared. The difference between oats and local corn was least in November 1938, a spread of about 7 cents. The spread increased during 1939, 1940, and 1941. The price of oats failed to increase as fast as other grains. In July 1941 oats were 31 cents per bushel under local corn.

Over a 4-year period, 1938 through 1941, local ear corn on the Nashville market averaged 4.7 cents per bushel below the price of shelled corn. Price relationships varied from month to month. In July 1939 ear corn was only 1/2 cent under shelled corn, but in May 1941 the price of ear corn was 10 cents under shelled corn. In general the price spread between ear corn and shelled corn increased from 1938 to 1941.

Some reasons for corn being shelled rather than marketed in the ear are advance in price, less transportation cost, and more economical use of storage space.

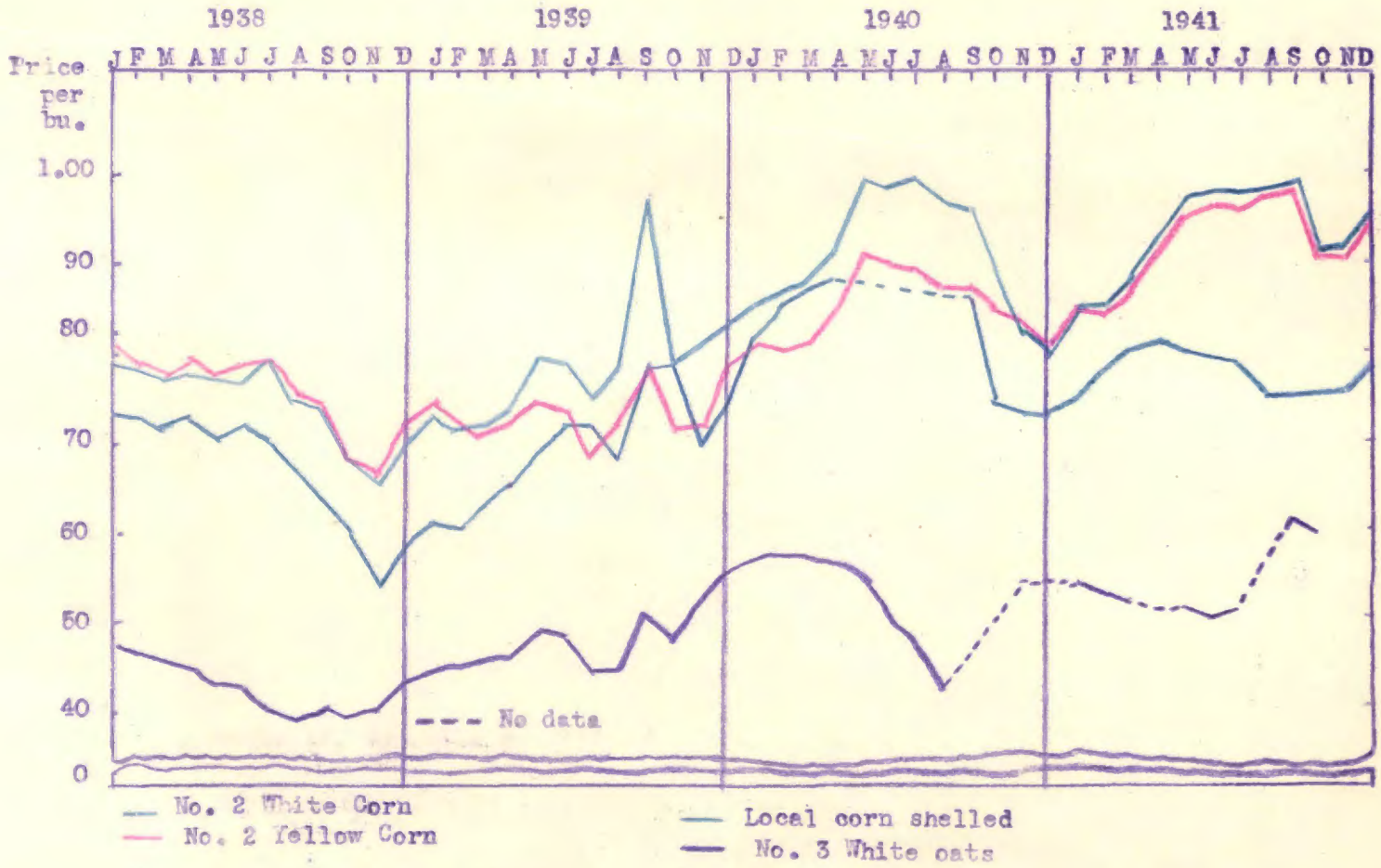
Atlanta: Prices of Number 2 white and yellow corn, local corn, and Number 3 white oats were compared at the Atlanta market. Of the corn being compared, Number 2 white averaged the highest price, Number 2 yellow next, and local corn averaged lowest.

The relation of white and yellow corn was very similar to the Nashville market. During 1938, January 1939, and December 1940 price



Source: Table IV, Appendix B

Fig. 76. Comparing prices of ear corn and shelled corn at Nashville, 1938-1941



Source: **Table VII, Appendix B**

Fig.77. Average monthly prices of grain at Atlanta, 1938-1941

of yellow corn was above white corn. Throughout the rest of the period the price of white corn was above yellow corn. The largest spread was in September 1939, a difference of 19 cents per bushel. Least difference occurred during 1938 and 1941.

Price of local corn was below Number 2 white and yellow corn except during July and October 1939, and January, February, and March 1940. Difference was greatest in 1938 and 1941. In September 1941 local corn was 22 cents under Number 2 yellow corn, the largest difference for the 4 years.

The spread between the price of oats and corn on the Atlanta market is similar to the Nashville market. Difference was least in November 1938 and greatest in August 1940. In general the spread increased from 1938 through 1940, but decreased during 1941.

CHAPTER V

QUALITY OF GRAIN

Effect of Quality on Price

Market prices for wheat, like farm prices, vary with the class, subclass, and grades of wheat as well as with the location and nature of the market.

Price quotations for wheat in the Knoxville area are based on Number 2 wheat testing 58 pounds. A premium of 1 cent per bushel is paid for wheat testing 60 pounds or better. The prices of other test weights are discounted in cents per bushel below the price of 58 pound wheat. Wheat testing 57 pounds in discounted 1 cent per bushel, 56 pound wheat is discounted 3 cents, and 55 pound wheat is discounted 5 cents.

Discounts of wheat for other than test weight varied from 1 to 5 cents per bushel, and as much as 12 to 15 cents and more for wheat that was classed as feed wheat.(1)

Price quotations for corn in this area are based on Number 2 corn. Practically all the corn marketed in Knoxville during the marketing year,

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(1) Feed wheat was wheat weighing less than 55 pounds; or which was musty, sour, or heating; or which was distinctly low quality.

October 1940 to October 1941, graded Number 2. In one or two cases where corn graded Number 3 there was a discount of 5 cents per bushel. In three or four cases corn was docked 2 cents per bushel due to high moisture content.

Quality Factors

Official wheat grades are based on the following factors: test weight per bushel, moisture content, percentage of damaged kernels, purity, cleanliness, and condition.

Quality factors that are recognized by some of the larger mills in this area are: test weight per bushel, damaged kernels, foreign material and moisture content. To these factors may be added the general condition factors of grain, as to whether it is musty, sour, or heating. Other important factors that are recognized by mills in this area are the presence in the grain of smut, garlic bulbs, and insects such as weevils.

Factors of quality and condition, with the exception of certain condition factors like mustiness and other odors, can be measured with considerable definiteness. Equipment has been developed and is available to measure these factors of quality and condition of grain, except for mustiness and other odors.

All mills and grain buyers should have standard equipment to measure the quality and value of grain and steps should be taken to correct the lack of uniformity in methods of discounting grain and to adopt a plan of paying a premium for good quality grain. It is believed that if this pro-

gram is generally adopted improvement in quality produced by farmers will result.

Factors that have been incorporated in the official grain standards and are not fully recognized by many of the mills in this area are: purity of type, color, cleanliness, and mixture of other classes. All of these are of importance in determining grades and value of different grains.

Quality Production

Many of the grade determining factors are under the control of the farmer or grain handler. Wheat may be assigned a lower grade because it contains an excess quantity of rye, weed seeds, smut, or onions. Grain is sometimes assigned a low grade because it has a musty odor or because it contains an excess quantity of damaged kernels as a result of the grain having been put into storage while it was still too damp.

Producers should avoid sowing wheat containing onions, and use every means to rid the farms of wild onions if they are already established.

Cockle is another weed that should be guarded against, and special care should be taken to sow only seed free from cockle.

The selection of suitable varieties, the recommended cultural methods, proper seed treatment, harvesting when the grain is mature, careful

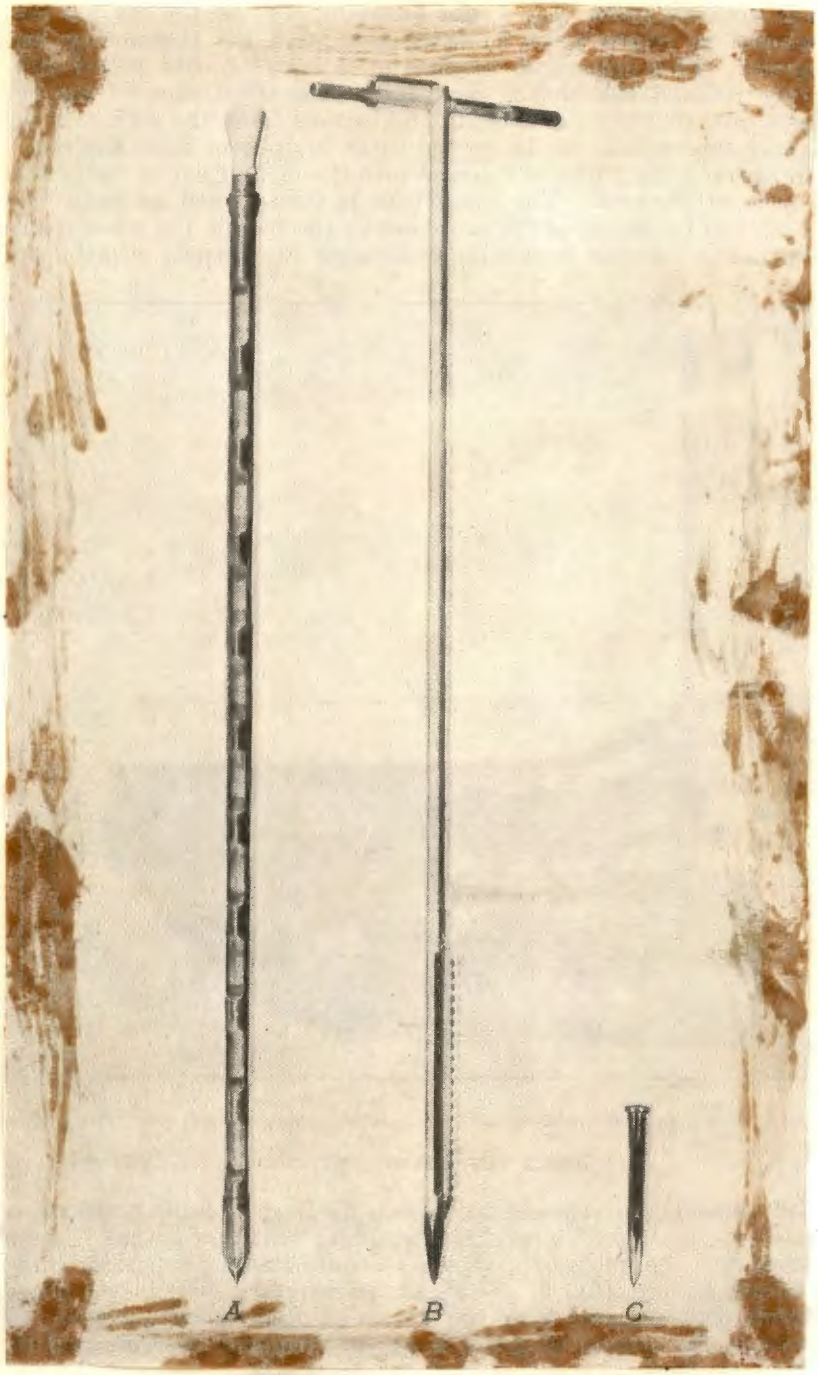
threshing and subsequent handling of grain. All are important farm practices which will help eliminating factors which lower the grade and value of grain crops.

Method of Grain Inspection and Grading in the Area

Local grain bought by mills in East Tennessee is not sold in interstate or foreign commerce as grain, therefore no licensed inspector is located in the Knoxville area. Some of the larger mills make their own tests for determination of quality and sale value. Smaller mills which lack facilities to make detail tests buy according to general appearance of the grain, and do not have a uniform method of arriving at discounts or paying a premium.

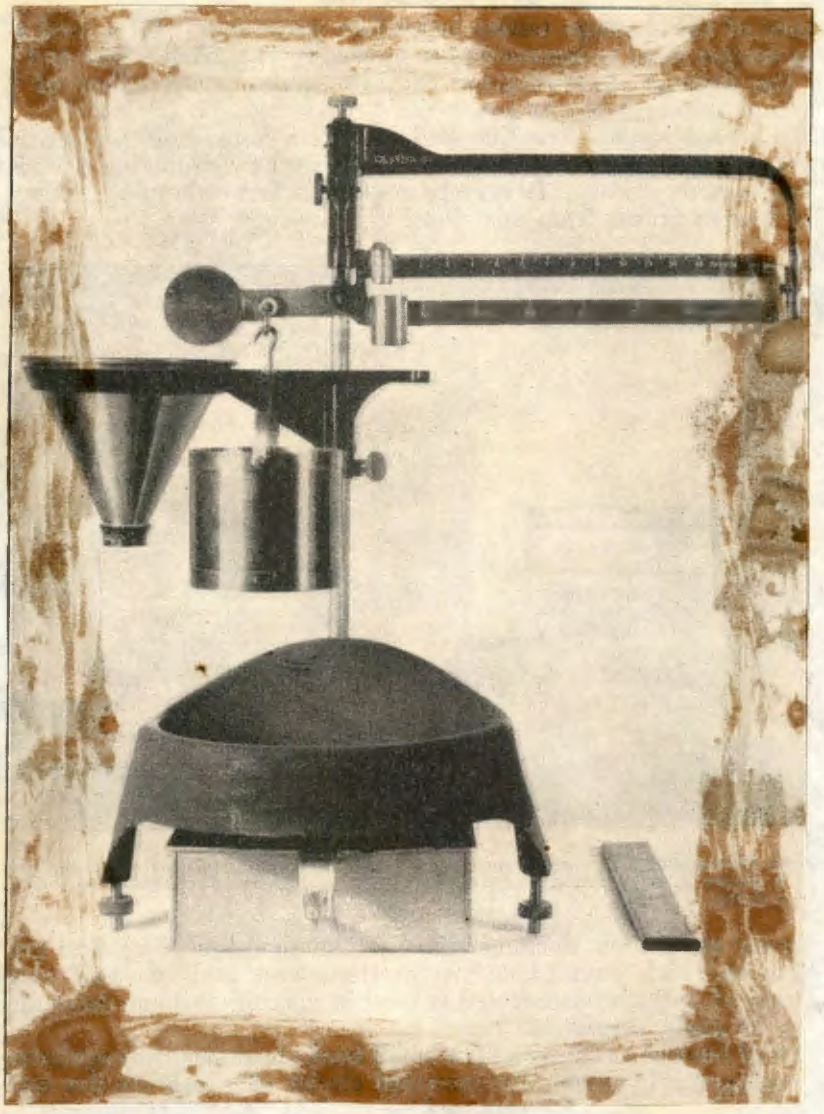
Only one out of forty-five mills visited in East Tennessee was equipped for determination of test weight per bushel, moisture content, and dockage. Only the larger mills, approximatly 18 percent of the mills visited in this area, had equipment to determine test weight per bushel. The smaller mills (over three-fourths of the mills visited) made no tests for farmers and bought grain according to general appearance. None of the mills visited bought grain from farmers on a protein basis.

Tests when applied are usually to determine test weight, moisture content, and dockage. Most out-of-state grain shipped in by rail is bought on the basis grade given the grain by a licensed inspector at the point of origin. Therefore, local inspection is for grain produced within the state, and a relatively small number of out-of-state truck loads that



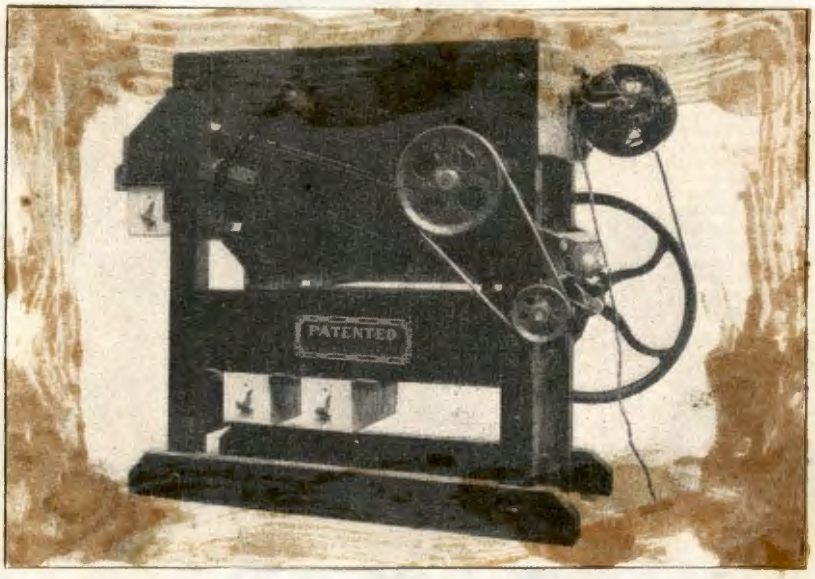
Source: U. S. D. A. Miscellaneous Publication No. 325

Fig.78. A, double-shelled compartment grain probe used for sampling bulk grain; B, a probe used for sampling ear corn in cribs; C, a small probe used for sampling sacked grain.



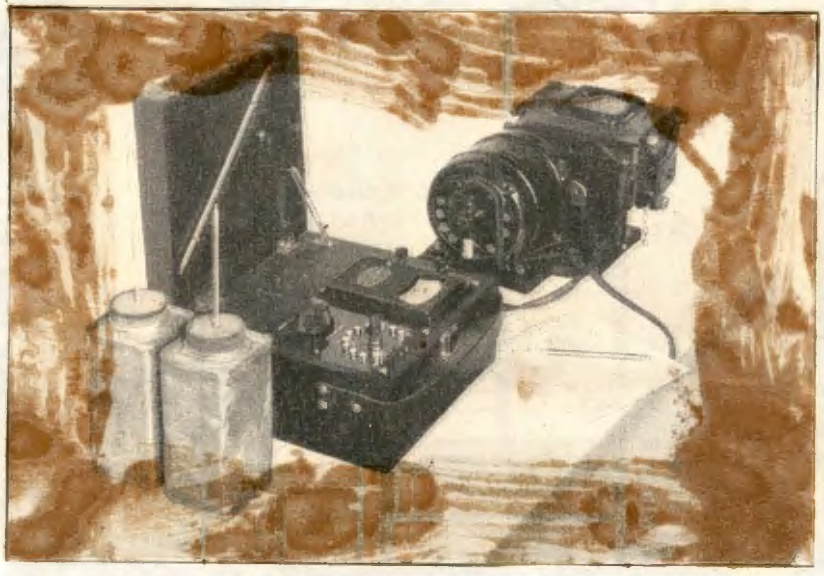
Source: U. S. D. A. Miscellaneous Publication No. 325

Fig. 79. Standard apparatus for determining the test weight per bushel of grain.



Source: U. S. D. A. Miscellaneous Publication No. 325

Fig. 80. Emerson dockage tester



Source: U. S. D. A. Miscellaneous Publication No. 325

Fig. 81. Electric moisture meter used for determining the moisture content of grain.

have not been graded.

Standard equipment used by some of the mills in this area for grading grain are: grain probe, apparatus for determining the test weight per bushel, dockage tester, and electric moisture meter (Figures 78, 79, 80, and 81).

In case of bulk grain received by trucks in Knoxville a sample is taken with a double-tube grain probe (Figure 78). The sample is taken in several places well distributed in different parts of the truck in order to get a representative sample.

In the case of grain in sacks, samples are drawn from as many individual sacks selected at random throughout the lot, as will enable the sampler to procure a representative sample of the entire lot. The sample is taken by the use of a small probe used for sampling sacked grain.

Test weight per bushel is one of the main factors in determining the quality of grain in this area, and is made immediately after the sample has been taken. Only the larger mills visited in the area were equipped to determine test weight per bushel (Figure 79). The smaller mills visited made no tests for farmers and bought grain according to general appearance.

Federal standards for grains provide for a determination of dockage. Dockage may be defined as the foreign material, and undeveloped, shriveled,

and small pieces of grain which can be removed readily by appropriate sieves and cleaning devices. A Federal dockage tester or Emerson dockage tester are used for determining dockage. If neither of the testers mentioned are available, approximate dockage determination can be made by hand sieves. In conducting the survey, equipment for determining dockage was observed in only one mill in the area (Figure 80).

Dryness has always been a much-sought-after quality in grain. Grain that contains more than 14 percent moisture will often spoil during storage. Damp grain cannot be satisfactorily milled for either flour or feed. Only one mill out of forty-five visited was equipped to make test determining moisture content. The method used was an electric moisture meter (Figure 81). No other mill visited made moisture tests, and none of the mills visited bought grain from farmers on a protein basis.

Quality of Grain Received at Knoxville

The wheat crop varies in quality from year to year, as a result of climatic and other conditions during growing season, and especially in the harvest period.

Because of climatic conditions Tennessee wheat has high moisture content, and it is a softer wheat and produces poorer quality and less flour than western wheat.

