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KANSAS STATE COLLEGE OF AGRICULTURE  
AND APPLIED SCIENCE

MANHATTAN, KANSAS

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## FACTORS AFFECTING BUTTERFAT PRICES IN KANSAS



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# FACTORS AFFECTING BUTTERFAT PRICES IN KANSAS<sup>1</sup>

By GEORGE MONTGOMERY AND F. L. PARSONS<sup>2</sup>

## INTRODUCTION

Dairying is the third largest source of income for Kansas farmers. In most years from 6 to 12 percent of the state's total agricultural income is from the sale of dairy products. In 1940 approximately 750,000 milk cows in Kansas produced more than three billion pounds of milk. Of this quantity, nearly three-fourths was sold as cream for the manufacture of butter. An understanding of the factors affecting butterfat prices should be of interest to the 130,000 farmers in the state who sell dairy products.

The price which producers receive for butterfat is determined by the cost of performing the necessary marketing services and by the level of butter prices in the central markets. Butter production, the quantity of butter in cold storage, imports and exports of butter, the consumer's ability to buy as determined by business conditions, and government purchases of butter are factors which influence the level of butter prices in central markets. The manner in which the influence of these factors is reflected from the central markets to the farm is a relationship which frequently is not fully understood. As dairying becomes more important in Kansas, there should be an opportunity to introduce more efficient methods and reduce local marketing costs. If marketing costs are to be substantially reduced, changes of a major character may be necessary such as consolidation of small cream stations and creameries in a market area or the elimination of costly duplication of effort in cream collection. While improvements in marketing usually mean greater profits to producers, it should be remembered that such improvements also may result in better quality and service and lower prices to consumers.

## THE TREND OF BUTTER PRODUCTION

Creamery butter production in the United States has increased rapidly during the last 25 years. In 1917, according to the United States Department of Agriculture, the production of butter in creameries was slightly more than 750 million pounds, while in 1940 it exceeded 1,800 million pounds. This was an increase of 140 percent in a 23-year period. This rapid increase in creamery butter production is due in part to a shift from farm butter production to

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1. Contribution No. 116 from the Department of Agricultural Economics.

2. Mr. Montgomery and Mr. Parsons are Marketing Specialists on the staff of the Kansas Agricultural Experiment Station. John B. Roberts, temporary assistant in Agricultural Economics, 1934-35, assisted in the preparation of part of the data for this publication.

factory production and in part to increased total production. Figure 1 shows the production each year since 1917 and also the trend of production. The largest increases occurred in the years immediately following World War I. After 1933, creamery butter production declined sharply until 1938 because of drouth and a decline in milk cow numbers. Since 1938, milk cow numbers have increased and creamery butter production has reached new highs.

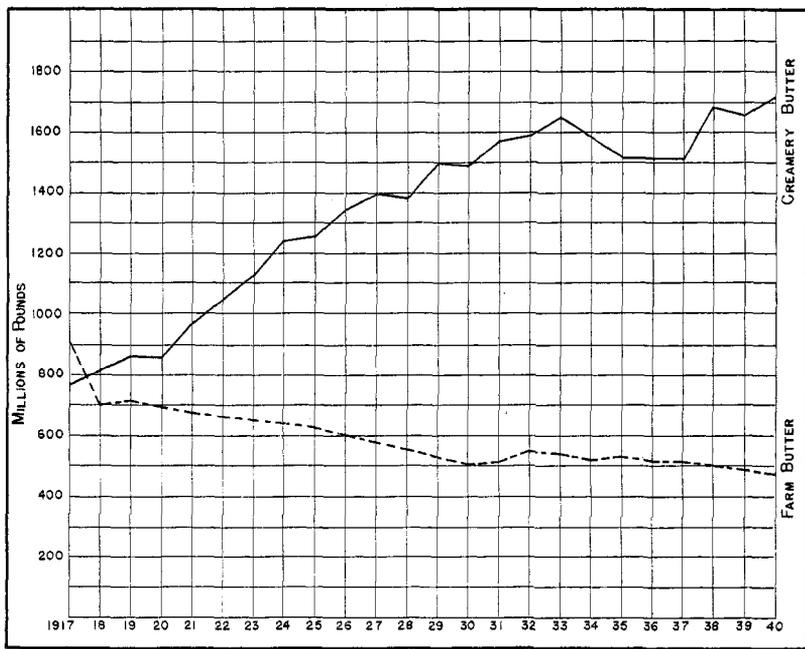


FIG. 1.—Annual creamery butter production and production of farm butter in the United States, 1917-1940. (Bureau of Census data.)

The center of butter production for market is in the northern Corn Belt and the upper Mississippi Valley. The abundance of pasture and feed makes this section the most important butter-producing region of the country. Five states in this area—Minnesota, Wisconsin, Iowa, Missouri, and Kansas—produce nearly one-half of the butter marketed in the United States. The center of butter production has moved westward as population increased and as dairymen in the eastern states have specialized in the production of fluid milk for city markets.

BUTTERFAT PRODUCTION IN KANSAS

As dairying has extended south and west, Kansas has become a more important butterfat producing state. With the exception of the Bluestem grazing area, dairying is more important in the eastern half of Kansas than in the western part. Figure 2 shows the quantity of butterfat sold per square mile in each county in Kansas in 1939 as reported by the Bureau of the Census.

The counties having large sales of butterfat may be grouped into three sections of the state. The first is the territory from the Kansas and Republican rivers north to the Nebraska state line. This section does not have so many cows per square mile as in

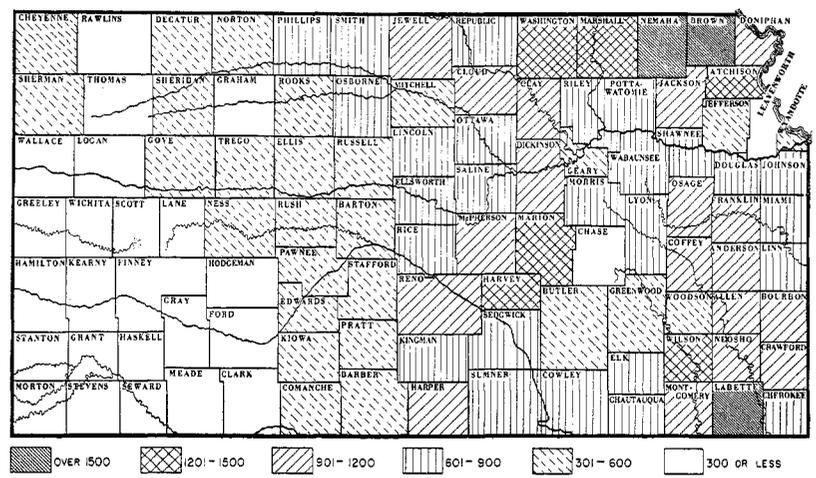


FIG. 2.—Pounds of butterfat sold per square mile in Kansas in 1939. (Data from U. S. Census.)

southeastern Kansas but it exceeds that section in the quantity of butterfat sold per square mile. The second area is a strip about three counties wide in the eastern end of the state, extending from the Kansas River south to the Oklahoma state line. This section has more cows per square mile than any other group of counties; however, it does not rank first in the sale of butterfat per square mile because much of the dairying is devoted to the production of fluid milk for city markets and condenseries. The other section is an area in central Kansas lying between the Oklahoma and Nebraska borders and from two to four counties in width. In this area dairying is an important supplementary enterprise to wheat farming. Data in Table 1 show the total quantity of butterfat sold, the sales per square mile, and the number of cows per square mile in the 12 counties having the largest sales of butterfat per square mile in 1939. Five of the counties having the largest sales were in north-eastern Kansas.

