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# Developing New Markets for Missouri Butterfat

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# Developing New Markets for Missouri Butterfat

F. L. THOMSEN AND W. H. E. REID

Farmers and business men of Missouri have recently evidenced much interest in new market outlets for dairy products. A number of factors have contributed to this interest:

(1) Dairying has long been advocated as a much neglected and potentially profitable enterprise for Missouri farmers. As a means of encouraging dairy farming the expansion of various lines of dairy manufacturing has been suggested. Communities which desire greater development in dairying look to the north and conclude that the prosperous dairy industry in that section is based on the types of market outlets for dairy products which are found there. But these market outlets may follow rather than precede intensive dairying. The question of which should come first—dairy cows or markets for dairy products—has always been a vexing one. Should we establish condenseries, cheese factories, and local creameries, in order to encourage dairying, or should dairying be encouraged first, with new market outlets as a natural result of such development?

(2) Unsatisfactory prices for many farm products, coming at a time when milk production has been on a comparatively prosperous level, has greatly stimulated interest in dairying and consequently in new markets for dairy products in those regions where dairy farming has not been pushed in the past.

(3) With increased interest in cooperative marketing there has been a strong revival of agitation for cooperative creameries, along with that for other cooperative enterprises. The need for such creameries, and the type of cooperative plant adapted to this section, have been the points of considerable controversy. Inasmuch as many hundreds of local creameries have already sprouted and died in this part of the country, it should be obvious that future success along these lines will depend largely on the degree of care exercised in planning and development. Prospective members and promoters of local private or cooperative creameries would do themselves an injustice by allowing any action to be taken that is not based on the best available facts.

(4) A fourth factor back of dairy manufacture promotion has been the struggle of the commercial interests of the smaller cities for additional industries, sometimes coupled with the activities of professional promoters whose interests may not coincide with those of the communities they seek to serve.

(5) The replacement of the old mud roads by modern highways in many parts of the state makes possible plans for collection of fluid milk or butterfat which formerly would have been utterly impractical. Good roads are a primary requisite for development in dairy manufacturing.

(6) A very significant movement has recently been observed in the dairy industry. With population in the industrial cities of the East increasing at a more rapid rate than milk supplies in surrounding territory, these centers have extended their milk collection systems gradually into newer and farther sections. New York City and Boston, for instance, now obtain their daily quotas of milk and cream from all over New England, New York, and even Canada and more distant states. Condenseries, creameries and cheese factories have for years been gradually forced out of this territory, and North Central States such as Wisconsin and Minnesota have undertaken the task of supplying a large part of the butter and cheese consumed in the East.

Very recently this general movement has been extending westward, and we now observe glass-lined tank cars transporting sweet cream from states west of Chicago to New York and Florida. The milk sheds of mid-western cities like Chicago have also increased in size. As a result of these developments, the dairy manufacturing enterprises in Wisconsin and Minnesota have experienced constantly increasing difficulty in price competition from city milk outlets; consequently large condenseries and powdered milk and cheese companies have become uneasy, and are cautiously looking farther afield for new, more stable, and cheaper sources of raw material.

While no one can at this time foresee the exact future trend of these developments, the latter have already resulted in expansion and development of the dairy industry in several northwestern states, including Washington, Oregon and Idaho, which seem in many respects ideally situated to assume the role held until now by Michigan, Wisconsin, and Minnesota, if the latter states are compelled partially to relinquish it for that of city milk supplier. In addition, some southern states such as Kentucky, Tennessee, Arkansas and Missouri have come in for attention in this regard, and a mild dairy "boom" has been experienced in these states. The increased number of cheese factories, condenseries and milk powder plants in Missouri and adjacent states is an indication of this expansion. It should be noted, however, that the intensity and extent of this movement can very easily be exaggerated. Past experience indicates that it will in all probability require many years to bring about a marked change in the general lineup of the dairy industry.

## OBJECTIVE OF THIS PUBLICATION

The problem of developing new markets for Missouri butterfat has two distinct phases: (1) What general types of market outlets are adapted to Missouri conditions? (2) Specific detailed requirements for particular dairy manufacturing enterprises and communities. In this bulletin it is proposed to treat only the first of these subjects. The second phase is largely a matter for individual analysis and prescription, or extension activity. The purpose of this publication is to point out the conditions under which the various outlets for butterfat are most likely to succeed, and to show what conditions actually exist in Missouri. It is an economic study of dairying in Missouri from the marketing standpoint. The promotion of a general understanding of these fundamentally important principles should do much to guide Missouri's future dairy marketing development along sound lines. This is the starting point for all more specific activities in this field.

Both original data and material from other sources have been used in their proper connection. Very few studies of cream marketing in centralizer territory are available, but the results of an exhaustive investigation by the Kansas Station\* are partly applicable to Missouri.

## DEVELOPMENT OF MARKET OUTLETS FOR DAIRY PRODUCTS IN MISSOURI

In order to understand the various factors to be considered it is first necessary to briefly view the development of market outlets for dairy products in Missouri, and the present system of marketing butterfat.

Until the latter part of the nineteenth century most of the milk produced in this and nearby states was sold for local consumption, or made into butter on the farm and then traded to the local merchant for needed supplies. While exact dates and figures are not available, it is known that at that time Missouri and nearby states somewhat similarly situated began to experiment with cheese factories as a means of disposing of their surplus milk and cream. A considerable number of these factories were started, but most of them were forced out of business, largely because, in the regions where they were located, dairying had not been sufficiently developed to furnish an adequate supply of milk.

**The Creamery Promoters.**—Not content with this lesson, Midwest farmers in great numbers listened to the arguments of a host of creamery promoters who overspread this part of the country, mainly during the

\*Bulletin 216, Kansas State Agricultural College and Experiment Station "The Marketing of Kansas Butter," by Theodore Macklin (1916).

eighties and nineties, and as a result there were established approximately 2000 small local creameries, about 125 of these being located in Missouri.\* Everybody became enthusiastic about the big increase in dairying which was expected, local business men got behind the movement, booster meetings were held, and as usual in such cases, experience and good judgment were more or less disregarded. As a result, according to the authorities cited, approximately 62 per cent of these creameries were failures, and in Missouri and some nearby states over ninety per cent failed.

**Why Local Creameries Failed in Missouri.**—The reasons for these failures were not hard to find and might easily have been foreseen by those concerned. The fact that a certain type of creamery is a success in one locality is no indication that a similar plant will be successful at another point. There are certain fixed overhead expenses such as rent, interest, depreciation, and butter maker's salary, which go on regardless of the volume of butter made. It is obvious, then, that with a small volume of business the cost per pound of butter is much higher than it would be if adequate supplies of raw materials were available. This is shown by Table 1, taken from the report of an exhaustive investigation of creamery costs conducted by the Minnesota Station.†

**Table 1.—Relation of Butter Output to Creamery Operating Costs in Minnesota.**  
(From Bulletin 231, Minnesota Agricultural Experiment Station.)

Output (thousands of pounds)	Costs per thousand pounds of butter				
	Equipment	Building and site	Labor and management	Supplies and miscellaneous	Total
100	\$5.00	\$6.75	\$20.20	\$16.50	\$48.45
200	4.25	3.75	15.75	14.25	38.00
300	3.75	3.00	13.67	13.15	33.57
400	3.25	2.55	12.75	12.25	30.80
500	3.00	2.45	12.30	11.50	29.25
600	2.75	2.40	11.50	10.65	27.30

In most parts of Missouri, at that time, the volume of cream necessary for efficient operation of local creameries was lacking. Each farmer, on the average, owned only a few cows and consequently did not have much cream to sell. The number of cows per square mile was small as compared with such states as Wisconsin and New York. Dairy farms were scattered, roads were bad, and it was very difficult to collect the butterfat from the farmers. In certain seasons some farmers would discontinue milking in order to carry on other farm operations. Moreover, the quality of the cream received was comparatively poor, due to

\*From an unpublished manuscript by Theodore Macklin, "A History of the Organization of Cheese Factories and Creameries in the United States."