Winters in East Tennessee are not cold enough to keep weeds like onions or garlic in check. Wheat containing onions or garlic is docked

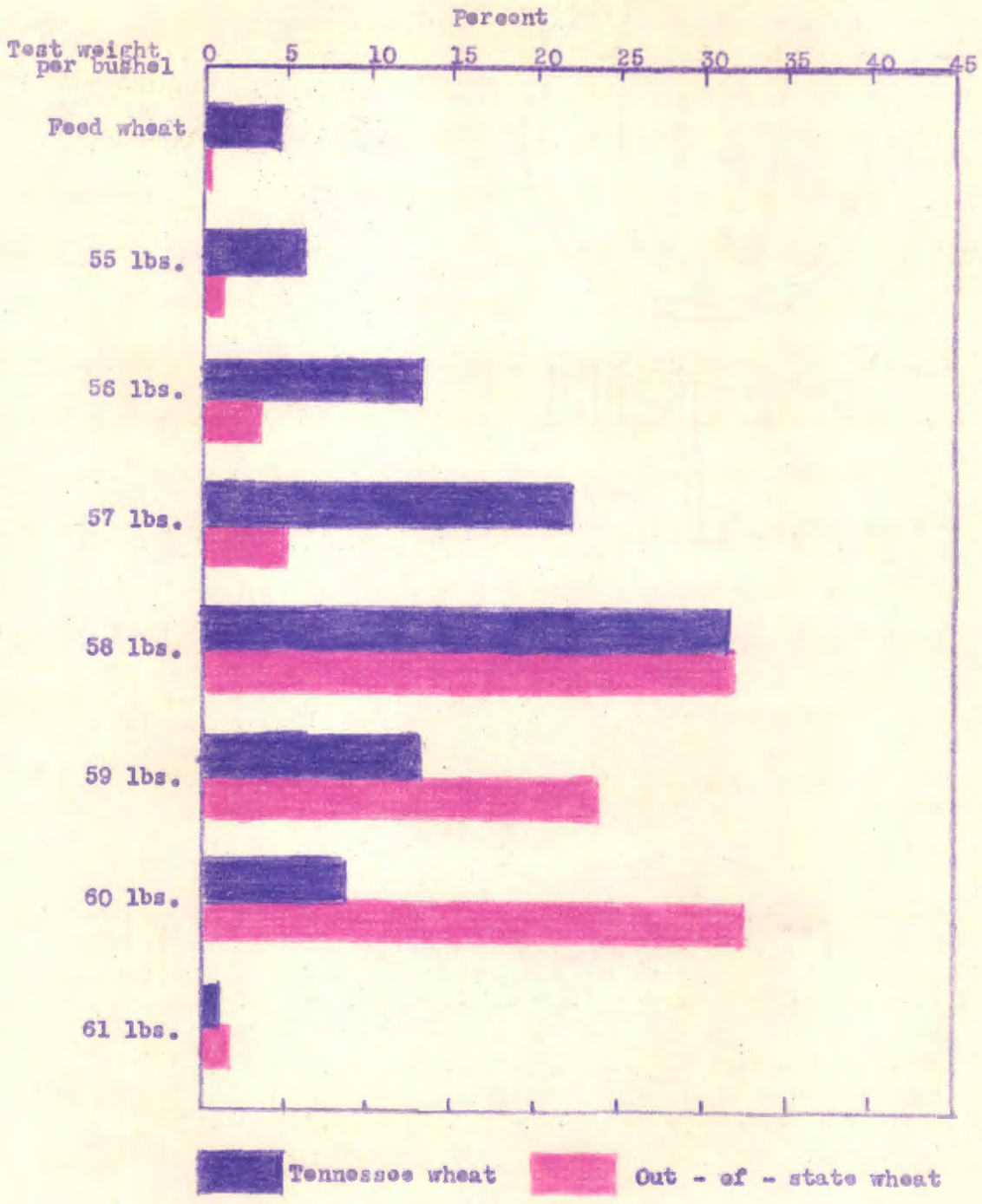
heavily, as bread made from garlicky flour has a pronounced odor and flavor.

Test Weight: During the marketing year July 1940 to July 1941, Tennessee wheat averaged much lower in test weight per bushel than out-of-state wheat. The average test weight of Tennessee wheat was 57 pounds as compared with 59 pounds for out-of-state wheat. The proportion of Tennessee wheat classed as feed wheat was 4.3 percent compared with 0.01 percent for out-of-state wheat (Table XXXIX and Figure 82). Around 45.5 percent of all Tennessee wheat tested less than 58 pounds per bushel, compared with 9.8 percent for out-of-state wheat. Only 23.0 percent of all Tennessee wheat tested 59 pounds or better compared with 58.2 percent of all out-of-state receipts. The sample was based on truck receipts of wheat in Knoxville.

TABLE XXXIX. TEST WEIGHT OF TENNESSEE AND OUT-OF-STATE WHEAT RECEIVED BY TRUCK, KNOXVILLE, JULY 1940 to JULY 1941

	Feed Wheat (Pct.)	55 Pounds (Pct.)	56 Pounds (Pct.)	57 Pounds (Pct.)	58 Pounds (Pct.)	59 Pounds (Pct.)	60 Pounds (Pct.)	61 Pounds (Pct.)
Tennessee wheat	4.30	6.00	13.00	22.20	31.50	13.20	8.70	1.10
Out-of-state wheat	.01	1.21	3.45	5.15	31.99	23.77	32.55	1.87

Source: Grain Marketing Survey, 1941.



Source: Grain Marketing Survey, 1941

Fig.82. Test weight of wheat received by truck, Knoxville, July, 1940 - July, 1941

Approximately one-tenth of all local wheat received in Knoxville during the marketing year, July 1940 to July 1941, tested 55 pounds or less, and over one-half (54.5 percent) tested 58 pounds and better. The proportion of wheat classed as feed wheat ranged from 23 percent of receipts from Campbell County to none from Sevier, Polk, and Monroe. Campbell, Anderson, Overton, and Hamblen counties had more than 10 percent of all wheat sold in Knoxville classed as feed wheat. The average for all counties was 4.3 percent (Table XL).

The proportion testing 55 pounds was largest for receipts from Campbell County, 16.0 percent. Only three counties, Campbell, Claiborne, and Union, had more than 10 percent of all sales 55 pounds. There was none in this group from Polk and Overton counties. The average for all counties was 6.0 percent.

The proportion of wheat with a test weight of 58 pounds was greatest from Monroe County, 73.3 percent. Proportion for other counties were Sevier, 54.0 percent; Overton, 52.8 percent; Anderson, 40.1 percent; and Knox, 36.4 percent. The average for all counties was 31.5 percent. The largest proportion was in this group than for any other test weight group. Only two counties, Polk and Union, had less than 15.0 percent of the wheat marketed in Knoxville in this group.

Wheat testing 59 pounds was greatest for Loudon and Sevier counties, 23.0 percent compared with the average of 13.2 percent for all counties. Considerably less wheat tested 59 pounds than the preceding group.

Six counties had 10.0 percent or less of the wheat sold in Knoxville in this group.

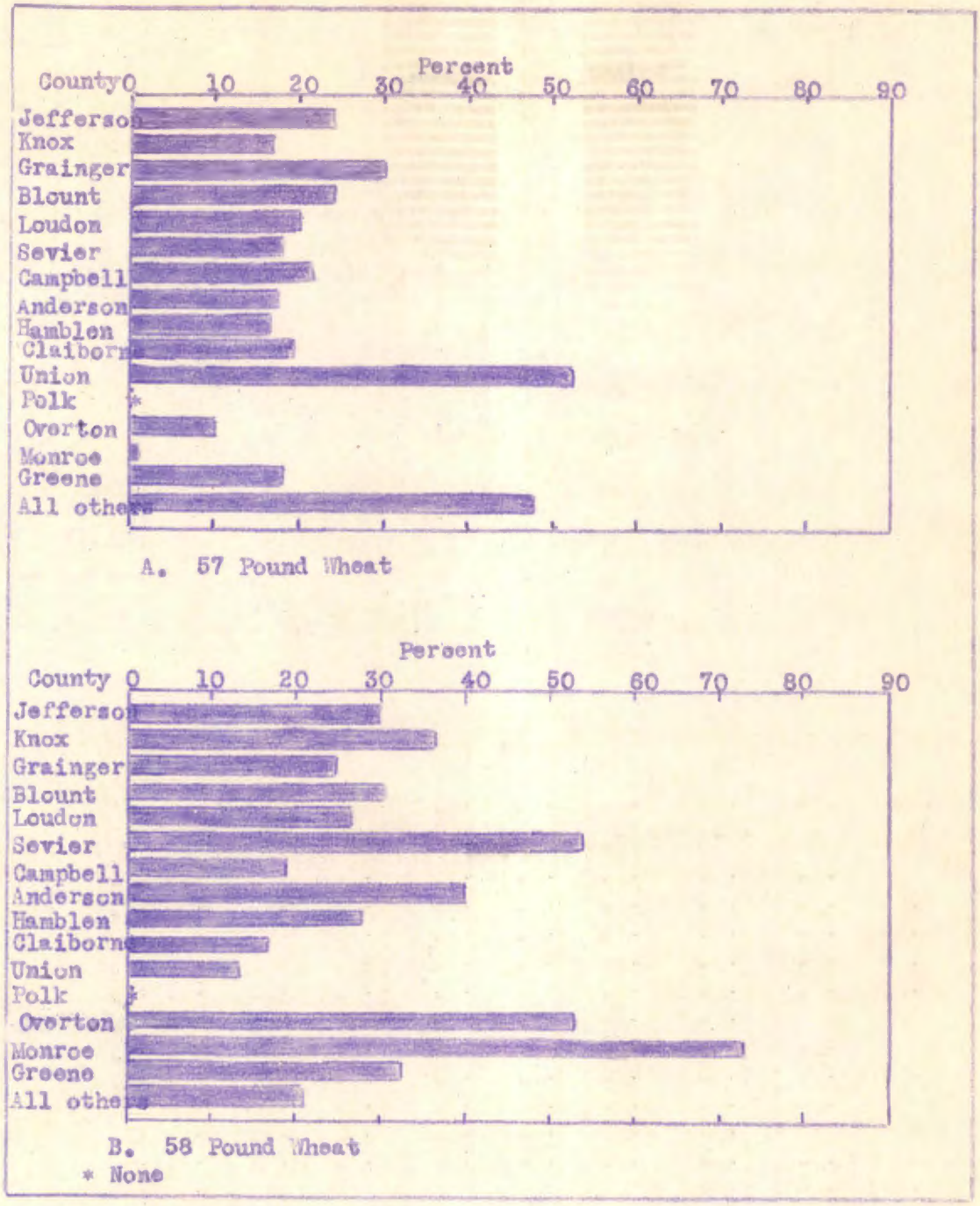
The proportion testing 60 pounds was 70.3 percent from Polk County compared with an average of 8.7 percent for all counties. The next highest proportion was little over 14 percent for Monroe and Blount. All the other counties selling wheat in Knoxville had none or less than 10 percent of their sales in this group.

Only one county, Polk, had as much as 10 percent of the wheat sold in Knoxville testing 61 pounds. The next highest proportion was

TABLE XL. TEST WEIGHT OF TENNESSEE WHEAT BY COUNTIES OF ORIGIN, KNOXVILLE, JULY 1940 TO JULY 1941

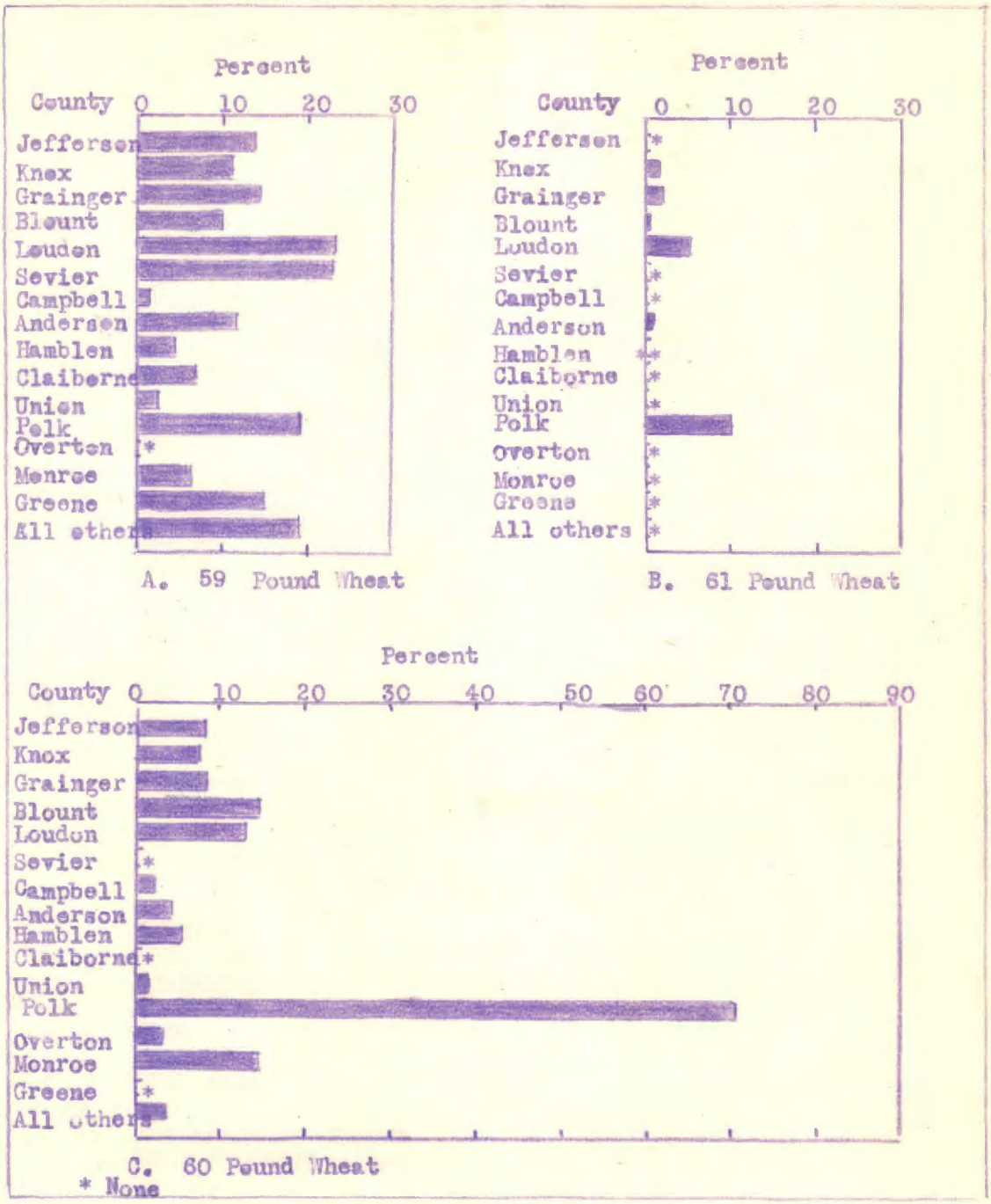
County	Total (Bu.)	Feed Wheat (Pct.)	55 Lbs. (Pct.)	56 Lbs. (Pct.)	57 Lbs. (Pct.)	58 Lbs. (Pct.)	59 Lbs. (Pct.)	60 Lbs. (Pct.)	61 Lbs. (Pct.)
Jefferson	46,206.3	3.6	7.1	12.3	24.4	30.2	14.1	8.3	-
Knox	28,009.2	2.9	9.6	14.1	17.1	36.4	11.0	7.3	1.6
Grainger	12,962.1	2.8	2.5	14.4	30.3	24.9	14.6	8.5	2.0
Blount	12,727.5	1.6	4.5	14.2	24.0	30.5	10.0	14.6	.6
Loudon	11,226.1	4.0	1.2	6.7	20.2	26.7	23.4	12.5	5.3
Sevier	7,772.6	-	.5	3.9	18.6	54.0	23.1	-	-
Campbell	3,902.9	22.9	16.0	17.0	21.9	18.5	1.7	2.0	-
Anderson	3,564.7	17.9	1.6	5.8	17.6	40.1	12.1	4.3	.6
Hamblen	3,359.3	11.8	.2	33.0	16.7	27.9	4.8	5.6	-
Claiborne	3,201.4	9.1	14.2	33.1	19.8	16.6	7.2	-	-
Union	2,749.4	1.0	13.5	15.4	52.6	13.1	2.7	1.7	-
Polk	1,872.2	-	-	-	-	-	19.4	70.3	10.3
Overton	1,731.6	13.0	-	21.1	10.1	52.8	-	3.0	-
Monroe	1,498.8	-	5.0	.8	.1	73.3	6.4	14.4	-
Greene	713.2	4.7	4.0	25.7	18.0	32.6	15.0	-	-
All others	416.2	-	-	8.0	47.9	20.9	19.4	3.8	-
Total	140,113.5	4.3	6.0	13.0	22.2	31.5	13.2	8.7	1.1

Source: Grain Marketing Survey, 1941.



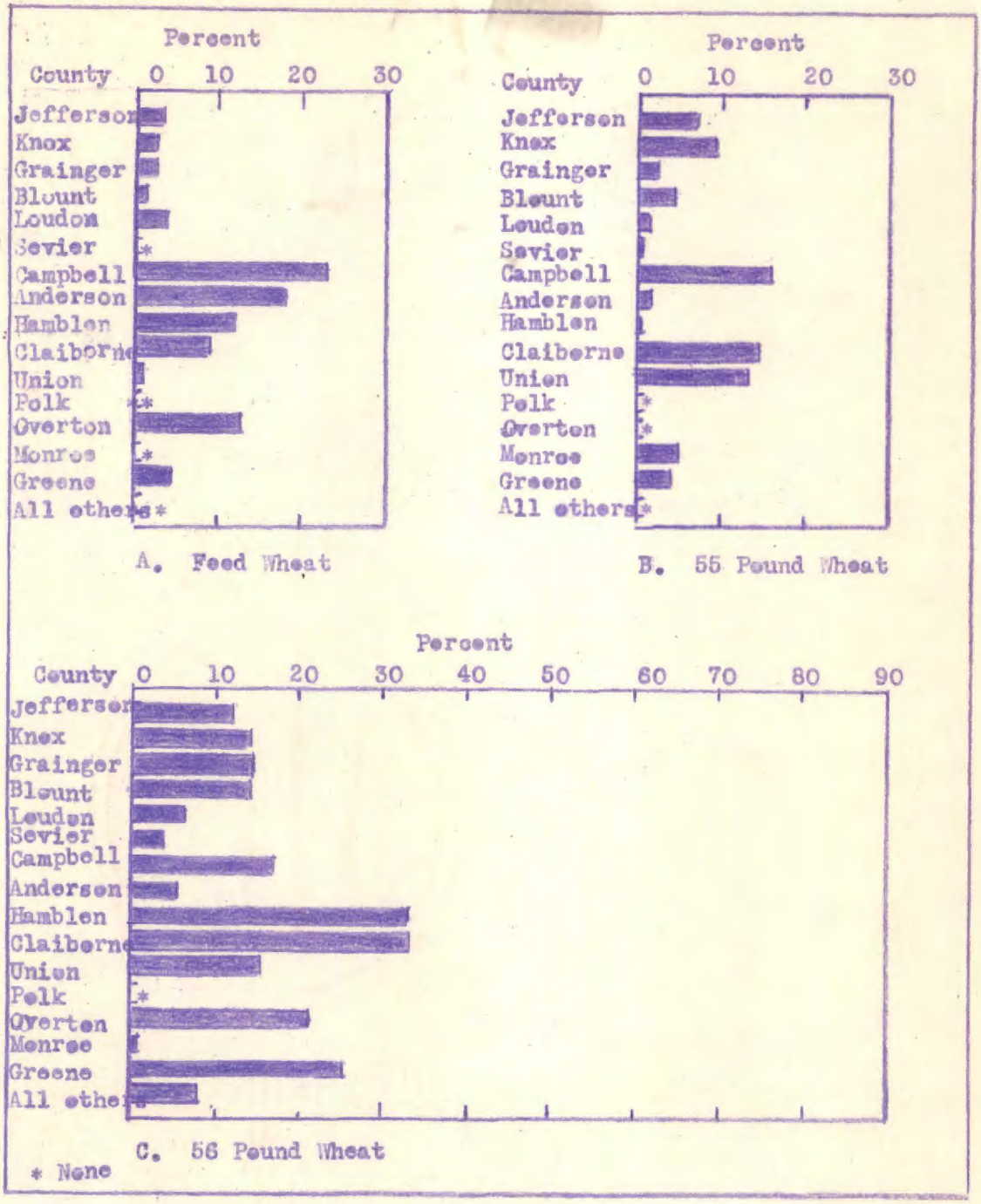
Source: Grain Marketing Survey, 1941

Fig.83. Test weight of Tennessee wheat, Knoxville, July, 1940 - July, 1941



Source: Grain Marketing Survey, 1941

Fig. 84. Test weight of Tennessee wheat, Knoxville, July, 1940 - July, 1941



Source: Grain Marketing Survey, 1941

Fig. 85. Test weight of Tennessee wheat, Knoxville, July, 1940 - July, 1941

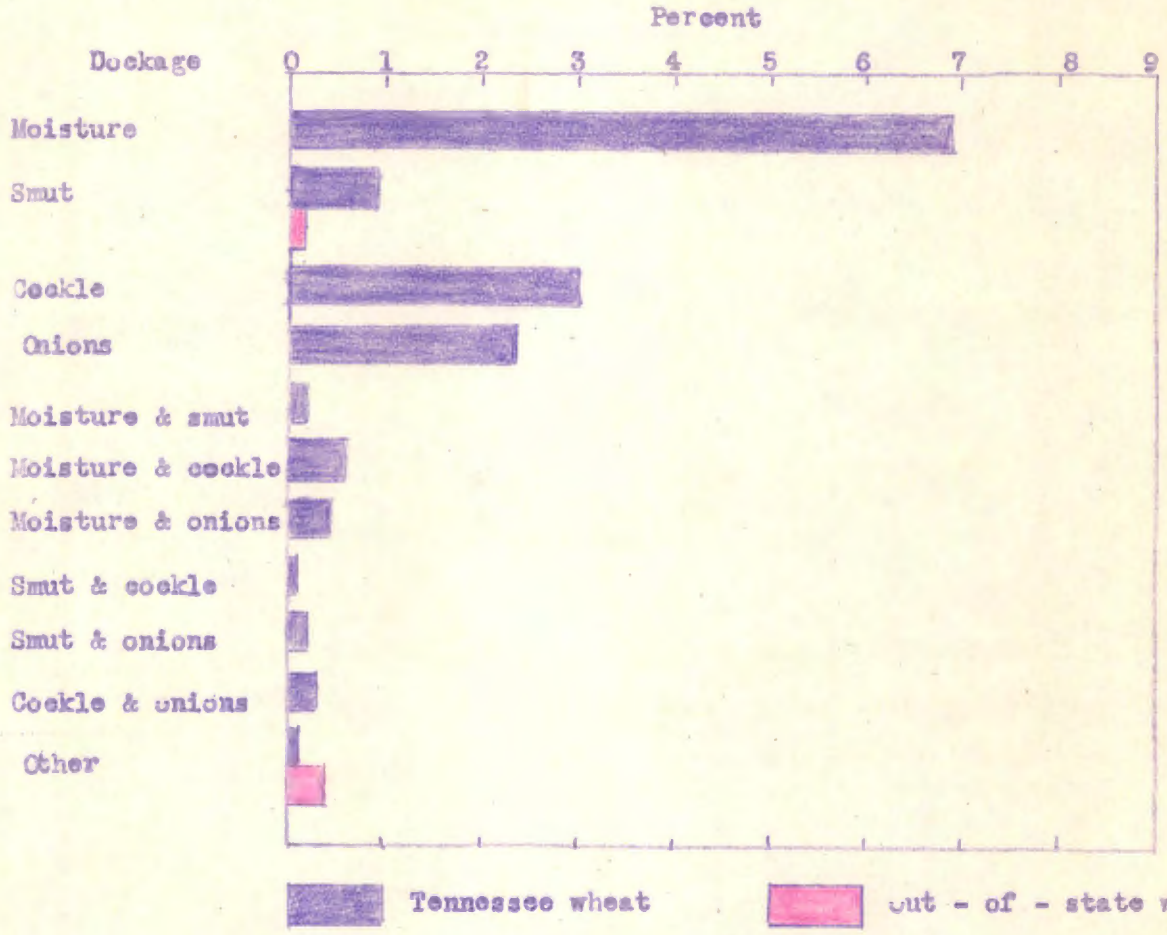
5.3 percent for Loudon County, and 2.0 percent for Grainger County. Knox, Blount, and Anderson had less than 2.0 percent in this group. The average for all the counties was 1.1 percent. No 61 pound wheat was reported from the other counties selling wheat in Knoxville.