TABLE 1.—Number of cows milked and butterfat sales by specified counties in Kansas having the largest sales of butterfat per square mile in 1939. (Data from Sixteenth Census of the United States.)

COUNTY.	Butterfat sold per square mile, 1939.	Cows milked per square mile, 1939.	Total butterfat sold, 1939.
1. Brown.....	2,115	17.5	1,207,895
2. Nemaha.....	2,049	16.2	1,466,565
3. Labette.....	1,726	20.2	1,109,985
4. Washington.....	1,366	13.7	1,232,353
5. Atchison.....	1,324	15.5	545,443
6. Marshall.....	1,299	13.1	1,174,710
7. Harvey.....	1,296	14.3	700,279
8. Marion.....	1,244	12.8	1,207,492
9. Wilson.....	1,243	13.8	722,575
10. McPherson.....	1,197	12.7	1,077,414
11. Montgomery.....	1,152	17.7	741,689
12. Jackson.....	1,142	12.6	700,279

Kansas produced about 90 million pounds of creamery and farm butter in 1939. This was approximately 4 percent of the total butter production of the United States. Of total Kansas production, about 9.9 million pounds (11 percent) was churned on farms

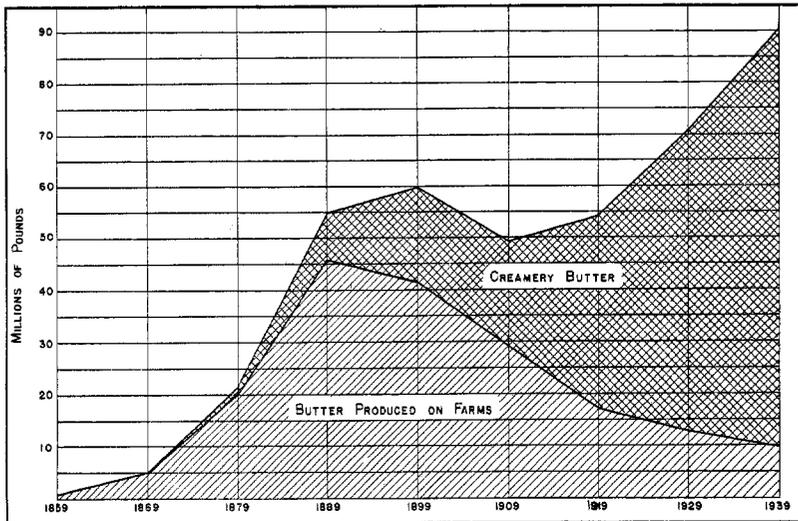


FIG. 3.—Butter production on farms and creamery butter production in Kansas by 10-year intervals, 1859 to 1939. (Bureau of Census data.)

and about 80 million pounds was produced in creameries or specialized butter plants. These figures do not represent the total butterfat production of Kansas, since large quantities of butterfat are shipped to Kansas City, Mo., Omaha, Neb., and other markets outside the state. It has been estimated that 15 to 20 percent of the butterfat produced in Kansas is manufactured into butter in creameries outside the state.

The quantity of butter produced on Kansas farms increased rapidly from 1869 to 1889 (Fig. 3). In 1889, 46 million pounds of butter was produced on Kansas farms, according to reports from the United States Bureau of the Census. Since that time, farm churning of butter has decreased and the quantity of butter made in creameries has gradually increased. The first step in the change to the making of creamery butter was the development of whole milk creameries. These were plants which received whole milk, separated the butterfat, and churned it into butter. The activities of these plants were limited to a comparatively small area because of the difficulties involved in handling and transporting whole milk. About 1890, two new developments further stimulated the transition to creamery butter production. In 1886, the first centrifugal hand separator was placed on the market. In 1890, the Babcock test for determining the butterfat content of cream and milk was perfected. These two inventions—one providing a rapid and convenient method of separating cream from milk on the farm and the other making it possible to determine accurately the butterfat content of the cream after it had been separated—transferred butter making from the farm home and the whole milk creamery to plants which specialized in collecting cream and churning it into butter. The production of butter for market is now confined largely to local and centralized creameries which have been developed as the result of changes brought about by these inventions. During the period when this change was taking place, the present methods of cream marketing became established.

TABLE 2.—*Farm and creamery butter production in Kansas. (Dairy Produce Yearbook and U. S. D. A. Agricultural Marketing Service.)*

	Farm butter production.	Creamery butter production.
1899.....	1,000 pounds. 41,641	1,000 pounds. 18,197
1909.....	29,648	18,711
1919.....	17,456	36,567
1924.....	17,293	46,844
1929.....	12,827	58,967
1934.....	12,666	79,248
1939.....	9,900	80,108

The production of butter in creameries increased rapidly from 1890 to 1900 but made little growth from 1900 to 1910. During the last 30 years the production of butter in Kansas creameries has increased rapidly, due partly to a more complete transition from farm to factory churning and partly as a result of expansion of dairying in the state. The relationship between creamery butter and farm butter production in Kansas during the last 40 years is shown in Table 2.

#### METHODS OF SELLING BUTTERFAT

The development of the creamery system of butter production, especially the centralizer system, has given rise to the problem of collecting or assembling cream in sufficient quantities to permit economical operation of butter plants. Because of the extent of the territory over which a centralizer creamery must operate and the competition involved, the problem of collecting butterfat in large quantities is difficult. This fact has been responsible for many of the characteristic features, as well as the problems, of the present system of cream marketing.

Because of the nature of the product, the method of marketing may influence not only the price received for the cream but also the quality of the butter produced. Under the creamery system of butter production, several methods of assembling cream have developed. Kansas farmers have the choice of alternative methods of handling cream from the farm to the creamery. Among them are (1) through local cream stations; (2) by direct shipment to centralizers; and (3) to local creameries, either by direct delivery or truck collection.

#### LOCAL CREAM STATIONS

The most common method of marketing butterfat in Kansas is selling to cream stations. It was estimated in 1929 that cream stations handled approximately two-thirds of the butterfat sold from Kansas farms. With this system of marketing, the farmer delivers the cream to the station, where it is weighed, tested for fat content, graded, and the value calculated. Payment is made when the patron calls for the empty can. In Kansas, operators of cream buying stations must obtain a license from the State Dairy Commissioner, and, at intervals, representatives of his office inspect the station and equipment. In 1939 there were 1,839 stations licensed to buy butterfat in Kansas. This was 411 less than in 1929. The majority of these stations were operated by centralizer creameries on a commission basis although some of them were operated by independent owners. Seven of the larger centralizers operated nearly two-thirds of the stations in 1939 and there were 19 companies which had more than 25 stations each. The largest number of stations were in eastern and northern Kansas (Fig. 4) where dairying is most important.