†Minnesota Agricultural Experiment Station, Technical Bul. 26.

differences in temperature and other natural conditions, and to the way in which the cream was produced and handled in this non-dairy section. Low quality brought low prices, which combined with high operating costs to make failure inevitable.

**Development of Centralizer System.**—Following these efforts of farmers to find a satisfactory market outlet for their surplus milk, there developed in this and other Missouri Valley states a group of creameries usually referred to as operating under the centralizer system. These creameries were the result of what might be called a process of natural selection, similar to that found in the plant and animal world. The difficulty of the smaller creameries and cheese factories covering a limited territory had been lack of sufficient volume. The centralizer creamery overcame this by spreading out over a much wider territory, in some cases covering thousands of square miles. With effective machinery for assembling the cream from this enormous area and bringing it to a central concentration point, by which large volume manufacturing and selling methods were made possible, the centralizer creameries were able to successfully compete with the other type located under more advantageous natural conditions in the Northern States.

The forces behind the development of the centralizer type of creamery are extremely significant in connection with any consideration of other market outlets for dairy products, yet have been and are now being given very little attention in many instances where there is dissatisfaction with present conditions.

**Change in Volume of Dairy Manufacturing.**—As a result of these developments the form in which Missouri dairy products are marketed has undergone a considerable change during the present century. Both butter made on and sold from farms decreased materially, as would be expected. The amount made on farms in 1924 was only about half that for 1899. But a proportionate drop was experienced by the country as a whole, according to census statistics, and Missouri still ranks among the leading states in the production of farm butter. In 1900 Missouri still produced over a million pounds of American cheese, which, however, represented only a very small part of the country's production. Since then production of cheese in this state has been steadily declining, and for the five years ending with 1925 it averaged only 202,000 pounds. Missouri has not until very recently been much of a factor in the production of miscellaneous dairy products such as evaporated milk, even now ranking only sixteenth among the states. Recent indications of revival of these industries seem to mark the beginning of a new upward trend.

The largest increase in dairy manufacturing, according to census figures, is found in the case of creamery butter. Information on butterfat

sold by farmers is not available for the early censuses, but the amount apparently has slightly more than doubled during the past five years,

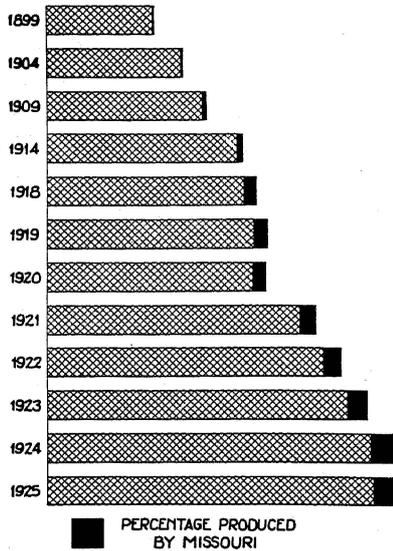


Figure 1.—Creamery Butter Production in the U. S., Showing Percentage Produced in Missouri. (Data from Census Records and U. S. Department of Agriculture Yearbook).

an increase which according to the census figures was proportional to that for the country as a whole. These figures correspond roughly with statistics on creamery butter production in Missouri and the United States issued by the U. S. Department of Agriculture. (See Figure 1.) Missouri now ranks ninth and has for some years held approximately the same relative position, among the states in the production of creamery butter. (See Figure 2.)

However, it is hard to believe that these data truly represent the actual change in creamery butter production from Missouri cream during these years. They do not correspond with other statistics on dairy production. Such an increase cannot have come from a greatly increased

number of dairy cows or production per cow, as will be shown by other statistics, and production of farm butter has not decreased to that ex-

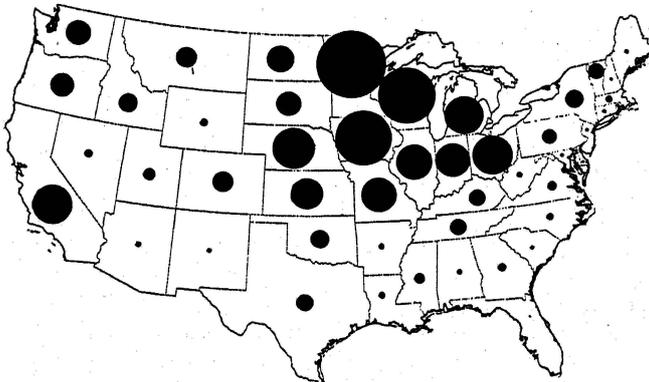


Figure 2.—Creamery Butter Production in the U. S., by States, 1925. (Data from U. S. Department of Agriculture Yearbook).

tent. Probably a more complete enumeration of butter production in later years has contributed largely to this showing, but the figures are sufficiently representative to be taken as a definite indication of consid-

erably increased creamery butter production. So far as Missouri is concerned, the out-state territory covered by creameries located within its boundaries has doubtless greatly increased in recent years, which partly accounts for the increase in production.

### THE CENTRALIZER CREAMERY SYSTEM IN MISSOURI

There are now approximately 85 creameries in Missouri, but of these only about 29 produce as much as a half-million pounds annually. These same plants, to approximately the same number, may be termed centralizers. The remaining 56 firms are mostly large dairies or ice cream plants which make up some of their surplus fat into butter. The latter group, however, includes a number of creameries which are similar to the local type common in Minnesota and Wisconsin. They are located in sections where dairying has been developed to an extent greater than in most parts of the state. Table 2 shows the number of Missouri creameries reporting to the U. S. Department of Agriculture grouped according to volume of business.

Table 2.—Missouri Creameries Reporting to the U. S. Department of Agriculture for 1926, Grouped According to Annual Volume of Business.

Annual volume in pounds of butter	No. of creameries
Less than 100,000	45
100,000-499,000	18
500,000-999,000	8
1,000,000-1,499,000	9
1,500,000-1,999,000	4
2,000,000—or more	8

In addition to the above there are approximately 25 creameries located in Nebraska, Illinois, and Iowa which buy a large volume of cream in Missouri. Most of these are large centralizers. Likewise, a number of the larger Missouri centralizers buy cream in surrounding states, principally Kansas, Arkansas, Oklahoma, Illinois and Tennessee. The "balance of trade" is probably about equal, although there are no accurate data on which to base such a conclusion. Of the total amount of butterfat sold by Missouri farmers to creameries, approximately 85 per cent is bought by centralizers.

Centralizer creameries rarely manufacture less than a half-million pounds of butter annually, and their output sometimes runs into several million pounds. Local creameries only occasionally produce a half-million pounds or more of butter, generally making from one to three hundred thousand pounds per year. The investment in local creameries may vary from \$5,000 to \$25,000, while that for centralizers runs up to several hundred thousand dollars.

With many of even the larger creameries the manufacture of butter is combined with some other line of business. In the case of the centralizers this is usually poultry and eggs. The buttermilk is used for fattening live poultry, and both in buying and selling these two enterprises go well together. The same local produce buying agencies usually handle these products, and one field service can be used for both purposes. The Packers and even the so-called independent plants have sales outlets which take both butter and other produce.

Approximately half of the centralizer plants located in Missouri are units in chains of two or more creameries operated by large firms and the packing companies. For instance, Swift and Company has four plants, located at Chillicothe, Trenton, Sedalia, and Springfield, and the Blue Valley Creamery Company has three located at St. Joseph, Kansas City and St. Louis.

