

The Surplus Problem
in the Northeastern
Milksheds

By

LELAND SPENCEI

Professor of Marketing

New York State College of Agriculture



New York State College of Agriculture

in cooperation with

Cooperative Division

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Summary

SURPLUS milk is variously defined, but generally is the milk which is put to uses that could be supplied by sources outside the milkshed. Difficulties with surplus milk are among the chief obstacles to be overcome by the fluid-milk bargaining associations, which represent a great majority of the producers in the Northeastern States.

The surplus problem in the northeastern milksheds involves two phases: (1) Utilization of milk in the Northeastern States; and (2) "western" cream, as a supplementary supply for the markets of this region. These aspects are treated separately in part I and part II of this bulletin.

Part I.—Three facts in the surplus-milk problem are of outstanding importance. First, surplus milk is mainly a seasonal occurrence resulting from lack of close adjustment between production and consumption. At times year-around surpluses have been caused by sudden decreases in consumption, and by abnormal price relationships that have attracted larger supplies of milk than the markets could absorb.

Second, the burden of surplus milk in each milkshed is unevenly distributed among the dealers and groups of producers. In general, the larger distributors have more milk going into surplus uses than the smaller distributors. Differences in prices paid for milk by large and small dealers is less than the difference in utilization would suggest.

Third, the problem of surplus milk in the Northeast centers in the New York milkshed. This milkshed has more highly seasonal production than any of the others. It is the only one of the six milksheds included in the survey in which no systematic effort has been made to bring about a leveling of seasonal production by price inducements. Since New York City is closed to cream shipments from outside the milkshed, a rather high peak of production is needed to maintain an adequate supply of cream during the summer months. Also, throughout a large part of the New York milkshed, natural conditions give more than the usual advantage to summer dairying.

Four lines of action appear to be the most promising approaches toward solving the problem. They are:

1. Firm adherence to a price policy the main objective of which is to maintain a close balance between the supply of milk in the milkshed and the consumption of fluid milk and cream. Further steps to encourage desired adjustments in seasonal production should be considered, especially for the New York milkshed.

2. Perfection of arrangements whereby each market may have access to properly supervised sources of cream outside its own milkshed, when local supplies are insufficient. If this were done, production could be adjusted seasonally so that a larger proportion of the supply could be utilized as fluid milk.

3. Greater coordination in the supply and disposal of milk by cooperative associations and dealers in the several milksheds. This might be accomplished by a cream pool or cooperative brokerage agency for surplus cream, representing as many interests as possible throughout the Northeastern States. The need for this will be lessened if milk supplies are adjusted more closely to the consumption of fluid milk and cream in each market.

4. Market-wide equalization of fluid sales and surplus at times when uneven sharing of large surpluses results in price cutting and drives producer prices below a reasonable level. Under ordinary circumstances, the best methods of overcoming the difficulties arising from uneven distribution of surplus among dealers and producer groups are to keep production in the closest possible adjustment to market demands for fluid milk and cream, and to avoid too wide a spread between the price of fluid milk and the returns obtainable for surplus milk.

The lines of action suggested in paragraphs 1 and 2 should be closely coordinated. The anticipated recovery in demand for fluid milk and cream in New York and other eastern markets may well provide both the opportunity and the necessity for both.

Part II.—Midwestern cream plants are complementary to the eastern milksheds. Few have continuous outlets in the eastern markets for a major part of their butterfat. Likewise few, if any, eastern manufacturers or distributors depend upon midwestern plants exclusively as sources of cream.

During recent years, the net returns from shipments of western cream to eastern markets, in comparison with returns from alternative uses of butterfat, have not been sufficient to encourage rapid expansion of this trade. It is unlikely that midwestern shippers will seriously depress cream prices in those markets where strict sanitary requirements are enforced.

The possibility of coordinating shipments of western cream more effectively with the supply and demand for cream in the East seems worthy of consideration, particularly by producers' bargaining associations.

While present methods of sanitary control have brought about much improvement in cream quality in most of the eastern markets, some serious difficulties arise from lack of coordination among the numerous municipal and State inspection agencies. There also is need for cream grades based upon physical properties and flavor, as well as sanitary considerations.