Dockage: During the marketing year July 1940 to July 41 dockage

TABLE XLI. DOCKAGE OF TENNESSEE AND OUT-OF-STATE WHEAT RECEIVED BY TRUCK, KNOXVILLE, JULY 1940 TO JULY 1941

Dockage	Tennessee Wheat	Out-of-State Wheat
	Pct.	Pct.
Moisture	6.9	-
Smut	.9	.15
Cockle	3.0	-
Onions	2.3	-
Moisture and smut	.2	-
Moisture and cockle	.6	-
Moisture and onions	.4	-
Smut and cockle	.1	-
Smut and onions	.2	-
Cockle and onions	.3	-
Other	.1	.38

Source: Grain Marketing Survey, 1941.



Source: Grain Marketing Survey, 1941

Fig. 86. Dockage of wheat received by truck, Knoxville, July, 1940 - July, 1941

of wheat received by truck in Knoxville averaged 15.0 percent for Tennessee wheat and only 0.5 percent for out-of-state wheat. Dockage for Tennessee wheat was made on moisture, 6.9 percent; cockle, 3.0 percent; onions, 2.3 percent; and smut, 0.9 percent. Other dockage was a combination of the above factors and for other factors not defined (Table XLI). Dockage on out-of-state wheat was 0.15 percent for smut and 0.38 percent for other factors not defined.

The average dockage for moisture for Tennessee wheat was 6.9 percent. Dockage for moisture alone was 20.8 percent in Monroe County, 18.3 percent in Greene, and 11.1 percent in Grainger. In six of the counties dockage for moisture was between 5 and 10 percent of receipts, between 1 and 5 percent from three counties, and less than 1 percent or more from three counties (Table XLII).

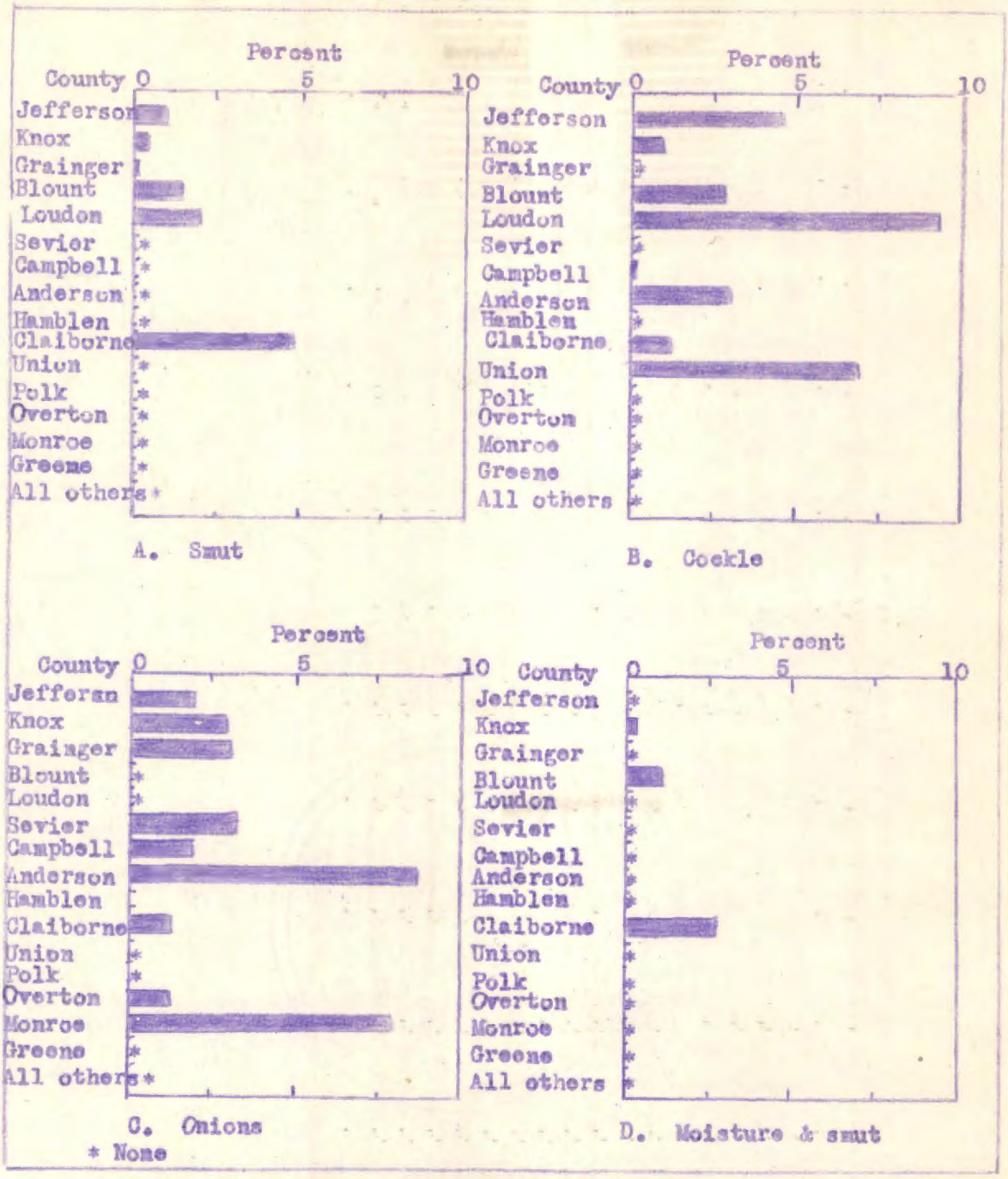
Dockage for smut was 4.9 percent of receipts from Claiborne County, 2.1 percent from Loudon, 1.5 percent from Blount, and 1.1 percent from Jefferson. Two counties, Knox and Grainger, had less than 1 percent, while the other nine counties had no dockage because of smut. The average for all the counties was less than 1 percent.

The extent of dockage due to cockle was 3.0 percent for the group as a whole. Cockle was the cause of dockage in the amount of 9.4 percent from Loudon County, 7.0 percent from Union, 4.7 percent from Jefferson, and 3.2 percent from Anderson. Three counties had between 1 and 3 percent

TABLE XLII. DOCKAGE OF TENNESSEE WHEAT BY COUNTIES OF ORIGIN, KNOXVILLE, JULY 1940 TO JULY 1941

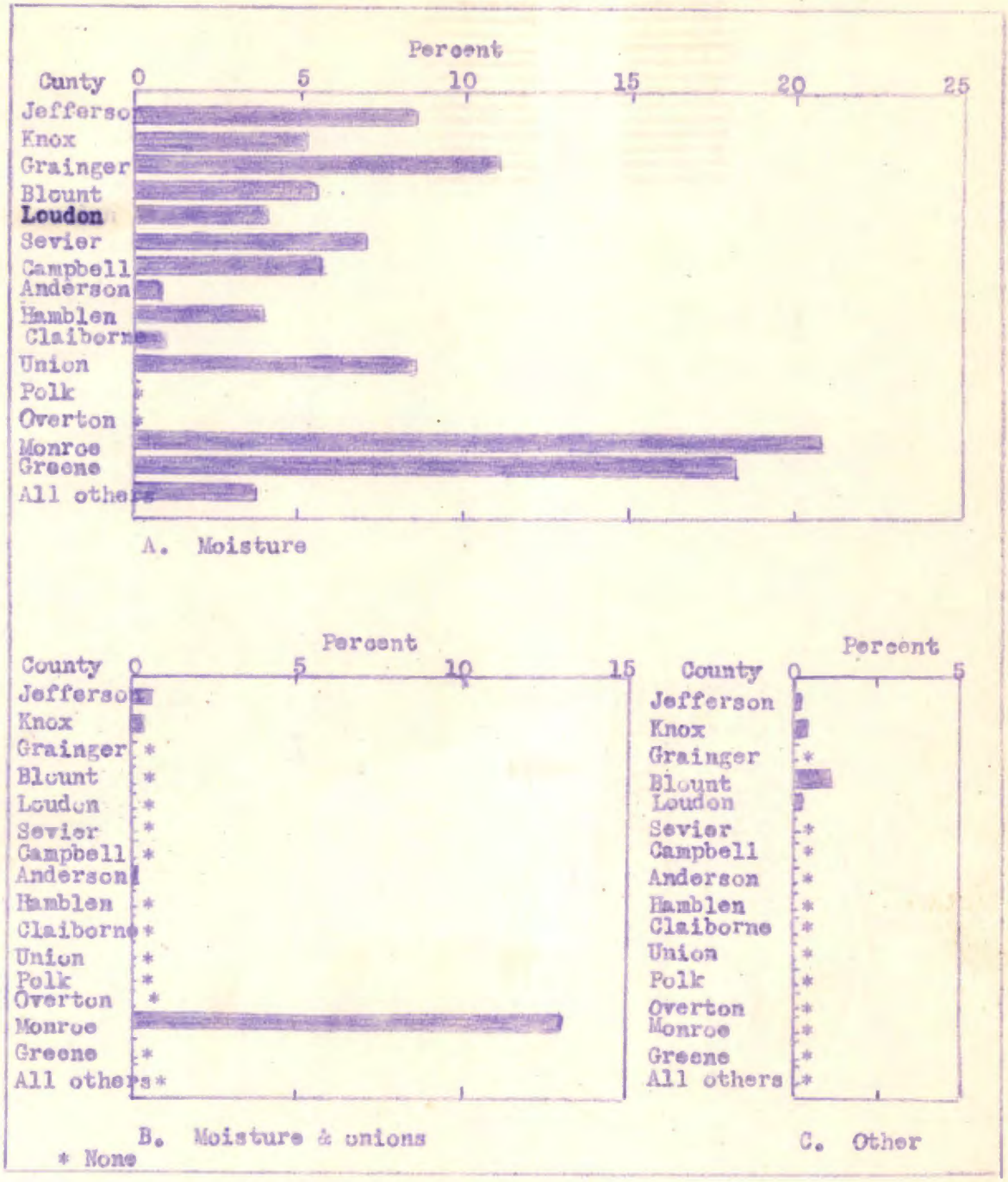
County	Total (Bu.)	Moisture (Pct.)	Smut (Pct.)	Cockle (Pct.)	Onions (Pct.)	Moisture and Smut (Pct.)	Moisture and Cockle (Pct.)	Moisture and Onions (Pct.)	Smut and Cockle (Pct.)	Smut and Onions (Pct.)	Cockle and Onions (Pct.)	Other (Pct.)
Jefferson	46,206.3	8.55	1.06	4.66	2.04	-	1.10	.59	.12	.73	.20	.02
Knox	26,009.2	5.38	.54	1.11	3.24	.35	.34	.38	.11	-	.70	.13
Grainger	12,962.1	11.10	.08	-	3.27	-	1.19	-	-	-	-	-
Blount	12,727.5	5.45	1.55	2.99	-	1.27	1.26	-	-	-	-	1.19
Loudon	11,226.1	4.2	2.08	9.38	3.33	-	-	-	-	-	1.03	.04
Sevier	7,772.6	7.0	-	-	-	-	-	-	-	-	-	-
Campbell	3,902.9	5.71	-	.23	2.5	-	-	-	-	-	-	-
Anderson	3,564.7	.96	-	3.15	8.82	-	-	.24	-	-	-	-
Hamblen	3,559.3	4.05	-	-	-	-	-	-	-	-	-	-
Claiborne	3,201.4	1.23	4.88	1.35	1.42	2.82	-	-	-	-	-	-
Union	2,749.4	8.61	-	6.99	-	-	-	-	-	-	-	-
Polk	1,872.2	-	-	-	-	-	-	-	-	-	-	-
Overton	1,731.6	-	-	-	1.41	-	-	-	-	-	-	-
Monroe	1,498.8	20.83	-	-	8.05	-	-	13.81	-	-	-	-
Greene	713.2	18.32	-	-	-	-	-	-	-	-	-	-
All others	416.2	3.84	-	-	-	-	-	-	-	-	-	-
Total	140,113.5	6.9	0.9	3.0	2.3	0.2	0.6	0.4	0.1	0.2	0.3	0.1

Source: Grain Marketing Survey, 1941.



Source: Grain Marketing Survey, 1941

Fig.87. Dockage of Tennessee wheat, Knoxville, July, 1940 - July, 1941



Source: Grain Marketing Survey, 1941

Fig. 88. Dockage of Tennessee wheat, Knoxville, July, 1940 - July, 1941



Source: Grain Marketing Survey, 1941

Fig.89. Dockage of Tennessee wheat, Knoxville, July, 1940 - July, 1941

dockage and eight counties had less than 1 percent or more because of cockle.

Dockage for onions amounted to a little over 8 percent of receipts from Anderson and Monroe counties, and a little over 3 percent from Knox, Grainger, and Loudon. Four counties had between 1 and 3 percent. Blount, Loudon, Hamblen, Union, Polk, and Greene had no dockage due to onions. The average dockage due to onions for the group as a whole was 2.3 percent.

Dockage from a combination of the above factors and other factors not listed was very small, in most cases amounting to less than 1 percent, and an average of less than one-half of 1 percent for the group as a whole.

CHAPTER VI

GRAIN PRODUCTS HANDLED BY RETAIL STORES

A check was made of 58 retail stores, 8 wholesale feed stores, and 3 bakeries in the area to see to what extent they furnished an outlet for local grain products (Figure 90). An attempt was made to interview a large proportion of the country stores in one county (Blount) and then later to reach a few sample stores in the other counties for comparison.

A check of 23 retail stores[1] in Blount County was made to determine to what extent they handled flour, corn meal, bread, and feed from local grain. In Blount County seven of the stores were from the county seat town; the remaining 16 were country stores in country villages.

All of the 23 stores there handled flour, corn meal, and bread, but only 16 handled feed.

Origin of Grain Products Handled by 23 Retail Stores in Blount County

Flour: It was found that less than one-third of the flour handled

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(1) Seven in Maryville, the county seat, and 16 country stores.

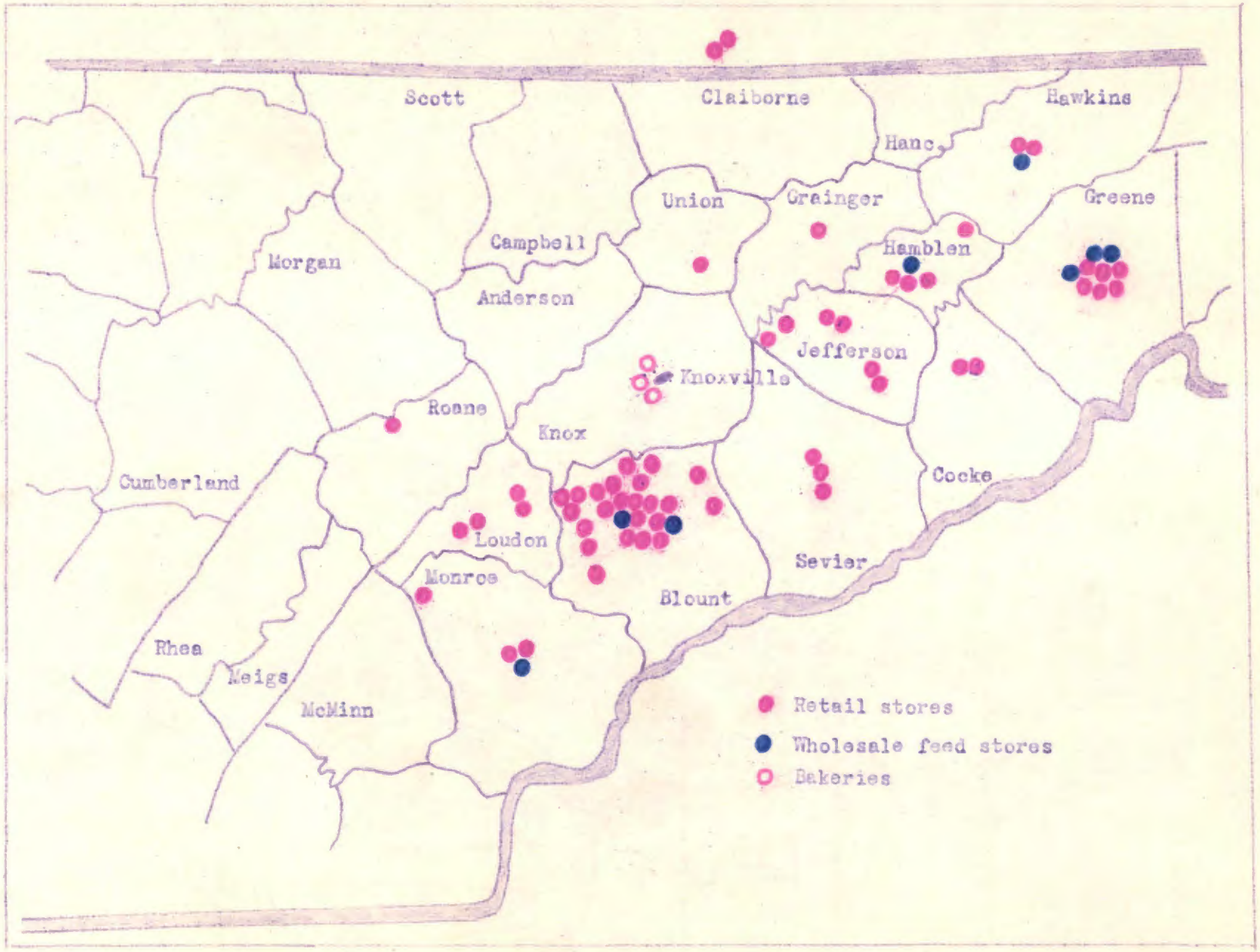


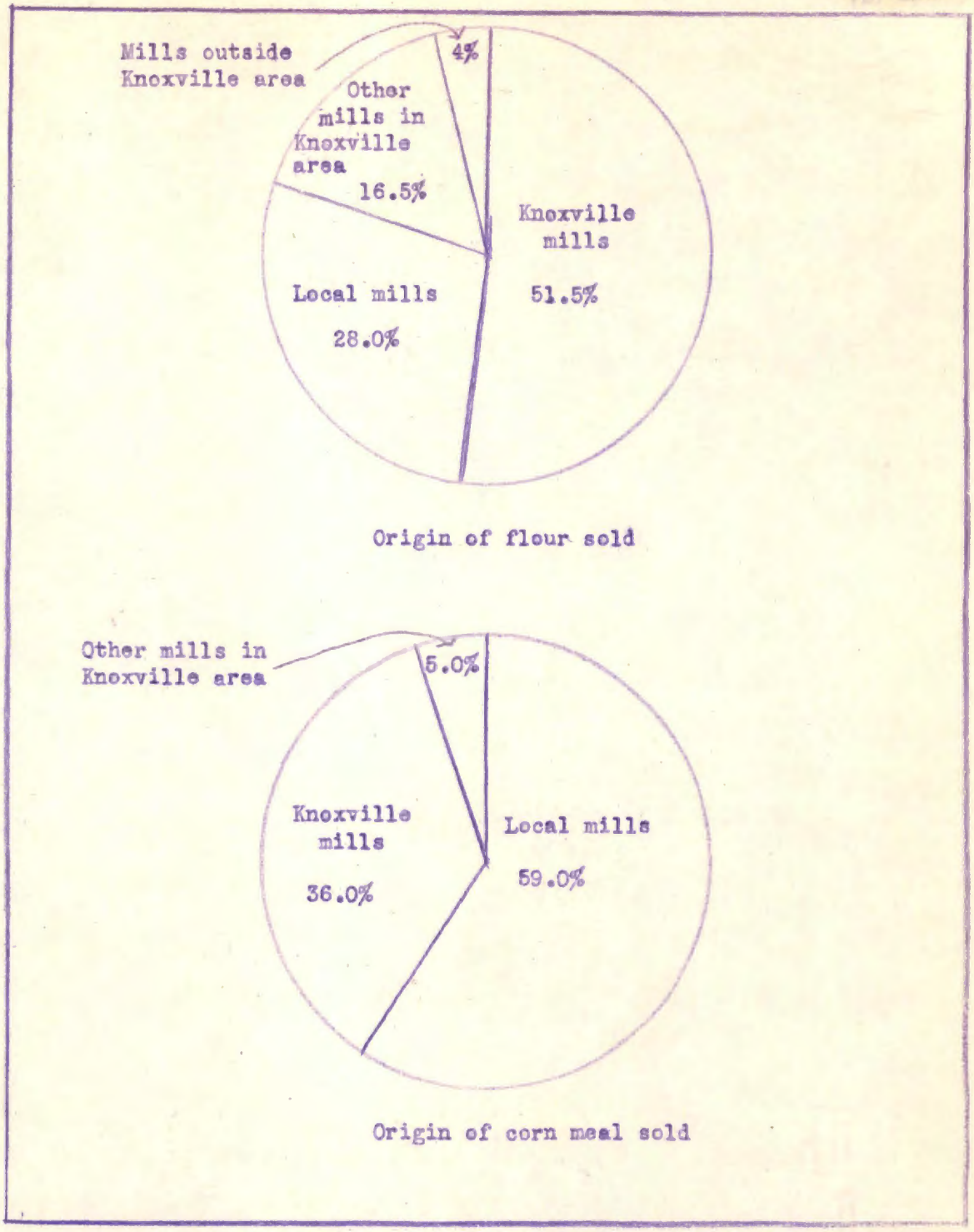
Fig. 90. Location of stores and bakeries interviewed in Knoxville Grain Marketing Survey, 1941

was obtained from local mills (Figure 91). Over half was obtained from Knoxville mills, one-sixth from other mills within the area. The remainder originated from mills in Chattanooga, Nashville, and Hopkinsville (Ky.).

Flour obtained from local mills ranged from no purchases for ten stores to 100 percent of all purchases for two stores. Five stores secured from 10 to 20 percent from local mills, three from 25 to 50 percent, and only five stores secured more than 50 percent of their flour from local mills.

Knoxville was the origin of 100 percent of all flour for five of the 23 stores surveyed in Blount County. One of these stores was located in the county seat while the other four were in country villages. Four stores obtained 80 to 90 percent of their flour from Knoxville mills, five, 50 to 75 percent. Nine of the stores received less than 25 percent of their flour from the Knoxville mills, and four of these had no receipts from Knoxville mills.