Marketing butterfat through cream stations has been characteristic of the development of dairying in the Middle West. It is a

system of marketing which is adapted to regions of extensive farming and scattered dairy farms. For example, in some counties in western Kansas there was less than one milk cow per square mile in 1939, and the average for all of western Kansas was less than four milk cows per square mile. In these areas of limited dairying the cream station is a necessary link between the farm and the butter plant. The local station provides a convenient and ready market at all times for the sale of butterfat in any quantity. In addition, the farmer receives immediate cash payment for the cream delivered.

But, in spite of these advantages, there are certain features of the cream station system which are undesirable in sections where sufficient butterfat is produced to justify other methods of marketing.

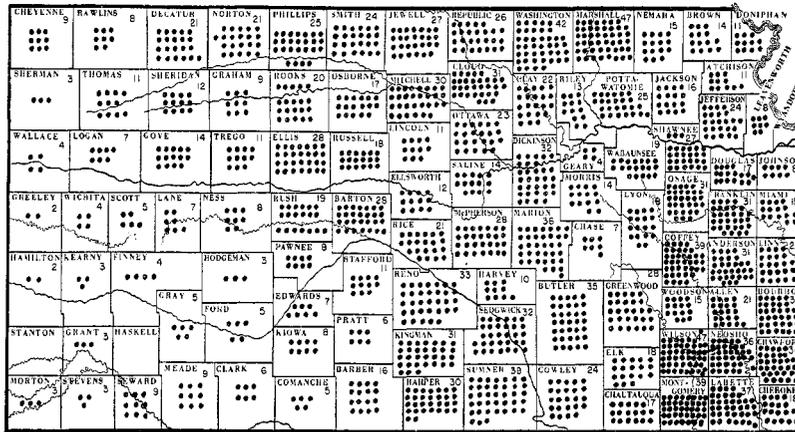


Fig. 4.—Number and distribution of cream-buying stations in each county in Kansas in 1940. (According to licenses issued by the State Dairy Commissioner.)

First, the cream station system is not conducive to the production and marketing of high-quality cream. Cream frequently is subjected to extreme summer temperatures, both at the station and in transit, causing it to arrive at the butter plant in poor condition. The cream must be handled a number of times and it often is held for several days before reaching the factory. Selling through the local cream station is an expensive method of marketing butterfat. In a study made by the Missouri Agricultural Experiment Station it was found that the cost of handling butterfat from the farm to the butter plant through cream stations was 6.6 cents a pound as compared to a cost of 2.2 cents by direct shipment.<sup>3</sup> The large number of stations, many of which are operated with a meager volume of business, makes the overhead costs per pound high.

3. Thomsen, F. L., and Reed, W. H. E., Developing New Markets for Missouri Butterfat. Mo. Agr. Expt. Sta. Bul. 267:15. 1929.



**DIRECT DELIVERY AND TRUCK COLLECTION BY LOCAL CREAMERIES**

Another method of cream collection, used principally by local independent or cooperative creameries, is direct delivery of the cream at the door of the plant. A modification of this method is the truck route collection, in which the creamery sends trucks on scheduled routes into the community to collect cream directly from the farm. This system is used by several of the more successful cooperative creameries of Kansas. While the operation of trucks represents an additional expense which must be deducted from the price paid for cream, this cost usually is considerably less than the margin of the local cream station. A summary of data obtained in 1931 from the cooperative creameries in Kansas operating truck routes showed that the average cost of collection by truck was 1.31 cents a pound of butterfat.<sup>4</sup> These costs have been reduced slightly

TABLE 3.—*Monthly average price paid for butterfat by cooperative creameries, and monthly average of cream station prices.*

YEAR AND MONTH.	Monthly average prices of butterfat.		Monthly average price of butterfat paid in one Kansas town.	
	Paid by four cooperatives operating truck routes.*	Paid by local stations in Kansas.†	Coöperative creamery price.	Local cream station price.
	<i>Cents per lb.</i>	<i>Cents per lb.</i>	<i>Cents per lb.</i>	<i>Cents per lb.</i>
<b>1939:</b>				
January.....	26.5	20.0	26	22.23
February.....	26.0	19.0	25	22.62
March.....	23.0	18.0	22	20.90
April.....	22.5	16.0	22	18.64
May.....	22.5	16.0	22	19.10
June.....	23.7	17.2	22	20.30
July.....	23.7	16.1	23	20.00
August.....	23.5	16.6	23	20.00
September.....	28.0	19.7	26	22.35
October.....	30.0	21.5	29	24.42
November.....	31.8	22.6	30	26.08
December.....	31.2	22.6	30	27.00
Yearly average.....	26.0	18.8	25.0	21.97
<b>1940:</b>				
January.....	33.7	25.9	34	29.08
February.....	30.7	24.1	30	28.84
March.....	29.0	22.9	29	27.12
April.....	28.5	21.8	28	27.00
May.....	27.7	20.8	27	25.61
June.....	28.0	19.6	27	22.16
July.....	27.7	20.6	27	22.70
August.....	28.5	21.0	28	24.55
September.....	30.7	21.6	30	26.04
October.....	32.0	23.9	32	28.15
November.....	36.3	27.1	36	30.41
December.....	37.5	29.7	37	34.16
Yearly average.....	30.8	23.3	30.4	27.15

\* Data obtained from Nemaha County Creamery Association; Washington County Coöperative Creamery Association; Sunflower Coöperative Creamery Association; and Ark Valley Coöperative Dairy Association.

† Data obtained from *Kansas City Daily Drovers' Telegram*.

4. Jouno, Russell John. The Route System of Cream Gathering in Kansas. Master's thesis, Kansas State College, 1931.

in recent years. Data from cooperative creamery managers in 1941 showed a range from 1 cent to 1.43 cents, with an average of 1.21 cents a pound of butterfat. Table 3 is a comparison of prices paid by certain cooperative creameries and prices paid at cream stations. Collection by truck has the further advantage that the cream is collected more frequently and arrives at the creamery in better condition.

#### COOPERATIVE CREAM POOLS

A method of marketing cream which has been used quite extensively in North Dakota, Idaho, and other states is the coöperative cream pool. A coöperative cream pool is formed by a group of dairy farmers who have united to sell their cream. The cream is collected, weighed, tested by the coöperative association, and sold collectively either to a coöperative creamery or by contract to a centralizer creamery. The advantages of the cream pool are that it increases the returns to producers, reduces the overhead costs of marketing and improves the quality of cream. The Idaho Agricultural Experiment Station reported that during 1925 nine coöperative cream pools in Idaho, handling approximately two million pounds of butterfat, paid to their members \$94,115 more than the members would have received had they sold at prevailing cream station prices.<sup>5</sup> This was an average of 4.7 cents a pound above station prices. It was possible to pay a higher price in the coöperative cream pool because the volume handled was several times larger than it was in the local cream station. This reduced overhead cost of operation per unit. Furthermore, a premium was received on the better quality cream. The pools were able to deliver as sweet cream from 50 to more than 80 percent of the cream handled over a three-year period.