**Difference Between Local and Centralizer Creameries.**—The real difference between the local creamery and the centralizer creamery is a matter of method rather than size. A large local creamery may actually have a greater investment and output of butter than a small centralizer. The point of differentiation is the manner in which the cream is collected.

**Assembly of Cream by Local Creameries.**—The local type creamery such as is found in the northern states usually has a large part of its cream brought direct to the plant by farmer patrons. These deliveries are made sometimes daily, and at least twice a week, the cream being received generally sweet and in good condition. Of course, there is practically no expense involved in obtaining butterfat in this way. As a supplement to the above method local creameries may have cream routes radiating into surrounding territory over improved roads. Where production of cream per farm and per square mile is sufficiently large this is also a relatively cheap method of assembly.

The simplicity and low cost of its methods of assembling cream have been among the most important reasons behind the success of the local creamery in Minnesota and Wisconsin. The cream obtained in this way is nearly always in satisfactory condition, and other things being equal, can be manufactured into a butter which will sell at a high price. However, it must be obvious that such methods are suitable only in a section where butterfat production is large both per farm and per square mile.

**Assembly of Cream by Centralizers.**—Because of the scattered production of butterfat in Missouri the centralizer creameries have developed two different methods of obtaining the required volume. The first of these methods is called "direct shipping", in which producers having sufficient volume ship their cream direct to the plant by express. Cream collected in this way is usually of good quality. An extra premium is paid for sweet cream.

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. The creameries reporting this type of assembly had an average of 49 stations per creamery, but this varies greatly, some of the smaller plants having less than a dozen while others have several hundred.

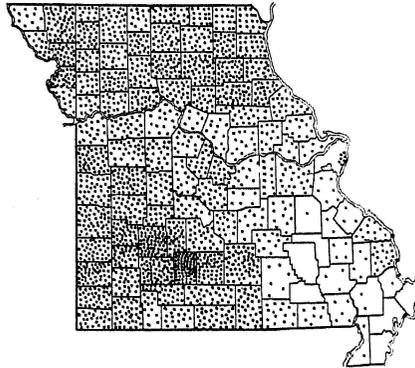


Figure 3.—Location of 2,861 Cream Stations in Missouri, 1927.

There are approximately 3,300 cream buying stations in Missouri. The location of 2,861 licensed stations is shown by Figure 3. These stations are located in 1,174 towns, giving an average of 2.4 stations per town. The number of towns having different numbers of stations, from one to ten, are shown in Table 3. Figure 4 shows the location of stations operated by a typical Missouri centralizer creamery and the

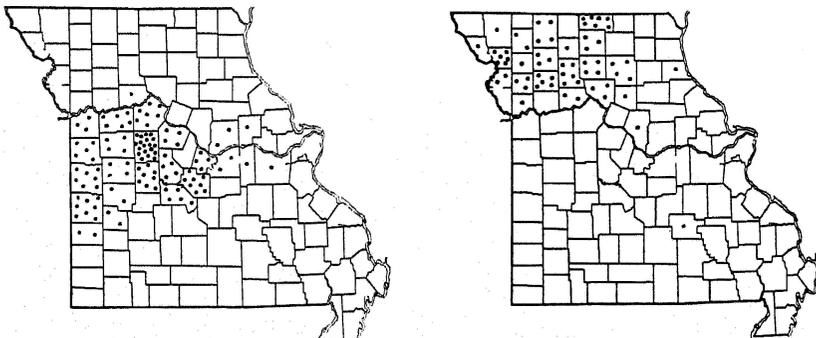


Figure 4.—Cream Stations of: (1) A Typical Missouri Centralizer Creamery, and (2) Missouri Stations of a Large Centralizer Located in a Nearby State.

Missouri stations of a large concern located in a nearby state, indicating the extent of the vast assembly systems which feed the larger plants.

**Table 3.—Number of Towns in Missouri Having Different Number of Cream Stations, 1926.**

Number of Stations	Number of Towns
1	364
2	238
3	131
4	83
5	39
6	28
7	20
8	11
9	8
10 or more	12

One large creamery having several plants in Missouri buys all of its cream from direct shippers, having established an extensive list of patrons over a considerable period of years. The other centralizers use both of these methods, but the proportion of cream obtained by either method varies greatly for different creameries, the average for the creameries reporting to this Station being 77.6 per cent of total fat from stations and 22.4 per cent from direct shippers. This proportion varies also according to the season of the year, less cream being received from direct shippers during the fall and winter months of light milk production. This is shown by Table 4.

**Table 4.—Percentage of Total Fat Obtained From Stations and Direct Shippers, by Months.**

	STATIONS %	SHIPPERS %
January.....	77.6	22.4
February.....	74.7	25.3
March.....	69.7	30.3
April.....	73.3	26.7
May.....	75.2	24.8
June.....	77.1	22.9
July.....	80.3	19.7
August.....	79.2	20.8
September.....	79.6	20.4
October.....	80.6	19.4
November.....	81.5	18.5
December.....	82.3	17.7
Average.....	77.6	22.4

Both the direct shipper and cream station methods of assembling cream have advantages and disadvantages for the farmer and the creamery. The farmer receives a higher price by shipping direct (3.72 cents per pound for the creameries reporting in 1925) but must exercise greater care in handling the cream and in shipping, and must pay express

charges. For heavy producers the direct shipper method is usually the most profitable. This would also be true of the creamery except that in nearly every case it is impossible to obtain an adequate amount of butterfat through this method alone. The maintenance of cream stations involves considerable difficulties for the creameries, but is necessary for efficient operation under present conditions.

**Advantageous Position of Centralizer.**—Operating under this system the centralizer has several definite advantages over the local creamery *except in regions of heavy dairy production*. These are:

(1) Volume production made possible by system for assembling cream from a wide territory. This also puts the large plant at some disadvantage, because procurement costs are frequently comparatively high, and the cream obtained will not be of high quality unless unusual precautions are taken.

(2) Large volume means large scale methods of operation and consequently low production costs. The very best buttermakers and plant superintendents obtainable can be afforded, and as a result the quality of butter made from a given grade of cream is very high. Laboratory tests and experiments of the most scientific type are made possible.

(3) Volume of sales enables the large centralizer creamery to dispose of its butter to the best possible advantage. The majority of these creameries sell a large portion of their butter direct to retail stores through their own branch selling offices and associated wholesale distributors, located principally in the East. This volume has also permitted these companies to advertise extensively and follow other merchandizing methods in building up a reputation for their various brands. All of this would be impossible for a small creamery, which would have to sell its entire output to large wholesale receivers in the primary markets, who in turn perform and receive the benefits of the sales services which have been described above. Of course, some local creameries are able to work up a local market in the surrounding small towns. This superiority in the marketing of its butter gives the centralizer creamery a tremendous advantage over the ordinary local plant. Some brands of butter made from Missouri cream bring top prices on the retail market in the large cities, although sold in competition with other butter of higher score. Consumers favor these standard brands because of their uniformity.

**Proposed Alternative Markets.**—The new markets for dairy products which have been proposed as alternatives for the centralizer system may be grouped under three headings: (1) local creameries, both cooperative and privately owned; (2) cooperative centralizer creameries; and (3) whole milk outlets, such as condenseries, milk powder plants and cheese factories.

## LOCAL CREAMERIES

Advocates of local creameries offer two principal arguments in favor of this type: first, the fact that prices paid for butterfat in states served by local cooperative creameries (as Minnesota and Wisconsin) are considerably higher than prices paid by centralizers in Missouri; and second, the unfounded belief that the centralizers generally resort to various unfair methods in buying, such as short-testing and underweighting.