Because of the diverse interests of the many agencies involved, the most practicable solution of the problem appears to be the promulgation and enforcement of Federal grades for sweet cream. Health authorities of eastern States and municipalities could then specify what Federal grades might be admitted for various uses.

*The Surplus Problem in the Northeastern Milksheds*¹

THE term "surplus" was brought into more common use by the drastic deflation of commodity prices and the resulting curtailment of demand during the several years following 1929. Surplus, however, is not a new term in the milk industry. The proper control, allocation, and utilization of surplus milk has long been a major problem, particularly in the milksheds of the larger cities.

The definition of surplus milk varies according to conditions in different markets. In general, it is that part of the supply which is available for sale in a given market, in excess of that which is required for consumption in fluid form and for other uses that must be supplied throughout the year from the same sources as the fluid milk. The supply available for a market usually is dependent upon the inspection and approval of stables, equipment, and cows on farms where the milk is produced, and of the plants where it is handled and processed. The health authorities of New York and a few other cities exercise practically the same supervision over fluid cream and milk products used in the manufacture of ice cream as they do over fluid milk. In such markets, the term surplus does not include milk required for these uses. The health authorities of Boston and some other cities have limited their inspections mainly or wholly to sources of fluid milk, and have not attempted to control or restrict the sources of cream for fluid use or for ice cream. In such markets the term surplus includes all milk available for sale in the market, in excess of the quantity required for use as fluid milk.

Every market in which there is a marked distinction in quality and in price between the milk used for consumption in fluid form and that which is used in the manufacture of butter, cheese, and other less

¹ This study, covering the New England States, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia, was undertaken in 1934. A preliminary study of the surplus problem, begun by the Federal Farm Board and completed by the Farm Credit Administration, is reported in "Report on the Survey of Milk Marketing in the Northeastern States," T. G. Stitts and others, U. S. Department of Agriculture. 94 pp. 1933. (Mimeographed.)

The author gratefully acknowledges the advice of Dr. T. G. Stitts, of the Cooperative Division, Farm Credit Administration. Credit is due the Department of Agricultural Economics, Pennsylvania State College, for its cooperation in the collection of a part of the data used in this study; to T. K. Cowden, of the Pennsylvania State College, and C. W. Pierce, of the New York State College of Agriculture, who collected and tabulated much of the data.

It is desired also to acknowledge the assistance of many individuals, firms, representatives of Federal and State departments of agriculture, cooperative associations of milk producers, milk dealers, and railroad companies, who made available the information essential to the study.

perishable dairy products, has a surplus problem. The problem may differ in details according to prevailing local conditions, but its characteristic features may be outlined as follows:

1. Fluid milk is considered an essential food. Consequently, each market must be assured of an adequate supply at all times regardless of variations which may occur in either supply or demand. On account of the perishability and bulkiness of milk, and the restrictions commonly enforced by municipal health authorities, the milk supply for each market must be obtained regularly from dairy farms and dairy plants located within a limited area called the milkshed.

2. The supply of milk and, to a lesser extent, the demand for milk are subject to wide variations. Since the variations in production are not readily controllable, it is necessary to maintain available to each market a supply considerably in excess of the quantities actually used for consumption in fluid form. Even with the best practicable adjustment of supply to demand, this necessary surplus amounts to approximately 15 to 20 percent of the quantity produced annually.

3. The excess, or surplus milk, has to be diverted to uses which yield comparatively low returns. Milk utilized in the manufacture of butter, cheese, and similar products does not enjoy the price enhancement accorded to fluid milk, because supplies for those uses are not so limited by bulkiness, perishability, and sanitary restrictions.

4. Because of the highly irregular volume of surplus milk, its handling and processing usually are inefficient and costly. Net returns on surplus milk generally are less than the prices paid by dairy plants that specialize in the production of manufactured dairy products. In some markets the limited number of outlets and lack of active competition for surplus milk have been a further cause of low returns.

5. The surplus milk in each milkshed is not shared among the various dealers and cooperatives in proportion to their fluid sales. Commonly the principal association of producers and one or two of the largest dealers handle a disproportionate share. This leads to price inequalities; both among producers and among dealers. When the surplus is abnormally large or when there is an unduly wide spread between price returns from fluid sales and from surplus, these inequalities become a serious disrupting force in the market.