Flour was also obtained from other mills within the area and from mills outside the area. Nine of the stores purchased flour from other mills within the area ranging from 10 to 100 percent of the total supply. Mills outside the Knoxville area furnished flour to only two of the stores, furnishing 80 percent of the supply to one store and 10 percent to the other. Both of these stores were in the county seat. No country or village stores obtained flour from outside the area.



Source: Grain Marketing Survey, 1941

Fig. 91. Origin of flour and corn meal sold by 23 retail stores in Blount County, 1941

Almost three-fourths (74.4 percent) of the flour handled by these stores was plain, and only one-fourth self-rising. Only one store reported having whole wheat flour in stock and it comprised less than one-half of one percent of the total flour sales. Stores in Maryville ran highest in percent of self-rising flour sold, but even here in only one store did self-rising flour sales exceed that of plain flour.

Corn Meal: The bulk of the corn meal was obtained from local mills within the county. Fifty-nine percent came from local mills, 36 percent from Knoxville mills, and 5 percent from another mill within the area (Figure 91).

Local mills furnished 100 percent of all corn meal handled by eight of the twenty-three stores, from 50 to 99 percent for eight, and from 10 to 25 percent for two stores. However, four stores handled no corn meal from local mills, and one store obtained all of its corn meal from a mill in Loudon County.

Feed: All the feed handled by these stores originated from mills within the Knoxville trade area. Local mills furnished 25 percent of the supply and Knoxville mills furnished the remaining 75 percent.

Local mills furnished all the feed for two stores, from 50 to 99 percent for three stores, and 10 percent for one store. The remaining seventeen stores obtained no feed from local mills; however, seven of these stores did not handle feed of any kind.

Knoxville mills furnished 100 percent of all feed handled by ten of the stores, 90 percent to one, and 75 percent to another store. Three other stores obtained feed from Knoxville mills, receiving from 30 to 45 percent of their supply from that source. Two other stores handled feed, but obtained none of their supply from Knoxville.

Two wholesale feed stores interviewed in Blount County handled feed obtained from mills outside the Knoxville trade area in Chattanooga, Nashville, and Cincinnati. Of the total amount of feed handled by these two feed stores, 75 percent was obtained from mills outside the trade area, the remaining 25 percent from mills within the Knoxville trade area.

Comparison of Flour and Corn Meal Sales: In comparing total corn meal handled with that of white flour, it was found that the value of corn meal sales was almost one-third that of flour. Average weekly sale of corn meal was $9.70 compared with $26.70 for flour. In terms of pounds, flour sold was less than double that of meal (Table XLIII).

TABLE XLIII. AVERAGE WEEKLY SALES OF FLOUR COMPARED WITH CORN MEAL, 23 RETAIL STORES, BLOUNT COUNTY, 1941

Items	Pounds	Value
Wheat flour	653	$26.70
Corn meal	384	9.70

Source: Grain Marketing Survey, 1941.

This should not be taken to mean that consumption of flour is greater, because probably a greater proportion of corn meal is custom ground in flour and grist mills. Also considerable corn meal is purchased direct from grist mill by consumers.

Bakery Bread Sales Compared with Flour and Corn Meal Sales: Value of sales of bakery bread is greater than that of wheat flour, but somewhat smaller than that of flour and corn meal combined. In 1941 bakery bread represented 44.0 percent of sales; wheat flour, 41 percent; and corn meal, 15 percent (Table XLIV).

TABLE XLIV. AVERAGE WEEKLY SALES OF BAKERY BREAD, FLOUR, AND CORN MEAL, 23 RETAIL STORES, BLOUNT COUNTY, 1941

	Wheat Flour	Corn Meal	Bakery Bread	Total
Dollars	460	174	500	1134
Percent of total	40.6	15.4	44.0	100.0

Source: Grain Marketing Survey, 1941.

Sale of bakery bread exceeded the value of flour and corn meal sales at nine stores, and flour sales exceeded the value of bakery bread and corn meal at three stores. Sale of corn meal was larger than sales of bakery bread at only one store, and larger than flour sales at three stores. In no case did the value of corn meal sales exceed the combined value of bakery bread and flour.

Trend: Since most of the stores covered in the survey are in commuting distance of the aluminum plant at Alcoa, this greatly increases the amount of bread sold in relation to flour sales. Most of the workers take a lunch and use bakery bread in its preparation.

Stores which have been in business 20 years or longer reported a marked decrease in flour sales and an increase in bread sales. Two reported a decrease of 30 percent in flour, but 50 percent increase in bread sales, with largest increases occurring during the last 5 years. Little change in sale of corn meal was indicated.

Origin of Grain Products Handled by 41 Stores in the Knoxville Area

A check of 41 stores(2) in the area was made to determine to what extent they furnished an outlet for local grain products. Thirty-five of these were retail stores and six were wholesale feed stores. These stores were fairly evenly distributed through the area. Figure 92 shows the origin of flour, corn meal, and feed handled by these stores.

Flour: It was found that less than one-fourth (24.5 percent) of the flour sold was obtained from local mills.(3) Knoxville mills furnished

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(2) Does not include the 23 stores surveyed in Blount County.

(3) Local mill is a mill within the community of store interviewed.

29.4 percent; other mills in area, 19.6 percent; and mills outside the Knoxville area furnished 26.5 percent of the flour sold by these stores (Table XLV).

Corn Meal: The bulk of the corn meal, 82.7 percent, was obtained from mills within the Knoxville trade territory. Almost half (49.7 percent) of the corn meal handled was furnished by local mills, 27.6 percent by other mills within the area, and only 5.4 percent by Knoxville mills. The remaining 17.3 percent was furnished by mills outside the Knoxville trade territory.

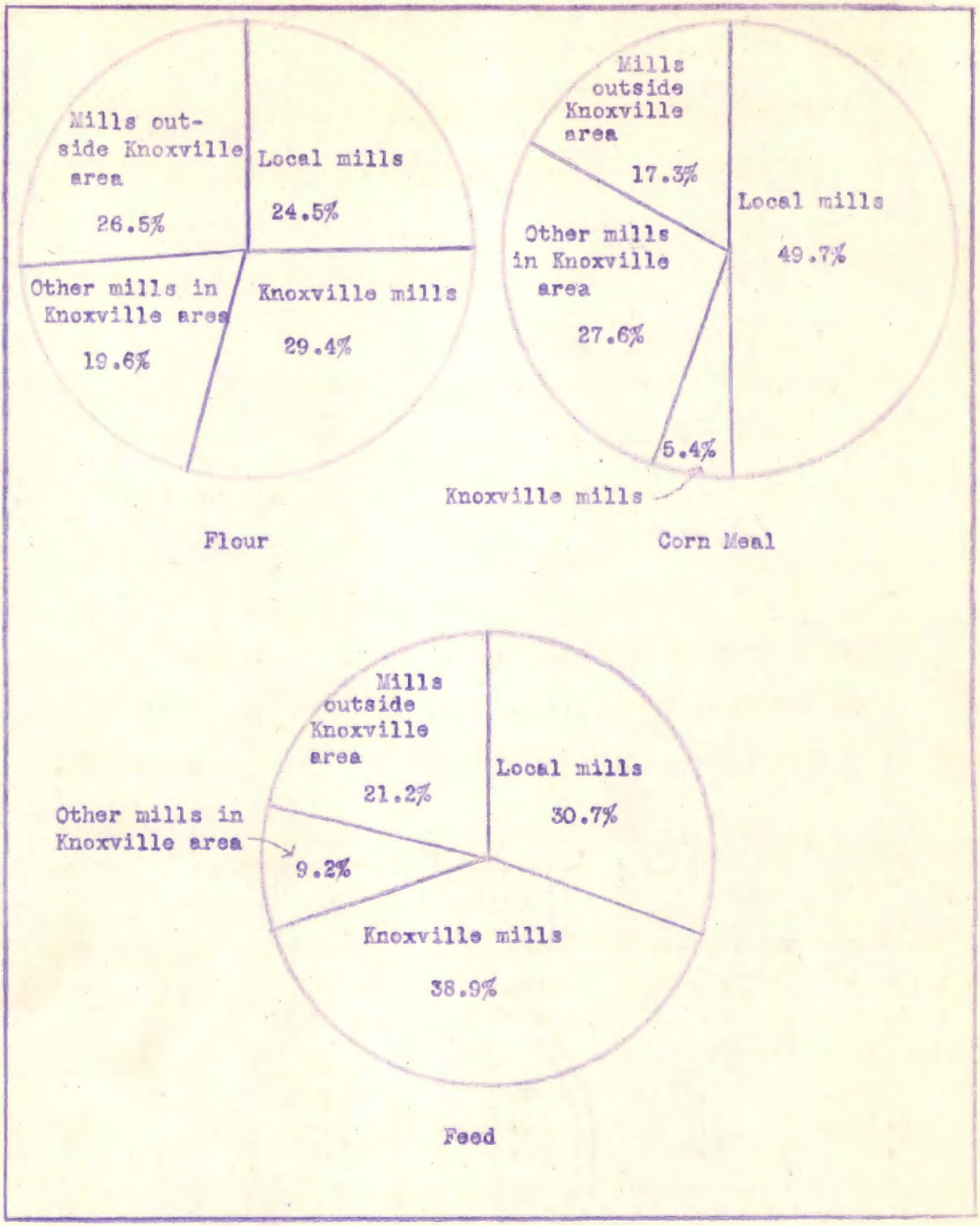
Feed: Local mills furnished less than one-third of all the feed handled by these stores. Local mills, 30.7 percent; Knoxville mills, 38.9 percent; other mills in area, 9.2 percent; and mills outside the area, 21.2 percent.

TABLE XLV. ORIGIN OF FLOUR, CORN MEAL, AND FEED SOLD BY 41* STORES IN THE KNOXVILLE AREA, 1941

Products	Local Mills	Knoxville Mills	Other Mills in Area	Mills Outside Knoxville Area
Flour	24.5	29.4	19.6	26.5
Corn meal	49.7	5.4	27.6	17.3
Feed	30.7	38.9	9.2	21.2

* Does not include the 23 stores surveyed in Blount County.

Source: Grain Marketing Survey, 1941.



Source: Grain Marketing Survey, 1941

Fig. 92. Origin of flour, corn meal and feed sold by 41 stores in the Knoxville area, 1941

Comparison of Blount County with Other Counties

Blount County stores obtained 96.0 percent of their flour from mills within the Knoxville area as compared with 73.5 percent for stores in other counties (Table XLVI). Stores in Blount County also obtained considerably larger proportion of their flour from Knoxville mills, 51.5 percent as compared with 29.4 percent.

All of the corn meal handled by stores in Blount County was obtained from mills within the Knoxville area as compared with 82.7 percent for stores in other counties. Blount County stores obtained 59.0 percent of their corn meal from local mills, but only 49.7 percent of the corn

TABLE XLVI. ORIGIN OF FLOUR AND CORN MEAL FOR BLOUNT COUNTY COMPARED WITH OTHER COUNTIES IN THE KNOXVILLE AREA, 1941

Mills	Flour		Corn Meal	
	Blount Co.	Other Cos.	Blount Co.	Other Cos.
	(Pct.)	(Pct.)	(Pct.)	(Pct.)
Mills within Knoxville area	96.0	73.5	100.0	82.7
Local mills	28.0	24.5	59.0	49.7
Knoxville mills	51.5	29.4	36.0	5.4
Other mills in area	16.5	19.6	5.0	27.6
Mills outside Knoxville area	4.0	26.5	None	17.3

Source: Grain Marketing Survey, 1941.

meal handled by stores in other counties was obtained from local mills. Knoxville mills furnished 36.0 percent of the corn meal handled by Blount County stores, but only 5.4 percent of the corn meal handled by stores in other counties.

More of the feed handled by stores in other counties was obtained from mills outside the area than by stores in Blount County.

Flour Used by Knoxville Bakeries

It is estimated that approximately 90 thousand barrels of flour are used annually by Knoxville bakeries for making bread and pastries. This is equivalent to 423 thousand bushels of wheat on the basis of 1 barrel of flour turnout from 4.7 bushels of grain.

TABLE XLVII. AMOUNT OF FLOUR USED AND SHIPPED IN ANNUALLY BY KNOXVILLE BAKERIES, 1941

Total (Barrels)	Local		Shipped In			
	Barrels	Percent	Barrels	Percent	Percent	
					Hard Winter Wheat Flour	Hard Spring Wheat Flour
90,000	4,500	5.0	85,500	95.0	94.3	5.7

Source: Grain Marketing Survey, 1941.

Commercial bakers prefer the flour from hard wheats for making bread, but soft varieties are used for pastries. Of the total amount of flour

used by Knoxville bakeries only 5.0 percent was obtained locally, which is soft wheat flour. Practically all the flour that is shipped in is hard winter wheat flour. Of the total amount of flour shipped in, 94.3 percent was hard winter wheat flour, and 5.7 percent was hard spring wheat flour (Table XLVII).

CHAPTER VII

MILLING INDUSTRY

Progress

A fundamental change has taken place in the manufacture of flour and the baking of bread. All the flour mills visited in the Knoxville area have adopted the steel roller process. The old fashioned millstones are still being used only in grinding corn meal. In the baking of bread the bakers loaf has largely replaced the home-baked product.

After the introduction of the purifier[1] and the steel roll come a train of useful inventions such as dust-collectors, scourers, bolters, separators, and sifters which were incorporated into the roller system of milling.

After the radical change-over from the stones to the roller system, attention has been directed toward many minor improvements. Intensive competition has made it necessary to reduce production costs to a minimum. The large improved mills have displaced many of the small mills in the area whose unit costs of production are high. This

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(1) A device for separating middlings and flour.

has tended to concentrate mills at points possessing favorable shipping facilities.

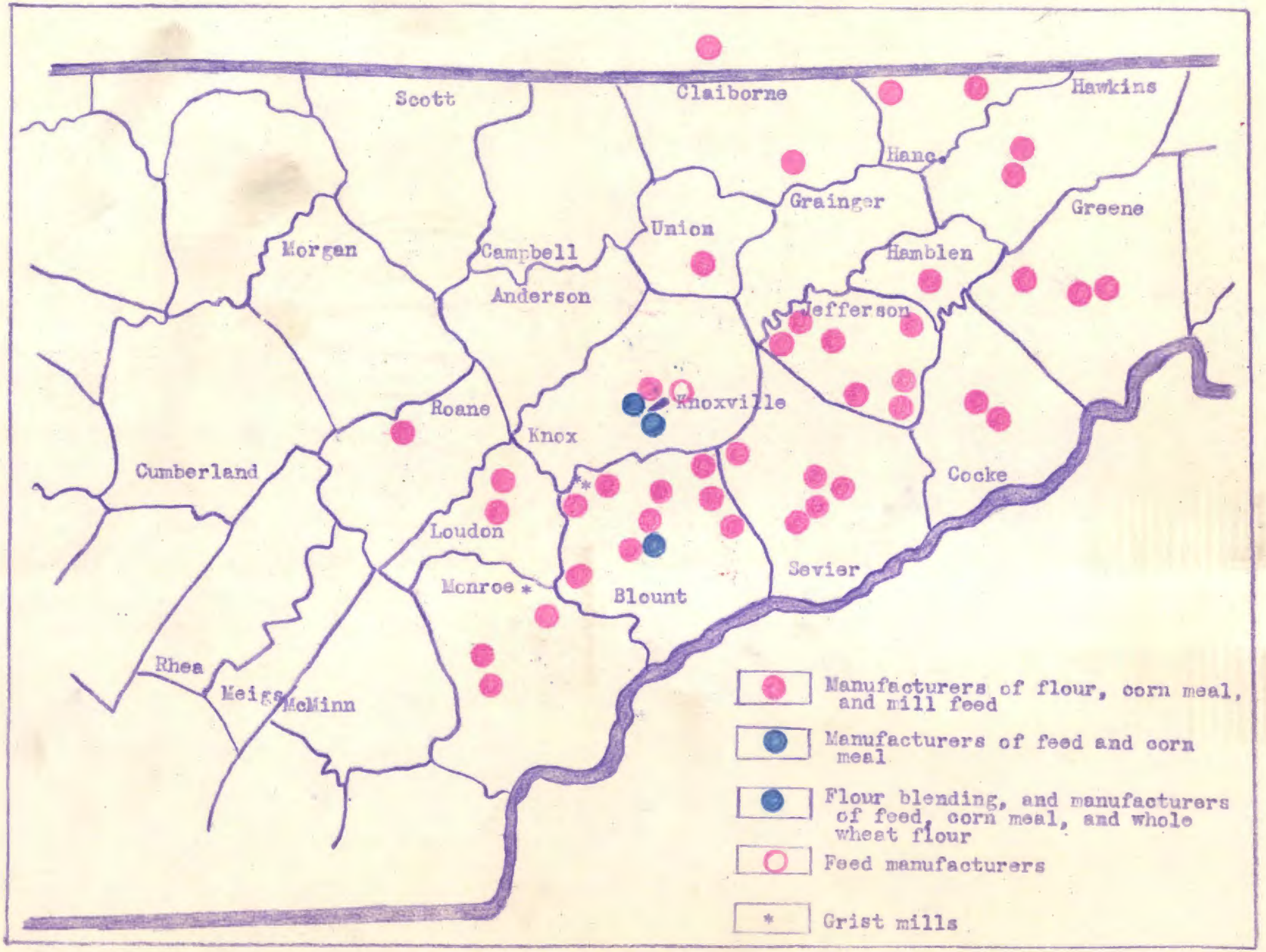
Type and Location of Mills

In 1941 there were approximately 99 mills in this area, 96 grinding flour and corn meal, 2 grinding corn meal and feed, and 1 feed manufacturing plant. A large number of these mills are small and custom grinding makes up most of their business. This survey did not cover the many hundreds of small feed mill outfits (stationary and portable) not set up for commercial business. Many of these operate only a small portion of the time.

Figure 93 shows the distribution and types of mills visited in East Tennessee. Of the 45 mills visited; 41 manufactured flour, corn meal, and mill feed; 2 manufactured feed and corn meal; 1 blended flour and also manufactured feed, corn meal, and whole wheat flour; and 1 manufactured feed only. Three grist mills were visited located as shown in Figure 93.

An attempt was made to locate all types of mills, including grist mills in one county. In order to determine pattern of distribution of all mills (including grist mills) a spot map of all such establishments was made in a sample county. Distribution of mills are shown in Figure 94.

Since corn is brought in at frequent intervals to be ground into meal, some kind of mill doing custom grinding was found within several



Source: Grain Marketing Survey in East Tennessee, 1941

Fig.93. Location and type of mills visited in East Tennessee, 1941



Source: Industrial and Agricultural Survey, 1934

Fig.94. Distribution of mills in Sevier County



1. Flour mill
2. Elevator for storing wheat
3. Elevator for storing corn
4. Main office

Capacity of mill is 2000 barrels flour and 2000 bushels corn meal. Set up with modern equipment and electric power.

Figure 95. The largest flour mill in the area.



Capacity of mill is 125 barrels of flour, and 500 bushels of corn meal. Power is furnished by electricity. Newport, Cocke County.



Capacity of mill is 60 barrels of flour, and 150 bushels of corn meal per 24-hour operation. Feed mill has a capacity of 1500 pounds per hour. Diesel engine furnishes the power. Sevierville, Sevier County.

Figure 96. Mills in small cities of the area dealing in various brands of flour, corn meal, and feed.



Figure 97. Milling plant in open country. Milling capacity of 40 barrels of flour and 225 bushels of corn meal. A water turbine furnishes the power. Blount County.



Wheat flour milling unit of 25-barrel capacity; a corn mill unit, capacity 250 bushels daily. Manufactures whole wheat flour and corn meal. Operated by water power. Blount County.



Flour milling unit of 40-barrel capacity; a corn mill unit, capacity 360 bushels daily. Manufacture Straight Grade flour and corn meal. Operated by water and electricity. Jefferson County.

Figure 98. Other country mills.





Milling capacity of 15 barrels of flour, and 240 bushels of corn meal. Manufacture Straight Grade flour and corn meal and grinds feed. Jefferson County.

Figure 99. Mill drawn by wooden water wheel. No other source of power required.



Corn mill. All custom grinding. Milling capacity 1-3 bushels an hour. Operated by water power.



Corn and feed mill. Gas engine furnishes power.

Figure 100. Grist mills in Blount County

miles reach of most farms. Many grist mills were within a mile of each other, usually at crossroads or small villages. They are built to serve surrounding rural families, many of whom have no conveyance for the corn or bag of meal other than on foot or horse back.

Various factors explain the location of mills where they are now found. Advantages of some locations are historic and the original advantages no longer exist, but the mill once established has continued operation despite some obvious disadvantages of location.

Mills in early days were limited to stream-side sites where flow of water could be depended upon for power. Water power was satisfactory for turning millstones at the slow rate of speed required. With slow methods of transportation it was desirable for mills to be near the wheat fields, and near the farming population, villages and towns as well. This required a large number of small mills serving small areas.

The development of improved milling machinery, steam and electric power, and more rapid transportation has resulted in a decreasing number of mills. Capacity of mills are large, serving wider areas than formerly.

Large regional mills are at railroad points where large quantities of grain can be obtained cheaply from distant producing areas at favorable rates. Small country mills are finding it more difficult to compete with the large mills more favorably located with reference to obtaining supplies of raw material by rail, and also reaching a wide market for finished products.

Small country mills still in existence were found in this survey

to possess one or more advantages such as abundance of cheap water power, location in a community where considerable high quality wheat is produced, established reputation for milling of good quality flour and meal, and nearness to a large city. Where milling business is small, operators may find it profitable to continue operation by engaging in a side-line business.

Mills Grouped According to Size of Business

All the mills visited in the area were grouped according to volume of business (grain handled). Group I consists of small country mills with a daily milling capacity[2] of 30 barrels or less. These mills are not equipped to manufacture high grade flour, and are finding it difficult to meet modern demand. Most of the mills in this group manufacture only one grade of flour, either straight grade or whole wheat flour, and in a few cases both. Over one-third (35.6 percent) of the mills surveyed were in this group, but handled only 5.3 percent of the total volume of grain. They obtained practically all of their grain (97.3 percent) locally, the remainder being obtained from out of state. Custom grinding makes up over half (55.4 percent) of their business (Table XLVIII).

Group II consists of mills having a daily milling capacity of 31 to 60 barrels. These mills are better equipped and are in a position

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(2) Milling capacity is based on 24-hour operation.

to manufacture higher grade of flour and meal, and are more or less on a commercial basis. Less than one-third (28.9 percent) of the mills visited were in this group and handled less than one-tenth (8.7 percent) of the total volume of grain. Only a little over one-fourth (25.4 percent) of the grain handled was custom grinding. This group obtained over nine-tenths (91.5 percent) of their grain locally.

