THE MARKETING OF CREAM IN OKLAHOMA

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By

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Foreword

Previous to this study very little information has been assembled as to the location of cream production or the method of cream marketing in Oklahoma. In November 1939 the Oklahoma Agricultural Experiment Station approved a project to make a two year study of cream marketing in Oklahoma. The project as set up was to be handled by the Agricultural Economics Department of Oklahoma Agricultural and Mechanical College.

The present report contains only that information obtained for the year 1938. Unfortunately information for the year 1939 was not available in proper form to be of much value in this report.

The purposes of this study are:

1. To determine the area of greatest cream production for market
2. To determine the seasonal variation in cream production
3. To determine the amount of each grade of cream produced in Oklahoma and the seasonal variation in grades
4. To determine the amount of cream handled by co-operative and private companies
5. To determine the movement of cream into and out of Oklahoma.

Since very little information has been collected relating to the development of the dairy industry in Oklahoma a brief history of the dairy industry in Oklahoma is included. The remainder of the report

deals with cream production and cream marketing in Oklahoma.

It should be remembered that it is impossible to segregate cream production from other parts of the dairy industry, therefore in many cases it is necessary to discuss the production and marketing of other dairy products along with that of cream.

Method and Scope of Study

The information forming the basis of this study was taken from individual centralizer reports made to the Oklahoma State Dairy Commissioner for the year 1938. Each centralizer is required by Oklahoma State Law to make monthly reports to the State Dairy Commissioner as to the exact amount of each grade of milk and cream bought and the uses made of each. Information concerning location of cream stations and the amount of butter fat handled by cream stations was taken from cream station reports for the years 1938 and 1939.

In addition to the above sources of data information as to the amounts of butter shipped to central markets was obtained from the Bureau of Agricultural Economics' Crops and Market Reports. Census material was used as a supplement in many cases throughout this study.

Terminology

Butter as used in this report refers only to butter manufactured in commercial creameries.

Number I or first grade cream consists of cream that is clean and palatable to the taste, has no undesirable odor, is free from curd and lumps and has less than .70 percent acidity calculated as lactic acid. 1/

1/ Definition as set up by Oklahoma State Law, Oklahoma Statutes, 1931, Article 7 of Chapter 38, Section 8607.

Number II or second grade cream consists of cream that is too sour to grade as first grade cream or contains undesirable flavors or odors in a moderate degree or that is slightly foamy, yeasty, stale or shows slight traces of sediment.[2/]

Market Milk refers to milk consumed in the fluid state in contradistinction to milk used for manufacturing purposes, and is sold under the classification of grade A or B milk.

Manufacturing Milk is milk which is converted into cheese, butter, ice cream, concentrated milk or any other dairy product except market milk.

Creamery as used in this report refers to a concern engaged in the manufacture of butter.

2/ Ibid.

History of Dairy Development in Oklahoma

Dairying in Oklahoma was of very little importance until the latter part of the nineteenth century. Even though Oklahoma was suited to the raising of dairy cattle, the Indians often used some substitute for milk. Hominy, which is very palatable and nutritious, was extensively used. Mr. George Butler, Cherokee Agent, in his annual report of 1859, stated that the Cherokees made both butter and cheese of a good quality; however both were usually made only during the spring months.[1/]

In the first Biennial Report of the Oklahoma Territorial Board of Agriculture for the years 1903 and 1904 a rather lengthy discussion of dairying was made. In this report dairying was discussed from the standpoint of the need of dairy development in Oklahoma. Those entering into the discussion were of the opinion that dairy development was needed because, as one speaker said, "Dairy farming means diversification--it means getting out of the ruts and away from the limitations of the one crop system."[2/]

This general opinion prevailed not only in Oklahoma but in most parts of the country about this time. At this time (1903) there were no creameries located in Oklahoma. There were a few cream separators located at various points along railroads leading into Kansas. The majority of the surplus milk on farms was fed to livestock or converted into farm butter and sold in the larger towns.

1/ Edward E. Dale, Readings in Oklahoma History, p. 271.

2/ First Biennial Report of the Oklahoma Territorial Board of Agriculture, 1904. "Needs of Dairying in Oklahoma," p. 150.

The first creameries in Oklahoma were started in 1904 in Oklahoma City, Guthrie, El Reno, Alva, and Shawnee almost simultaneously. By 1906 there was a creamery or representative in every town with a population of 500 or more. There was an increase of over 100 percent in the manufacture of creamery butter during 1905. By 1908 there were 28 creameries in Oklahoma; their output of creamery butter for that year was approximately 5,000,000 pounds.[3/]

With the rapid development that took place in dairying during the period 1903 to 1908 it became evident that new facilities were needed to cope with the increasing problems that were encountered in the industry. Therefore in 1909 a bill was passed by the legislature, providing for the creation of a State Dairy Commission. The purpose of this commission was to set up and enforce intelligent and practical rules of inspection and sanitation, raise standards, gather useful statistics, and create and foster a spirit of cooperation to advance dairy and creamery interests throughout the State. Prior to the formation of the State Dairy Commission, dairy regulations were extremely lax and uncertain; consequently little incentive was offered for systematic development of dairying. The State Dairy Commission has been instrumental in securing the passage of dairy laws and has assisted in keeping dairy regulations in harmony with the development of the industry. (See Appendix).

Apparently there have been two stages in dairying in Oklahoma. The first extended up to about 1904. During this early stage dairying was important only in proportion to the amount of dairy products used

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3/ First Biennial Report of the Oklahoma State Board of Agriculture, 1908.

in the home. During the period 1904 to 1909 dairying passed into a stage of commercialization. There was not a departure from the importance of dairy products used in the home with the coming of the commercial dairying but rather an inauguration of a system through which dairy products could be disposed of with the realization of a cash income to the farmer. In fact it is likely that the new system tended to increase the use of dairy products in the average farm home. In many parts of the State very little cash income is realized from the sale of dairy products and dairying is still important only as products are used in the home, but for the State as a whole the sale of dairy products forms an important source of cash farm income. (Table 1).

Table 1. Oklahoma Cash Farm Income Derived from Dairy Products, 1924-1938.

Year	Amount Received from Dairy Products (1,000 dollars)	Percent of Total Cash Farm Income Derived from Dairy Products
1924	16,340	5.1
1925	20,780	6.3
1926	21,675	8.0
1927	28,060	9.0
1928	27,380	8.8
1929	30,700	9.8
1930	24,989	14.6
1931	21,125	17.1
1932	15,588	15.2
1933	16,242	11.8
1934	17,659	11.7
1935	20,615	11.4
1936	22,253	14.4
1937	25,035	13.1
1938 */	21,844	12.0

SOURCE: Compiled by the Department of Agricultural Economics, Oklahoma A. and M. College, from data published by the United States Department of Agriculture, Bureau of Agricultural Economics, Washington, D. C.

*/ Figures for the year 1938 were taken from "Cash Farm Income", Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C., January 20, 1939.

Figures are not available as to the amount of cash farm income derived from dairying compared with other farm products prior to 1924. The percentage of cash farm income derived from dairy products increased from 5.1 percent in 1924 to 12.0 percent in 1938. This indicates that dairying greatly increased in importance so far as the cash farm income is concerned between 1924 and 1938.

The number of milk cows on farms in Oklahoma has varied from year to year but over the period from 1901 to 1939 has increased from 161,455 to 720,000. (Table II). This also indicates the increasing importance of dairying in Oklahoma.

Table 2. Number of Milk Cows on Farms in Oklahoma */ by Years 1901-1939

Year	Number	Year	Number
1901	161,455	1921	549,000
1902	172,757	1922	560,000
1903	183,122	1923	566,000
1904	188,616	1924	549,000
1905	186,730	1925	565,000
1906	192,332	1926	570,000
1907	198,202	1927	581,000
1908	338,000	1928	610,000
1909	338,000	1929	610,000
1910	355,000	1930	666,000
1911	531,000	1931	682,000
1912	504,000	1932	716,000
1913	484,000	1933	766,000
1914	484,000	1934	797,000
1915	494,000	1935	733,000
1916	519,000	1936	766,000
1917	535,000	1937	728,000
1918	562,000	1938	713,000
1919	561,000	1939	720,000
1920	560,000		

SOURCE: Yearbook of Agriculture, 1901 to 1935. 1936 to 1938, Agricultural Statistics of the United States Department of Agriculture. The 1939 figure is an estimate made by Mr. K. D. Blood, State Statistician.

*/ Number on farms January 1 each year.

Location of the Dairy Industry in Oklahoma

Dairying in Oklahoma does not follow any definite or set practice. The amounts of cream and milk produced and the areas in which it is produced are determined by both physical and economic factors. Cost of production in certain areas may prove a limiting factor, since the cost might be more than would be received from the sale of the milk or cream. Under present conditions the sale of cream is about the only means through which the average farmer can market surplus from his dairy herd. In the more developed states the farmer may have two or more markets for his milk. He may market it as manufacturing milk, as cream, or in many cases as Grade A milk. A larger number of outlets increases the farmer's chances of deriving a profit from the dairy enterprise. Farmers located near the larger towns in Oklahoma usually have two or three markets, but this group is a very small percentage of the total farmers.