Briefly stated, the objectives in working toward a solution of the surplus problem are: To keep the supply of milk available for fluid use in each market in the closest possible adjustment with the demand; to segregate the surplus from the fluid-milk supply, so that it will interfere as little as possible with the maintenance of stable and reasonably high fluid-milk prices; to bring about a more equitable sharing of the burden of surplus among the producers and among the dealers in each milkshed; and to obtain higher returns for the surplus milk.

Importance to Northeastern Cooperatives

THE SURPLUS problem is especially serious in the large markets of the Northeastern States (fig. 1). This is a deficit region for dairy products. Most of the butter, a large proportion of the cheese and evaporated milk, and considerable quantities of cream used in these northeastern markets are shipped from the Midwestern States and other distant sources. Wages, feed prices, and other items of cost are higher in the northeastern milksheds than in the sections more remote from large centers of population. Costs of producing and handling market milk in this region are further enhanced by strict sanitary requirements and the necessity for maintaining a year-around supply. Relatively high prices are necessary in order to maintain production at a level adequate for local fluid-milk requirements. Normally there is a wide spread between fluid-milk prices in

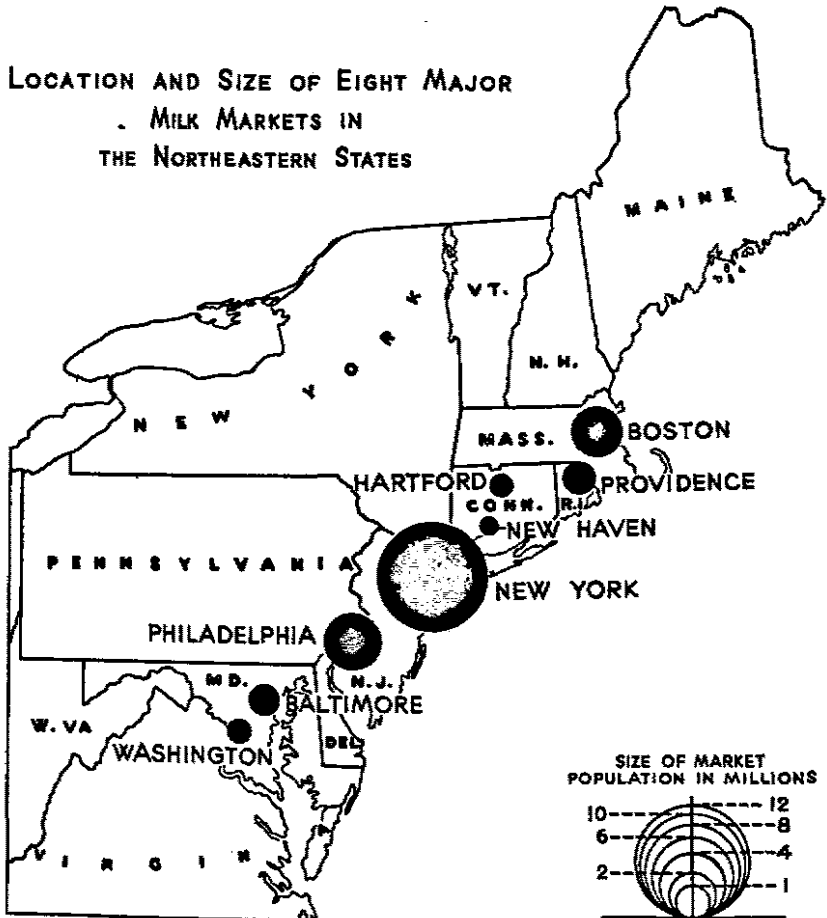


FIGURE 1.—The major metropolitan milk markets lie along the northeastern seaboard.

this region and the returns obtainable for milk utilized in butter, cheese, or other relatively concentrated, nonperishable products. Under these circumstances, any increase in surplus above the necessary minimum is likely to break down the price structure for fluid milk.