TABLE XLVIII. FORTY-FIVE MILLS GROUPED ACCORDING TO VOLUME OF BUSINESS

	Total for All Groups	Group I (30 Barrels or Less)	Group II (31-60 Barrels)	Group III (61-120 Barrels)	Group IV (121 Barrels and Over)	Others*
Number of mills	45	16	13	6	6	4
Percent of total	100	35.6	28.9	13.3	13.3	8.9
Amount of grain handled	4,529,225	147,800	394,350	475,000	2,519,700	992,375
Percent of Total	100	3.3	8.7	10.5	55.6	21.9
Percent of total grain handled by each group						
Local grain	-	97.3	91.5	91.2	24.5	13.3
Custom grinding	-	55.4	25.4	22.4	5.5	0.2

* Includes mills other than flour mills.

Source: Grain Marketing Survey, 1941.

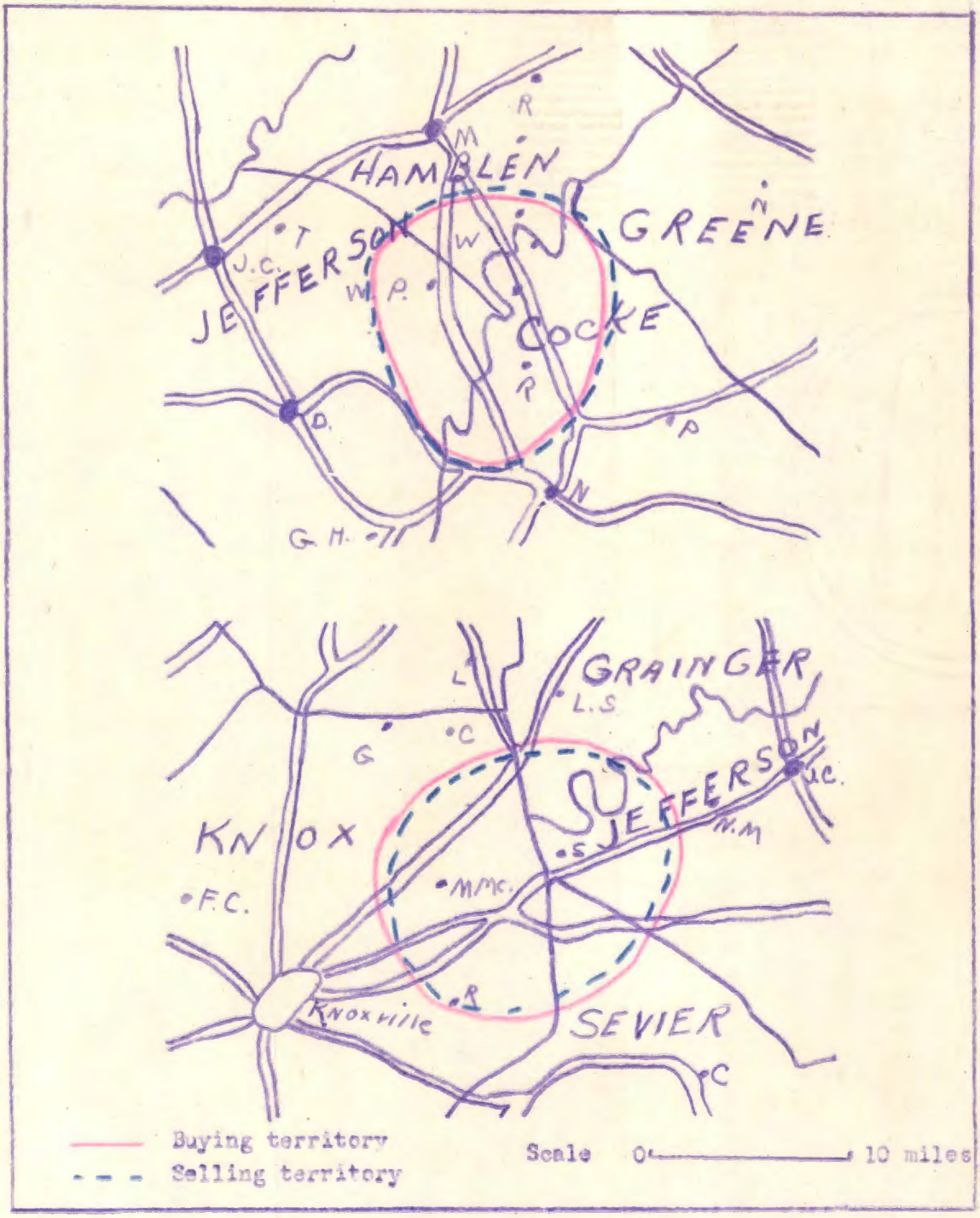
Group III consists of mills located in bigger towns, and have a daily milling capacity of 61 to 120 barrels. These are more up-to-date mills, dealing in various brands of flour, corn meal and feed. Custom grinding makes up only a small percentage of their business (22.4 percent) Of the total number of mills visited this group represented 13.3 percent of the total, and handled one-tenth of the total grain. Over nine-tenths (91.2 percent) of the grain was obtained locally.

Group IV consists of large commercial mills having a daily milling capacity of 121 barrels and over. These were all up-to-date mills and manufacture high grade of flour and meal, and deal in various brands of flour, corn meal, and feed. This group represents 13.3 percent of all the mills visited, but handled over one-half (55.6 percent) of the total grain handled by all mills included in the survey. Less than one-fourth (24.5 percent) of the grain handled was obtained locally. Custom grinding made up only 5.5 percent of their volume of business.

The last group includes mills other than flour mills. This group represents 8.9 percent of all the mills visited, and they handled over one-fifth (21.9 percent) of the total volume of grain. This group obtained only 13.3 percent of their grain locally, and less than one-half of 1 percent was custom grinding.

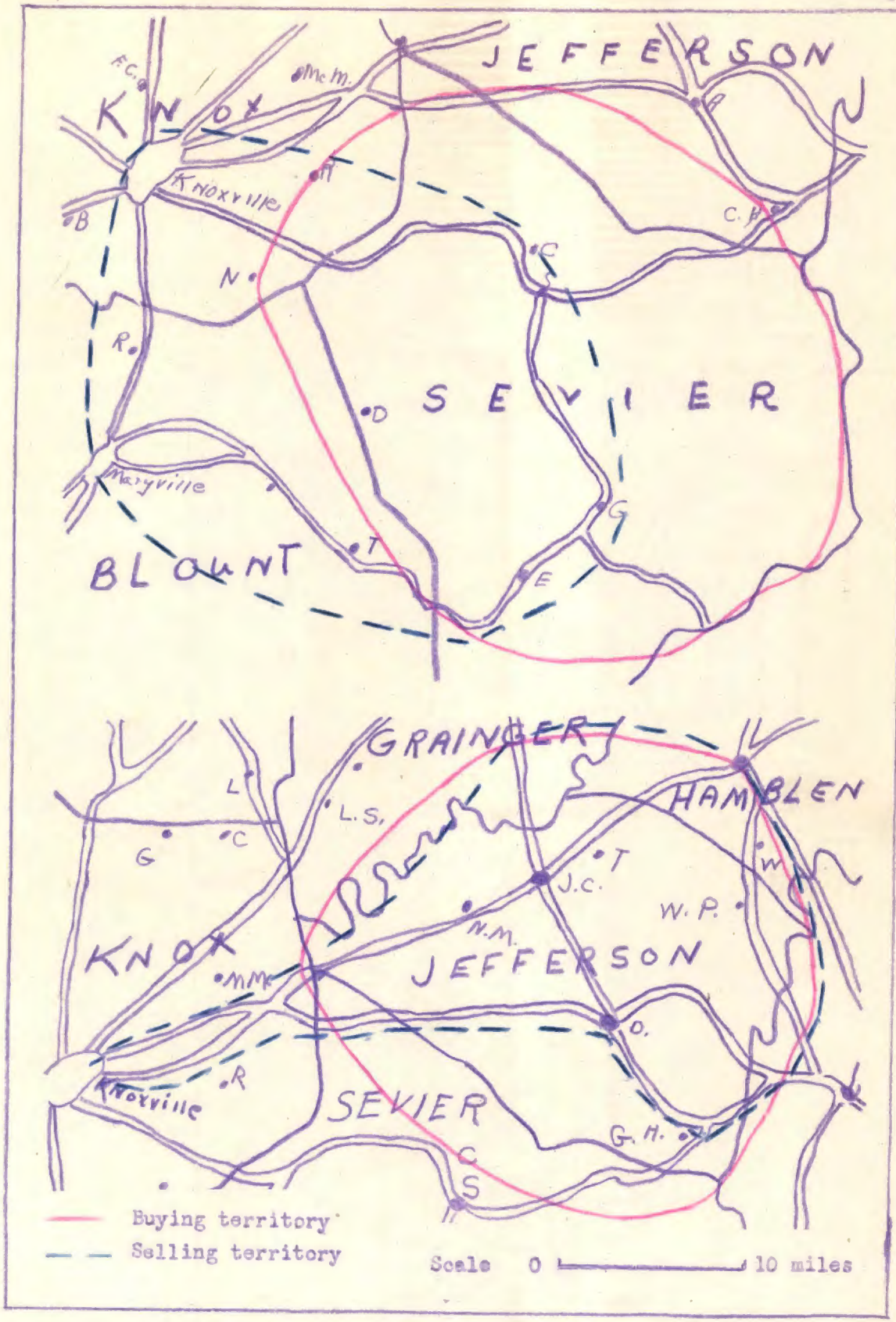
Area Served

Size of area served is another indication of size and strength



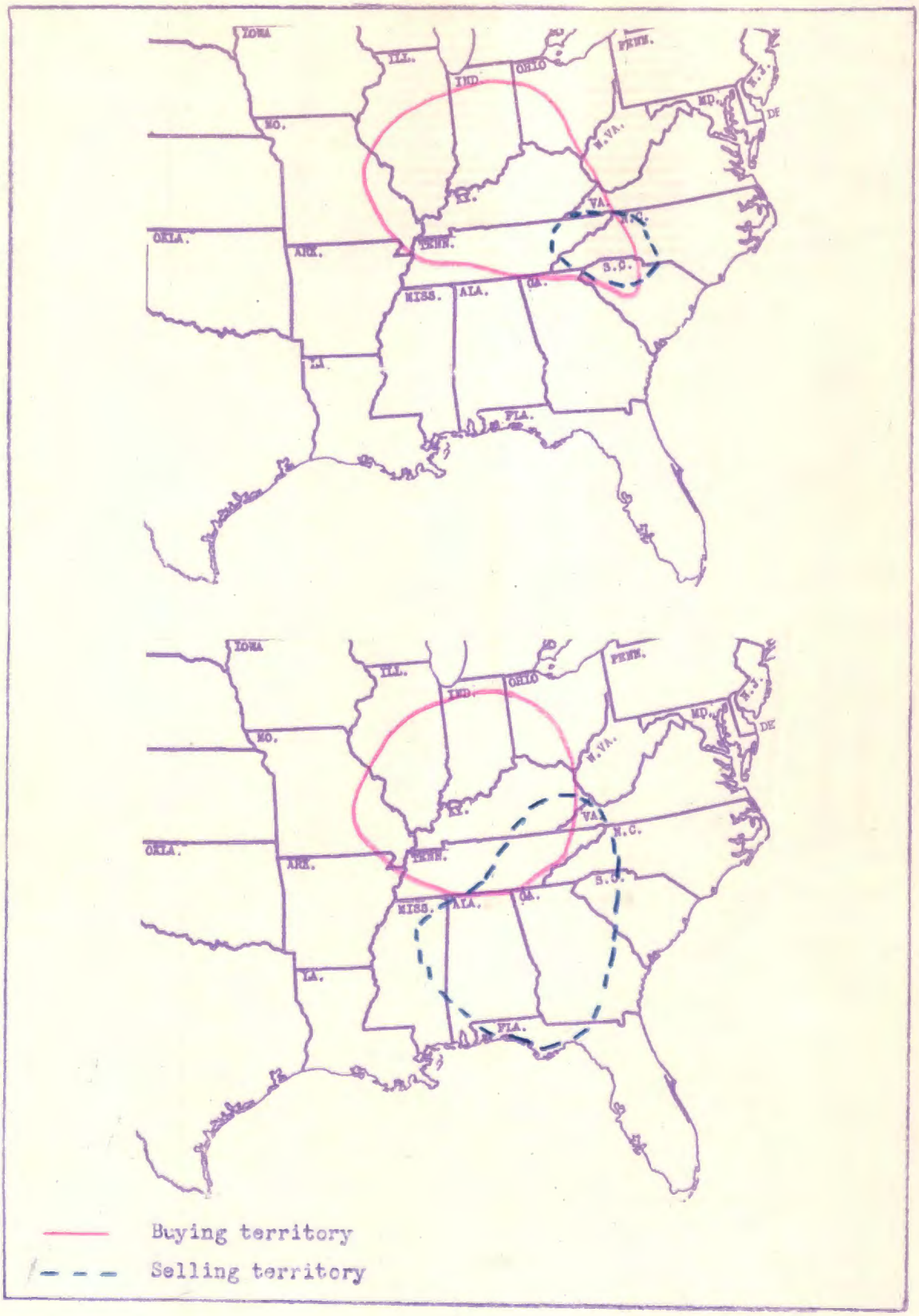
Source: Grain Marketing Survey, 1941

Fig. 101. Buying and selling territory of small country mills, Knoxville area, 1941



Source: Grain Marketing Survey, 1941

Fig. 102. Buying and selling territory of large town mills, Knoxville area, 1941



Source: Grain Marketing Survey, 1941

Fig. 103. Buying and selling territory of large regional mills, Knoxville area, 1941

of an establishment. Producing areas from which supplies are drawn and distribution areas of the marketable products may or may not coincide. Producing and distributing areas of different types of mills are shown in Figures 101, 102, and 103. For some of the smaller mills doing a large proportion of custom business, producing and distributing areas are small and coincide. In the case of regional mills, the supply area extends northward beyond the Ohio River, while the distribution area comprises the southeastern states of North Carolina, South Carolina, Georgia, Alabama, and Florida.

Procurement

There were several methods by which mills in this area procure grain: direct from farmers, through brokers, from truckers, direct from mills and elevators in other areas, and through buyers who are local farmers or business men and buy grain for some of the larger mills and receive commission for their services.

All the local grain is bought direct from farmers or through buyers. However, most of the local grain is obtained direct from farmers. Farmers close in make their own deliveries. Others at greater distances have grain brought in by truckers, and mills are finding it increasingly necessary to go out and obtain grain from farmers in their own trucks.

Grain that is shipped in by rail is obtained through brokers or direct from mills and elevators in other areas. Large percentage of the grain that is shipped in by rail is obtained through brokers.

Considerable amount of grain is trucked in from the Ohio River Valley, practically all of which is bought direct from truckers. These truckers are usually contacted by telephone. Some grain is bought direct from mills and elevators in the Ohio River Valley and trucked to Knoxville and other points in East Tennessee.

Competition for Grain: In order to insure a continuous grain supply for continuous operations mills must frequently purchase grain for in advance of current needs. The smaller mills that handle only local grain buy 75 to 80 percent of their wheat during the first three or four months of the marketing season. Lack of capital for financing their peak season purchasing commonly curtails the volume of business for the year. Corn is usually marketed more uniformly throughout the year than wheat. However, corn shellers are scarce in certain communities, and when one is pulled into a community corn is shelled for a large number of farmers at one time. Under these conditions the local supply of corn becomes available at one time and is quickly disposed of to the highest bidder if well financed outside buyers enter the market in competition with local mill. Once the local supply is moved out of the locality later on the local mill is forced to buy corn from outside the community. In most cases at a higher price to which cost of trucking must be added.

Price Basis: Price quotations are obtained by telephone, through newspapers, and by radio. Most of the smaller mills in the area who base

their price on the Knoxville market obtain price quotations by telephone. The larger mills rely more on price quotations in daily papers and on market reports over the radio.

Thirty-one of the 45 mills or 68.9 percent of the mills visited in East Tennessee area based their price on the Knoxville market. Of these thirty-one mills, two paid 2 to 5 cents more for corn, but same for wheat; two paid 2 to 5 cents less for wheat, but same for corn; eleven of them paid 2 to 5 cents less for both wheat and corn; and sixteen paid Knoxville price for both wheat and corn (Table XLIX).

TABLE XLIX. MILLS VISITED BASING PRICE ON KNOXVILLE MARKET, CHICAGO CASH PRICE, AND CHICAGO FUTURE PRICE

Number of Mills	Wheat			Corn		
	Above (cents)	Less (cents)	Same	Above (cents)	Less (cents)	Same
2	-	-	x	2-5	-	-
2	-	2-5	-	-	-	x
11	-	2-5	-	-	2-5	-
16	-	-	x	-	-	x
* 4	12-20	-	-	12-20	-	-
** 5	-	5-10	-	-	5-10	-

* Chicago cash price
** Chicago future price

Source: Grain Marketing Survey, 1941.

Four of the mills visited based their price on the Chicago cash price and paid 12 to 20 cents more. These mills were located in the eastern part in Morristown, Greeneville, and Rogersville.

Three mills based their price on the Chicago future price, and paid 5 to 10 cents less.

Two mills located in the eastern part based their price on Morristown, Greeneville, and Johnson City market, and paid the same.

Two of the mills visited did not purchase any grain. All grain handled was custom grinding. Three of the mills visited did not state what their price bases were.

Hedging:(3) It is not a universal practice of mills in this area to hedge. Only the larger mills made a practice of hedging. Of the 45 mills interviewed, less than one-fourth (24.4 percent) reported hedging. All of the mills that reported hedging handled a large volume of grain annually, and had a daily milling capacity of 80 barrels or more, except one mill with a daily milling capacity of 40 barrels. Mills must purchase enough grain to meet future needs, and if mills wish to be assured of grain with particular characteristic they must buy early or they may be unable to purchase it later, except at a higher premium. Hedging is a method of protection against loss from price declines on these advance purchases.

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(3) Hedging involves contracting to purchase or sell in the future market at the same time that a regular business transaction of any opposite nature is started, which is also to culminate in the future. That is, a purchase of goods to be sold later is offset by a sale of goods for future delivery to be purchased later in the "future" market, or vice versa, a sale is offset by a purchase.

Milling-in-Transit:(4) Of the 45 mills interviewed in the Knoxville area 14 were located so that they could make use of the milling-in-transit privilege, but only 11 actually made use of the privilege. The reason that those mills that had milling-in-transit privilege did not make use of it was because they have not been shipping finished products by rail in recent years. Finished products like flour, corn meal, and feed are distributed throughout the area by truck.

The use of the milling-in-transit privilege is illustrated by a shipment of wheat from Nashville to Newport. The freight rates on wheat from Nashville to Newport are 16 1/4 cents per bushel at which point the wheat is stopped for milling. The wheat was milled at Newport and the flour was shipped to Asheville, North Carolina, with an additional cost of 3 cents per hundred pounds on plain flour. If no milling-in-transit privileges the freight rate from Newport to Asheville, North Carolina, would have been 15 cents per hundred pounds on plain flour.

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(4) Wheat may be sent to the milling point, stopped for milling, and then shipped on to the market, all at the through freight rates, plus a transit charge. This saves paying the relatively higher local freight rates to the points of milling and from the point of milling to the market. Shippers are also allowed in some instances to ship grain to a terminal market and then to send it on in the same general direction at a rate less than the regular local rate from the terminal to the final market place.

Sideline Business

The outlet for grain products of small country mills is rather limited, especially for flour. Commercial bakers prefer the flour from hard wheat, and for pastries and home baking a high patent soft white flour made by larger mills is demanded. There is considerable demand for corn meal within the area, and there has been an increased demand for feed grinding and feed mixing services.

Volume of business is one of the most important factors influencing the profits of mills and it is unusual for mills to make a profit handling as little grain as is handled by many of the mills in the East Tennessee area. The small mills which do not combine a considerable sideline business like grinding and mixing feed, handling commercial feeds or other sidelines, are finding it increasingly difficult to operate and meet modern competition.

One of the most important sideline businesses reported by mills in East Tennessee was feed grinding. Several managers made the remark that if it were not for the feed business they would be out of business. Several also made the remark that feed grinding for farmers has increased considerably in the last year, and in some cases as much as 50 percent.

Of the total number of mills visited in this area 71.1 percent of them reported having feed mills, and grinding feed for farmers (Table L).

TABLE L. MILLS VISITED IN EAST TENNESSEE REPORTING FEED MILLS, BY COUNTIES

County	No. of Mills Visited	Mills Reporting Feed Mills		County	No. of Mills Visited	Mills Reporting Feed Mills	
		No.	Percent			No.	Percent
Claiborne	1	1	100.0	Knox	4	3	75.0
Hamblen	1	1	100.0	Blount	10	5	50.0
Hancock	2	2	100.0	Cocke	2	1	50.0
Jefferson	7	7	100.0	Hawkins	2	1	50.0
Monroe	3	3	100.0	Loudon	2	1	50.0
Rosne	1	1	100.0	Greene	3	1	33.3
Union	1	1	100.0	Middlesboro, Kentucky	1	0	-
Sevier	5	4	80.0				
				Total	45	32	71.1

Source: Based on mills included in survey.

The percent reporting feed mills by counties is based on the number of mills visited in each county, which varied from 1 to as many as 10 in some counties. All mills visited in Claiborne, Hamblen, Hancock, Jefferson, Monroe, and Union reported having feed mills. The percent of mills visited reporting feed mills in other counties were as follows: Sevier, 80 percent; Knox, 75 percent; Blount, Cocke, Hawkins, and Loudon, each 50 percent; and Greene, 33.3 percent.

Of the total 45 mills included in the survey over one-half (51.0 percent) of them reported other sideline business.(5) Types of

(5) Other sideline business does not include feed mills.

such businesses are as follows: sale of commercial feed, 15.6 percent; fertilizer, 4.4 percent; trucking, service station, ice plant, coal, and general store, 2.2 percent each (Table LI).

TABLE LI. SIDELINE BUSINESS OTHER THAN FEED MILLS REPORTED BY 45 MILLS VISITED IN EAST TENNESSEE, 1941

Sideline Business	Percent of Total	Sideline Business	Percent of Total
Sale of commercial feed	15.6	Service station	2.2
Farming	13.3	Ice plant	2.2
Feed stores	6.7	General store	2.2
Fertilizers	4.4	Coal	2.2
Trucking	2.2	None	49.0
		Total	100.0

Source: Based on mills included in survey.

Equipment

Equipment of mills in East Tennessee varies considerably in type, make, and size.

The grinding equipment for flour varies from a single unit midget flour mill to three and four units and up to as many as forty-eight units. Most of the mills in this area have three or more flour units (Figure 104).

All the mills have a receiving separator (Figure 105) for cleaning out foreign material, and a scouring machine. They also have flour sifters and reels, the number and size depending on the number and size of the

flour units. However, some of the small mills just have a sifter or a reel. Other equipment may consist of dust collectors, bleaching equipment for bleaching flour, batch mixer (Figure 108) for adding self-rising ingredients, and packers. Some of the small mills do not have bleaching equipment, batch mixers, or packers.