The cream pool is an excellent marketing agency in communities which have unsatisfactory cream markets. It also may be a forerunner of a coöperative creamery since it provides experience in cooperative effort and is an effective way of building up sufficient volume of business to support a coöperative creamery. In many communities in Kansas the present system of marketing cream is unsatisfactory, both from the standpoint of the quality of butterfat which reaches the creamery and from the standpoint of the cost of the service rendered. In those communities in which there is a sufficient volume of cream to permit economical operation, the coöperative creamery offers a method by which marketing costs may be reduced and quality of cream improved.

#### HOW BUTTERFAT PRICES ARE ESTABLISHED

The price of butterfat is determined to a large degree by the prevailing price of butter in the principal markets. The Chicago and New York butter markets establish the level of Kansas butterfat

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5. Atkeson, F. W., and Fourn, D. L., Coöperative Cream Pools in Idaho. *Ida. Expt. Sta. Bul. 144*; p. 9. 1926.

prices. The price which consumers are willing to pay for butter in Chicago or New York is reflected through the creamery, the cream station, and finally determines the price of butterfat to the farmer.

Frequently it is asked why butterfat prices sometimes are higher than butter prices and at other times may be several cents below the price of butter. The margin or the spread between butter and butterfat prices is not fixed but fluctuates according to the price of butter. When butter prices are high, butterfat may be as high as, or even higher than, butter. On the other hand, when butter is low in price, the price of butterfat may be 6 or 8 cents below the market quotation for butter. This is the influence of the overrun on prices.

#### INFLUENCE OF THE OVERRUN

This variation in the spread between butter and butterfat prices arises from the fact that a pound of butterfat will make more than one pound of butter. In the process of churning, moisture, salt, and a small quantity of curd are incorporated into the butter so that a pound of pure butterfat will churn into nearly  $1\frac{1}{4}$  pounds of butter. This increase is referred to as the "overrun." A skillful buttermaker can obtain a 23 or 24 percent overrun; that is, from 100 pounds of butterfat he can churn 123 or 124 pounds of butter. The overrun has an important influence on the price of butterfat. It means that a pound of butterfat tends to be equal in price to  $1\frac{1}{4}$  pounds of butter, less the cost of making the butter. When butter is selling for 25 cents a pound in Chicago, a pound of butterfat when made into butter is worth about 31 cents in Chicago. When butter is 40 cents per pound, the butter made from a pound of butterfat is worth about 50 cents. So, when prices are high, the value of the overrun may make it possible to pay a price per pound of butterfat that is higher than the price per pound of butter.

#### MARGINS MUST BE DEDUCTED

To determine the value of butterfat on the farm, the cost of collecting the cream and the cost of churning, packing, and selling the butter must be deducted from the value of the butter at the central market. The margin charged by the local cream station for collecting and shipping butterfat usually is 3 to 5 cents a pound. The margin deducted for churning the butter, packing, and preparing it for shipment usually averages about 2 to 5 cents a pound, depending on the efficiency of the creamery and the volume of butter produced. To these margins must be added transportation charges and expense of selling in the central market. These charges can be calculated at 2 to  $2\frac{1}{2}$  cents on Kansas shipments in carload lots. These figures indicate that the total cost of collection of butterfat through local cream stations, churning it into butter, and placing it on the Chicago market is from 7 to 11 cents, depending on the distance of shipment, efficiency of the creamery, and the overhead costs per pound of butter produced. As a general statement, it may be said that Kansas butterfat prices tend to be equal to  $1\frac{1}{4}$  times the price

of butter in Chicago, less about 8 to 10 cents a pound for manufacturing and transportation expense. This relationship is shown diagrammatically in Figure 6. These costs vary from creamery to creamery depending on volume of butter handled and other factors. In general, however, where the local cream station method is used in collecting butterfat, the costs will be near the estimates indicated in the diagram. Since more than one-half the butterfat marketed in Kansas is sold through cream stations, this relationship tends to establish the level of butterfat prices.

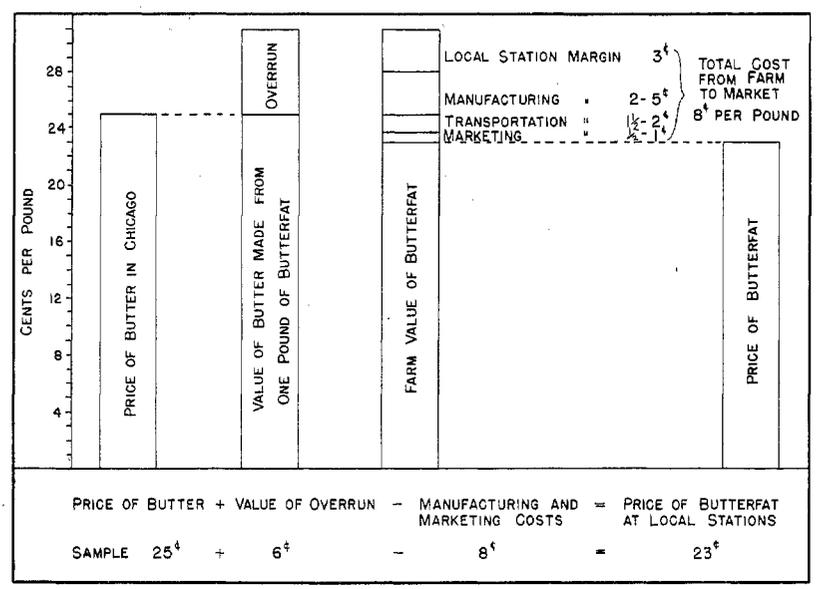


FIG. 6.—Diagrammatic sketch showing how the price of butterfat is determined.

**NORMAL SPREAD BETWEEN BUTTER AND BUTTERFAT PRICES**

The manufacturing and marketing margins tend to remain about the same per pound regardless of the price of butter. Therefore, when butter is low in price, these expenses tend to make up a larger part of the selling price than when it is high in price. Consequently, the spread between prices of butter and butterfat is wider when butter is low in price than when it is high. For example, when standard score butter in Chicago is selling for 25 cents, the butter produced from a pound of butterfat will be worth about 31 cents. If 8 cents a pound is deducted from this amount for cream collection, processing or churning, transportation, and other marketing charges, 23 cents is the farm price of butterfat. When butter is selling for 40 cents, the butter produced from a pound of butterfat is worth about 50 cents in Chicago. If 8 cents is deducted from this amount, 42 cents is the local price of butterfat. At lower prices

the spread between butter and butterfat will be wide, at higher prices the spread will be narrowed, and at relatively high prices the farm price of butterfat may even exceed the price of butter as it did during 1919 and 1920. Figure 7 shows the monthly average of prices of butter in Chicago and Kansas butterfat prices over a period of 23 years.