Another group of factors that greatly influences the amount of cream produced are physical in nature. These factors are such as rainfall and weather conditions. In the more developed dairy states dairying is carried on much more intensively than in Oklahoma. In many cases the dairy farmer feeds practically all of the feed consumed by the cows with a minimum of pasture, but in Oklahoma the majority of the dairy cows producing milk for the sale of cream are cared for in a much more extensive manner usually with a minimum of feed being fed directly. Therefore pasture conditions greatly influence the

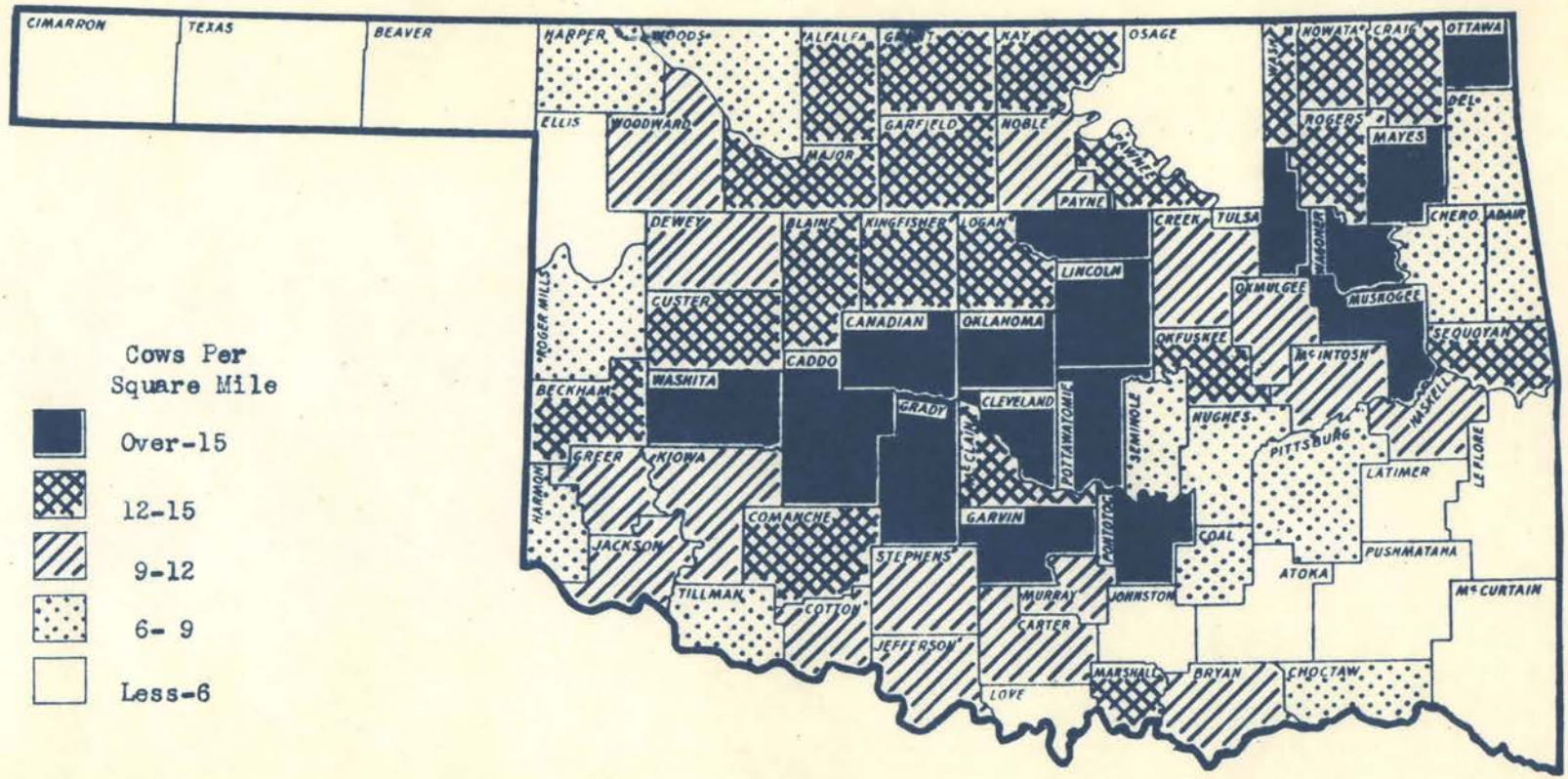
production of cream in Oklahoma. Since pasture and feed crops are dependent on rainfall and weather conditions, the above mentioned physical factors are very important determinants of cream production in Oklahoma.

The industry is much more mobile with respect to location than are most types of farming. Usually a limited number of crops can be grown in a given area determined primarily by rainfall and weather conditions, but dairy farming can be carried on in a much larger territory provided market conditions and pasture are such as to make or allow it to be profitable. This being the case, dairying varies in concentration in the State with natural conditions most suitable for dairy production and market outlets for milk. Hence, often a single county or part of a county may have very little dairying carried on within it but be surrounded by counties in which dairying is quite important. Cream production and dairying in general would, therefore, be greatest in that part of Oklahoma in which pasture and feed crops are usually most abundant and in which there is a desirable market outlet. This set of factors is most prevalent in the western half of Oklahoma.

The greatest concentration of milk cows is in the west central, north central, and north eastern parts of Oklahoma. (Figure I). This portion of Oklahoma is the greatest cream producing area, excepting those counties in which a large percentage of the milk is used for some purpose other than market cream. This is the case with Tulsa County. The majority of the milk produced in Tulsa County is used as market milk, practically all of the market milk used in Tulsa being

FIGURE I.

Number of Milk Cows Per Square Mile by Counties, 1939



SOURCE: K. D. Blood, State Statistician, Estimated number of cows on farms in Oklahoma, January 1, 1939.

produced in Tulsa County.[1] Also the larger towns usually create a market for large amounts of manufacturing milk to be used in the manufacture of cheese, ice cream, and other dairy products. Usually the manufacturing milk shed extends farther out from the central market than does the market milk shed as more lax sanitary regulations are permitted in the production and care of milk to be used for manufacturing purposes. The three Panhandle counties, Cimarron, Texas, and Beaver, have a very low concentration of milk cows per square mile. Osage County and the counties in the extreme south eastern part of the State also have a small number of milk cows per square mile compared with the rest of the State.

A high concentration of milk cows is not always an indication of a large market cream producing area because there are often two or three outlets for milk. During 1938 more than 4,000,000 pounds of Grade A and B milk were purchased by centralizer plants located in each of Caddo, Garfield, Oklahoma, and Tulsa counties. (Table 3). The large towns located in each of these counties create a market for large amounts of milk to be used for fluid milk consumption.

Until recently very little milk has been used for manufacturing purposes in Oklahoma. During 1938 centralizer plants located in Oklahoma, Murray, Tulsa, Pottawatomie, and Pittsburg counties bought more than 7,000,000 pounds of manufacturing milk per county. (Table 4). Most of these counties are located in south central Oklahoma. There is a high concentration of cows in this section of the state but very little cream marketed as indicated by Figure II. Apparently milk produced in this part of Oklahoma is used principally for manufacturing purposes.

1/ H. Little, An Analysis of the Tulsa Milk Market, (an unpublished Master's thesis, Oklahoma A. and M. College), 1939, p. 3.

Table 3. Grade A and B Milk Bought in Oklahoma by Counties 1938.

County	Amount (Pounds)	County	Amount (Pounds)
Oklahoma	24,835,186	Pontotoc	928,316
Tulsa	15,918,179	Grady	725,954
Garfield	5,851,655	Woods	505,838
Caddo	4,934,865	Stephens	574,623
Logan	1,686,167	Pawnee	204,453
Carter	1,622,650	Kiowa	213,200
Seminole	1,588,869	Muskogee	136,127
Jackson	1,387,655	Cleveland	64,000
Payne	1,385,943	Murray	53,823
Pottawatomie	1,239,830	Lincoln	38,753
Kay	1,122,682	Creek	3,082
Comanche	961,935		

SOURCE: Centralizer Reports for 1938.

Table 4. Milk Bought for Manufacturing

Purposes by Counties 1938.

County	Amount (Pounds)	County	Amount (Pounds)
Oklahoma	14,627,182	Garvin	3,212,625
Pittsburg	8,713,981	Garfield	3,006,619
Pottawatomie	7,465,329	Logan	2,862,855
Murray	7,342,507	Comanche	2,690,593
Tulsa	7,017,816	Carter	616,640
Grady	6,748,186	Pontotoc	373,007
Kay	6,330,827	Woods	306,430
Payne	6,315,910	Cleveland	246,000
Ottawa	6,013,013	Bryan	38,753
Muskogee	4,712,543	Alfalfa	15,654
Custer	4,304,563	Pawnee	6,109

SOURCE: Centralizer Reports, 1938.

Figures were assembled showing the number of cows per 100 acres of available crop land by counties. This showed a greater concentration of cows in the eastern part of Oklahoma. This can be explained because of the smaller amount of available crop land per square mile in the eastern part of the State as compared with the western part. Those counties included in types of farming areas 10 and 14 each showed a high concentration of cows.[2/] These areas contain a large amount of rough mountain and wooded area. As a result of the small amount of available crop land there is an apparent high concentration of cows. In a study of the relation of dairying to farm organization in Okfuskee county the writer found that less than fifty percent of the farms produced cream for market during any part of the year. It is believed that this is the situation in most of the south eastern part of Oklahoma. It is also believed that a larger percentage of farms in the western part of Oklahoma produce cream for market than in eastern Oklahoma. This might be explained on the basis of the more dense population per 100 acres of available crop land in eastern than in western Oklahoma, the denser population requiring more milk for home consumption.

2/ Peter Nelson, "Geographical Variability in Types of Farming in Oklahoma," Current Farm Economics, Oklahoma Agricultural Experiment Station, February, 1936.

Area Description:

10. "Some Fruit, General Farming, Dairy and Poultry. Self-Sufficing. (Rough Wooded Area)."
14. "Cotton, Self-Sufficing, Livestock. (Rough Mountain and Wooded Area)."

Location of Cream Production in Oklahoma

Since the data used in this study were available only by counties it was practically impossible to set up and segregate definite cream producing areas, therefore cream production is here discussed on a county basis. The best indication of the concentration and location of cream production available at the time of this writing is the estimated total butter fat handled by cream stations 1/ for the years 1938 and 1939. (Figure II). As a group, the counties located in the west central part of Oklahoma are the ones in which the largest amount of cream is handled by cream stations. This group includes the following counties: Beckham, Dewey, Custer, Washita, Kiowa, Caddo, and Grady, in each of which more than 200,000 pounds of butter fat were handled. Garfield and Craig Counties may also be included with the above group on the basis of cream bought by cream stations. Since cream bought by cream stations is usually produced within a short radius from the buying station it is believed that Figure II is an accurate estimate of the largest cream producing counties. The western half of Oklahoma on this basis is a much greater cream producing section than eastern Oklahoma. The three Panhandle counties and