The following is a list of minimum equipment needed to produce high grade of flour:

Receiving separator (cleaning out weeds, straw, and other foreign material)
Scouring machine (for cleaning dust and dirt from wheat)
Grade maker (separator)
Tempering conveyor (to wet wheat)
2 to 4 stands-double rolls roller mills (for grinding)
1 6 to 8 section sifter (for making different grades of flour)
1 to 2 reels (to separate bran, middlings, and flour)
1 bleaching equipment (for bleaching the flour)
1 batch mixer (for mixing self-rising ingredients with flour)
2 packers
Dust collector

The total investment for the above equipment based on price quotations of second hand equipment would amount to $1500 to $3000.

Practically all of the smaller mills and even some of the larger mills in this area still use the old fashioned stone burr for grinding corn meal (Figure 107). In most cases the small mills have a separator for cleaning foreign material out of corn, stone burr for grinding, and a screen for bolting or separating the bran from the meal. Others have receiving separator for cleaning foreign material out of corn, a scouring machine (Figure 105) for cleaning dirt and dust of the corn before

grinding, steel rollers for grinding, reel for separating the bran from the meal, and packers.

The feed equipment varies considerably in mills in this area. Some of the mills only have a mill feed grinder which is used for regrinding the wheat and corn bran. In addition to a mill feed grinder other mills also have a feed mill for grinding feed. Several mills in this area also were equipped with a batch mixer and molasses mixer for mixing feed.

The following is a list of equipment that should be considered when rebuilding and remodeling an old mill or constructing a new one. This gives a complete equipment for manufacturing flour and corn meal, and also includes equipment for grinding and mixing feed.

Flour unit: milling capacity of 40 to 60 barrels daily
- Receiving separator
- Scouring machine
- Grade maker
- Tempering conveyor
- 4 stands-double rolls roller mills
- 8-section sifter
- 2 reels
- Bleaching equipment
- Batch mixer
- 2 packers
- Dust collector

Corn unit:
- Receiving separator
- Mill separator
- Scouring machine
- 1 3-pair rolls (breaker rolls, medium breaker rolls, and finishing roll)
- Reel or sifter (for finishing)
- Packers
- Dust collector



3 stands flour units - capacity 40 barrels daily



4 stands flour units - capacity 80 barrels daily

Figure 104. Flour grinding units



Receiving separator for cleaning wheat



Corn scouring machine

Figure 105. Cleaning equipment

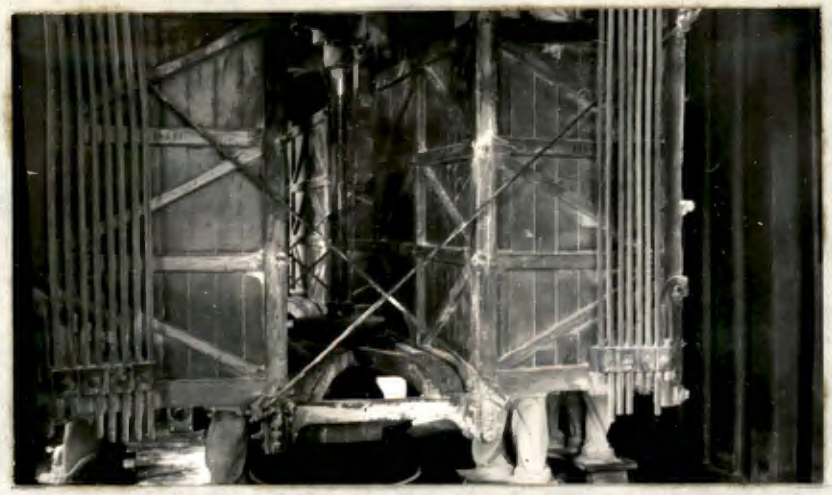




Figure 106. Flour sifters



Dismantled burr outfit, smooth stone left, cutting stone in center. Other burr unit is in operation in background

Figure 107. Corn grinding units; 48-inch French stone burr and a 24-inch meadows stone burr in background



Figure 108. Batch mixer for adding self-rising ingredients to flour

Feed unit:
Hammer mill
Dry batch mixes
Molasses feed mixes
Dust collector.

The above equipment including investment in building would require an investment of approximately $25,000 to $30,000.

Type of Power Used: Location of mills are influenced by the relative manufacturing cost at different sites as influenced by water power, cost of electric power, and other factors.

A check was made as to what type of power was used by mills in this area. Of the 45 mills included in the survey almost one-fourth (24.4 percent) of the mills reported using water power (Table LII). Other type of power used is as follows: electric, 17.8 percent; water and oil, 8.9 percent; gas, 6.7 percent; electric and oil, 4.4 percent; steam, gas and electric, steam and electric, 2.2 percent each.

TABLE LII. TYPE OF POWER USED BY 45 MILLS VISITED IN EAST TENNESSEE, 1941

Type of Power	No. Reporting	Percent of Total	Type of Power	No. Reporting	Percent of Total
Water	11	24.4	Electricity and oil	2	4.4
Electricity	8	17.8	Steam	1	2.2
Oil	7	15.6	Gas & elec.	1	2.2
Water & electricity	7	15.6	Steam & elec.	1	2.2
Water & oil	4	8.9	Total	45	100.0
Gas	3	6.7			

Source: Based on mills included in survey.

Investment: The investment of mills in the East Tennessee area varies considerably. It varies according to size and type of mills and the amount of equipment. Investment varies from approximately $6000 for the smaller mills to almost $50,000 for some of the bigger mills, and more in two or three cases.

There are two new mills under construction in this area and these mills are completely equipped to manufacture high grade flour, corn meal, and feed. Equipment includes batch and molasses mixers. It has been learned from a reliable source that the total investment will amount to approximately $30,000 for one of the mills and $40,000 for the other. The difference in investment is mainly due to the size of equipment installed.

Efficiency and Possibilities

Efficiency of mills depends on several factors such as volume of business, relative economy in procuring raw materials, distributing finished products, and the relative manufacturing cost at different sites as influenced by water power, cost of electric power, labor supply, and other factors.

Large mills are located at points possessing favorable shipping facilities with reference to obtaining supplies of raw material by rail, and reaching a wide market for finished products. They have the advantage of modern mechanical equipment, and continuous operations.

However, the large mills are not in a position to be of maximum service to local farmers. These mills serve a comparatively large area and are usually located at a great distance from most farming communities. In many cases this results in a long haul and increased transportation costs. Also the grain sold at large mills enters direct competition with other grain producing areas. The large mills are on commercial basis, and as a rule do not do any custom grinding of flour or meal for farmers. All feed grinding and feed mixing services are on a commercial basis.

The small mills are in a position to render many more services to farmers. They are located in the farming community within a reasonable hauling distance of most farms in the community, which means a great savings in transportation costs. Perhaps the most valuable services rendered by small mills is custom grinding of flour, and meal.

Other services that are rendered by some of the mills and which are suggestive of what others may do are: cleaning and treating seed, grinding and mixing feed, and shelling corn. By installing equipment to render these services it provides the services of equipment that farmers cannot afford to own and in addition brings the services to his community at a rate that is very little higher than the trucking charges to a central point.

Many of the mills do not have a sufficiently wide market for their limited variety of products to maintain continuous operation of the machinery and equipment. One method of increasing volume of business is through rendering a greater variety of services to farmers, such as those suggested.

With an increase in production of livestock and livestock products and greater production of feed grains, demand for feed grinding and feed mixing services are to be expected.

Mills have also the opportunity to assist farmers in finding a market for oats, barley, and rye by assembling and storing in large lots for outside buyers.

Along with a coordinated program for quality production and enlarged outlets for whole wheat flour discussed in next chapter, increased volume of business may be developed.

CHAPTER VIII

A PROGRAM FOR IMPROVEMENT OF GRAIN MARKETING

Problems of grain marketing in the Knoxville area need to be attacked on all fronts. A single approach would be ineffective because the problems are interrelated. For instance, quality production need not be emphasized until an adequate premium is paid for it. Moreover mills hesitate to provide more facilities, services such as bulk storage, equipment for grading and testing grain, heavy duty wagon and truck scales, and elevators (stationary or portable) to facilitate unloading of bulk grain, and moving grain from one bin to another which would facilitate conditioning of grain. Possibilities for development of the local industry is greatly affected by transportation rates from competing areas, barge and truck transportation.

The problem calls for enlistment of not only the farmer, but all interests - millers, grain dealers, bakeries, merchants, Agricultural Extension Service, Experiment Station, Crop Improvement Associations, Farm Bureau, Farm Credit Administration, Farm Security Administration, instructors of vocational agriculture, and others. Broadly speaking, the

problem is principally providing broader outlets for grain products. This breaks down further into increasing consumption of local grain products, and strengthening local mills.

Strengthening of Small County Mills

It is obvious from the findings of this survey that unaided the small country mill cannot survive in competition with large mills at central points. It has also been shown that the small country mill has been the farmer's natural outlet for his grain. In order to maintain this service institution it is suggested that outside aid be given in the form of technical advice, credit, and sales promotion of whole wheat products.(1) Change of location is recommended in some instances.

Technical Assistance: A research project in milling should be set up at the University designed to deal with technical problems of the small mill under local conditions. The Agricultural Extension Service should then work with the millers and carry the results of this research to them.

Efforts should be directed towards research in putting out a high quality flour. This would require work with farmers on seed selection along with developing equipment best adapted to small units in producing the type of flour desired.

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(1) Sales promotion is discussed in a later section of this chapter.

Extensive baking tests may be necessary to determine desirable blends and processes adapted to varieties of wheat grown here, and better milling varieties may need to be developed.(2)

It is suggested that the Extension Marketing Specialist call a meeting of country millers to talk over common problems, and let them outline the technical details of problems they face. Suggestions brought out at these meetings could form the basis for the University program of assistance.

Credit: Financial assistance is definitely needed by small mills. Many do not have enough working capital to purchase local grain after harvesting when seasonal prices are lowest. Besides, capital is required to make needed improvements.

It is suggested that the Federal government, through some of its lending agencies such as the Reconstruction Finance Corporation, Farm Credit Administration, or Farm Security Administration, provide credit on suitable terms to mills which buy grain direct from local farmers.

Change of Location: In line with becoming more fully a service institution for farmers, location of some mills should be changed to places more convenient to farmers' trade centers. Many are located where they are on account of water power. With other mobile forms of power now available the reason for many present locations no longer exists. Besides, shifts in the highway pattern have isolated many mills.

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(2) At present plant breeders at the Tennessee Agricultural Experiment Station are attempting to develop a wheat of higher protein content, superior in milling quality.

Storage Facilities at Market Points

Establishment of public warehouses and elevators at trade centers distributed over the area would enable grain farmers to take advantage of wheat loans through the Commodity Credit Corporation, and in general would enhance their bargaining position. Storage and provision for financing would make it feasible to retain and use grain in the locality which otherwise would have to be bought back later from the outside, at a higher price plus cost of transportation. The Cooperative Service Program of the Farm Security Administration and the Farm Credit Administration is designed to meet this need.

Storage Facilities on Farms

Grain storage facilities on farms in this area are not adequate in volume or type. The limited storage on farms has been done more or less in a careless, slipshod manner. Any type of structure, or part of a structure, at hand has been utilized. The grain or feed room in the barn is usually open to rats and vermin. Often it is exposed to the weather. One sometimes sees excess grain, in a good crop year, piled on the porch or on the floor of a tenant house, in a hog pen with a tarpaulin or tar paper roof, in the driveway of the stable, or anywhere to get it out of the way of livestock and under shelter. The results of

such careless handling are losses in actual cash value beyond the cost of adequate storage facilities.

Improved and expanded storage facilities would in many cases aid growers in marketing their wheat to advantage. Farmers can now store their own wheat and obtain government loans, instead of taking it to a bonded warehouse. According to an article appearing in the Knoxville Journal June 5, 1942, it was pointed out to the AAA Committee that farmers in Knox County will be loaned $1.40 on each bushel of wheat. The market price of wheat at that time was around $1.20 per bushel. This places farmers who have satisfactory storage facilities in an advantageous position.

Any storage program, to be a success, must have well designed structures, and the grain must be well seasoned and protected from insects and rodents. A good storage house should be designed to permit easy filling and unloading. The arrangement within the storage house should be designed to allow transfer of the grain from one bin to another.

One of the most laborious tasks is unloading into the bins. If some thought is given to the storage before building, an easy method for unloading can be built into the structure at little extra cost. By means of a stationary or portable elevator bulk grain can be placed in farm storage or granaries. Under favorable conditions hillside bins can be used which eliminates the need for a portable elevator for filling and emptying the bins.

The Agricultural Engineering Department of the Experiment Station could render valuable service to farmers by designing inexpensive and effective structure for farm storage of grain, and by ascertaining the cost of converting farm sack-grain harvesting, handling, and storage equipment into bulk equipment.

Considerable improvement can and should be made by farmers in the Knoxville area in handling and providing facilities for handling and storing bulk grain. Owing to the shortage of burlap bags, bulk storage of grain on farms may become the only alternative.

Quality Improvement

There is little question but what greater attention on the part of farmers to producing cleaner wheat, of better milling quality, will result in a better demand for flour made from local wheat.

It is suggested first that mills pay farmers prices that adequately reflect differences in the quality of the products in each case, and thus provide an incentive for improvement. This in turn would require use of more complete testing equipment by mills, as described in Chapter V. A grain grading school is needed, to be conducted by the Crop Improvement Associations and State Extension Service for millers, grain dealers and buyers. When buyers grade in this area, many complaints are heard regarding the wide differences in grade given loads from the same bin.

As a second step, more mills can assist farmers in improving their grain by installing smut treating machines, more complete seed cleaning outfits, and by arranging for purchase or exchange among farmers of improved seed grain.

A third phase of the work of millers is educational, that of "talking up" quality improvement among farmers. Millers can perform valuable service as contact men for the crop improvement specialist of the Extension Service.

Improvement of storage conditions and treatment of grain in storage is another approach to improvement of quality, and to control of moisture content and weevil damage.

Educational work conducted by State extension and crop improvement organizations can accomplish much in increasing quality of grain produced. By encouraging the farm practices which are beneficial to both the producer and the buyer, grain of higher grade can be grown and marketed, and the entire industry will benefit from such a program.

Market Quotations

The system of market quotations in this area is generally unsatisfactory, one price being quoted in the daily papers for corn and wheat, without reference to grade. Farmers do not know how to interpret these prices in terms of their particular grade of grain. At least the grade should be designated to which the price applies. It would be desirable

to give prices for more than one grade, and for both white and yellow corn. Until an active local market for oats, barley, and rye are established, at least nominal quotations should be listed.

Cooperative Grain Buying Agencies

There is only one cooperative grain-marketing agency in the State and that is in the Knoxville area. This association buys outright, processes, and resells grain and feeds. It also does some feed and flour milling for farmers.

It is doubtful if this type of membership or management should be recommended generally for country mills. However, cooperative grain marketing agencies at trade centers, warehouses or elevators, dealing in various kinds of grain should be considered. There is a need for more grain buying agencies at trade centers that will provide a year-around market for all grains, and provide facilities for storing, handling, and conditioning grain for farmers and others. The cooperative section of the Farm Security Administration and Farm Credit Administration are designed to meet this need. Loans are made to enable farmers to form a cooperative association which will furnish marketing or purchasing services which they need.

Merchant Trucker Outlets

The merchant has come to be the most convenient marketing agency of many farmers, for a great variety of products. Functioning as a

dealer he buys livestock, potatoes, peaches, etc., direct from the farmer, but not so with grain. Hauling is on a hired basis in this area, and in truck lots. This is a distinct handicap to farmers with less than truck lots who are located considerable distance from mills. For them practically no market exists for their grain other than as feed for livestock.

For the most part this situation reflects fundamental weaknesses in the grain marketing set-up of the area.

Specific reasons why truckers do not buy grain from farmers are as follows:

Difficulty in handling marketing cards (for wheat only).
Tennessee grain is usually of poor quality; that is, light weight, high in moisture, infested with wild onions, cockle, some smut, and weevils.
Truckers do not know how to grade grain.
For Tennessee especially, each farmer has only a small quantity to sell in many instances.
Farmers with poor quality grain do not know it is poor quality and are unwilling to sell to truckers for what it is worth.
Farmers feel that they are getting cheated on both weight and grade, as well as in price.

Wheat

Tennessee wheat is generally of poor quality. It is a soft winter wheat, low in protein, and not well suited for milling of flour used by commercial bakers for making bread. Local wheat is usually of light weight, high in moisture content, infested with wild onions, cocke, weevils, and some smut. All of this renders it undesirable for milling of high grade flour. Many of these conditions are under the control of the farmer or grain handler.

Promotion of Whole Wheat in the Diet of Rural Families:

Since small mills have difficulty in producing a white patent flour equal in quality to that of the large mills, it is desirable that they concentrate their efforts on producing a less refined type of flour, preferably whole wheat. This brings up the question of obtaining outlets for this type of flour.

It is suggested that home demonstration agents and home management supervisors, in their drive for more adequate and wholesome diets, point out the merits of food products from locally grown and locally manufactured cereals, and from whole wheat flour. Demonstrations should show how to make tasty rolls, biscuit breads, cookies, and cereals from the whole grain. The South would experience a two-fold gain in the universal incorporation of this health food into the diet, for that would provide a broader market for a local industry. The State Agricultural Extension Service in North Carolina is at present (1942) undertaking a program along the lines just indicated. The program there is "the answer to the problem created in eastern North Carolina by the rapid increase in small-grain acreage".(3)

While large milling and bakery interests spend large sums for advertising the merits of their varied products, it is appropriate that a farm supported agency take the initiative on behalf of

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(3) L. L. McLendon (Dumplin County, North Carolina), article in Extension Service Review, 1942.

the grain farmers to create demand for their products.(4)

Use of Home Grinding Outfit: In communities where small flour and grist mills are not readily accessible, introduction of small home grinding outfits should be encouraged. In North Carolina the Agricultural Extension Service, in connection with the nutrition program, is featuring the desirability of home grinding. Satisfactory small mills are on the market, one recently developed by the Tennessee Valley Authority. The community service program of the Farm Security Administration is also designed to meet this need; it can make loans to supply much-needed services or equipment too costly for one individual to obtain. Groups of low income farm families can get together and borrow money at low interest rate (3 percent) to purchase equipment. These loans run from 1 to 5 years, according to the amount of the loan, the type, and life of the services. Longer periods can be arranged if found advisable.

Promotion of Soft Wheat Flour for Bread Making: Commercial bakeries in this area use hard winter wheat and hard spring wheat flour for making bread, mostly hard winter wheat flour. There is considerable demand for soft wheat flour for home baking and pastries. Some bakeries claim that soft winter wheat flour does not make good bread, others stated that bread could be made from soft wheat flour, but that bakeries are unable to use it because bread made from soft wheat flour

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(4) Per capita consumption of wheat products in the U. S. is about half that of some other nations, and in the south it is much lower than in many other sections of this country.

does not stand the rough machinery used for making bread.

Cereal chemists should direct their efforts towards the possibilities of putting out high quality flour from soft winter wheat, to meet the demand of commercial bakers. This would require extensive baking tests to determine desirable blends and processes adapted to the varieties of wheat grown.

Plant breeders at the Agricultural Experiment Station should and are attempting to develop a wheat of higher protein content with superior milling quality that will yield well under local conditions.

Positive Approach to Better Wheat:

1. Developing portable seed cleaning and treating machines: These machines provide the services of equipment that the farmer cannot afford to own, and in addition deliver the services to his granary door, at rates that are no higher than trucking charges to a central point. This would bring about material improvement in the quality of grain going to market.

The community service program of the Farm Security Administration is set up to meet this need. It provides credit to a group of low income farmers at a low rate of interest for the purchase of equipment which could not be purchased by an individual farmer.

Small flour and grist mills can assist farmers in their communities by installing seed cleaning and treating machines.

2. Place a premium on good quality wheat: This would be an excellent method of getting proper varieties established in an area, and retaining the purity and quality once the desirable varieties have been established. This positive approach is far better than the old system of seriously docking the grain, which is negative in its approach. This would require use of more complete testing and grading equipment by mills and other grain buying agencies.

3. Develop a wild onion or garlic control plan whereby wild onions or garlic are controlled by means of cultural operations: It offers a practical, efficient, and effective method of keeping garlic in control when the land is not in wheat. Farmers should avoid sowing wheat containing onion bulblets and use every means to rid the farm of them if already established.(5)

This plan of control is another example of a positive approach to a serious menace that has threatened the wheat growing and processing industries of the area.

4. Use seed free from cockle: Cockle cannot be removed from wheat very easily, and is very injurious to flour. Special care should be taken to sow only seed free from cockle and to remove all plants that appear in wheat fields.

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(5) Methods of eradicating wild onions are given in Farmers' Bulletin 610.

5. Thresh wheat when dry: Threshing and combining operations should not start until the moisture content of wheat is 14 percent or less. Dryness has always been a much sought-after quality of wheat. Grain that contains more than approximately 14 percent of moisture will often spoil during storage or shipment. It may spoil with even lower moisture content in a warm, damp climate or under improper storage conditions.

Threshers can help by not insisting on threshing immediately after a rain or in damp weather while the grain is not thoroughly dry.

In communities where threshers are scarce and where farmers have only small quantities of grain the operators have insisted on threshing grain in damp weather and even after a rain when the grain is still wet. Under such circumstances the farmer has no choice other than to thresh when the grain is damp or not at all. If all farmers would stack their wheat and let it go through a sweat before the threshing starts, the moisture situation would be improved.

6. Prevent damage in storage: Storage damage includes heat-damaged, weevil-damaged, and moldy grain. Damage in storage usually is preventable because it takes place in the storage bins, which in turn are under the control of the farmers and grain handlers.

Ventilation or artificial drying of high-moisture wheat, and fumigation, are the usual means of preventing damage in storage.

The best practice is to thresh or combine wheat only when it is dry enough to store safely; but wet weather at harvest or threshing time, too early use of the combine, or green weed seeds in the threshed grain

may cause wheat to have too high an initial moisture content for safe storage on the farm.

Under such conditions, simple and reliable methods of holding and drying damp grain without spoilage would be valuable. If inexpensive and effective methods for ventilating grain in the bin were available, the problem would be partly solved, but no method has as yet been devised that is universally satisfactory.

7. Develop better milling varieties of soft winter wheat: Wheat of higher protein content, and harder and flintier than wheat now grown which will produce a higher yield of better quality flour, needs to be developed. Such wheat should produce flour demanded by commercial bakers for bread making.

Plant breeders at the experiment station should and are attempting to develop a wheat of higher protein content, superior in milling qualities.

8. Reduce damage from weevils and grain moths:(6) These insects do considerable damage to wheat in this area, and wheat damaged by weevils is heavily docked on the market. If heavily infested the wheat is classed as feed wheat.