**Butterfat Pricer Higher in Local Creamery Territory.**— It is true that cream prices are higher in local creamery territory, but at the same time they are lower in some other states than in Missouri. Table 5 shows the prices paid producers in several states. The average price

Table 5.—Prices Paid Producers for Butterfat; a Comparison of Several States; by Months, 1926 and 1927.\*

State	Jan.		Feb.		Mar.		April		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Average	
	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27	'26	'27
Minn.	47	52	45	51	45	51	43	51	41	48	42	44	41	44	41	43	43	45	46	48	49	48	52	52	44.5	48.
Iowa	44	47	42	47	42	49	40	49	38	45	39	43	39	42	38	41	40	42	42	45	47	45	47	48	41.5	45.2
Wis.	50	54	48	54	48	54	44	53	42	49	43	47	42	46	42	44	44	48	47	52	54	50	53	55	46.4	50.5
Mo.	37	42	38	43	38	44	36	44	34	38	35	36	35	36	34	35	36	36	40	40	43	41	44	45	37.5	40.0
Kan.	37	40	36	41	36	43	34	43	33	37	34	36	33	34	32	34	36	36	39	39	44	41	41	41	36.2	38.7
Neb.	38	41	37	42	37	44	35	44	34	38	34	37	33	36	33	35	36	37	40	40	43	40	42	42	36.8	39.6
Ill.	42	46	42	45	41	48	39	46	37	42	38	39	37	38	36	38	39	40	41	43	45	43	45	47	40.1	42.9
Ark.	40	38	37	41	38	42	32	41	34	38	35	35	36	33	34	34	34	34	38	38	39	39	39	40	36.3	37.7
Ark.	40	38	37	41	38	42	32	41	34	38	35	35	36	33	34	34	34	34	38	38	39	39	39	40	36.3	37.7

\*Data from price quotations obtained by state statisticians, U. S. D. A., reported in "Crops and Markets" each month.

during the year, November 1926 to October 1927, was 48 cents in Minnesota and 40 cents in Missouri, a difference of eight cents. In 1925-1926 the average difference was seven cents.

It must be recognized, however, that there are at least two very definite reasons why butterfat prices are lower in centralizer than in local creamery territory. The first of these is higher procurement costs; the second is generally poorer quality cream.

(1) It is obvious that the complicated system of assembling necessary in order to obtain adequate volume of raw material in sections of scattered production costs more to operate than the simple collection system of the local creamery. Table 6 shows the cost of procurement for twelve centralizer creameries reporting to this Station. Since the butterfat prices for Missouri given in Table 5 are really cream station prices, the procurement cost used in this comparison must be that for cream stations.

According to the investigation conducted by the Kansas Station previously referred to it cost in 1916 approximately twice as much to get

Table 6.—Cost of Procurement for Cream Obtained from Stations and Direct Shippers, and Weighted Combined Average, by Months, in Cents Per Pound of Fat.

	From Stations	From Direct Shippers	Weighted Combined Average
January.....	7.01	2.25	6.21
February.....	7.09	2.42	6.77
March.....	9.40	4.25	8.13
April.....	7.50	4.03	5.28
May.....	6.09	1.80	5.77
June.....	6.02	1.52	4.80
July.....	6.37	1.10	5.33
August.....	6.28	1.42	5.56
September.....	6.44	2.74	6.06
October.....	6.27	2.49	5.89
November.....	6.39	2.66	6.15
December.....	7.01	2.62	7.00
Weighted Avg.....	6.577	2.21	5.85

butterfat to the creamery in Kansas as in Wisconsin. There is every reason to believe that about the same condition prevailed in Missouri, and still exists at the present time. In fact, because of the greater territory now covered by many centralizers, and increased transportation charges, any change which may have occurred has probably increased the difference.

Using this and the figures given in Table 6 as the basis of calculation, it will be seen that procurement costs are probably 3.30 (one-half of 6.587) cents higher in Missouri at present than they are in local creamery territory. With a price difference of 7.5 cents between Missouri and Minnesota (the latter state is chosen because it is more typically a creamery area than Wisconsin), there remains approximately four cents difference per pound to be accounted for.

(2) The second factor causing the difference in price between the two sections is the difference in the quality of the cream.

The average person has only a vague idea of the relationship between the quality and price of butter, or of the great differences in quality which are encountered. This is one of the main reasons behind the slow progress in improving the quality of Missouri cream, and why it is hard for farmers to understand why butterfat prices are lower here than in some other states. No butter has been made with a theoretically perfect score of 100 per cent, the best grades of butter scoring 93, this being the highest score commonly used in the trade. From this highest grade, butter is found scoring on down to as low as 70 or 75, although the greater part of production scores between 80 and 93.

This wide variation in quality is due to differences in the quality of cream from which the butter is made, and to methods of manufacturing. Of these two it may be said that the former is the more important,

particularly in Missouri, 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.

Calculations were made some time ago by the U. S. Department of Agriculture (and a similar study made at this time would no doubt yield results not materially different) of the wholesale price of butter on the New York market, which may be considered fairly representative for the country as a whole. The price varied from 62.59 cents per pound for 93 score butter to 50.79 cents for 86 score butter, or a variation of 23.2 per cent. Below this point there is an even more rapid decline in price, since it is out of the scoring range of butter ordinarily sold for table use.

It is practically impossible for an ordinary centralizer creamery in this part of the country to have any considerable part of its butter output score more than 90, despite extreme care in manufacturing and the use of the most scientific equipment and methods. During the summer months of July, August, and September, when conditions for keeping and handling cream are unfavorable for producers with inadequate equipment, a very large percentage of the butter produced will fall somewhat below this point.

It was found to be impossible to ascertain the exact proportion of butter of different scores made by creameries in Missouri. Estimates of the production of Missouri butter of different scores made by responsible persons place it as follows: 90 or above, 10%; 88 to 90, 55%; 85 to 88, 30%; 80 to 85, 5%. On the basis of the usual price differences existing in the wholesale market as previously given, and keeping in mind the total production in Missouri of approximately 65,000,000 pounds, it may be roughly calculated that Missouri farmers are losing several millions of dollars annually because of the poor quality of the cream they produce.

Local creameries in the northern states, despite less exact methods of manufacturing, are able to manufacture a superior quality of butter because of the better grade of cream received. Particularly is this true following the federation of cooperative locals into a central sales association, and the increased attention which in the past few years has been paid to quality production. Using the best information available, it may reasonably be concluded that the greater part of the butter produced in Minnesota scores above 90, as compared with only a small part of the Missouri output. The monthly settlement basis of the Land O' Lakes Creameries, Inc., provides only for scores above 88, and this may be considered as indicative of the situation in the state as a whole.

Accepting these estimates, it can only be concluded that the four-cent difference in butterfat prices as between Missouri and Minnesota which remains after allowance is made for the extra procurement cost is fully accounted for by the difference in the quality of the cream produced in the two states.

**Unfair Practices in Selling.**—The second reason why local private or cooperative creameries are advocated is the general belief that present creameries frequently discriminate against communities as regards price, and fail to give correct weights and tests.

During the year 1927 this Station, in cooperation with the Missouri Cooperative Crop Reporting Service, conducted a special investigation of local prices paid for farm products in all parts of the state. The complete results of this investigation are not yet available, and the influence of location and freight rates have not been calculated. However, the average deviation in butterfat prices as between towns was found to be 2.49 cents, which, together with isograph maps of these prices, indicates that prices vary considerably between towns without close relation to transportation costs. Probably the most important factor behind these variations is the competitive situation existing in any given locality. This, however, is in itself no indication of dishonest methods, or of need for change in the type of creameries. Similar wide variations in butterfat prices occur in other regions, although they are the result of quite different causes. This is shown in the Minnesota study to which reference has previously been made.

Table 7.—Shortage and Overage (Butterfat Paid for Minus Butterfat Received at Creameries) by Months, for Missouri Creameries Reporting, 1925. (Expressed As Percentage of Total Intake of Butterfat.)