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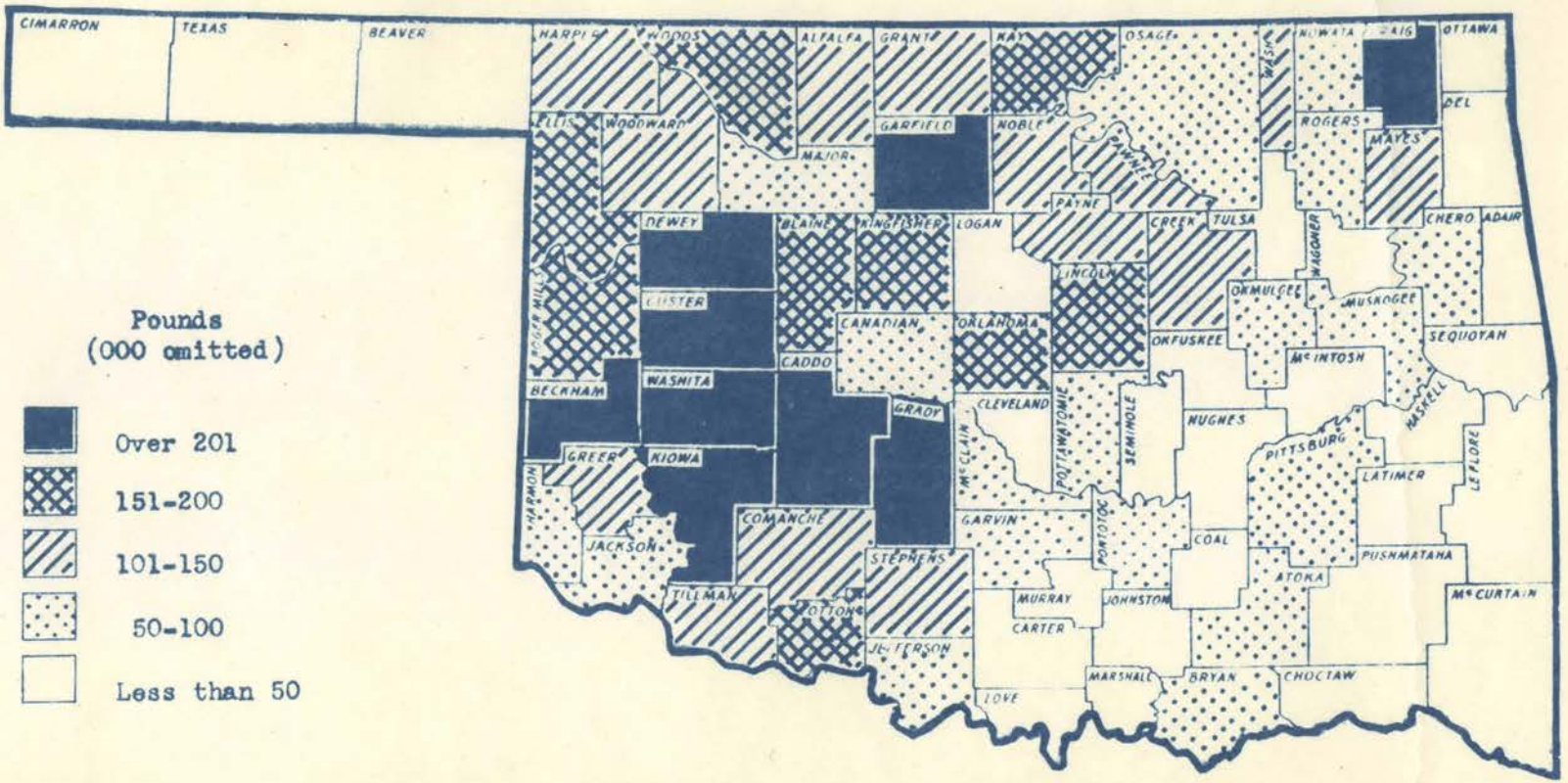
1/ Data used in preparing Figure II were taken from cream station reports for 1938 and 1939. Since all stations did not file reports the average amount handled by each cream station reporting was determined and this used as an average for the total number of cream stations located in each county for each month. For the two years 1938 and 1939, 40 percent of the stations sent in reports of the amount of butter fat purchased.

FIGURE II.

Estimated Total Butterfat Sold Through Cream Stations by Counties
1938-39



SOURCE: Cream Station Reports, 1938-1939.

practically all of the south eastern counties produce very little cream for market, each selling less than 50,000 pounds of butter fat through cream stations during 1938 and 1939.

A large number of cream stations operated in an area is indicative of a large volume of cream production. There are very few cream stations located in Texas, Cimarron, Beaver, and Osage counties and in the south-eastern part of Oklahoma. (Figure XIII). It should be noted that north-eastern, central, and west central Oklahoma have the largest concentration of cream stations.

Since it was not considered practical to define definite cream producing areas, Oklahoma was divided into quarters and each quarter designated as an area in order to determine more nearly the section of the State in which cream production is greatest. (Figure III).

The north western quarter of Oklahoma was designated as Area I. This area is made up very largely of cash grain farming.

Area II includes the north eastern part of Oklahoma. This area is very largely a general farming, range livestock, dairy and poultry type of farming.

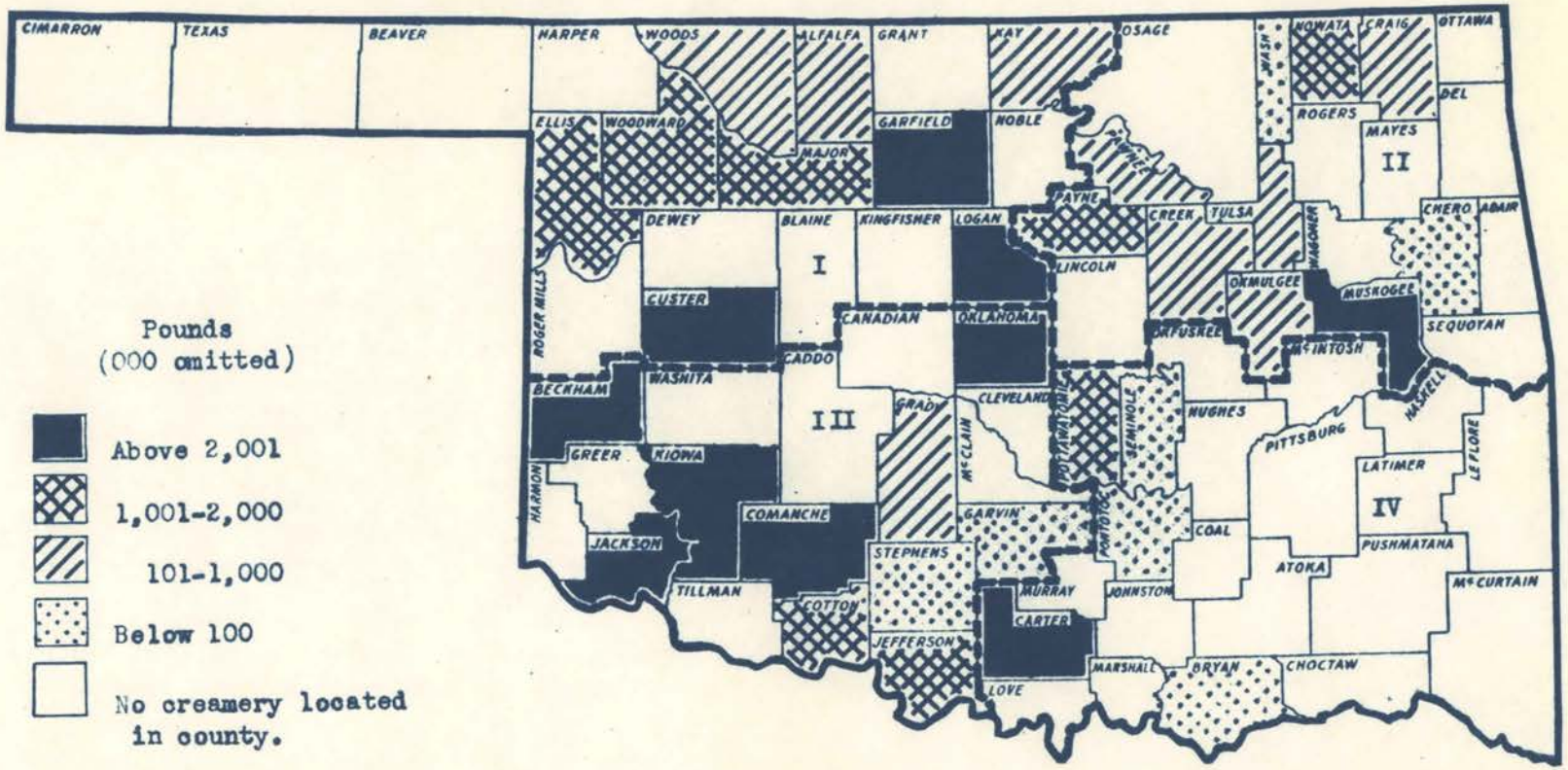
Area III is made up of the south western portion of the State. This area is largely made up of cotton, dairying, and poultry farming.

Area IV includes the south eastern part of Oklahoma. This area is largely a general farming, self-sufficing area.

Each of these areas includes counties with great variation in cream production, but there are distinct differences in production between certain of the areas. Area III appears to be the greatest cream producing quarter of the State, as 36,656,000 pounds of cream were handled by centralizers in that area in 1938. (Table 5). Area I is second in

FIGURE III.

Total Pounds of Cream Handled by Centralizers and Areas of Production, 1938



SOURCE: Centralizer Reports, 1938.

total volume of cream handled by centralizers, there being 25,764,000 pounds handled in 1938. Area II and Area IV each had less than 11,000,000 pounds of cream so handled for the same year. This indicates that western Oklahoma produces a much greater volume of cream for market than eastern Oklahoma; however it is believed that a large portion of the cream produced in Area II is processed by out-of-state creameries. It is believed that the location of creameries is an important indication of the largest market cream producing sections of Oklahoma. Of course, many of the centralizers receive cream from the entire State as well as from out-of-state shipments, but it is likely that the creameries were established in highest producing areas. It should be noted that very few creameries are located in south eastern Oklahoma.

Table 5. Total Pounds of Cream Produced in Oklahoma Handled by Centralizer Plants by Areas, 1938.

	Area I (Pounds)	Area II (Pounds)	Area III (Pounds)	Area IV (Pounds)
Butter Fat Handled by Cream Stations */	2,741,999	1,514,716	2,938,756	653,799
Total Cream	25,764,569	10,418,325	36,656,051	7,945,401
No. I Cream	23,144,659	9,397,348	32,992,625	5,645,537
No. II Cream	2,412,950	998,333	3,603,613	698,466
Sweet & Premium Cream	206,960	22,644	59,814	1,610,398
Total Pounds of Butter Manufactured	15,115,863	6,285,831	19,862,615	4,513,331

SOURCE: Centralizer Reports, 1938.

*/ Includes 1938 and 1939.

Seasonal Variation in Oklahoma Cream Production

Figures from the reports of individual centralizers indicate monthly variation in cream production. (Table 6). The amount of cream handled by centralizers in Oklahoma during 1938 varied from approximately 4,500,000 pounds in November to 13,000,000 in May. This indicates that cream production is from two to three times larger during spring months than during the fall and winter months.

The largest amount of cream was marketed during the spring and early summer months. April, May, and June were the months during which the largest volume of cream was marketed. As has already been stated pasture is a great determinant of cream production in Oklahoma. During these months pastures are usually good and the natural breeding practices that are usually followed in herds producing milk for the sale of cream are such that a large proportion of the herd freshens at this time of the year.