This damage may be prevented by use of liquid carbon disulphide. This calls for air-tight bins. Otherwise the control is not difficult or expensive.

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(6) Detailed information concerning these pests, and complete directions for destroying them, are contained in Farmers' Bulletin 799.

Educational work conducted by State extension and crop improvement organizations, and instructors in vocational agriculture, concerning these pests with complete directions for destroying them would accomplish much in increasing the quality of wheat produced in this area.

9. Smut control: (7) The smuts are common diseases of wheat in this area. There are two of them, the stinking smut and the loose smut. Wheat infested with smut is discounted heavily on the market.

The stinking smut can be controlled and even eliminated by treating the seed with formaldehyde, which is easy to apply.

The loose smut can be controlled by hot-water treatment. The hot-water treatment, however, is difficult to apply and is not generally practicable for farmers to use.

Methods of smut control, and methods of treating wheat for smut, should be promoted through educational work by State Agricultural Extension Service and crop improvement associations, and vocational agriculture men in their respective communities. Through these organizations much could be accomplished in increasing the quality of wheat produced in those communities.

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(7) For a more complete discussion of the smuts of grain, and of smut treatments, see Farmers' Bulletin 507.

Other Problems in Connection With Marketing and Storing Wheat: Much could be accomplished towards increasing the quality of wheat produced in this area by providing bulk storage facilities with equipment to handle and condition wheat. This would also enable farmers to store the wheat on the farm, and thus take advantage of the wheat loan program. Mills would be in position to store and condition grain for farmers and others. To provide facilities and equipment of this type would be too costly for small scale farm and mill operators.

Small mill operators and truckers buying wheat have difficulty in handling marketing cards, required of all wheat growers. As a result some of the small mills do not buy any wheat, and in some cases did not do any custom grinding of wheat in 1941, due to reasons stated above. Truckers formerly bought considerable quantities of wheat from farmers, especially in the Ohio River Valley, but due to red tape in handling marketing cards, they have been buying practically all their wheat, the last two years, from mills and elevators in that area.

It appears that the use of marketing cards for wheat will be in force for some time to come, and in order to overcome these difficulties in handling it is suggested that the AAA Committee and Extension Service hold educational meetings in the respective communities to instruct mill operators, grain dealers, and farmers as to how to handle the cards. This would perhaps clarify many of the questions,

and permit small mill operators and truckers to resume wheat buying.

Large numbers of farmers in the Knoxville area grow only a few acres of wheat each, and have but small quantities to sell. In such cases, and in communities where local mills are not accessible or do not buy sufficient amount to take care of the local production, there is need for some method of assembling small quantities at country points.

In those cases perhaps merchants, truckers, and others through some arrangement with larger mills could assemble wheat at country points and be of valuable service to those farmers that have small quantities to sell. Another approach is that mills and grain dealers use their own trucks in assembling those small quantities.

Many of the mills in this area, especially the smaller mills, do not have sufficient equipment for determining grade (test weight, dockage, etc.). There is a need for more uniform method of discounting wheat and also for paying premium for good quality wheat. This in turn would require use of more complete testing equipment by mills, as described in Chapter V.

Farmers with poor quality wheat often do not know that it is poor quality and consequently are unwilling to sell for what it is worth. A grain grading school is needed to be held by the State Agricultural Extension Service, and crop improvement associations, for the

benefit of farmers, millers, and other grain dealers.

Many small country mills in this area do not provide a year-around market for wheat. In some communities the small mills do not buy wheat at all. The main reason is that they are not equipped to produce high grade flour in competition with the larger mills. They do not have an outlet for their finished products. Consequently many farmers are forced to sell their wheat to large mills located at central points, often located 40 to 60 miles away. This adds considerably to the marketing cost.

Cheap truck and barge transportation of wheat from the Ohio River Valley in recent years had had a tendency to lower the price of local wheat.

Although river barges have not brought wheat up as far as Knoxville in the Tennessee area they are bringing wheat to Nashville and Chattanooga, which is tending to lower the price level in this area.

Corn

There is a wider and more uniform market for corn in this area than for any of the other grains. Considerable demand exists for white corn meal throughout the year. Considerable demand exists for yellow corn for use as feed, especially chicken feed. Dealers have to depend on outside sources for this product. It was estimated that almost

nine-tenths (87.1 percent) of the yellow corn handled by mills is shipped in from out-of-state, but only 16.7 percent of the white corn (Chapter III).

According to agronomists it is very probable that within the next three to five years yellow corn hybrids will be available that can be recommended for Tennessee. Plant breeders at the Tennessee Agricultural Experiment Station might well direct their efforts towards the development of hybrid corn, to increase yields and production and thus more nearly meet local demand.

The seasonal pattern in marketing corn has not changed much, in spite of the fact that earlier marketing is now possible by greater use of trucks and the planting of hybrid corn. Neither has the actual season of marketing corn been affected greatly by commodity credit corporation loans to farmers.

Corn can be more conveniently and cheaply stored on the farm than wheat or other grains. A good substantial crib can be built at a fairly low cost. However, it should be a well designed structure to keep the corn protected from insects and rodents. Storage of corn at terminal or central markets is seldom practical for farmers in this area.

A considerable number of farmers believe it pays them to hold their corn. When corn is sold by grade, either as shelled corn or as ear corn, the loss in weight usually does not reduce the total value

of the corn. Shrinkage usually is simply a loss of moisture, and such loss is likely to improve both the quality of the grain and its price. If, however, some factor other than moisture content determines the grade, then shrinkage may become an item of cost. In farm-stored corn, damage to kernels (chiefly by insects, molds, and rot) frequently lowers the grade. If corn is so damaged a reduction in moisture will not raise the grade, but the dry corn will usually sell at a somewhat higher price.

The demand for corn, depending largely on the needs for feed and food, is fairly well distributed over the year. Sales of corn respond very readily to price changes, selling being heavy when the price is satisfactory, and resistance to sales being stubborn when prices are considered too low.

Printed price quotations for corn in this area are without reference to grade or color. It would be desirable to give prices for more than one grade and for both white and yellow corn.

If premiums were paid for good quality corn it would be helpful in getting proper varieties established in the area, and in retaining purity and quality, once the desirable varieties have been established.

Proper control methods of disease and insects that are seriously injurious to corn would do much to increase the quality of corn produced in this area. This work should be carried on by the Agricultural Extension Service, Crop Improvement Associations, and vocational agricultural teachers.

Feed grinders and corn shellers would be of service to farmers in the respective communities, if installed in all mills. These machines would provide the service of equipment that small farmers cannot afford to own individually.

In communities where small flour and grist mills are not accessible, farmers could group together and purchase portable feed grinders and corn shellers. The community service section of the Farm Security Administration is set up to finance this need.

In communities where no market is now accessible, and especially where farmers have only small quantities of corn to sell, merchants could accept corn in trade and have it ground into meal at grist mills.

Cheap barge transportation of corn from the Ohio River Valley and Argentina in recent years has had a tendency to lower the price of corn. Although river barges have not brought corn as far as Knoxville, they are bringing it to Chattanooga which is tending to lower the price level in this area. Farmers that formerly marketed their corn in Chattanooga are now selling in Knoxville.

Oats, Barley, and Rye

There is need for a better developed market for oats, barley, and rye in this area. Very few mills buy any oats or barley, with the exception of two or three feed manufacturing plants. Only one

mill of the forty-five visited reported handling rye. Other than the above mentioned mills there was no market for oats, barley, or rye except for seed.

The desirability of increasing the production of fall-sown oats, barley and rye for winter cover is recognized as a good farm practice, from the standpoint of soil conservation, and for increased production of livestock. These fall-sown grains have the threefold advantage of providing a winter soil cover, a grain crop, and some winter pasture.

The use of home ground and mixed feeds is a good farm management practice, recommended for years, but which needs further emphasis by livestock specialists.

The use of portable feed grinders and mixers, in communities where mills equipped for grinding and mixing feed are not readily accessible, would make it possible to utilize locally grown feed grains.

The Community Service Section of the Farm Security Administration can make loans to groups of low income farmers for equipment too costly for a farmer to obtain as an individual. This equipment could be owned and operated by an individual for the benefit of a group; jointly by several members of a group; or by the group as a whole (unincorporated association).

In communities where flour and grist mills are readily accessible, the installing of feed grinding and mixing equipment that farmers cannot afford to own alone, can render an additional service to the

community. Feed grinding and mixing equipment in a community makes it possible to utilize locally grown feed grain. City business groups, or Chambers of Commerce, in the large cities of the area should take the responsibility of finding or developing a market for the grains now being encouraged for cover crops and as substitutes for corn. If these grains could be assembled into car or truck lots, outlets could be found in the area or in nearby cities.

Selection of suitable varieties, use of the recommended cultural methods, proper seed treatment, harvesting when the grain is mature, careful threshing and subsequent handling of grain are important farm practices which will help improve the grade and value of grains.

Oats: Oats enter less into commerce than wheat, corn or barley, because it is too bulky in relation to price to bear the cost of long-distance transportation. Therefore, the greatest portion of the crop is consumed on farms where produced.

The by-products from oats are the basis of a large mixed-feed industry. Oats is very valuable for diluting a heavy grain ration, such as corn.

There has been a slight resumption of oat production in this area since 1929. The development of hardier, more disease-resistant, and more productive varieties should permit further extension of

fall-sown oats.

Oats is better adapted to climatic conditions in this area than wheat. From the standpoint of soil conservation, and for increased production of livestock and livestock products, winter oats probably has some future in this area. With a better developed market for oats farmers will be able to use their land to better advantage, increase the quantity of feed produced, and better utilize locally grown feed grains.

Barley: Barley acreage in East Tennessee has shown a substantial increase at each census period since 1909, and indications are that the acreage will continue to increase. The very high return per acre is gradually causing a higher appreciation of barley as a feed crop. In general, the trend at present is towards an increase in the farm use of barley for feeding stock, for winter cover, and for winter pasture. The climate in East Tennessee is favorable for winter barley, and the crop has been more profitable than oats. Probably the most important factor contributing to the increase in barley acreage is the development of varieties especially adapted to this section.

As in the case of oats, there is need for a better developed market for barley, a grain marketing agency that will provide a year-around market for barley as well as other feed grains.

Rye: Rye closely resembles wheat in composition and use, as

its protein is of a character that permits the use of yeast in making raised bread. However, with plentiful supplies of wheat, the consumption of rye products is not likely to be increased very much. Rye grain is not specially desirable as a feed for livestock, although some is fed.

From an agricultural standpoint, it is unfortunate that conditions are not more favorable for development of the rye crop. There is much land on which it can be grown to advantage, in fact to better advantage than wheat. A dependable market for an enlarged production would assist in establishing a system of agriculture that would utilize our natural resources better, and enlarge the quantity of food and feed that we can produce.

CHAPTER IX

SUMMARY

Findings

Over 12 million bushels of grain were harvested in 23 counties of Knoxville area in 1939, which represents one-fifth of the grain produced in the state.

Slightly over half (51.5 percent) of the cropland harvested in 23 counties in East Tennessee in 1939 was in grain. This is 2.6 percent more than the 48.9 percent for the state as a whole.

Corn is by far the most important grain crop in East Tennessee. Of the total acreage in grain crops in 1939, 74.4 percent was in corn, 19.1 percent in wheat, 2.8 percent in barley, 2.4 percent in oats, and 1.3 percent in rye.

The general trend in total acreage of grain crops in East Tennessee has been downward since 1909. Total acreage decreased from over three-fourths million acres in 1909 to around a half million in 1939, which was almost a 30 percent decrease. Production, however, decreased only a little over 5 percent during the same period.

Approximately 80.2 percent of the 1940 corn crop in East Tennessee was consumed on the farm. The largest proportion, 76.8 percent, being fed to livestock.

Of the wheat, 52.6 percent was sold, 20.5 percent was ground or exchanged for flour, 11.6 percent was fed to livestock, 8.6 percent used for seed, 1.4 percent was lost from shrinkage, and 5.3 percent held on farms as carryover. The proportion ground or exchanged for flour was larger than for the state as a whole.

Mills are the chief marketing agencies in the area. There are approximately 99 mills in East Tennessee, 96 grinding flour and corn meal, 2 grinding corn meal and feed, and 1 feed manufacturing plant. There are no grain elevators or other agencies in the area that buy, store, or condition grain for farmers or others.

It is estimated that 3,360,000 bushels of wheat and 3,240,000 bushels of corn could be milled annually in East Tennessee, based on 200 day operation and 60 percent of capacity. These figures include only those mills buying grain, excluding small grist mills.

Most warehouses storing grain in East Tennessee are operated in connection with mills. However, one warehouse has stored grain in sacks for the Commodity Credit Corporation for the past few years.

Total rated grain storage capacity for East Tennessee as of March 1, 1941, was approximately 1,074,815 bushels. Storage capacity

was reported at 539,140 bushels for bulk grain, 473,650 bushels for sacked grain, and 62,025 bushels capacity of crib storage for ear corn.

Grain storage facilities in this area are fairly satisfactory as to distribution and location, but are not adequate in volume and type of storage. The two main complaints about grain storage are (1) the amount of public storage is too small, and (2) the type and equipment in most cases is inadequate. Practically all of the mills are privately owned and do not make a practice of storing grain for farmers and others. Very few of the smaller mills have much bin storage capacity, and do not have facilities or equipment to handle bulk grain. Consequently much grain has to be stored in sacks, which is not a satisfactory method of storing grain for any length of time.

Practically all of East Tennessee grain is handled and marketed in sacks, whereas all out-of-state grain that is shipped or trucked in is in bulk.

Sack handling is more suitable for small scale mill and farming operations as it involves less capital equipment, but there are many advantages of bulk handling.

It is estimated that approximately 5,743,000 bushels of grain were handled by mills in the East Tennessee area during the marketing year July 1940 to July 1941. Of this amount around 57 percent was wheat, 23

percent white corn, 12 percent yellow corn, 6 percent oats, 1 percent barley, and less than 1 percent rye and grain sorghums combined.

Over one-half the grain handled by these mills (51.6 percent) was shipped in from other states. The proportion of grain shipped in were: yellow corn, 87.1 percent; oats, 81.6 percent; wheat, 55.3 percent; barley, 44.1 percent; and white corn, 16.7 percent. All rye handled in the area was obtained in Tennessee, all grain sorghums shipped in from other states.

Of all out-of-state shipments, Indiana led with 17.8 percent of total receipts. Other states ranked in importance in the following order: Ohio, Missouri, Kentucky, Illinois, Alabama, and Texas.

In addition to whole grains, it is estimated that between 2,000 and 2,500 tons of commercial feeds are handled annually by mills in the area. A large percent of this is shipped in from other states. Illinois, Ohio, and Indiana are the major sources of commercial feeds.

Of all local wheat sold in Knoxville 99.7 percent was received from 15 East Tennessee counties. One-third was from Jefferson County. Knox and Jefferson counties furnished over half the local supply. Grainger, Blount, Loudon, and Sevier furnished considerable amounts. These six counties furnished over four-fifths (83.5 percent) of the local wheat receipts in Knoxville. None of the other nine counties selling in Knoxville furnished as much as 3 percent of the local supply.

Local corn was sold in Knoxville from Knox and seventeen surrounding counties. Over one-fourth (28.7 percent) of Tennessee corn receipts in Knoxville were from Roane County. Roane, Rhea, Loudon, Knox, and Monroe counties furnished over 80.0 percent of the local corn received in Knoxville. Only one of the remaining thirteen counties, Grainger, furnished more than 3 percent of all local corn.

Heaviest receipts of grain by Knoxville mills occurred during July and August with little change throughout the rest of the year. The relatively uniform flow of all grain is due to purchasing by mills from other states throughout the year to meet current requirements.

Around 59 percent of all local farm sales of wheat are made during June, July, and August. Smallest sales occur in January and February.

Over a nine year period, 1931 to 1940, sale of corn by farmers in East Tennessee was characterized by two heavy marketing months, November and July. Purchases were smallest in October. During the remainder of the year the monthly purchases are fairly uniform.

According to a survey of 45 mills in East Tennessee, 76.5 percent of all out-of-state grain was shipped in by rail. Of all out-of-state grain received in Knoxville, around 80.0 percent was by rail.

For the 45 East Tennessee mills covered in the survey the proportion of each grain shipped in by rail was as follows: wheat, 80.5 percent; white corn, 42.1 percent; yellow corn, 71.3 percent; oats, 84.1 percent; barley, 100 percent; and grain sorghums, 100 percent. The remaining out-

of-state receipts and all local receipts were by truck.

A total of 69,537 tons of grain were shipped into Tennessee by water during the marketing year July 1940 to July 1941. All of this grain moved from states contiguous to the upper Mississippi and Ohio Rivers. Practically all of it came to Nashville and Chattanooga. Of the total amount of grain shipped by water over one-half (55.1 percent) was wheat, 35.5 percent corn, 2.8 percent oats, 5.9 percent barley, and 1 percent rye.

East Tennessee being a deficit grain producing area, farmers have a price advantage over the rest of the state as well as over central markets like Nashville and Chicago, but cheap barge and truck transportation rates are reducing this advantage.

Over a 17-year period (1925-1941) the average price of corn received by farmers in East Tennessee was 88.3 cents per bushel. Prices were highest during May through October. September was the peak month, averaging 99 cents per bushel. Lowest prices were in November, December, and January, reaching the lowest point in December, 77 cents per bushel.

During a 17-year period (1925-1941) prices received by farmers for wheat in East Tennessee averaged $1.15 per bushel. Highest prices were received during February through June. The peak month was May with an average of $1.21 per bushel. Lowest prices were received during July through December, reaching the lowest point in August, at $1.09 per bushel.

Price of oats was more uniform throughout the year than for other types of grain. Over a 9-year period, 1933 through 1941, highest average

monthly price, 58 cents per bushel, was in April, and lowest, 49 cents per bushel, was in July.

The highest price received by farmers for barley in East Tennessee came most commonly in October. During the years 1933-1941 prices increased an average of 11 cents from the low price during July until October high.

From 1933 through 1941 the highest price received for rye in East Tennessee occurred during October and November and averaged 8 cents above the average for July.

Over a 5-year period, 1937 through 1941, price of corn in East Tennessee averaged 8.8 cents per bushel above the state average; wheat, 6.2 cents; oats, 4.6 cents; barley, 4.9 cents; and rye, 3.5 cents per bushel.

During the marketing year, July 1940 to July 1941, Tennessee wheat averaged much lower in test weight per bushel than out-of-state wheat. The average test weight of Tennessee wheat was 57 pounds as compared with 59 pounds for out-of-state wheat. Dockage of wheat received by truck in Knoxville averaged 15.0 percent for Tennessee wheat, and only 0.5 percent for out-of-state wheat.

Blount County stores obtained 96.0 percent of their flour from mills within the Knoxville area as compared with 73.5 percent for stores in other counties.

All of the corn meal handled by stores in Blount County was obtained

from mills within the Knoxville area as compared with 82.7 percent for stores in other counties.

Approximately 90 thousand barrels of flour are used annually by Knoxville bakeries for making bread and pastries. Of the total amount of flour used by Knoxville bakeries only 5.0 percent was obtained locally. Practically all of the flour that is shipped in is hard winter wheat flour. Of the total amount of flour shipped in, 94.3 percent was hard winter wheat flour, and 5.7 percent was hard spring wheat flour.

The development of improved milling machinery, steam and electric power, and more rapid transportation has resulted in a decreasing number of mills. Capacity of mills are large, serving wider areas than formerly.

Producing areas from which supplies are drawn and distribution areas of the marketable products, may or may not coincide. For some of the smaller mills doing a large proportion of custom business, producing and distributing areas are small and coincide.

There were several methods by which mills in this area procure grain. Direct from farmers, through brokers, from truckers, direct from mills and elevators in other areas, and through buyers who are local farmers or business men and buy grain for some of the larger mills and receive commission for their services.

It is not a universal practice of mills in this area to hedge. Only the larger mills made a practice of hedging. All of the mills that reported hedging handled a large volume of grain annually, and had a daily milling capacity of 80 barrels or more, except one mill with a daily milling capacity of 40 barrels.

Of the 45 mills interviewed in the Knoxville area 14 were located so that they could make use of the milling-in-transit privilege, but only 11 actually made use of the privilege.

The outlet for grain products of small country mills is rather limited, especially for flour. Commercial bakers prefer the flour from hard winter wheat, and for pastries and home baking a high patent soft wheat flour made by larger mills is demanded. There is considerable demand for corn meal within the area, and there has been an increased demand for feed grinding and feed mixing services.

The small mills which do not combine a considerable sideline business as grinding and mixing feed, handling commercial feeds or other sidelines are finding it increasingly difficult to operate and meet modern competition.

Equipment of mills in the Knoxville area varies considerably in type, make, and size. Investment varies according to size and type of mills, and the amount of equipment. Total investment varies from approximately $6000 for the smaller mills to almost $50,000 for some of the

bigger mills, and more in two or three cases.

Efficiency of mills depends on several factors such as volume of business, relative economy, in procuring raw materials, distributing finished products, and the relative manufacturing cost at different sites as influenced by water power, cost of electric power, labor supply, and other factors.

Large mills are located at points possessing favorable shipping facilities with reference to obtaining supplies of raw material by rail, and reaching a wide market for finished products. However, the large mills are not in a position to be of maximum service to local farmers.

The small mills are in position to render many more services to farmers. They are located in the farming community within a reasonable hauling distance of most farms in the community, which means a saving in transportation costs. Perhaps the most valuable services rendered by small mills is custom grinding of flour and meal. Other services that are rendered by some of the mills and which are suggestive of what others may do are: cleaning and treating seed, grinding and mixing feed, and shelling corn. These services provide the equipment that the farmer cannot afford to own and in addition brings the services to his community at a rate that is very little higher than the trucking charges to a central point.

Problems Needing Further Study

Lack of time has not permitted detailed study of all phases of grain marketing in the Knoxville area. The following are suggestions for further study in connection with grain marketing in this area:

It would be helpful if surveys similar to this one were made for other areas in Tennessee.

A study of bulk versus sack handling of grain should be made showing comparative costs of handling grain in bulk and in sacks on both farms, and in the trade.

A study should be undertaken to ascertain the cost of converting farm equipment from sack-grain harvesting, handling, and storage into bulk equipment.

Additional analysis of price data included in this report would be valuable. Rather complete data on prices have been presented in numerous tables and figures in Chapter IV and should be the basis for further study on grain prices. More detailed information on price differential at different markets within the area as well as prices paid for local and out-of-state grain by grades.

A study should be made of the possibilities and need for farmers' cooperative grain marketing at trade centers including assembling, storing and conditioning grain for farmers and others in this state.

A consumers' study of brands of flour and meal used by consumer groups, including both urban and rural families. This should include per capita consumption of local products for food and feed.

A more complete study of feed stores in the Knoxville area might well be undertaken to determine their importance as a marketing agency for local grain, and to what extent they furnish outlets for local grain products.