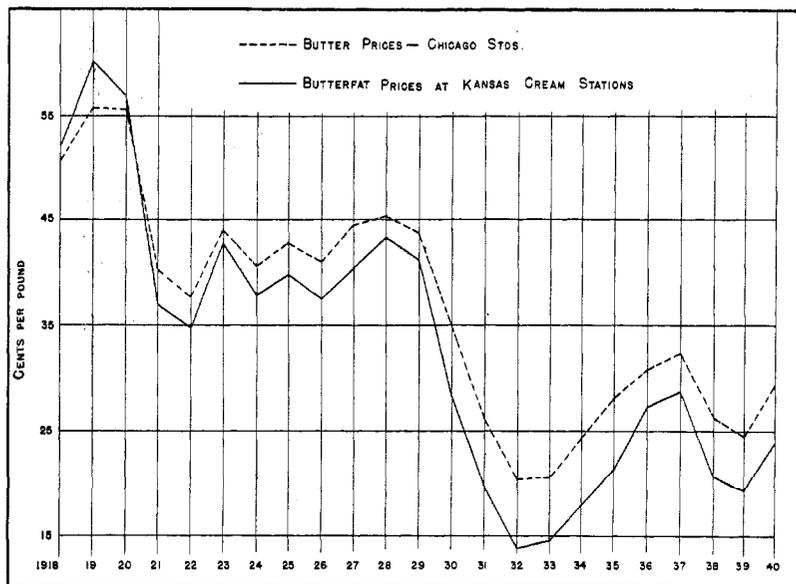


Fig. 7.—Yearly average prices of Chicago standards and butterfat prices at Kansas cream stations, 1918-1940. (Data taken from Dairy Produce Yearbook and *Kansas City Daily Drover's Telegram*.)

During the period of high prices of 1918 to 1921, butterfat prices exceeded butter prices by several cents. During periods of low prices such as 1931 to 1934, butterfat tended to average several cents below butter prices. This relationship between the price of butter and butterfat should emphasize the importance of watching factors which influence the price of butter in the central markets. A declining butter market is especially unfavorable to the dairy farmer since the price of butterfat declines more rapidly than the price of butter, so the proportion of the retail price which the farmer receives is much smaller when prices are low than when prices are high. On the other hand, rising prices are especially advantageous since butterfat prices advance rapidly in periods of rising prices and may even exceed butter prices. A further reason for watching conditions on the central market is that there is a definite seasonal cycle in butter prices. Influences affecting production have a more certain and more regular effect on the price of butter than on any other farm commodity, unless it is poultry or eggs.

THE SEASONAL TREND OF PRICES

Butter prices tend to follow a definite seasonal pattern during the year. Prices usually are low during the summer months and high in the late fall and winter months. From 1908 to 1940, inclusive, the highest monthly average price during the year for creamery firsts at Kansas City was in December 15 times and in January five times. The low monthly average price occurred in June and July more frequently than in any other months, having been in these two months 17 times in the 33-year period. During this period the average price spread between June and December was about 7 cents. The largest spread was 22.2 cents in 1918, the difference between the low of 41.6 cents in June and the high of 63.8 cents in December. In recent years the seasonal price spread has tended to be slightly less because of a larger into-storage movement of butter during the season of higher production. This suggests that producers may, under some circumstances, take advantage of the more or less regular

TABLE 4.—Monthly average price of butter at Chicago and Kansas City and the monthly average of the station price of butterfat, 1935-1939.

	Monthly average price of standard butter at Chicago (a)	Monthly average price of creamery first butter at Kansas City (b)	Monthly average local station buying price of butterfat (c)
	Cents per lb.	Cents per lb.	Cents per lb.
January	31.0	30.4	28.3
February	31.7	31.3	27.3
March	29.7	29.3	24.7
April	28.2	28.0	23.0
May	25.7	25.7	20.2
June	26.0	25.6	20.1
July	27.0	26.6	21.1
August	27.6	27.5	22.1
September	28.6	28.2	23.1
October	28.9	28.5	23.7
November	30.4	29.8	25.3
December	31.2	30.3	26.0
Five-year average, 1935-1939	28.8	28.4	23.6

(a) Based upon monthly average prices, Dairy Produce Yearbook.  
 (b) Prices taken from the *Daily Drovers Telegram*, Kansas City, Mo.  
 (c) Monthly average of *Daily Drovers Telegram* quotations of station price.

seasonal price fluctuations by producing a greater quantity of butterfat at the season of high prices—in other words, make an effort to even out the production cycle. However, any method of feeding or management for the purpose of increasing the production of butterfat during the season when a large proportion of the feed must be purchased or cheap pasture is not available will increase the per unit production costs. This extra cost may be compared with the increased income, and the economy of such shifts in production ascertained. In any event, it is desirable both for the producer and the creameryman to be aware of the seasonal price changes and to

adjust production and management practices to obtain the greatest net income.

Weekly average prices of 90-score butter in Chicago for the five-year period 1935 to 1939, inclusive, are shown in Figure 8. This illustrates the usual decline in prices during March, April, May, and early June, which is characteristic of the butter market at that season of the year. Usually butter prices reach a seasonal low point in early summer, after which they advance. The seasonal advance continues into the fall and winter months. It lasts through November and frequently continues into December and January. The advance is seldom steady and continuous until January. Prices fre-

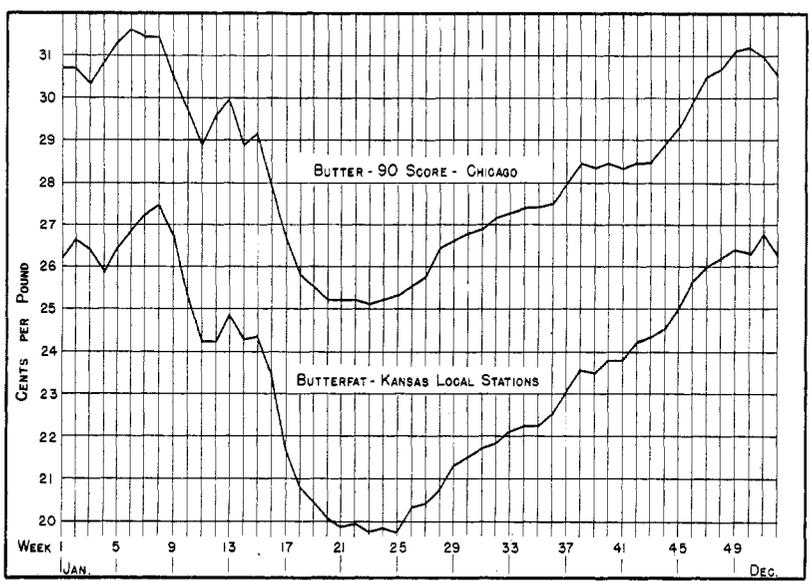


FIG. 8.—Seasonal fluctuation in the price of butter at Chicago and butterfat at Kansas cream stations. Weekly averages for the five-year period from 1935 to 1939, inclusive. (Data from the Dairy Produce Yearbook and the *Kansas City Daily Drovers' Telegram*.)

quently weaken temporarily in late December. In February and early March, butter prices may again show a small advance. The strength in the market at that time usually is not sufficient to advance the market above the high price of the previous December or January.