The market could be more nearly stabilized if through proper management of breeding practices herds freshened during the fall months. The spring months would still be the largest producing months as a result of natural conditions but production could be spread more uniformly during the remaining months. In many states educational organizations have aided in correcting the above mentioned maladjustment,[1/] but the limited attempts made to acquaint Oklahoma farmers with proper breeding practices have not met with much response on the part of the farmers.

1/ R. W. Bartlett, St. Louis Milk Problems with Suggested Solutions, Illinois Agricultural Experiment Station Bulletin No. 412, April, 1935, p. 135.

Table 6. Seasonal Variation in Cream and Milk Produced in Oklahoma and the Manufacture of Dairy Products, 1938
(000 omitted)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Amount Purchased													
Sweet and Premium Cream	214	199	303	326	470	397	521	594	544	529	522	595	5,216
First Grade Cream	5,699	6,172	8,619	9,272	11,721	10,673	6,891	6,373	4,875	4,553	3,940	4,193	82,985
Second Grade Cream	315	324	489	694	993	1,127	1,091	666	601	442	194	127	7,064
Total Cream	6,227	6,695	9,411	10,293	13,185	12,198	8,503	7,633	6,025	5,525	4,655	4,916	95,265
Grades A and B Milk*/	5,298	5,195	5,956	6,838 **/	5,884	5,568	4,441	5,491	5,220	5,103	4,837	5,769	62,973
Milk for Mn'f. Purposes	5,649	6,306	8,872	11,817	13,991	11,950	9,636	8,311	5,893	4,494	3,563	3,876	95,358
Amount Manufactured													
Creamery Butter	2,893	3,094	3,723	4,754	6,037	5,323	4,929	4,238	3,571	3,131	2,732	2,895	47,318
Cheese (All Varieties)	521	540	704	934	1,083	894	866	733	531	462	357	412	8,076
Dried and Powdered Products	110	122	177	184	226	141	132	137	104	87	82	85	1,587
Condensed Products	159	153	266	358	373	283	207	116	111	96	111	148	2,382

SOURCE: Centralizer Reports, 1938

*/ Surplus not included

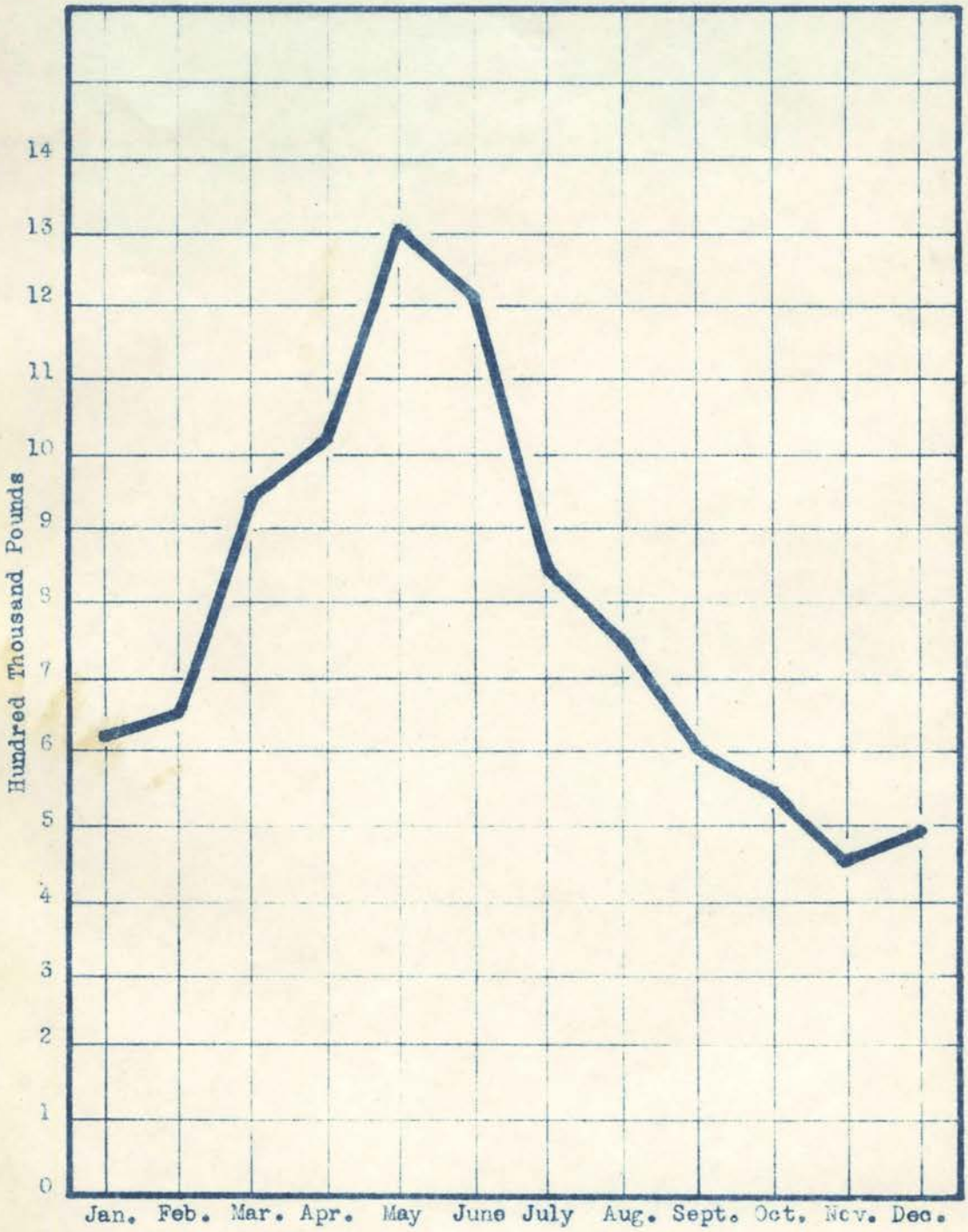
**/ Estimated from totals pounds of butter fat purchased in Grades A and B Milk

It is believed that there would be a large gain made by Oklahoma cream producers if they would more evenly distribute production throughout the year, because butter fat price is usually relatively low during the months of heavy production.

Not only is the production of cream greater during the spring months, but the production of milk for all other purposes is greatest during this period. During the month of May production of milk for all other purpcses reached its highest peak except in the case of milk sold for fluid milk consumption. (Figures IV-XI). During this month, as would be expected, the manufacture of all dairy products was greatest. The amount of milk bought for fluid milk consumption remained more nearly constant throughout the year than did the amount of milk bought for manufacturing purposes or the amount of cream purchased. Total cream purchased was greatest during May, but the total amount of second grade cream purchased was greatest during June. This indicates that the production of second grade cream is greater during the warmer months.

FIGURE IV.

Total Cream Purchased By Centralizers, 1938



SOURCE: Centralizer Reports, 1938.

FIGURE V

Amount of Number I and II Cream Purchased, 1938

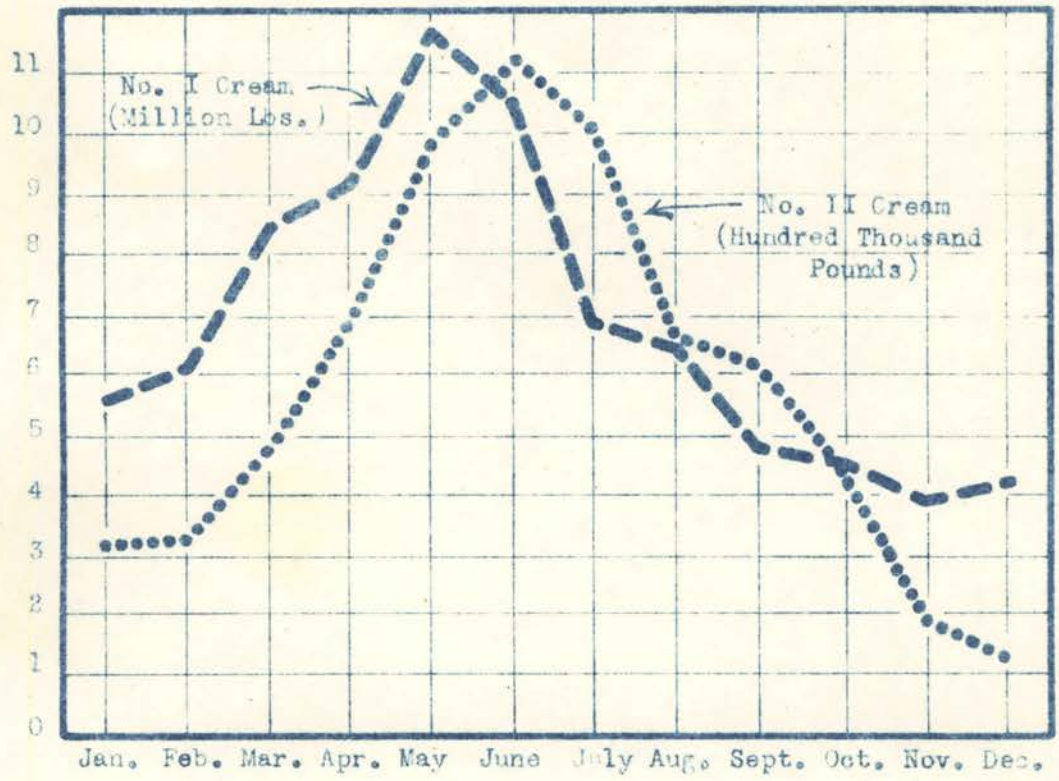
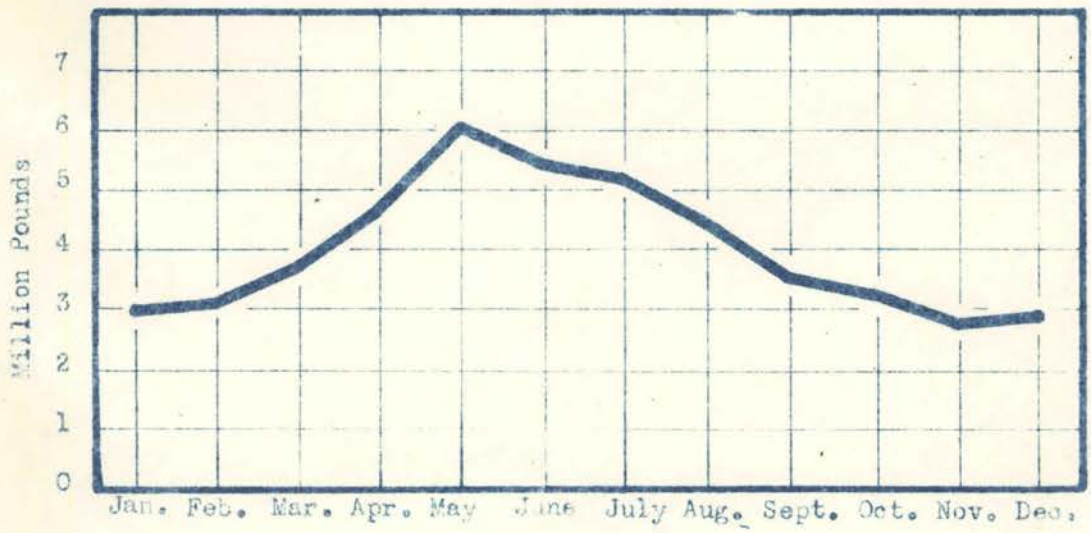


FIGURE VI.