For a fuller and more complete picture of grain marketing this study should be followed with a complete study of distribution of grain products; including marketing channels, agencies, methods, and problems involved in marketing grain products. This would take up the volume marketed locally and amount shipped out of the state, as well as the destination of such products. The distribution of grain products would provide sufficient basis for separate study.

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APPENDIX A

SCHEDULES

GRAIN MARKETING SCHEDULE

University of Tennessee, Dept. of Agr. Economics

1. _____ Location _____ County _____ RR ____ GD _____
2. Type of Firm: Warehouse __ Elevator __ Flour Mill __ Corn Mill __
   Feed Mfg. & Mixer ____
3. Grain Storage Capacity: Bulk ____ Bu., Crib ____ Bu., Sacked _____ Bu.
   Total _____ Bu. Private _____ Public _____ Charges _____
4. Daily Milling Capacity, 24 Hour Operation: Flour __ Bbls., Corn Meal __ Bu.,
   Other _____
5. Equipment of Mill: Bleaching _____ Cleaning _____ Other _____
   Type of Power _____ _____ _____ _____

Percent Damage to:

	Wheat	Corn	Comments		Wheat	Corn	Comments
Sprouted grain				Weevils			
Heat damage				Onions			
Broken kernels				Cockleseeds			
Moisture				Vetch			
Scabby				Foreign matter			
Stack stained				Combine			
Smut				Threshing			

Quality of Local Grain:

	Ave. Test Wt.	Ave. Moisture Content	Ave. Protein Content	Average Grade
Wheat				
Corn				
Oats				
Rye				
Barley				
Other				

6. Quality Improvement Efforts: Pure Seed ____ Smut Treatment _____
   Premium Price _____ Proper handling and storage of grain _____
   Precaution in threshing to prevent mixing of varieties in community ____
   Other _____
7. % farmers holding grain ____ % farmers forced to sell by (a) lack of storage facilities _____, (b) financial condition _____.
8. Products and By-Products _____ _____ _____ _____
   Sideline business _____ _____ _____ _____
   Competitive products and brands _____ _____ _____ _____
   Effect of changing demands: Bakery bread _____
   High quality (patent) flour _____ _____
9. Trade territory and outlets. Show on map. (a) Buying territory _____
   _____
   (b) Selling territory _____
   _____

	Wheat	Corn		Oats	Bar-ley	Rye	Other
		White	Yellow				
Origin: Local (bu.)							
Toll							
Commercial							
Percent milled							
_____(bu.)							
Quality _____							
_____ (bu.)							
Quality _____							
Local Prod. Probable Inc. or Dec.							
Price Basis							
Factors Affecting Local Prices							
Method of Procurement							
Financing _____							
Seasonal distribution							
What season is best time to market?							
Why?							
Hedging							
Competition for local grain							
Amount shipped in by rail							
Amount trucked in							
Why?							
Rates							
Milling in transit							
Percent used for: Flour							
Corn meal							
Feed							

10. Location of grist mills in community. Show on map. _____

_____

Interviewer _____ Date _____

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
Cooperating with University of Tennessee
Knoxville, Tennessee

October 1941

INQUIRY ON CORN

Dear Sir:

In order that we may better assist farmers in their grain marketing problems, information and suggestions are desired concerning the disposal of your corn crop. Will you kindly answer the questions below and return in the enclosed envelope which requires no postage. I realize you will not be able to answer all questions, but will appreciate your judgment for as many items as possible.

Respectfully,

S. T. MARSH,
Agr. Statistician

In case the corn is grown under share rent, include both the landlord's and tenant's share in answering all questions.

CORN SUPPLY ON THIS FARM	CORN White (Bu.)	CORN Yellow (Bu.)
1. Approximate amount of corn on hand Oct. 1, 1940		
2. Corn produced on this farm in 1940		
3. Corn bought between Oct. 1, 1940, and Oct. 1, 1941		
4. Total Supplies (sum of items 1, 2, and 3)		
DISPOSITION OF ABOVE CORN SUPPLIES Between Oct. 1, 1940, and Oct. 1, 1941		
5. Corn used for planting the 1941 crop on this farm		
6. Corn ground or exchanged for meal for use as food on this farm		
7. Corn made into hominy for use as food on this farm		
8. Corn fed to livestock and poultry on this farm		
9. Corn sold direct to small local mills		
10. Corn sold direct to large city mills		
11. Corn sold direct to merchants		
12. Corn sold direct to truckers		
13. Corn sold direct to other farmers		
14. Corn sold to tenants and croppers on this farm		
15. Corn disposed of in other ways		
16. Corn lost through weather damage and spoilage		
17. Corn lost through waste, insects, rats, mice, etc.		
18. Corn on hand October 1, 1941		
19. Total Disposal (sum of items 5 to 18 inc.)		

(continued)

20. Bushels of corn sold by you each month between Oct. 1, 1940, and Oct. 1, 1941

October 1940	____	January 1941	____	April 1941	____	July 1941	____
November 1940	____	February 1941	____	May 1941	____	August 1941	____
December 1940	____	March 1941	____	June 1941	____	Sept. 1941	____

Why did you sell your corn at the time indicated above? _____

21. If sold to trucker where does he take the corn, name cities or states _____ _____ _____ _____ _____ _____ _____

22. If sold to a merchant did he have it ground into meal or sell it to mills? _____ If sold by the merchant, name cities or states to which it was shipped _____ _____ _____ _____ _____ _____

23. What qualities are required in corn for it to bring best price in this community? (a) White corn _____
(b) Yellow corn _____

24. Price of corn in your community at this time:
(a) At what price is
local white corn selling? _____ per bu.
local yellow corn selling? _____ per bu.
(b) At what price is corn trucked or shipped in from another state selling?
white corn _____ per bu.
yellow corn _____ per bu.

25. How does the year ending October 1, 1941, differ from the average year in:
(a) Percentage of corn sold to each type of buyer _____
(b) Seasonal distribution of sales _____
(c) Relative price of local and out of state corn _____

26. How can market conditions for corn in your area be improved? _____

27. Other comments and suggestions: _____

APPENDIX B

SUPPLEMENTARY TABLES

APPENDIX TABLE I. ACREAGE OF MAJOR GRAINS IN EAST TENNESSEE AND TENNESSEE (1909-1939)

Years	Corn		Wheat		Oats	
	East Tenn.	Tennessee	East Tenn.	Tennessee	East Tenn.	Tennessee
1909	576,816	3,146,348	188,377	619,861	63,564	342,086
1919	601,813	3,301,075	230,786	684,497	41,647	162,417
1924	617,644	2,872,599	122,072	287,614	10,908	52,176
1929	458,525	2,693,141	101,133	279,667	7,340	30,660
1934	497,209	2,835,976	133,650	418,249	10,107	38,618
1939	436,918	2,517,279	112,055	338,722	13,820	55,196

Years	Barley		Rye		Total	
	East. Tenn.	Tenn.	East Tenn.	Tenn.	East Tennessee	Tennessee
1909	368	2,563	3,095	22,798	832,220	4,133,660
1919	1,745	5,894	5,487	28,326	881,478	4,182,209
1924	5,199	10,059	3,295	11,744	759,118	3,234,192
1929	6,003	11,215	3,632	14,862	576,633	3,029,545
1934	8,237	26,590	6,440	24,551	655,643	3,343,984
1939	16,551	53,454	7,551	44,307	586,895	3,008,958

Source: U. S. Census of Agriculture.

APPENDIX TABLE II. PRODUCTION OF MAJOR GRAINS IN EAST AND TENNESSEE, 1909 - 1939

Year	Corn		Wheat		Oats	
	E.Tenn.	Tenn.	E. Tenn.	Tenn.	E.Tenn.	Tenn.
1909	10,589,666	67,682,489	1,531,080	6,516,559	735,777	4,720,692
1919	12,703,205	60,639,252	1,977,873	6,362,357	467,129	2,413,409
1924	10,666,141	60,248,771	1,163,938	2,892,296	158,404	954,459
1929	9,941,595	61,045,986	866,338	2,478,612	96,581	478,230
1934	10,625,326	60,250,222	1,279,168	4,255,475	162,643	618,406
1939	10,166,155	54,904,608	1,295,025	3,886,315	287,890	1,046,786

Year	Barley		Rye		Total	
	E.Tenn.	Tenn.	E.Tenn.	Tenn.	E. Tenn.	Tenn.
1909	4,507	53,201	16,863	140,925	12,877,893	79,113,846
1919	26,671	96,173	30,822	171,124	15,205,700	69,682,315
1924	83,568	167,600	25,693	87,329	12,097,744	64,350,455
1929	109,124	210,488	25,313	97,175	11,038,751	64,310,391
1934	135,255	419,667	45,208	169,733	12,247,600	65,713,503
1939	371,794	1,029,965	68,256	403,581	12,189,100	61,271,235

Source: U. S. Census of Agriculture.

APPENDIX TABLE III. RATED TOTAL GRAIN STORAGE CAPACITY IN TENNESSEE BY COUNTIES, MARCH 1942

County	No. of Plants	Capacity (Bu.)	County	No.of Plants	Capacity (Bu.)
Bedford	9	118,500	Madison	3	54,000
Blount	10	93,700	Marshall	3	180,000
Carter	3	8,700	Maury	11	416,500
Cocke	4	160,000	Monroe	8	60,000
Coffee	4	143,600	Montgomery	7	644,500
Davidson	21	5,072,500	Obion	8	279,000
DeKalb	3	22,100	Robertson	9	365,625
Franklin	5	73,975	Rutherford	10	241,000
Giles	3	58,500	Sequatchie	3	8,500
Greene	26	129,360	Sevier	8	86,900
Hamblen	3	310,260	Shelby	13	3,981,535
Hancock	4	3,700	Sullivan	11	45,500
Hawkins	5	59,250	Sumner	3	76,900
Henry	4	15,000	Warren	6	37,112
Humphreys	3	23,300	Washington	23	302,750
Jefferson	11	57,350	Weakley	5	25,450
Johnson	4	2,900	Williamson	3	467,600
Knox	9	364,090	Wilson	4	173,000
Lincoln	6	252,000	All others	49	690,030
Loudon	7	29,500			
McMinn	8	53,350	Total	339	15,187,537

Source: U.S.D.A., Bureau of Agricultural Economics, Division of Agricultural Statistics.

APPENDIX TABLE IV. AVERAGE MONTHLY PRICE OF GRAINS AT NASHVILLE, 1938-1941

Date		No. 2 White Corn	No. 2 Yellow Corn	*Local Corn Shelled	*Ear Corn	No. 3 White Oats
Month	Year	Dols.	Dols.	Dols.	Dols.	Dols.
Jan.	1938	.678	.688	.602	.583	.402
Feb.	1938	.658	.677	.598	.588	.394
March	1938	.643	.656	.580	.562	.385
April	1938	.654	.676	.590	.564	.378
May	1938	.626	.666	.566	.548	.36
June	1938	.649	.680	.600	.570	.35
July	1938	.663	.682	.631	.574	.314
August	1938	.611	.622	.547	.530	.310
Sept.	1938	.616	.627	.530	.500	.325
Oct.	1938	.539	.549	.443	.400	.318
Nov.	1938	.524	.544	.445	.390	.318
Dec.	1938	.568	.603	.558	.443	.363
Jan.	1939	.614	.624	.537	.473	.378
Feb.	1939	.597	.597	.547	.510	.371
March	1939	.608	.60	.554	.525	.38
April	1939	.635	.608	.573	.530	.390
May	1939	.678	.635	.622	.575	.407
June	1939	.674	.624	.615	.585	.405
July	1939	.647	.589	.570	.565	.333
Aug.	1939	.678	.611	.627	-	.370
Sept.	1939	.778	.684	.630	-	.433
Oct.	1939	.668	.601	.612	.550	.416
Nov.	1939	.678	.613	.609	.558	.448
Dec.	1939	.717	.674	.628	.570	.479
Jan.	1940	.744	.706	.674	.618	.497
Feb.	1940	.763	.704	.704	.635	.508
March	1940	.778	.705	.691	.635	.508
April	1940	.812	.744	.718	-	.493
May	1940	.886	.797	.775	-	.464
June	1940	.868	.790	-	-	.412
July	1940	.875	.775	-	-	.355
Aug.	1940	.836	.762	-	-	.367
Sept.	1940	.840	.764	-	-	-
Oct.	1940	.759	.722	.691	-	-
Nov.	1940	.706	.716	.665	.590	.462
Dec.	1940	.682	.682	.640	.590	-

(continued)

APPENDIX TABLE IV. AVERAGE MONTHLY PRICE OF GRAINS AT NASHVILLE, 1938-1941 (continued)

Date		No. 2 White Corn	No. 2 Yellow Corn	*Local Corn Shelled	*Ear Corn	No. 3 White Oats
Month	Year					
		Dols.	Dols.	Dols.	Dols.	Dols.
Jan.	1941	.734	.727	.670	.606	.465
Feb.	1941	.749	.702	.694	.640	.452
March	1941	.768	.754	.699	.640	.442
April	1941	.817	.794	.731	.650	-
May	1941	.836	.830	.761	.662	.427
June	1941	.818	.818	.757	.708	.388
July	1941	.844	.818	.770	.756	.422
Aug.	1941	.854	.848	.756	.726	-
Sept.	1941	.838	.840	.766	.698	.525
Oct.	1941	.764	.764	.642	.612	.494
Nov.	1941	.803	.784	.698	.666	-
Dec.	1941	.845	.830	.735	.662	-

* Truck lots.

Source: U.S.D.A., B.A.E. - Weekly Grain and Feed Market Review, Atlanta, Georgia.

APPENDIX TABLE V. AVERAGE MONTHLY PRICE OF GRAINS AT KNOXVILLE AND NASHVILLE, 1938-1941

Date		No. 2 Soft Red Winter Wheat			Local Corn Buying Price *
Month	Year	Local		Nashville F.O.B. Selling Price With Railroad Bill **	
		Local Knoxville Buying Price *	Nashville Delivered at Mill **		
Jan.	1938	1.01	.975	1.12	.64
Feb.	1938	1.05	1.00	1.11	.66
March	1938	1.025	.95	1.04	.65
April	1938	.97	.89	.99	.63
May	1938	.95	.775	.93	.65
June	1938	.80	.70	.885	.62
July	1938	.76	.70	.834	.66
Aug.	1938	.725	.675	.79	.66
Sept.	1938	.71	.65	.79	.66
Oct.	1938	.75	.66	.82	.60
Nov.	1938	.75	.70	.79	.52
Dec.	1938	.78	.67	.83	.56
Jan.	1939	.80	.712	.86	.62
Feb.	1939	.80	.75	.87	.65
March	1939	.80	.75	.86	.65
April	1939	.80	.77	.89	.68
May	1939	.85	.795	.98	.69
June	1939	.90	.80	.94	.72
July	1939	.796	.72	.84	.71
Aug.	1939	.80	.65	.85	.70
Sept.	1939	1.00	.81	1.01	.84
Oct.	1939	1.00	.85	1.02	.75
Nov.	1939	1.045	.85	1.055	.70
Dec.	1939	1.05	1.00	1.16	.70
Jan.	1940	1.125	1.06	1.16	.71
Feb.	1940	1.135	1.05	1.19	.75
March	1940	1.20	1.05	1.18	.78
April	1940	1.21	1.05	1.20	.80
May	1940	1.25	.975	1.13	.86
June	1940	1.00	.80	.975	.90
July	1940	.88	.785	.87	.83
Aug.	1940	.876	.78	.87	.86
Sept.	1940	.895	.80	.94	.87
Oct.	1940	.965	.86	1.01	.85
Nov.	1940	1.02	.90	1.03	.73
Dec.	1940	1.027	.90	1.045	.72

(continued)

APPENDIX TABLE V. AVERAGE MONTHLY PRICE OF GRAINS AT KNOXVILLE AND NASHVILLE, 1938-1941 (continued)

Date		No. 2 Soft Red Winter Wheat			Local Corn Buying Price *
		Local		Nashville F.O.B. Selling Price With Railroad Bill **	
Month	Year	Local Knoxville Buying Price *	Nashville Delivered at Mill **		
Jan.	1941	1.032	.94	1.04	.73
Feb.	1941	1.00	.875	.99	.76
March	1941	.98	.87	1.02	.78
April	1941	1.01	.92	1.065	.79
May	1941	1.06	.93	1.09	.84
June	1941	1.092	.93	1.135	.90
July	1941	1.10	1.015	1.17	.89
Aug.	1941	1.072	1.00	1.22	.83
Sept.	1941	1.132	1.00	1.29	.75
Oct.	1941	1.155	1.00	1.27	.715
Nov.	1941	1.172	1.05	1.30	.70
Dec.	1941	1.225	1.138	1.388	.80

Source: * The Knoxville Journal.
** The Nashville Tennesseean.

APPENDIX TABLE VI. AVERAGE MONTHLY PRICE OF GRAINS AT CHICAGO, 1938 - 1941

Date		No. 2 Red Winter Wheat	No. 2 White Corn	No. 2 Yellow Corn	No. 3 White Oats	No. 2 Rye
Month	Year					
		Dols.	Dols.	Dols.	Dols.	Dols.
Jan.	1938	-	.635	.588	.335	.807
Feb.	1938	.968	.600	.558	.328	.806
March	1938	-	.609	.552	.322	.72
April	1938	.880	.602	.601	.312	.658
May	1938	.821	.582	.588	.293	.600
June	1938	.755	.584	.583	.284	.543
July	1938	.704	.594	.591	.256	.526
Aug.	1938	.664	.541	.540	.240	.459
Sept.	1938	.669	.536	.530	.266	.455
Oct.	1938	.673	.464	.430	.254	.457
Nov.	1938	.670	.488	.468	.263	.465
Dec.	1938	.688	.546	.519	.293	.478
Jan.	1939	.727	.550	.524	.307	.508
Feb.	1939	.670	.525	.490	.304	.495
March	1939	.734	.536	.485	.308	.480
April	1939	.738	.548	.495	.322	.456
May	1939	.829	.575	.519	.340	-
June	1939	.747	.574	.513	.340	.500
July	1939	.692	.522	.472	.287	.457
Aug.	1939	.682	.557	.456	.296	.461
Sept.	1939	.920	.628	.567	.359	.576
Oct.	1939	.890	.609	.495	.345	.583
Nov.	1939	.920	.613	.507	.386	.570
Dec.	1939	1.040	.638	.570	.408	.620
Jan.	1940	1.059	.647	.590	.424	.720
Feb.	1940	1.056	.664	.580	.429	.697
March	1940	1.075	.662	.583	.430	.718
April	1940	1.134	.701	.632	.431	.735
May	1940	-	.758	.685	.406	-
June	1940	-	-	.657	.351	-
July	1940	.773	.761	.653	.324	.488
Aug.	1940	.766	-	.660	.300	.463
Sept.	1940	.800	-	.649	.309	-
Oct.	1940	.910	.719	.657	.342	-
Nov.	1940	-	.712	.660	.378	.520
Dec.	1940	.930	.688	.628	.381	.500

(continued)

APPENDIX TABLE VI. AVERAGE MONTHLY PRICE OF GRAINS AT CHICAGO, 1938 - 1941 (continued)

Date		No. 2 Red Winter Wheat	No. 2 White Corn	No. 2 Yellow Corn	No. 3 White Oats	No. 2 Rye
Month	Year	Dols.	Dols.	Dols.	Dols.	Dols.
Jan.	1941	-	.690	.651	.382	.642
Feb.	1941	.886	-	.638	.371	-
March	1941	.955	.720	.675	.386	-
April	1941	.944	.739	.705	.390	-
May	1941	1.012	.795	.731	.371	.655
June	1941	1.030	.833	.741	.371	-
July	1941	1.041	.863	.742	.356	.611
Aug.	1941	1.082	.850	.751	.373	-
Sept.	1941	-	.825	.757	.459	-
Oct.	1941	-	.767	.710	.437	-
Nov.	1941	-	.813	.738	.477	-
Dec.	1941	-	-	-	-	-

Source: Crops and Markets.

APPENDIX TABLE VII. AVERAGE MONTHLY PRICE OF GRAINS AT ATLANTA, 1938 - 1941

Date		No. 2 White Corn	No. 2 Yellow Corn	*Local Corn Shelled	No. 3 White Oats
Month	Year	Dols.	Dols.	Dols.	Dols.
Jan.	1938	.778	.797	.718	.460
Feb.	1938	.769	.774	.714	.454
March	1938	.75	.764	.70	.445
April	1938	.757	.778	.711	.436
May	1938	.750	.758	.685	.418
June	1938	.748	.778	.70	.41
July	1938	.772	.778	.68	.386
Aug.	1938	.729	.731	.65	.375
Sept.	1938	.723	.728	.618	.394
Oct.	1938	.660	.661	.587	.380
Nov.	1938	.642	.65	.527	.386
Dec.	1938	.686	.708	.568	.422
Jan.	1939	.717	.73	.696	.438
Feb.	1939	.698	.70	.592	.435
March	1939	.704	.695	.615	.440
April	1939	.728	.705	.638	.448
May	1939	.781	.73	.677	.477
June	1939	.773	.72	.706	.467
July	1939	.732	.666	.704	.427
Aug.	1939	.775	.706	.665	.432
Sept.	1939	.958	.767	.768	.496
Oct.	1939	.776	.700	.727	.469
Nov.	1939	.799	.709	.684	.513
Dec.	1939	.824	.770	.727	.543
Jan.	1940	.840	.798	.800	.555
Feb.	1940	.850	.789	.840	.562
March	1940	.869	.795	.855	.561
April	1940	.908	.837	.870	.562
May	1940	.982	.898	-	.535
June	1940	.970	.885	-	.490
July	1940	.980	.875	-	.460
Aug.	1940	.953	.858	-	.406
Sept.	1940	.949	.862	.802	-
Oct.	1940	.873	.831	.732	-
Nov.	1940	.809	.820	.724	.530
Dec.	1940	.786	.791	.720	-

(continued)

APPENDIX TABLE VII. AVERAGE MONTHLY PRICE OF GRAINS AT ATLANTA, 1938 - 1941

Date		No. 2 White Corn	No. 2 Yellow Corn	*Local Corn Shelled	No. 3 White Oats
Month	Year				
		Dols.	Dols.	Dols.	Dols.
Jan.	1941	.838	.835	.738	.525
Feb.	1941	.844	.828	.767	.515
March	1941	.871	.860	.790	.505
April	1941	.921	.903	.805	-
May	1941	.960	.941	.788	.500
June	1941	.965	.956	.784	.492
July	1941	.967	.947	.778	.500
Aug.	1941	.972	.967	.741	-
Sept.	1941	.983	.971	.749	.605
Oct.	1941	.900	.899	.749	.582
Nov.	1941	.908	.891	.747	-
Dec.	1941	.953	.936	.782	-

* Truck lots

Source: U.S.D.A., Bureau of Agricultural Economics, Weekly Grain and Feed Market Review, Atlanta, Georgia.