	Net Overage	Net Shortage
January.....	--	.7
February.....	--	.5
March.....	--	.4
April.....	--	.5
May.....	.1	--
June.....	--	--
July.....	--	.6
August.....	--	.7
September.....	--	.6
October.....	--	.6
November.....	--	.6
December.....	--	.6
Avg. for Year.....	--	.5

Since the invention of the Babcock tester cream producers and buyers have waged a more or less constant warfare over weights and tests. Due to the difficulty of directly controlling the cream station

buying operations, creameries which have a perfectly honest management may find their local agents favoring one patron at the expense of another and following other unfair practices in order to gain business or make something in addition to commissions. But so far as the state as a whole is concerned, there is definite evidence that cream bought through local stations is over rather than under tested or weighed. This is indicated by Table 7, made up from the reports of twelve creameries, which shows that for all except one month there was a net shortage in butterfat receipts as compared with the amounts actually paid for. Cream station operators, in trying to get business away from one another (operating on a commission basis), tend to read their tests or weights, or both, a little high, and this causes a shortage in the receipts of the creamery as a whole.

From this evidence it may be concluded that while unsatisfactory buying practices may be found in connection with cream marketing in Missouri, a result of imperfect competition and local conditions, they are not nearly so prevalent as supposed, and are in themselves insufficient evidence of the need for new marketing agencies.

**The Advantages of Local Cooperative Creameries in Missouri.**—While existing conditions generally justify the difference in butterfat prices as between centralizer and local creamery territory, a soundly organized and efficiently managed local creamery established in a section of Missouri able to support it would be in a different position. In the first place, procurement costs would not be as great as under the present centralizer system, and in the second place the quality of the cream obtained would be higher, because of the different method of collecting the cream.

Therefore, it will be seen that the real question is, not whether local creameries are better than centralizers, but whether or not production conditions make possible the successful operation of the former type plant. Wherever dairying has progressed sufficiently, the local creamery has a distinct advantage over the centralizer. Local creameries having a volume of from two hundred thousand to a half-million pounds of butter annually (see Table 1) should be able to compete successfully with the centralizer type, and in some localities to pay appreciably higher prices for butterfat. The practical limits of this possible price differential are indicated by the facts previously cited regarding the difference in price between Minnesota and Missouri.

It should be noted, however, that the centralizer creameries would continue to have the advantages of superior technical operating methods and sales connections which give them a considerable advantage in disposing of their product. At the present time there are a few local creameries in the centralizer territory which have been able to develop a good

business in surrounding towns, so that their disadvantage in this respect is minimized. But it must be remembered that if a large volume of Missouri cream should be processed in local creameries it would be necessary to find out-of-state markets for this butter, so it would be unwise to base predictions of the possibilities of local creameries in this territory entirely on the position of existing creameries.

## COOPERATIVE CENTRALIZER CREAMERIES

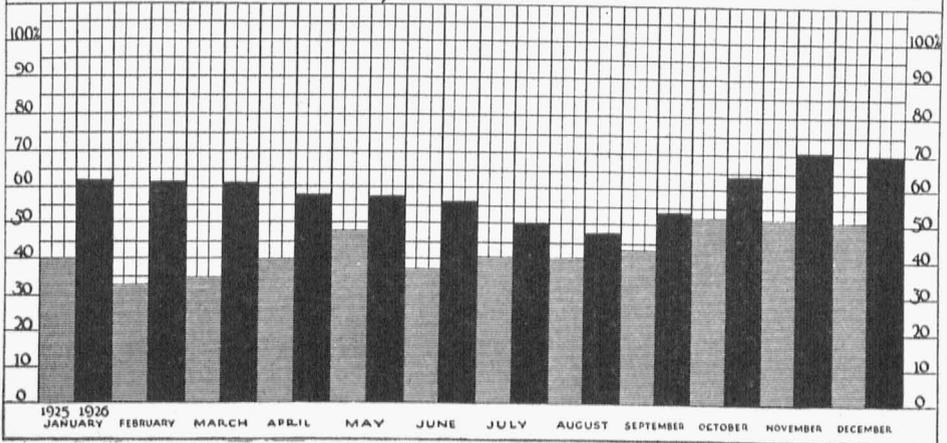
Where local cooperative creameries cannot be established the other alternative type of creamery, cooperative centralizers, may be considered. This kind of cooperative plant would not have the local creamery's advantage of greatly reduced procurement costs. Nevertheless, they would not be in exactly the same position in this regard as private centralizers. The latter constantly engaged in a fierce and costly struggle for volume of cream, and this is one reason for high procurement costs. Cooperative creameries of a modified centralizer type should be able to obtain their raw material at slightly lower cost because of their relationship to producers and local cooperatives. For instance, where local cooperative units buying cream are already in operation, the cream at present sold to private firms could be diverted to the cooperative factories, and if the latter were properly distributed with this in view, sufficient volume might be insured from the outset and a low cost of procurement be maintained.

The quality of cream obtained by cooperative centralizers would presumably be no better than that now going to existing creameries. But it is a well known fact that one of the principal benefits of cooperative marketing is its effect on quality of production. For example, The Land O' Lakes Creameries, a federation of local cooperative creameries in Minnesota, launched a drive for quality production and as a result the percentage output of the high priced sweet cream butter scoring 93 or better was increased from 32.4 in February 1925, to 61.0 in the same month of 1926. Other months show similar encouraging gains. The better prices due to improved quality received by local creameries shipping through this organization in 1926, as compared with 1925, are said to have amounted to over two hundred thousand dollars. These facts are shown graphically in Figure 5.

There are many obstacles confronting centralizers in their efforts to obtain a higher quality of cream. Cooperative creameries of the centralizer type could undoubtedly, through strict payment by grade and through educational campaigns, improve the quality of Missouri cream marketed through them. While it might be impossible for them to raise this quality to a point where their butter output would be comparable in this respect with that of northern creameries, they should have a definite advantage in this respect over private firms operated under the same general circumstances.

Thus, slightly lower procurement costs and higher quality cream are the principal advantages which efficiently organized and operated cooperative centralizer creameries might have over their privately owned competitors. In addition, providing they were equally efficient, the

*Chart Showing Comparative Percentages of 93 Scoring Butter Shipped to Land O' Lakes Creameries Inc. Each Month During Years 1925 and 1926*



**CHART SHOWING VALUE OF IMPROVEMENT IN QUALITY OF BUTTER**

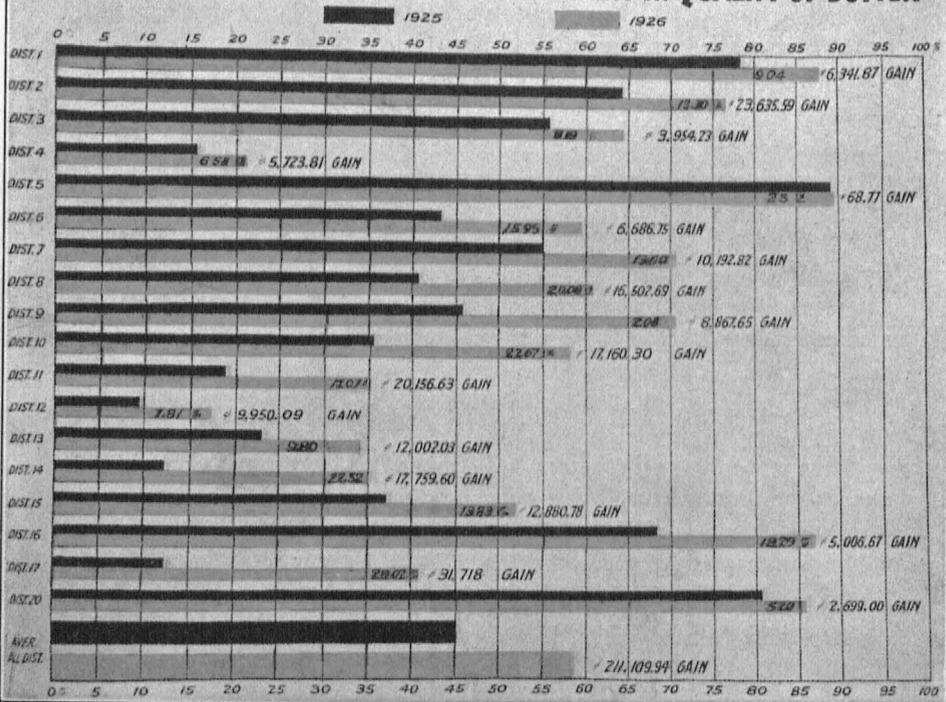


Figure 5.—Improved Quality of Butter Resulting from Cooperative Marketing in Minnesota, and Increased Returns to Producers. (Courtesy Land O' Lakes Creameries, Inc.)