Amount of Creamery Butter Manufactured, 1938



SOURCE: Centralizer Reports, 1938

FIGURE VII.

Amounts of Grade A and B Milk Purchased, 1938

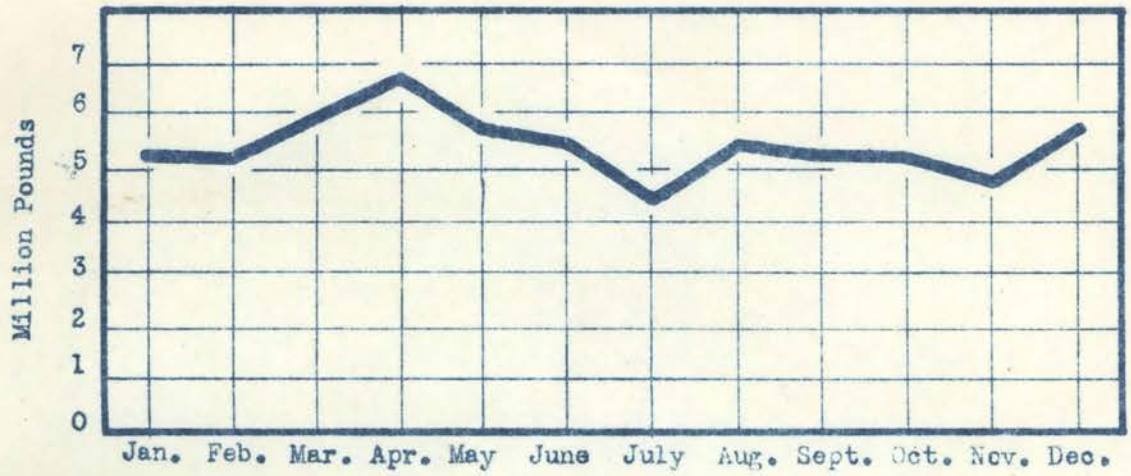
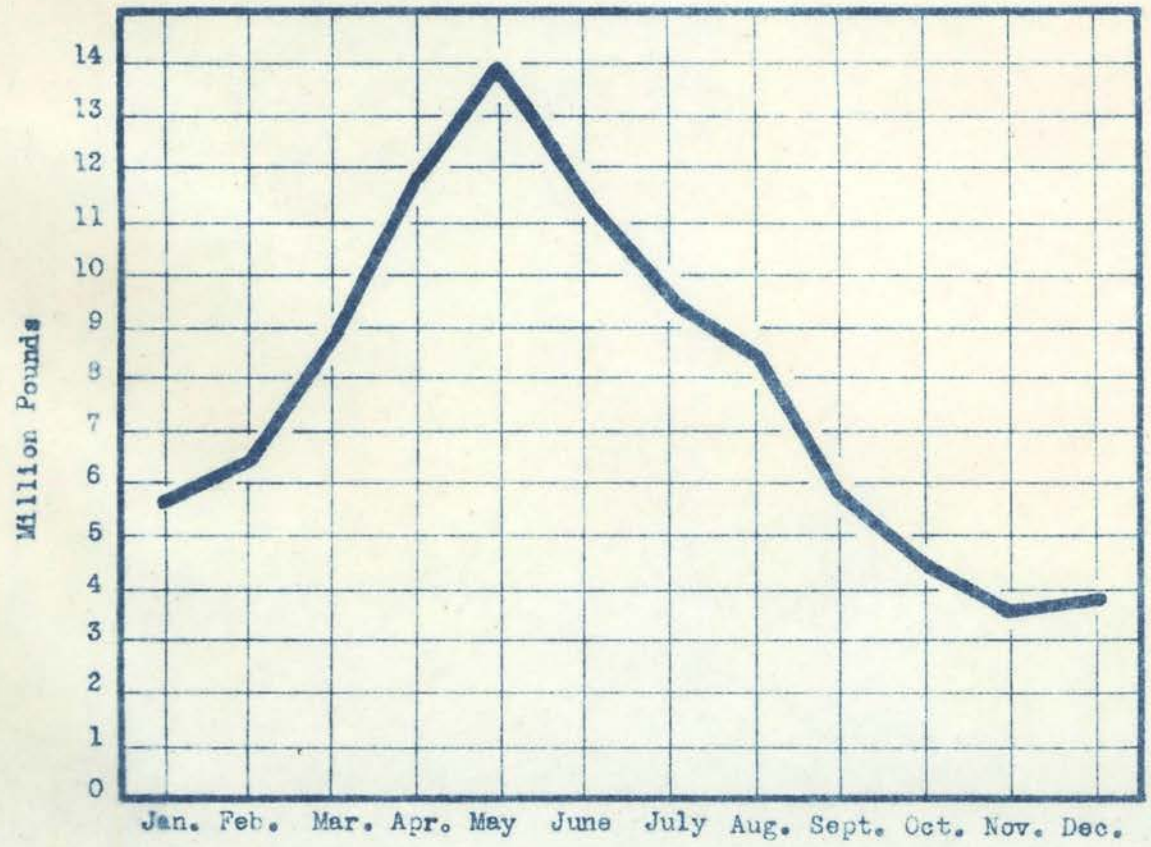


FIGURE VIII.

Amount of Milk Bought For Manufacturing, 1938



SOURCE: Centralizer Reports, 1938.

FIGURE IX

Amount of Cheese Manufactured
(All Types), 1938

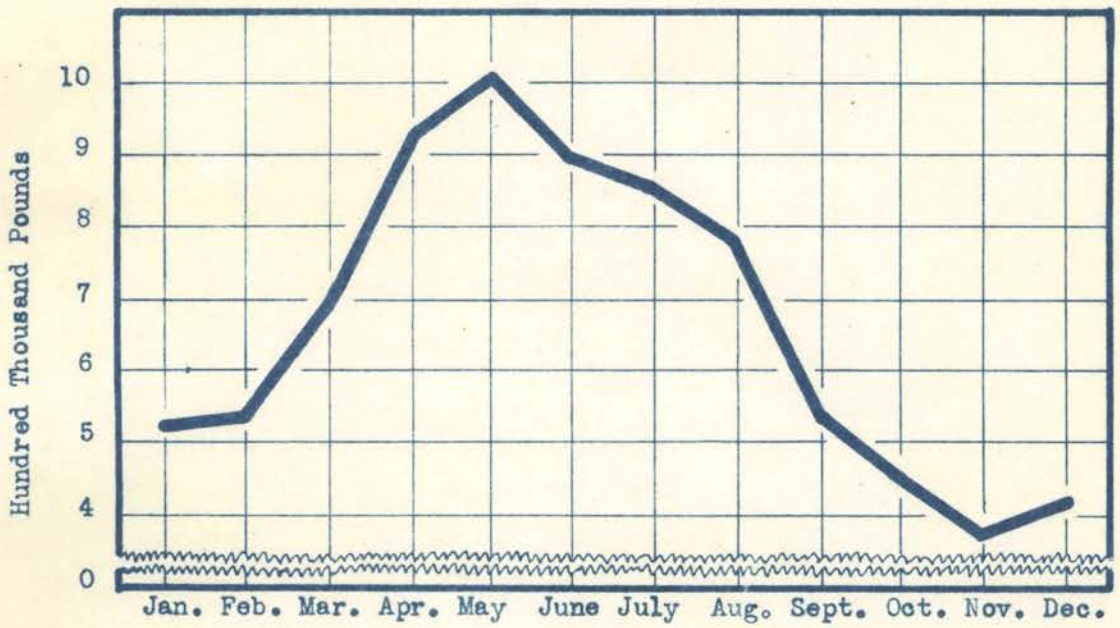
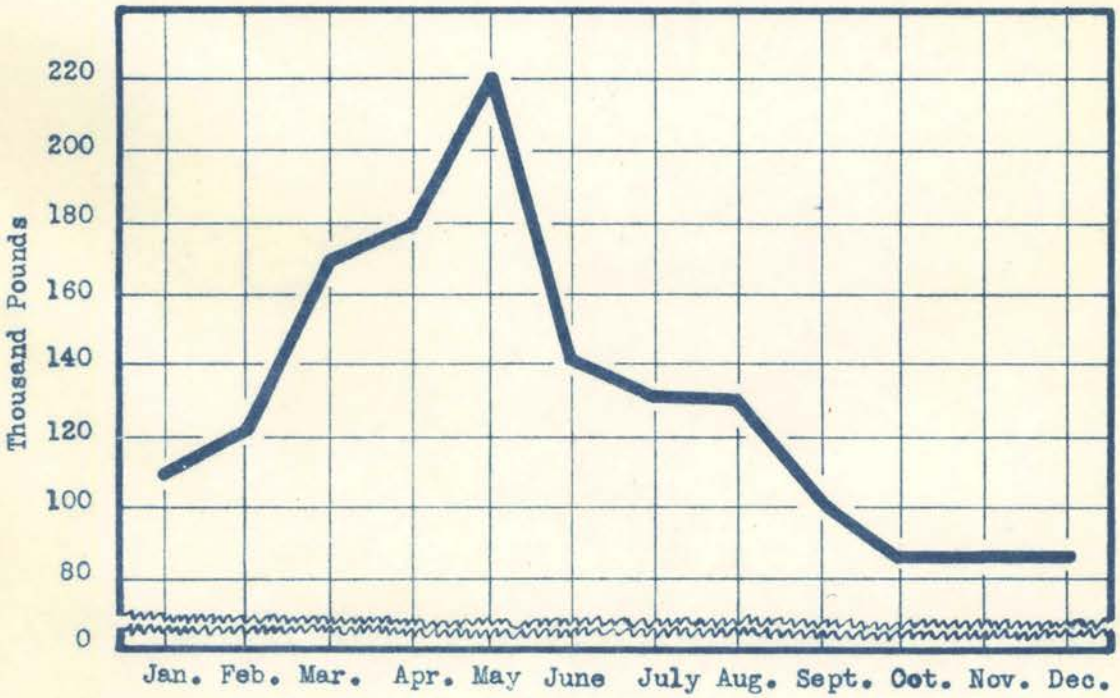