Kansas butterfat prices show the same seasonal fluctuations as Chicago butter prices. Weekly average butterfat prices at Kansas cream stations for the five-year period 1935-1939 also are shown in Figure 8. While butterfat prices have followed the major seasonal trend of butter prices, they have shown wider seasonal fluctuations. In the winter months when prices are relatively high the price spread

between butter and butterfat is relatively narrow compared with the spread during the summer when prices are relatively low. In the day-to-day or week-to-week fluctuations butter prices often advance or decline more sharply and to a greater extent than butterfat prices. At other times the greater short-time fluctuations occur in butterfat prices.

**CAUSES OF SEASONAL FLUCTUATIONS IN PRICES**

**SEASONAL VARIATIONS IN BUTTER PRODUCTION**

The seasonal trend of butter prices is the result of conditions under which butter is produced and consumed. The production of butter is influenced by seasonal conditions, but the consumption of butter is more uniform throughout the year. The largest production of butter occurs in the late spring and summer months when feed conditions are favorable for heavy production of milk. This is especially true in much of the central west where dairying is a general farm activity rather than a specialized farm enterprise. Figure 9 shows the percentage of the total annual butter production produced in each month of the year. Almost twice as much butter is produced during the summer months of peak production as during the winter months.

There has been a tendency during recent years to shift production so that it is more uniform throughout the year. Production apparently is becoming somewhat less in May and June and is being adjusted so that a relatively larger proportion of the total is produced in November, December, January, and February. Figure 9 shows

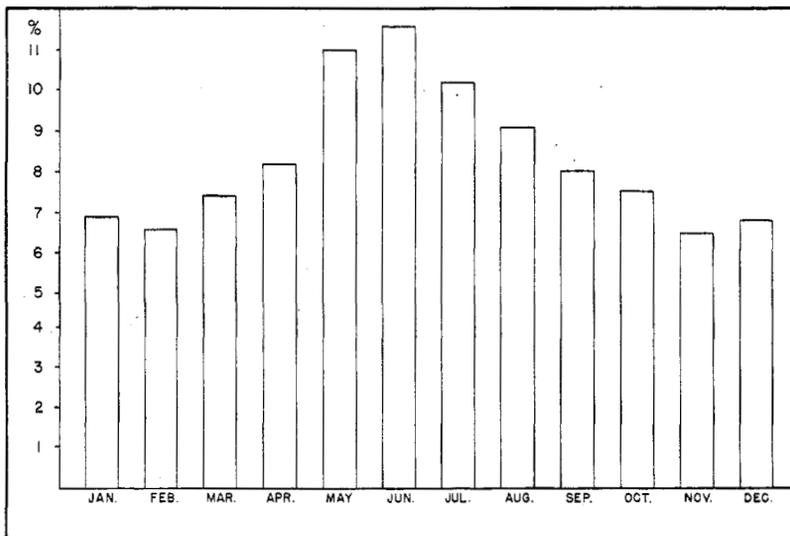


FIG. 9.—Percent of the annual butter production in the United States that is produced each month, 1930-1939 average.

the typical seasonal distribution of butter production in the United States. Conditions which influence the production of butter are the same in Kansas as for the United States as a whole.

**RECEIPTS OF BUTTER AT CENTRAL MARKETS**

The seasonal production is reflected in the shipments of butter arriving at the central markets. Figure 10 shows the weekly average receipts of butter at the New York, Chicago, Philadelphia, and Boston markets during the five-year period 1935 to 1939. From

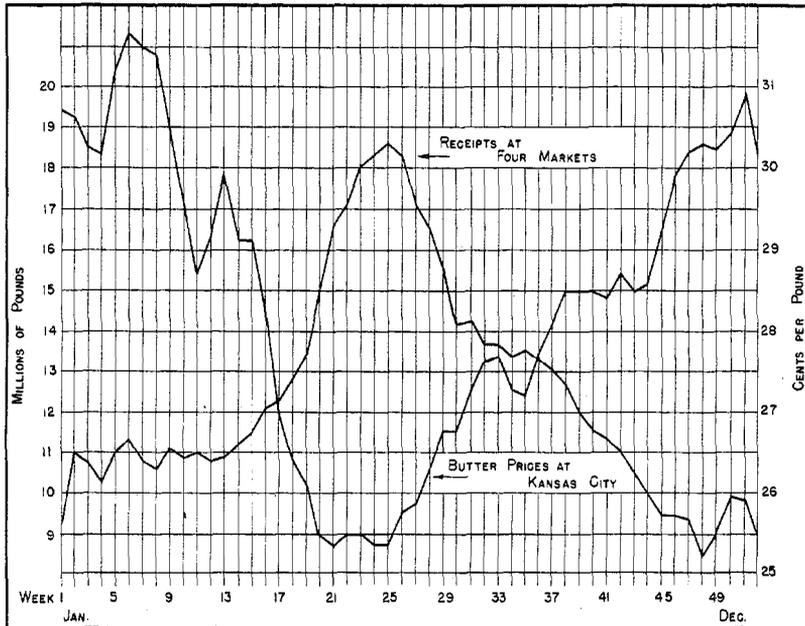


FIG. 10.—Weekly average receipts of butter at New York, Chicago, Philadelphia and Boston, and the weekly average price of creamery-first butter at Kansas City, for the period 1935 to 1939, inclusive. (Data from the Dairy Produce Yearbook and the *Kansas City Daily Drovers Telegram*.)

early January until the middle or latter part of April, shipments increase irregularly from week to week. During the latter part of April and in May and June, the supply of fresh butter arriving at the central markets increases rapidly. The weekly arrivals of butter during the summer peak of production are about 70 percent larger than the weekly receipts in the first three months of the year.

After early July, receipts decrease from week to week until about the first of December. In the five years from 1935 to 1939 the average receipts of butter at the four important markets during the first week of December were about one-half the receipts during the peak arrivals in June.

The supply of butter arriving at the central markets plays an important part in determining butter prices. A comparison of weekly prices with weekly receipts shows that they vary almost inversely; that is, the season of low prices occurs during the period of large market receipts of fresh butter and the highest prices are in the period of smallest receipts.

During the summer months when increased supplies reach the market, the consumption tends to remain about constant. As a result, prices decline so that the increased supplies may be moved into market channels. The larger the supply of a commodity and the more perishable it is, the larger will be the decline in price. Fortunately, in the case of butter, part of the summer supply moves into cold-storage and is held for consumption during the winter months of limited production. The movement of butter into storage during the months of heavy production tends to prevent prices from going as low as they would if butter were not stored. Likewise, the withdrawal of butter from storage during the months of light production tends to keep prices from reaching high peaks during the winter months.

#### COLD-STORAGE MOVEMENT

During the latter part of April the supplies of fresh butter become more than sufficient to equal current consumption. As prices begin their seasonal decline, butter moves into cold-storage to be held for the market during the next fall and winter. The into-storage movement of butter increases as the receipts increase and as prices become more favorable for storing for fall and winter markets. This movement of butter into storage continues until the middle or latter part of August. After August the out-of-storage movement of butter usually exceeds the into-storage movement so that the total cold-storage holdings tend to decrease from August until April. This period is referred to as the out-of-storage season, or the period when butter is taken from storage and placed on the market.