profit now going to private creameries would be received by the farmers either as dividends or as a higher price for butterfat. In the Kansas study previously referred to, it was found that the average profit of Kansas centralizer creameries was only .81 of a cent per pound of butter (1916 price level). On the basis of the 1927 price level this would be .935 of a cent per pound. Many farmers are of the opinion that creamery profits are much larger than this, but it is a well known fact among those acquainted with creamery operations that these firms depend for dividends on a small profit on a large volume of business rather than a large profit per pound.

It is entirely unreasonable to assume that cooperative centralizer creameries could be operated more efficiently than the larger private centralizers. The latter have been brought to a high point of efficiency, and in fact the cooperatives would have to extend themselves in order to keep pace with this development. Hence, there could be expected no appreciable savings due to reductions in manufacturing costs.

Cooperative creameries might help to some extent in stabilizing butterfat prices by establishing a more uniform competition in the various sections of the state. A full discussion of the benefits of cooperative marketing, most of which apply in this case, will be found in Bulletin 253, issued by the Missouri Agricultural Experiment Station.

In the foregoing discussion it has been brought out that: (1) There are valid reasons why butterfat prices are lower in centralizer territory, and many of the arguments used against private and in favor of local or cooperative centralizer creameries cannot be substantiated. (2) Local or cooperative centralizer creameries have certain advantages which should enable them, if properly located and efficiently managed, to bring somewhat higher returns to producers. (3) The question of whether or not private centralizer creameries may profitably be replaced by local creameries depends mainly upon the character of dairy production in any given section.

### WHOLE MILK OUTLETS FOR BUTTERFAT

There are two main factors to be taken into account in considering alternative market outlets for dairy products; (1) the relative position of these different enterprises as regards the price they are able to pay for butterfat, and (2) the character of local dairy production.

**Prices Paid by Alternative Markets.**—Any marketing agency has a definite limit beyond which it cannot go in paying for raw material, this limit being fixed by the returns which it receives for the finished product. Competition tends to equalize these returns as between cheese, butter, and other dairy products, since if one enterprise is out of line

with the others, production will gradually rise or fall until prices of that commodity are back on the general level. However, due to factors such as distance from markets of typical producing areas, the use of surplus market milk, etc., there is some difference between the general level of prices which can be paid by cheese factories, creameries, condenseries, milk powder plants and city milk dealers. But any single plant may be above or below the average in this regard, due to the presence or lack of favorable local markets or outside sales connections.

There are no available statistics showing the relative prices paid for butterfat by cheese factories, creameries, condenseries, and other plants located in dairy regions. However, as stated by a dairy marketing specialist of the U. S. Department of Agriculture, it is known in a general way that "fluid milk concerns can outbid dairy manufacturing concerns, and usually the milk concerns which have city milk trade as their outlet pay more than those concerns which condense, dehydrate, or evaporate milk. Cheese factories have been paying some very attractive prices this year (1928), but over a long period of time they cannot be expected to pay more than butter factories, when we take into consideration that they buy milk instead of cream. Local conditions, of course, have considerable to do with this."

From this it will be seen that whole milk outlets can be expected to pay considerably higher prices for butterfat than Missouri centralizer creameries and usually somewhat higher than local creameries. This difference is at least partially accounted for by the value of the skim milk, and the fact that the butterfat is in sweet cream. The question of which market is best will depend on the individual farmer's circumstances, his uses for skim milk, possible outlets for sweet cream, the time required for separating, the volume of milk production, the length of haul, cost of hauling, and condition of roads.

**Character of Local Dairy Production.**—To be successful, any plant requiring the use of fluid milk needs (1) adequate supply, and (2) good roads for collection.

Those who have observed the preliminary steps taken by large evaporated milk companies before a condensery is started in any locality have seen the elaborate precautions which are taken to insure adequate volume. It is undoubtedly true that in many cases cheese factories and other dairy enterprises have been proposed for Missouri communities where there was almost no chance for success. On the other hand, there are some sections of the state where fluid milk concerns can be profitably operated, and would undoubtedly be of great help in stimulating dairy production and community growth.

## PRODUCTION CONDITIONS IN MISSOURI FROM A MARKETING STANDPOINT

From the foregoing discussion it will be seen that the advisability of establishing local creameries, cheese factories, condenseries, or other dairy manufacturing enterprises depends largely on the character and intensity of milk production in the territory concerned. While this cannot be definitely determined for any individual community except by local survey, it is entirely possible to show the general conditions which prevail in Missouri at the present time.

**Recent Tendencies in Dairy Production.**—Much has been said about the great strides which dairying has made in Missouri. Undoubtedly some counties have greatly increased both number of dairy cows and production per cow. However, real dairy farms and cows are a relatively small factor in the production of milk in this section. A vast part of the butterfat sold from Missouri farms comes from cows of inferior quality which are milked intermittently and cared for indifferently, depending on many factors such as butter prices, feed costs and conflicting farm operations.

Because of these factors erroneous conclusions may easily be drawn regarding changes in the character of dairy production, at least so far as its marketing significance is concerned. A hundred per cent increase in the number of real dairy farms in some counties may have little effect on the total quantity of butterfat available.

**Development Since 1900.**—Practically no reliable quantitative data are available to show the historical development of dairying in Missouri. Census figures which are frequently used for such purposes, have been found upon careful examination to be unreliable in many respects. Data obtainable from other sources are either incomplete or biased.

Census figures indicate only a small growth in dairy farming *in Missouri as a whole* during the present century. The number of dairy cows in Missouri increased only 5.7 per cent from 1899 to 1924, as compared with a national advance of 22.0 per cent. Milk production increased 6.1 per cent during the same period in Missouri, compared with 26.6 per cent for the nation as a whole. Production per cow, as computed from these figures, increased only slightly in both Missouri and the United States.

As given by the Bureau of the Census, the value of dairy products sold in both Missouri and the United States increased greatly during this quarter century. When allowance is made for changes in the value of the dollar (by correcting each figure according to the U. S. Bureau of Labor

Statistics wholesale price index for all commodities), the increase is not nearly so marked, it being 30.0 per cent for the United States and an actual loss for Missouri of 7.3 per cent. This does not, however, indicate a decrease in the physical quantity marketed. The facts given above are summarized in Table 8.