FIGURE X

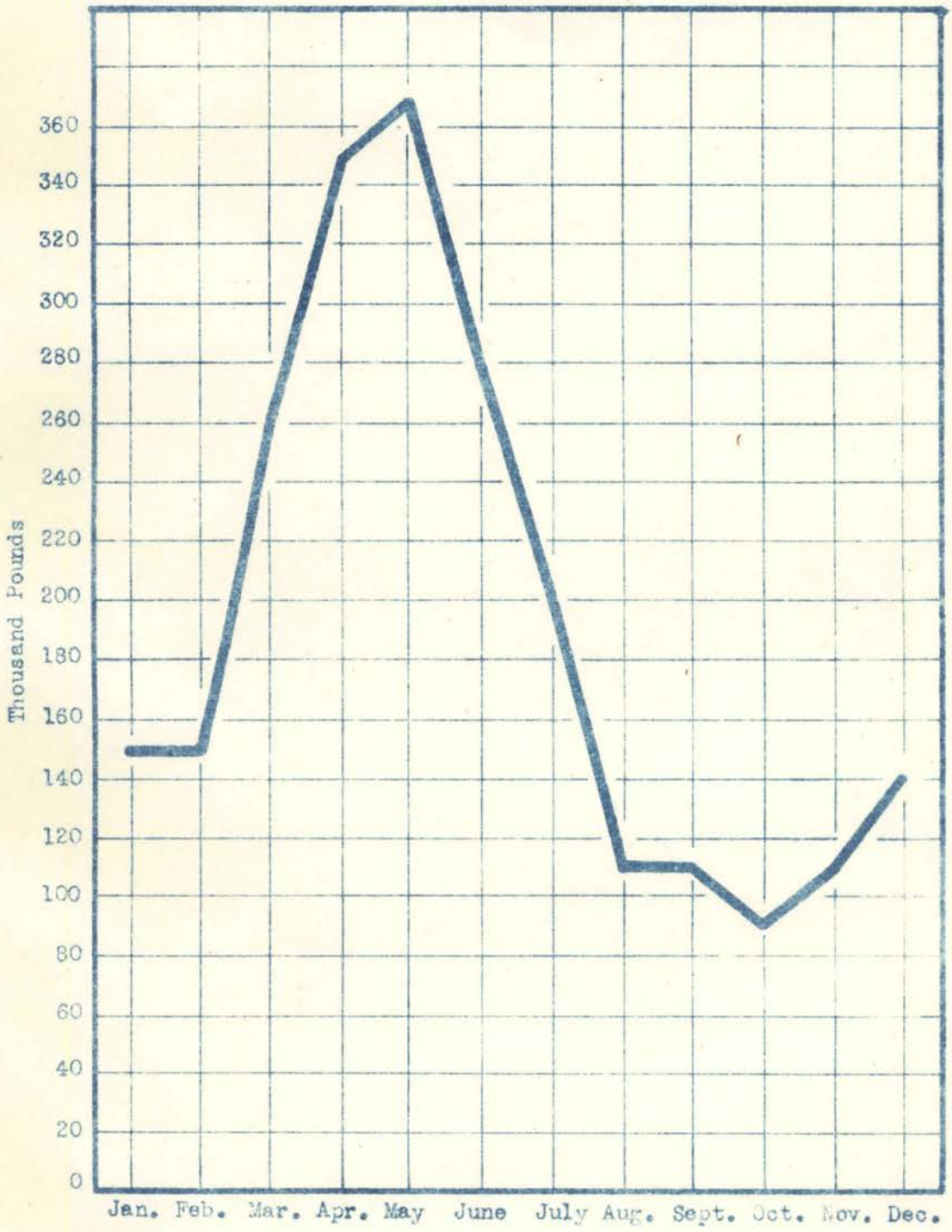
Total Dried and Powdered Products Manufactured,
1938



SOURCE: Centralizer Reports, 1938.

FIGURE XI.

Total Condensed Products Manufactured, 1938



SOURCE: Centralizer Reports, 1938.

Quality of Oklahoma Cream

Quality of cream is one of the most important problems encountered by creamerymen, since it is a primary determinant of the score of butter. The score of butter ranged from 85 to 95, but the majority of Oklahoma production scores 89 or 90.[1/]

This wide variation in quality is due to differences in the quality of cream from which butter is made, and to methods of manufacturing. Of these two it may be said that the former is the most important since creamery methods are more or less standardized. Thus it will be seen that the producers in any section are in a large measure responsible for the quality of butter made from the cream produced.

The average annual spread between the Oklahoma farm price and the United States farm price of butter fat per pound during the five years--1931 to 1935--was 3.90 cents.[2/] A portion of this spread in price may be attributed to the quality of the butter offered for sale by Oklahoma creameries which in turn is due to the quality of cream produced.

During 1938 there was approximately 7,063,520 pounds of second grade cream marketed in Oklahoma. This figure represents 8.5 percent of the total cream marketed. A common difference between the prices paid for first and second grade cream is 3 cents per pound of butter fat. Assuming 3 cents as the average difference in price, Oklahoma farmers would have received $84,762 more for their cream had it all

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1/ E. L. Fouts, Dairy Department, Oklahoma A. and M. College, in a personal interview.

2/ A. W. Jacobs, Cream Grading Increases Profit, Cooperative Extension Work, State of Oklahoma Circular No. 342, 1937, p. 11.

been first grade.

The percentage of second grade cream varies greatly from month to month. (Figure XII). Very little second grade cream is produced during the winter months, the bulk being produced during the warmest months. During the month of July 13.6 percent of the cream marketed was second grade cream, compared with less than 3 percent during December. July, August, and September are the months during which the largest amount of second grade cream is marketed in Oklahoma.

FIGURE XII.

Percentage of Total Cream Marketed as Second Grade Cream During 1938

SOURCE: Centralizer Reports, 1938.

Assembly of Cream by Centralizers

Two methods of obtaining volume have been developed by creameries in Oklahoma because of the scattered production of cream for market. The first of these methods is called "direct shipping," in which producers having sufficient volume[1] ship their cream direct to the creamery by express.

The other method of assembling used by centralizers is the system of local cream buying stations maintained at country trading points throughout the territory covered. Local agents operating these stations on a commission basis receive the cream from farmers who bring it to town with them usually when on other business. The local agent weighs and tests the cream and pays the farmer for it immediately, usually with a company check.

Both of the above mentioned methods are used extensively in Oklahoma. During the calendar year 1929 sixty-four percent of the butter fat sold by Oklahoma farmers was sold through cream stations operating in Oklahoma. During that year there were 1,620 cream stations operating in Oklahoma.[2] It is not known what percentage of the total Oklahoma cream was sold through cream stations during 1938, but it is believed that the direct shipping method of marketing has gained in volume handled.

The number of cream stations buying cream in Oklahoma does not

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1/ Usually five gallons or more are necessary for this system of assembly.

2/ Assembling of Butter-fat through Cream Stations, Distribution No. A-201. United States Department of Commerce, Bureau of the Census, Washington, D. C., 1932, p. 7.

remain constant from month to month. During the heaviest production months a larger number of cream stations are operated than during the months of least production. During 1939 there was an average of 1,944 [3/] cream stations operating in Oklahoma. These stations bought cream for fifty-seven creameries operating in Oklahoma and approximately thirty creameries outside of Oklahoma. The location of 1,925 cream stations and 57 butter manufacturing plants operating in Oklahoma during 1938 is shown by Figure 13. These stations were located in 529 towns, an average of 3.6 stations per town. The number of stations per town varies greatly with the size of the town and the amount of cream produced in the surrounding territory. (Table 7).

Table 7. Number of Towns in Oklahoma Having Different Number of Cream Stations, 1939

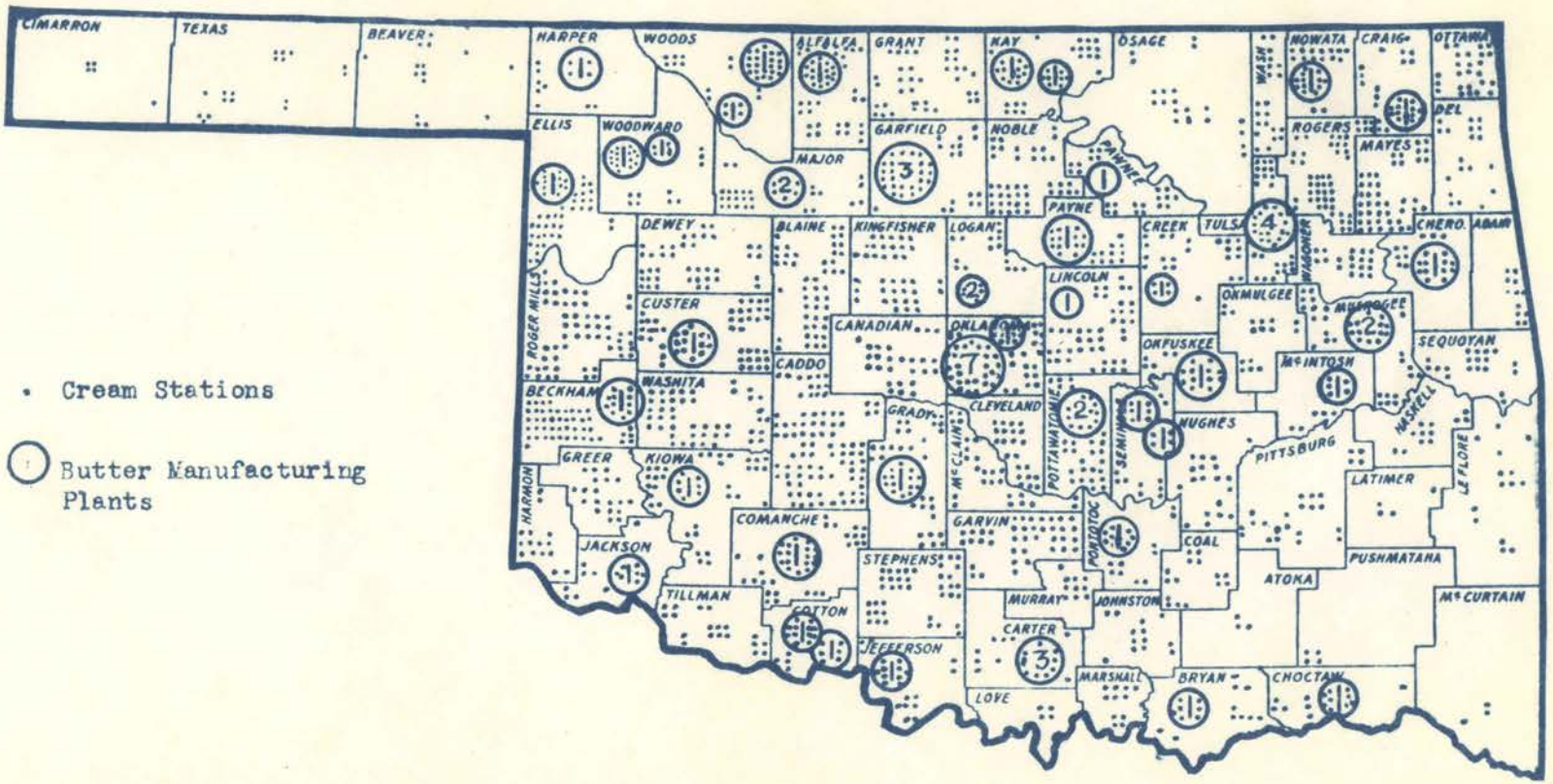
Stations Per Town	Number of Towns	Number of Stations
Under 3	346	601
3 - 6	96	458
6 - 9	52	412
9 -12	22	238
12 -15	8	112
15 -18	2	32
18 - over	3	71
Total	529	1,925

SOURCE: Cream Station Reports, 1939

3/ The average number of stations was figured by taking the total stations operated during each month of 1939 and computing a simple average for the year.