Figure 11 shows the average weekly supplies of butter in cold-storage in 26 important markets for the five-year average 1935 to 1939, inclusive. The curve is based on the total supplies in storage at the end of each week during the year. During this period the largest cold-storage holdings at these markets were in late August, when the holdings averaged about 110 million pounds. The smallest holdings were in April when supplies of stored butter on these markets dropped to six or seven million pounds. The cold-storage holdings on 26 markets constitute 70 to 72 percent of the total butter in storage in the United States.

The quantity of butter put into storage and the rate at which it moves into storage are influenced by a number of factors, among the more important of which are the market supplies of fresh butter, the price of butter in the spring in relation to the usual price during the fall and winter, and the profits made from storage operations during the previous year. The rate at which butter moves into storage influences the price during the spring and summer months,

while the total quantity put in storage and the rate at which it is taken from storage play an important part in determining the level of butter prices during the fall and winter. When storage supplies are large, the owners of the butter may decide to move it regardless of the price situation. Under such conditions, the cold-storage movement influences prices, rather than prices determining the rate of out-movement of stored butter. Butter prices during October, November, December, and January are especially sensitive to changes in cold-storage supplies of butter.

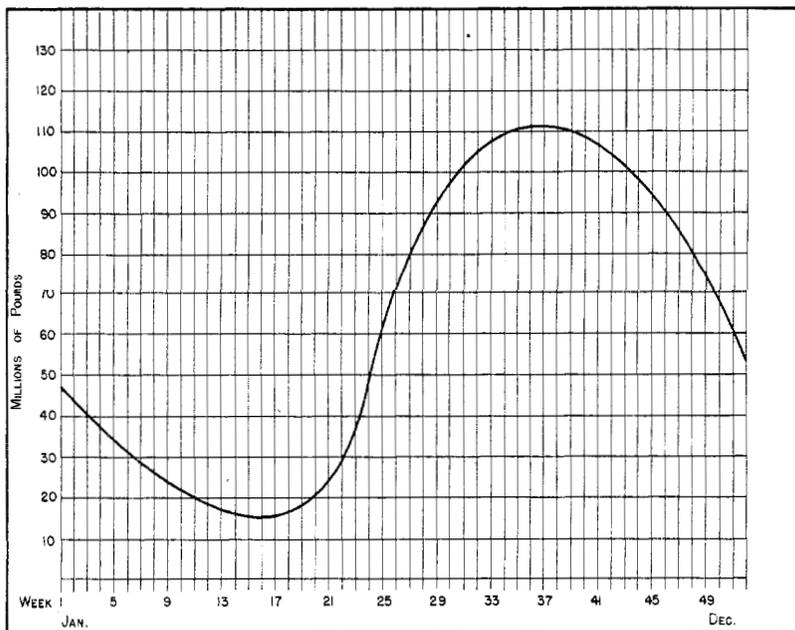


FIG. 11.—Five-year average of weekly holdings of butter in cold storage at 26 markets. (Data from Dairy Produce Yearbook.)

The storing of butter has a stabilizing effect on the seasonal fluctuations of prices. If no butter were stored, all the butter produced in the summer would have to move immediately into channels of consumption. If this situation existed, prices would go much lower during the summer months than they do at present, and fall and winter prices would be much higher since consumers would have to depend entirely upon limited supplies of fresh butter. By the removal of 125 to 150 million pounds of butter from the summer market and making it available to consumers during the winter, seasonal fluctuations in prices are reduced and butter is made available to consumers who otherwise might not be able to obtain it during periods of limited production.

THE DEMAND FOR BUTTER

From month to month the consumption of butter tends to be more uniform than the production; that is, consumption does not show any marked fluctuation from season to season as does the production and supply of butter. However, from one year to another, the demand varies widely. For this reason, the general level of butter prices or the yearly average price shows considerable variation over a long period of time. This is due largely to changes in fundamental factors which determine demand. As in the case of other food products, the demand for butter is determined by consumers' desire for butter and the income available for food purchases.

THE EFFECT OF CONSUMERS' ABILITY TO BUY

An average of butter prices over a period of time shows that there is a relationship between the purchasing power of consumers and the level of butter prices. A measure of consumers' ability to buy compared with butter prices shows that major changes in consumers' purchasing power are reflected in butter prices. Some measures which may be used to indicate the average consumer's ability to

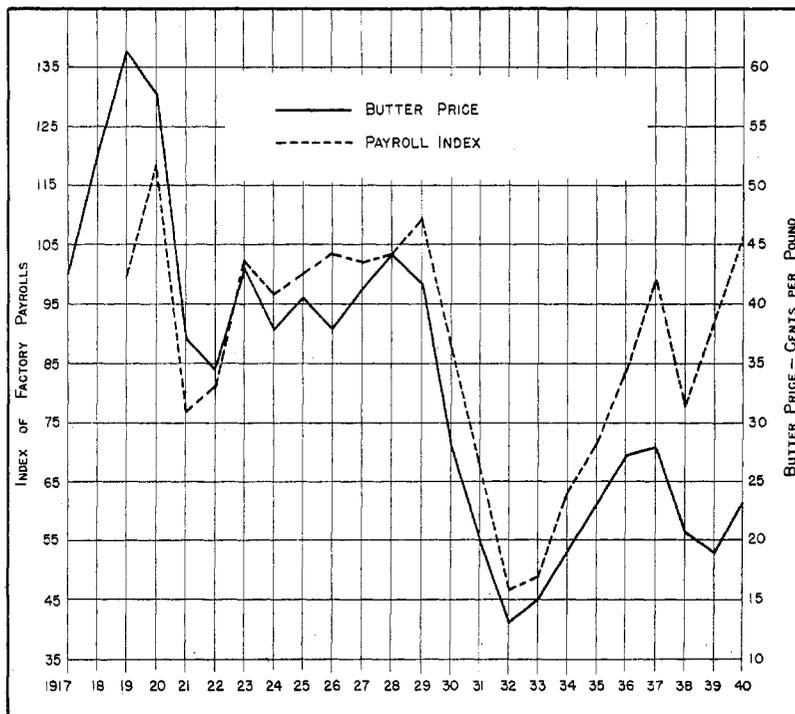


FIG. 12.—Yearly average price of butter at Kansas City and the annual index of factory pay rolls. (Data taken from the *Kansas City Daily Drovers' Telegram* and the Survey of Current Business.)

buy are factory pay rolls, factory employment, and general industrial activity. Changes in consumers' ability to buy are felt first on the large butter markets such as those at Chicago and New York, but the effects of the changes are soon transmitted to farms where butterfat is produced.

The relation of factory pay rolls to the yearly level of Kansas butterfat prices is shown in Figure 12. Pay rolls are expressed in percent of the 1923-1925 average, which is taken as 100. It may be contended that there are fundamental factors such as general business influences which determine the level of both factors. This is true. It is general business conditions which influence butter prices. Factory pay rolls have been used simply as a convenient measure of business conditions. It is through factory pay rolls and employment that changes in business conditions are transmitted to the butter market.