**Table 8.—General Statistics Showing Development of Dairying in Missouri. (Data Mostly from Bureau of Census—See Remarks in Texts Regarding Accuracy.)**

	Missouri		United States	
	1899	1924	1899	1924
Population (1924 estimated) -----	3,106,665	3,455,376	75,994,575	112,078,611
Number of Dairy Cows -----	765,386	808,732	17,135,633	20,899,647
Milk Production (Gals.) -----	258,207,755	273,956,020	7,265,804,304	9,198,304,000
Milk per Cow (Estimated lbs.) -----	2,898	2,915	3,646	3,784
Butter Made on Farms -----	45,509,110	25,937,470	1,071,626,056	642,803,267
Value of Dairy Products (\$) -----	15,042,360	28,638,424	472,276,783	1,260,777,798
Same corrected for purchasing power (1913) -----	20,327,500	18,841,000	638,211,800	829,459,000
American Cheese (lbs.) -----	1,072,751	252,000	281,972,324	347,240,000
Creamery Butter (lbs.) -----	1,440,616	56,801,000	420,126,546	1,356,080,000

If it can be considered permissible to draw conclusions from data which are as unsatisfactory as these, it seems reasonably evident that until very recently dairying has had a gradual but not very marked growth in the state as a whole, and that the conditions which brought about the present general set-up of marketing facilities in Missouri had not been materially altered in 1924 in most sections of the State. Undoubtedly dairying has during those years made rapid progress in certain areas—changes sufficient to justify changes in marketing methods.

A new series of reports to the Missouri Crop Reporting Service beginning in 1925 indicate that there has been a material expansion in dairying in Missouri since that year, as shown in Table 9. Production

**Table 9.—Index Numbers Showing Trend of Dairying in Missouri, 1925-1928 (1925 = 100). (Data from Missouri Cooperative Crop Reporting Service.)**

	1925	1926	1927	1928
No. of Farms Reporting ..	5329	5379	5278	5530
Cows Per Farm -----	100	100	103	103
Cows Milked -----	100	101	107	113
Production of Milk -----	100	103	109	116
Production Per Cow -----	100	103	106	113
Prod. Per Cow Milked -----	100	102	102	103

of milk on the reporting farms increased 16 per cent from 1925 to 1928. This was apparently due to some increase in the number of cows milked

and to an increase in the production per cow, rather than an increase in the total number of "cows".

**Comparison With Other Regions.**—A more satisfactory appraisal of production conditions, from the standpoint of their effect on marketing, can be made by comparing current conditions in Missouri with those in other regions.

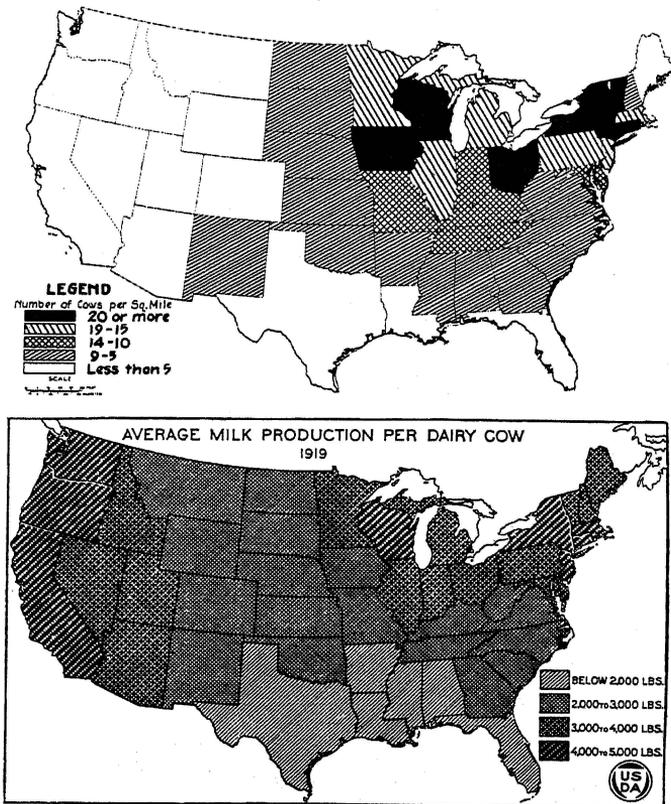


Figure 6.—(1) Number of Cows Per Square Mile in 1925 (2) Average Production Per Cow in 1919. (Latest Figures Available), by States.

Figure 6 shows the relative position of Missouri among the states with regard to number of cows per square mile and milk production per cow, probably the most significant of statistical measures. Missouri *as a whole* apparently still ranks among other states in centralizer territory with respect to the above factors. This becomes more plainly evident when individual states are compared.

In 1925 the value of milk products sold in Missouri was \$59,378,200, or 8.1 per cent of the total for all farm commodities. The value of milk products equalled that of small grains, ranking sixth among the principal lines of production in this state. This may be significantly contrasted with the situation in Wisconsin, where 49 per cent of the gross farm income was derived from milk. This is shown graphically by Figure 7.

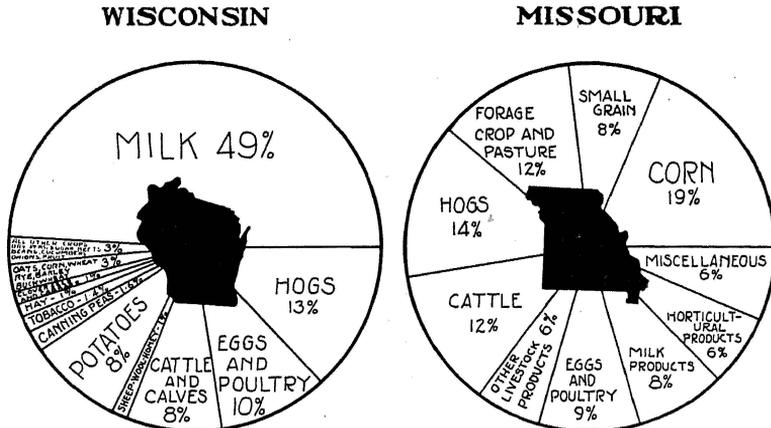


Figure 7.—Relative Importance of Milk and Other Farm Products in Wisconsin and Missouri, 1925. (Data for Wisconsin from Bulletin 74, Wisconsin Crop and Livestock Reporting Service; for Missouri, from 1925 Farm Census Report of Missouri Cooperative Crop Reporting Service.)

An even more significant picture of the difference in volume of dairy production as between Missouri and the northern dairy states is obtained from Figure 8, showing the cows per square mile in Missouri and

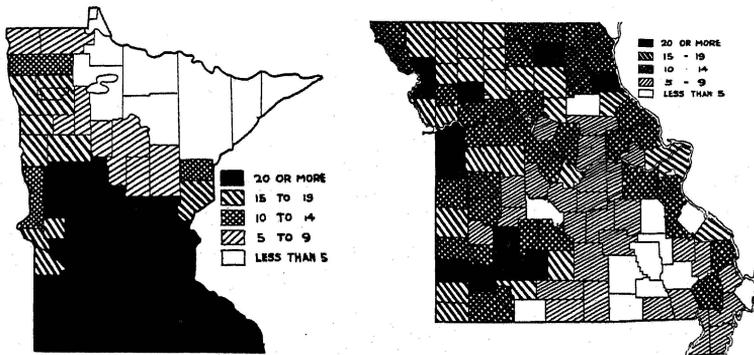


Figure 8.—Milk Cows Per Square Mile in Minnesota and Missouri, 1926. (Original Data from State Crop Reporting Services.)

Minnesota, and Figure 9, showing butterfat sold per county in Missouri, Minnesota, and Wisconsin.