FIGURE XIII

Location of Cream Stations and Butter Manufacturing Plants, 1938



SOURCE: Centralizer Reports 1938; Cream Station Reports 1939.

Cooperative Creameries in Oklahoma[1]

The cooperative creamery movement had its beginning about the middle of the nineteenth century but did not come into widespread use until after 1900. In 1934 there were 1,388 cooperatives manufacturing butter in the United States. Cooperative creameries are present in all states in which dairying is important, but the majority of them are located in Minnesota, Iowa, and Wisconsin. The cooperatives operating in these three states produced more than 68 percent of the butter produced and marketed by cooperatives in the United States in 1934.[2]

In 1931 there were fourteen cooperative creameries in Oklahoma which in that year manufactured 3,170,000 pounds of butter.[3] There were twelve cooperative creameries operating in Oklahoma in 1938. These creameries were not located in any one area but were scattered throughout the State. (Figure XV). They were in areas adapted to very different types of agriculture, from the cotton section of southern

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1/ It is not the purpose of this report to discuss the cooperative creamery movement in Oklahoma but merely to indicate the location of cooperative creameries and the amount of butter manufactured. For further information concerning Oklahoma cooperative creameries see Economic Analysis of Cooperative Creameries of Oklahoma, C. G. Sherman (Unpublished thesis, Oklahoma A. and M. College), 1932.

2/ Ward W. Fetrow, Cooperative Marketing of Agricultural Products, Bulletin No. 3, Farm Credit Administration, Cooperative Division, Washington, D. C., February 1936, p. 24.

3/ C. G. Sherman, op. cit., p. 52.

FIGURE XIV

Location of Cooperative Creameries in Oklahoma, 1938

SOURCE: Centralizer Reports, 1938.

Oklahoma to the cash grain area of north western Oklahoma and to north-eastern Oklahoma where general farming is predominant.

Cooperatives manufactured 6,236,276 pounds of butter during 1938. This figure represents 13.2 percent of the total butter manufactured in Oklahoma during 1938. Even though the number of cooperatives operating in Oklahoma decreased in number from 14 to 12 between 1931 and 1938, the total amount of butter manufactured by cooperatives doubled during the same period.

There was very little difference in the average price paid for butter fat by cooperatives and non-cooperatives during 1938. (Table 8). However, the cooperatives paid slightly more for both first and second grade cream. This price does not include dividends or special services that may have been paid or rendered cooperative members.

Only 4.1 percent of the total cream handled by cooperatives during 1938 was graded as second grade cream. This percentage compared with the percentage of the total cream marketed in Oklahoma as second grade cream which was 8.5 percent indicates that the quality of cream handled by cooperatives is above that of non-cooperatives. This is probably due to the method in which cooperatives collect cream, as the majority of it is brought to the creamery directly by the producer or by a cream route system. This method decreases the average length of time the cream is held before being processed. Also, a well organized cooperative usually encourages the production of quality cream by various educational programs.

Table 8. Average Price Paid for

Oklahoma Butter Fat, 1938

Type of Creamery	Price Paid Per Pound Butter Fat	
	First Grade Cream (cents)	Second Grade Cream (cents)
Private or Company	.2457	.2226
Out of State	.2471	.2190
Cooperative	.2509	.2275

SOURCE: Centralizer Reports, 1938.

Movement of Cream and Butter Into and Out of Oklahoma

During 1938 approximately 19,000,000 pounds of cream were bought in Oklahoma and shipped to out-of-state creameries to be processed; the majority of it went to creameries located in Kansas and Missouri. During the same year less than 7,000,000 pounds of cream were bought out-of-state by creameries located in Oklahoma. This indicates that there is a much larger volume of cream moving out of than into Oklahoma.

There are approximately 190 cream stations in Oklahoma buying cream for out-of-state creameries. This number is small in comparison to the total amount of cream bought by out-of-state creameries; therefore, it is believed that a large volume is shipped to out-of-state creameries by the direct shipper method. This conclusion is further substantiated by the fact that the direct shipper method of assembling cream is used extensively by Kansas and Missouri creameries. A large portion of the cream sold out-of-state is processed by creameries located in these two states.

The large volume of cream moving into other states to be processed may be explained on the basis of services rendered by out-of-state creameries since the price paid by out-of-state creameries is practically the same as the price paid by Oklahoma creameries, as indicated by the average price paid for Oklahoma butter fat during 1938. (Table 8). It is believed that certain out-of-state creameries use very lax systems of grading. This would encourage cream producers to ship their cream

to out-of-state creameries.

A large portion of Oklahoma butter sold out-of-state is marketed through one of the four principal markets.[1] Occasionally some butter is shipped from Oklahoma to Los Angeles or San Francisco, but the total amount going to both markets is usually less than a million pounds per year.[2] The total amount of butter sold on the four principal markets from Oklahoma increased from 12,212,000 pounds in 1932 to 25,482,000 pounds in 1938. (Table 9). This is a 100 percent increase during the seven year period. The 25,482,000 pounds of butter sold in these markets from Oklahoma in 1938 represents 53.9 percent of the 47,318,000 pounds of butter manufactured in Oklahoma during this year.

Chicago has increased in importance as a market outlet for Oklahoma butter during the seven year period from 1932 to 1938. (Table 9). In 1932, 55 percent of the butter sold on the four principal markets from Oklahoma was sold through the Chicago market while in 1938, 89 percent of it was sold through the Chicago market. During 1938, 22,628,000 pounds of butter manufactured in Oklahoma were sold through the Chicago market, which represents 48 percent of the total butter manufactured in Oklahoma during 1938. Thus, Chicago is the leading market outlet for Oklahoma butter.

1/ Markets included are: New York, Chicago, Philadelphia, and Boston.

2/ Dairy and Poultry Market Statistics, Annual Summaries, 1934 to 1938, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Table 9. Pounds of Butter Shipped from Oklahoma to Four Principal Markets, 1932-1938.

	1932 (1,000 Pounds)	1933 (1,000 Pounds)	1934 (1,000 Pounds)	1935 (1,000 Pounds)	1936 (1,000 Pounds)	1937 (1,000 Pounds)	1938 (1,000 Pounds)
Chicago	6,763	6,931	4,023	8,019	8,015	15,568	22,628
New York	2,767	1,928	898	447	481	1,095	1,754
Philadelphia	755	343	485	154	107	45	63
Boston	1,927	1,979	2,342	2,599	753	2,045	1,036
Total	12,212	11,180	7,748	11,419	9,406	18,754	25,482

SOURCE: Crops and Markets, 1932 to 1938, Bureau of Agricultural Economics, United States Department of Agriculture.

Summary

Dairying was of very little commercial importance in Oklahoma until after 1904. During that year creameries were established in Oklahoma City, Guthrie, El Reno, Alva, and Shawnee. Since the first creameries were established dairying has increased in importance until in 1938 twelve percent of Oklahoma cash farm income was derived from dairy products.

The greatest concentration of milk cows is in the west central, north central, and north eastern parts of Oklahoma. These portions of Oklahoma are the greatest market cream producing area. As a group, the counties located in west central Oklahoma are the greatest market cream producers. This group includes Beckham, Dewey, Custer, Washita, Kiowa, Caddo, and Grady county. Very little cream is produced for market in Cimarron, Texas, Beaver, and Osage counties and in the south eastern part of Oklahoma.

Market cream production in Oklahoma varies greatly from season to season. The amount of cream handled by centralizers in Oklahoma during 1938 varied from approximately 4,500,000 pounds in November to 13,000,000 pounds in May. The largest amount of cream was marketed during the months of April, May, and June. This wide variation is largely due to better pasture conditions during the spring months and to the natural breeding practices that are usually followed in herds producing milk for the sale of cream.

The percentage of second grade cream varies greatly from month to month. Very little second grade cream is produced during the winter

months, the bulk being produced during the warmest months. During the month of July, 1938, 13.6 percent of the cream marketed was second grade cream compared with less than 3 percent for December. July, August, and September are the months during which the largest amount of second grade cream is marketed in Oklahoma. During 1938, 8.5 percent of the total cream marketed was purchased as second grade.

Two methods of assembling cream are used by creameries in Oklahoma. The first of these methods is the "direct shipping" method in which the producers ship their cream directly to the creamery by express. The other method is the system of local cream buying stations maintained at trading points throughout the territory covered. During 1939 there was an average of 1,944 cream stations operating in Oklahoma. These stations bought cream for fifty-seven creameries operating in Oklahoma and approximately thirty creameries operating outside of Oklahoma.

There were twelve cooperative creameries operating in Oklahoma during 1938. These cooperatives manufactured 6,236,276 pounds of butter. This figure represents 13.2 percent of the total butter manufactured in Oklahoma in 1938. Only 4.1 percent of the total cream handled by cooperatives during 1938 was graded as second grade cream.

During 1938 approximately 19,000,000 pounds of cream were bought in Oklahoma and shipped to out-of-state creameries to be processed. During the same year less than 7,000,000 pounds of cream were bought out-of-state by creameries located in Oklahoma.