#### QUALITY OF BUTTER

Another factor which has an influence on the demand for butter is quality. The butter sold on central markets is graded according to its quality. The grading is done by scoring it on the basis of 100 points. Scores of 92 and 93 indicate high-quality butter. Ninety score indicates fair or average quality. In the past, various terms instead of numerical scores were used to designate quality and in some areas these terms are still in use.

In addition to influencing the quantity of butter consumed, quality influences the market price of butter. This is especially true at certain seasons of the year. At some seasons there is from one-half cent to one and one-half cents spread in price between each of the various grades of butter. The largest spreads are in the late summer or early fall, usually in September or October. The spread between grades tends to be narrow in March and April. The price spread between grades is influenced by the relative supplies of the various grades. Late summer and early fall are periods when the supply of high-quality butter is limited because much cream reaches the creameries in poor condition as a result of high temperatures. Also, it is a period when market supplies of fresh butter begin to decrease. In March and April larger supplies of high-quality butter reach the market. Temperatures favorable to the marketing of sweet cream and the seasonal increase in butter production make the supplies of higher grades more abundant.

#### MONTHLY AVERAGE PRICE AT KANSAS CITY

The forces of demand and other factors which establish the level of butter prices from year to year tend to influence the seasonal trend of prices. In some years the cyclical or long-time movement tends to overshadow the seasonal fluctuations in butter prices. In years when the general level of butter prices is working lower, the high price for the season may be earlier than usual and the low may be later than usual. Likewise, when butter prices are tending toward

higher levels, the seasonal low point in prices may be earlier than usual and the high later than usual. In some years there is such a strong tendency for butter prices to work higher or lower that seasonal price changes are obscured.

The extent to which the seasonal price changes occurred on the Kansas City market is shown in Figure 13. This chart shows the number of times during the 32-year period from 1908 to 1939, inclusive, that the average price in each month was above or below that of the previous month. For example, the January price averaged higher than the preceding December price in 11 years, there were 19 years in which it was lower, and in two years the average was the same for the two months. The chart indicates the chance that the price in any particular month will be above or below the price for the preceding month. There is about a fifty-fifty chance (14 to 18) that during March, Kansas City butter prices will average above February prices. The chances are 25 to 5 that May prices will average below April prices. In only four years since 1908 has the September price failed to average as high as or higher than the August price. When the seasonal price movements are analyzed with the factors which determine price change such as production, cold-storage holdings, feed ratios, business conditions, and government purchases of butter, it is possible to forecast direction and amount of price change with a reasonable degree of accuracy.

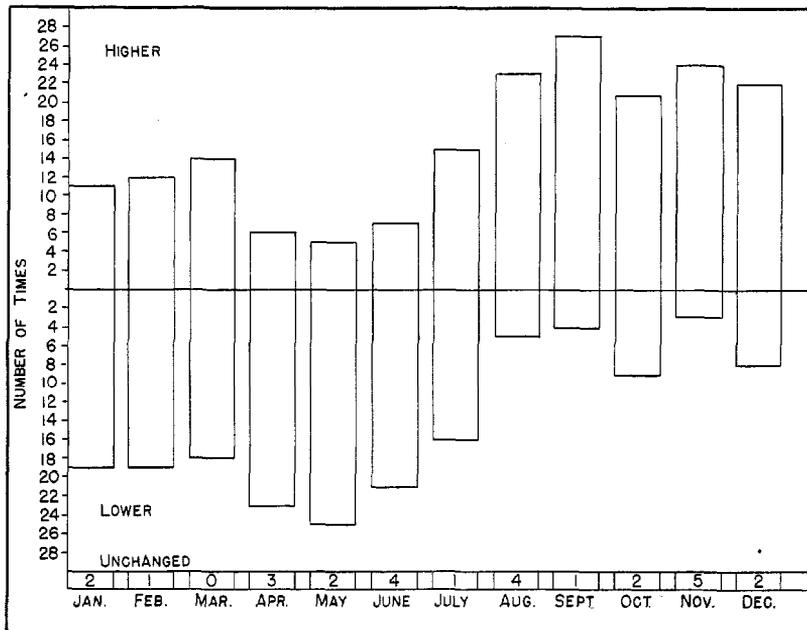


FIG. 13.—Number of times in 32 years (1908-1939, inclusive) that the monthly average price of butter in Kansas City was higher or lower than that of the previous month.

SUMMARY

1. In 1939 Kansas produced about 80 million pounds of creamery butter and about 10 million pounds of farm churned butter. Production of creamery butter has increased rapidly in the last 25 years and farm butter production has slowly declined.

2. The three more important butterfat producing sections of Kansas are (1) northeastern Kansas, (2) the section east of the Bluestem grazing section, and (3) an area in the central part of the state extending from the Nebraska to the Oklahoma lines.

3. The principal methods of selling butterfat in Kansas are to local cream stations, direct shipping to centralizers, and truck collection or door deliveries to local cooperative and independent creameries.

4. The cream station system does not provide a satisfactory method of marketing Kansas cream in some areas: (1) It is not conducive to the production and marketing of high-quality cream because of excessive handling and loss of time in getting cream to the factory, (2) it is not an economical method of marketing due to the large number of stations handling a small volume of cream, and (3) the competition between stations which in some cases causes wide price difference between towns in an area.

5. Prices paid for cream marketed by direct shipment tend to average about 2 cents more than prices paid by local stations.

6. Efficiently operated cooperative creameries paid 5 to 7 cents above local cream station prices for butterfat during 1939 and 1940. In some states farmers have obtained the benefits of group action by organizing cooperative cream pools and cooperative cream stations.

7. The price of butterfat is based upon the price of butter in the central markets. The value of the "overrun" tends to establish the spread between the price of butter and the price of butterfat.

8. Although there is great variation from creamery to creamery, the general level of butterfat prices in Kansas where the principal method of cream collection is through local cream stations tends to be equal to  $1\frac{1}{4}$  times the prices of 90-score butter in Chicago, less collection, manufacturing, and shipping costs of 8 to 10 cents a pound.

9. Butter prices tend to follow a definite seasonal trend, being low during the late spring and summer months of heavy production and high in the fall and winter months.

10. The principal cause of seasonal trends of butter prices is the variation in butter production from season to season. The movement of butter into and out of cold storage tends to modify the seasonal price movement.

11. Large supplies of fresh butter reach the market during the summer months and small supplies during the winter months.

Nearly twice as much butter is produced during June as during November, but there is some indication that seasonal fluctuations in production are becoming less pronounced.

12. Butter consumption from season to season tends to be more uniform than production. Changes in consumers' purchasing power have an important influence on the price of butter over a period of years.

13. Major changes in consumers' purchasing power are reflected in butter prices to a greater extent than in the prices of many foods. There is a close correlation between factory pay rolls and the level of butter prices.

14. In years when the general level of butter prices is tending downward, the high price of the season may be earlier than usual and the low price may be later. Likewise, when butter prices are tending to higher levels, the seasonal low point in prices may be earlier than usual and the seasonal high may be later than usual.



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