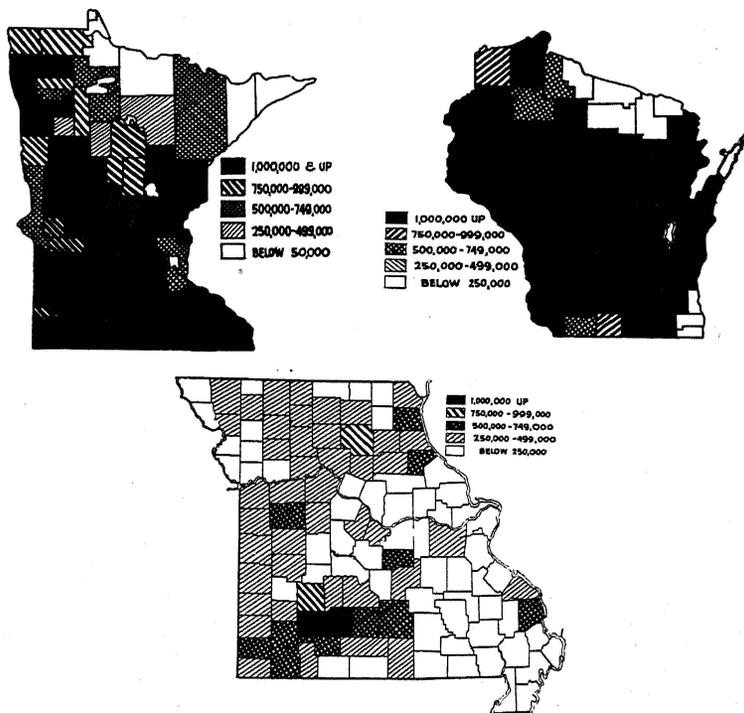


Figure 9.—Butterfat Sold Per County in Minnesota, Wisconsin and Missouri, 1924. (Data from State Crop Reporting Services.)

**Sections Where Marketing Expansion Seems Justified.**—Figures 10, 11 and 12 showing percentage of cows milking, milk production, and value of dairy products sold, by counties, in addition to the maps previously cited give a comprehensive picture of the production conditions in different sections of Missouri.

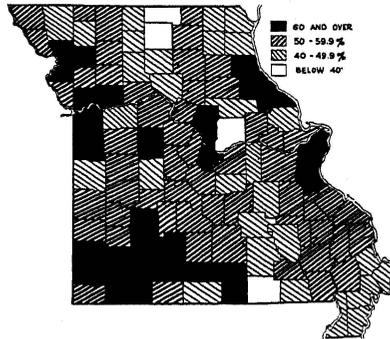


Figure 10.—Per Cent of Cows Milking, by Counties for Missouri, 1925. (Data from Missouri Crop Reporting Service, E. A. Logan, State Statistician.)

Obviously, no single factor can adequately measure the condition of dairying. For example, since the percentage of cows milking and the type of cow in different counties vary greatly, number of milk cows is in itself only a partial indicator of dairy production. Again, milk production by counties is only partially indicative, because of variation in size of the counties and of the greater or less proportion devoted to city milk supply and other uses. All of the factors must be considered together in order to comprehend the situation in a given area and for the state as a whole.

It is intended in this publication to outline only the general principles involved. Those who are interested in dairy marketing in particular counties, or in a particular type of enterprise, should first of all be informed regarding these principles. From then on it becomes a matter for individual consideration. The situation in any community concerned should be thoroughly investigated, in order to ascertain whether or not the particular conditions encountered justify further efforts. The Missouri College of Agriculture will assist so far as possible in this and in the technical phases of organization and operation of new dairy marketing

enterprises. The specialist in marketing can aid in organization procedure, and the specialists in dairying can aid in perfecting operating plans and specifying types of plants and plant equipment.

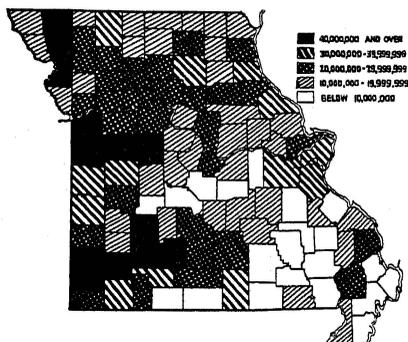


Figure 11.—Milk Production in Missouri, by Counties, 1925. (Data from Missouri Crop Reporting Service, E. A. Logan, State Statistician.)

**Cooperative Cream Buying Stations**—Cases have presented themselves where there was an insistent demand on the part of farmers for new dairy marketing enterprises, yet conditions did not at the time justify their establishment. In such cases a beginning might be made by establishing a cooperative milk or cream buying station.

Such stations may furnish a new and beneficial kind of local competition, and can help to educate members concerning cream marketing problems and the necessity for producing a higher quality cream. If they can arrange for premium prices for their high grade cream the members will be benefited accordingly. In some sections trucking routes might be established, and the sweet cream collected in this way sold to the city ice cream manufactures. Meanwhile, dairying may be stimulated in the community, and small deductions from cream checks might be made for the purpose of financing a creamery or other enterprise when and if conditions justify one.

Cooperative cream buying stations have already been tried out in Missouri some years ago. In 1908 stations were started at Strafford, Rogerville, Fordland, Diggins, Seymour, Mansfield, Ava, Norwood, Mountain Grove, and Willow Springs. The amount of butterfat handled is said to have increased from 100,000 to 1,500,000 pounds annually,

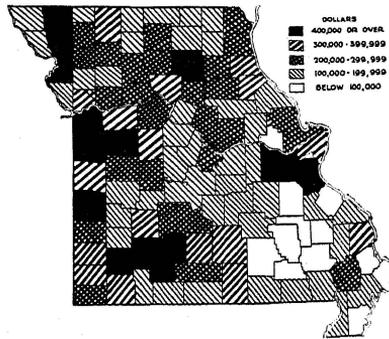


Figure 12.—Value of Dairy Products Sold, by Counties for Missouri, 1924. (Data from Missouri Crop Reporting Service, E. A. Logan, State Statistician.)

during the several years of their existence. The cream was contracted to the highest bidder among private creameries, by a committee composed of one representative from each local association, the price contract for the year being based on central market quotations.

According to a former leader of this organization, cream was successfully bought on a graded basis. When they started, it is said, producers were receiving seven cents below Elgin prices, but "the last year we got one and a half cents below Elgin". Apparently the members were not entirely satisfied with these accomplishments, so "when we could not get what we thought we should, we decided to build a creamery". This venture met with immediate difficulties, and became insolvent.

## SUMMARY

(1) There has been built up in Missouri and surrounding states a system for assembling butterfat which has as its operating unit the centralizer creamery. This type of market outlet for butterfat has survived others because it is adapted to the peculiar production conditions which have existed in this region.

(2) Due to higher procurement costs and poorer quality of cream, the centralizers are unable to pay as high prices for butterfat as do local creameries, cheese factories and condenseries located in this state and in northern dairy states. While this price difference is justified in centralizer territory as a whole, higher prices can be expected from other market outlets where production conditions justify their establishment.

(3) Volume of butterfat production is the principal test to be applied to any community or territory in judging its ability to support new market outlets. Some of the latter require greater production than others. In general, Missouri is still a centralizer territory, but there are some sections of the state where other market outlets may profitably be established.

(4) Whole milk markets such as condenseries, milk powder plants and cheese factories are able to pay higher prices for butterfat under ideal conditions for both, but the value of skim milk and costs of delivery must be taken into consideration, and generally leave these enterprises with relatively small if any advantage.

(5) Local creameries, either privately owned or cooperative, can be profitably operated where the local volume of cream production justifies. The local creamery has the advantage of lower procurement costs and higher quality of product.

(6) Because of the high efficiency of the operating and sales methods of private centralizers, cooperative centralizers would have to depend on two probable advantages in order to pay materially better prices; slightly lower procurement costs and better quality cream. Their success would depend on a full understanding by producer-members of these facts.

(7) Finally, it may be said that the old question of which should come first, market outlets or milk production, can have but one answer. It takes considerable time to develop the dairy industry in any one community. Meanwhile, local enterprises started without adequate supplies would more often fail than succeed. This would retard rather than stimulate dairy production. A marketing agency cannot be expected to operate at a loss over an extended period in order to build up production. Good local dairy marketing units do help to build up the dairy industry, but they must first have a minimum amount of raw material for economic production. Dairying must come before new dairy markets.