Four principal markets, New York, Chicago, Philadelphia, and Boston purchased 53.9 percent of the total butter manufactured in

Oklahoma during 1938. The total amount of butter sold through the four principal markets from Oklahoma increased from 12,212,000 pounds in 1932 to 25,482,000 pounds in 1938. Chicago is the leading market outlet for Oklahoma butter, as 48 percent of the total butter manufactured in Oklahoma in 1938 was marketed through the Chicago market.

APPENDIX

RULES AND REGULATIONS

Dairy Department

OKLAHOMA STATE BOARD OF AGRICULTURE

Oklahoma City, 1939

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RULES ADOPTED BY THE OKLAHOMA STATE BOARD OF AGRICULTURE GOVERNING THE LICENSING OF THOSE HANDLING CREAM, AND MANUFACTURING BUTTER.

RULE 1. No person, firm, corporation or association shall do or transact any business in the State of Oklahoma pertaining to the dairy interests in the state without first having made application to the State Board of Agriculture on forms provided by the Dairy Commissioner of the State of Oklahoma in which all information deemed necessary by them shall have been clearly and definitely set forth and answered and such application has been approved by the State Dairy Commissioner and permission has been granted for applicant to engage in such business as specified in the application.

RULE 2. The evidence of having met the requirements of Rule 1 on the part of such person or persons making application will be the issuing of a permit to such applicants which will be in force and effect for the fiscal year or the part thereof in which such permit was issued provided that such permit is not revoked for cause.

RULE 3. There is hereby levied a license fee on each creamery, cheese factory, ice cream factory, counter freezer, pasteurizing plant, frozen custard machine, including hand or power machine used for the whipping of dairy products where sold at retail or wholesale. From each person engaged in testing cream or milk for commercial purposes, $2.00 annually. Said fees shall be paid annually as provided by law, in advance of the issuance of any permit. All permits so issued shall expire on the thirtieth day of June next succeeding the date of issuance. License fees are payable according to the following schedule:

Creamery
Graduated License Scale

1 pound butter to 500,000 pounds butter manufactured per year, $10.00 annually.
500,000 pounds butter to 1,000,000 pounds butter manufactured per year, $15.00 annually.
1,000,000 pounds butter and over manufactured per year, $25.00 annually.

Ice Cream Factory Graduated License Scale (Counter freezers, Frozen Custard Machine, including hand or power machine used for the whipping of dairy products where sold at retail or wholesale)	1 gallon ice cream to 50,000 gallons ice cream manufactured per year, $10.00 annually. 50,000 gallons ice cream to 100,000 gallons ice cream manufactured per year, $15.00 annually. 100,000 gallons ice cream and over manufactured per year, $20.00 annually.
Pasteurization Plants	$15.00 annually.
Cheese Plants	$15.00 annually.
Cream Brokers (parties who buy cream for resale)	$10.00 annually.

In cases where more than one phase of the Dairy Industry is being handled in the same plant, you determine by volume of business based on pounds of finished products manufactured and the amount of raw products required the major activity by applying the above scale, then all other branches may be licensed at $5.00 each.

Example: A plant manufacturing 750,000 pounds of butter annually with ice cream, cheese, and milk as minor activities, the license would be $15.00 for the butter plant, and $5.00 each for the other three branches, making a total of $30.00.

RULE 4. It is hereby ruled that the owner of the equipment in each cream buying station in the state of Oklahoma pay annually a license fee of $2.00 after which station permit will be issued. Said permit cannot be used by any other company or individual except the one paying for it, nor can it be used in any other town except that designated on the permit.

RULE 5. It is ruled that hereafter all station license fees shall be collected at the time of issuance of tester's permit for that station, and no tester's permit will be issued where station permit has not been paid. It is ruled that on and after this date all companies doing business in the State of Oklahoma shall pay an annual license fee of $5.00 for each field superintendent's permit.

RULE 6. It is the duty of the State Dairy Commissioner to collect the above named license fees as provided by law, in advance of the issuance of any permit. All permits so issued shall expire on the thirtieth day of June next succeeding the date of issuance.

RULE 7. The applicant shall be construed to mean a creamery company, ice cream factory, counter freezer, cream station operator, corporation,

associations, organizations, of individuals located out of the state who purchase cream within the state, or those likewise specified herein who buy or sell or manufacture dairy products within the state and applies to those as described herein who buy such products as defined in these rules within the state for shipment out of the state.

RULE 8. (a) All buyers of cream shall have posted in the front window and or on vehicle the price to producer in numerals of size which can be read at a distance of fifty feet, and they shall pay price as posted.

(b) All bonuses, premiums, cash, merchandise, or other considerations of value shall constitute a part or all of the purchase price and shall be posted as paid.

RULE 9. No cream station operator shall change from one creamery to another without filing an application with the State Dairy Commissioner in which the reason for such change shall be clearly set forth and has been approved.

RULE 10. No permit shall be issued to any person who is an applicant for a cream station license until such person has taken an examination after the form as may be hereafter described. In the examination he shall show his fitness, knowledge and qualifications to make the Babcock test, grade cream, make composite tests and make monthly reports and meet all requirements as may be specified in such examination.

RULE 11. All permits issued by the State Dairy Commissioner are subject to suspension or cancellation for cause. Cause being construed neglect, refusal or carelessness on the part of the holder of a permit in not carrying out the provisions of the rules and regulations and not buying cream on GRADE.

RULE 12. All cream station operators shall make a composite test of each shipment of cream and there shall not be a tolerance of more than one percent over or one percent short on the amount of butter fat indicated on the cream sheet and that which is invoiced to the creamery. A cream station operator shall make monthly reports on or before the tenth of each month of the business transacted at his station. Every creamery company shall make a monthly report on forms furnished of cream purchased from cream stations in the State.

RULE 13. All cream purchased in the state shall be bought according to the definition of the cream grading law of the state. All purchasers of milk or cream must refuse same when there is no question of it being unfit for human consumption and it is the duty of the State Dairy Commissioner or his deputies to condemn third grade cream whenever found in the state so that it cannot be offered for sale.

RULE 14. Any creamery company who employs field men or superintendents or have members of their own firm who act in this capacity whose duties are to look after the business already procured by the company or to solicit new business, such creamery companies shall file with the State Dairy Commissioner the names of such person or employees and such persons herein described shall appear before the State Dairy Commissioner and take an examination in which they shall show their qualifications and fitness to obtain a license to act in this capacity.

RULE 15. In the event that any section, paragraph, rule, or part thereof shall be questioned in any court and shall be held to be invalid, the remainder shall not be invalidated thereby but shall remain in full force and effect.

RULE 16. All examinations and applications shall be given under the direction of the State Dairy Commissioner and the carrying out of these rules and regulations shall be delegated to the Dairy Department of the Oklahoma State Board of Agriculture and under the State Dairy Commissioner's supervision.

RULE 17. Cream tester's examinations shall be given each year at convenient places throughout the state. Examinations shall be held by counties so far found convenient and all persons holding a permit or desiring to do so, must be in attendance at this meeting at a time and place designated. In the event any cream tester is found absent, unless he has given a sufficient reason, he shall forfeit his license.

RULE 18. It is hereby made unlawful for any owner or employee of any creamery, ice cream factory or dairy to in any way manipulate the tests, either up or down, calls for cancellation of permit.

RULE 19. Butter shall contain not less than 80 percent butter fat.

RULE 20. A cream receiving station shall be a separate room with outside openings only, and shall be lathed and plastered or of tongued and grooved lumber, brick, or cement, plaster board, sheet-rock, or other material which may be approved by the State Dairy Commissioner.

RULE 21. No cream station shall be operated adjoining any poultry room, yard, or garage, unless separated by a solid partition of brick, stone, cememt, or tongued and grooved lumber, with battened cracks and such partition shall not have any opening therein. The Dairy Department reserves the right to condemn or abolish any cream station if same is in their opinion subjected to contamination.

RULE 22. Every person testing cream must have a permit to do so obtained in the way prescribed in the regulations. Any person working in the capacity of a substitute cream tester, or sampler shall hold a permit.

RULE 23. All cans shall be removed immediately from the railroad station or the terminal or other modes of transportation. The lid shall

be immediately removed and placed on a can rack and the can on this rack shall not be closer than sixteen inches to the floor. The rack shall be of substantial construction, kept clean and well painted.

RULE 24. The cream station shall be provided with a sanitary washer in which cans and other utensils may be cleaned and provisions must be made for plenty of hot water to keep the station in a sanitary condition.

RULE 25. Every station shall be provided with the necessary apparatus to make an accurate Babcock test, including vessel used for temperature baths, a thermometer, Glymol, and other essentials necessary to make such tests.

RULE 26. (a) Cream shall be shipped to churning destination three times per week from May 1 to September 1, twice per week for rest of time even though there is no more than one can in the shipment. The retention of the operator's permit depends upon his ability to segregate No. 2 cream and to invoice it as such, and cans being properly tagged, showing the quality of cream contained therein.

(b) Cream shall be graded by sight, smell, taste, and sediment test. Sediment test disc be held and protected from other contaminations for Dairy Inspector by station operator. (A visible sediment test card is suggested for holding disc.) Sediment test to be made on each patron every 30 days or more often if necessary to eliminate sediment.

RULE 27. Railroad companies, express companies, and baggage companies or other transportation companies accepting cream for shipment shall provide a place where cream shall be out of the sun and kept as cool as possible and given reasonable attention to safeguard the quality of such cream while waiting to be transported.

RULE 28. (a) Butter must be marked plainly with the net weight and have the manufacturer's or distributor's name upon every package or container when sold. Each pound must weigh a full sixteen ounces and contain at least 80 percent butter fat.

(b) All cream samples shall be held for at least forty-eight hours after testing, kept in a cool place, and tightly covered to prevent evaporation.

RULE 29. All ice cream sold in the State of Oklahoma must contain at least 12 percent butter fat and thirty-two and one half percent solids ten percent butter fat is permissible where fruit or nuts are used. All ice cream mix shipped into Oklahoma from outside the state must meet the Oklahoma State Requirements and all milk used in manufacture of ice cream must be pasteurized.

RULE 30. It is the duty of the State Dairy Commissioner or his deputies whenever a written complaint is filed to take samples and see

that the above requirements are complied with according to our State Dairy Laws.

RULE 31. All butter, ice cream, cheese, milk or other dairy products must be pasteurized in a room set aside for this purpose to comply with our State Dairy Laws. Surroundings must be clean and have ample facilities for sterilizing with steam or hot water.

RULE 32. It is hereby ruled that all persons employed in the receiving, grading, processing or manufacturing of any dairy product must be free from all contagious or communicable disease and hold a health certificate showing such to be the case at time of employment.

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