In each of the milksheds tributary to the major northeastern markets, most of the producers are represented in a cooperative association whose main function is collective bargaining for the maintenance of satisfactory prices and marketing conditions for milk. The difficulties associated with surplus milk are among the chief obstacles to be overcome by these associations in the attainment of their objectives.

Scope and Method of Study

REALIZATION of the importance of the surplus problem led the National Cooperative Milk Producers' Federation, in 1932, to request the Federal Farm Board to make a study of this problem in the northeastern milksheds. A preliminary study was initiated by the Federal Farm Board and completed by the Farm Credit Administration in 1933.² In the brief time available, the investigators concerned themselves with such matters as the sources of supply of milk and cream for each of the major markets; milkshed boundaries; production and farm disposal of milk in the region; comparative quantities of fluid sales and surplus; the relative quantities handled or controlled by the cooperative bargaining associations and independent producers; location and proprietorship of country milk plants; and comparative net prices to producers in the several milksheds. The present study was undertaken by the Cooperative Division in the summer of 1934.

This study covers the New England States, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia. The Pittsburgh market was not included because much of its supply originates in Ohio and West Virginia. Chief attention has been given to the major markets in this area, and especially to the New York milkshed, in which the proportion of surplus was greatest. In addition to the data concerning supply and utilization of milk, which were obtained from State and Federal departments of agriculture, much information of a confidential nature pertaining to the quantity and methods of disposal of surplus milk, purchases of cream, and the like, was obtained directly from the principal cooperatives, milk dealers, and cream buyers in each market.³ Data concerning shipments of cream from Midwestern States to eastern markets were obtained from the railroad companies participating in this traffic. Western cream shippers were interviewed concerning their operations during the 12-month period ending with July 1936.

² See footnote p. 1.

³ Sample copies of the questionnaire forms used in this study can be obtained from the Cooperative Division, Farm Credit Administration, Washington, D. C.

Part I. Utilization of Milk in the Northeastern States

Demand and Supply Situation *

THE most important fact in the milk-marketing situation in the Northeastern States is the large urban population. The region including 11 States, from Maine to Maryland, and the District of Columbia embraces less than 6 percent of the farm acreage of the United States, but it contains fully 40 percent of the people who live in cities and villages of 2,500 or more population. Including the rural residents, in 1930 this northeastern section had one person for

TABLE 1.—NUMBER OF MILK COWS PER 1,000 POPULATION; ALSO MILK PRODUCTION PER CAPITA AND PER ACRE, IN THE NORTHEASTERN STATES AND OTHER STATES, 1930

State or region	Milk cows per 1,000 popula- tion	Milk produced annually	
		Per capita	Per acre of farm land
	<i>Number</i>	<i>Gallons</i>	<i>Gallons</i>
Maine.....	172	99	18
New Hampshire.....	166	98	22
Vermont.....	742	421	39
Massachusetts.....	32	22	43
Connecticut.....	65	43	45
Rhode Island.....	32	23	55
New York.....	103	66	46
New Jersey.....	29	21	46
Pennsylvania.....	89	54	33
Maryland.....	110	55	20
Delaware.....	131	61	16
Average, 11 States and District of Columbia.....	88	54	35
Average, other States.....	227	116	10
Average, United States.....	186	97	12

Source: Computed from data on number of cows and milk production as reported in MILK PRODUCTION TRENDS, Statistical Supplement No. 8, 1933, issued by the U. S. Bureau of Agricultural Economics; and from data on population and farm land area as reported by the U. S. Bureau of the Census.

* The probability that the demand for milk, cream, and ice cream will increase faster than production in the New York milkshed is discussed in Farm Economics, New York State College of Agriculture, No. 103, October 1937, pp. 2507 and 2513.

each acre and a half of land in farms; whereas, in the other 37 States there were almost 11 acres for each person. The demand for dairy products and other foods in the Northeastern States greatly exceeds their farm output.

Throughout most of the area covered by this study, dairying is the principal branch of agriculture. In the 11 States, the annual production of milk is equivalent to 35 gallons per acre of land in farms, compared with an average of only 10 gallons for the other 37 States (table 1). Rhode Island, with 55 gallons of milk per acre, is the most intensive dairy State in the group (fig. 2). New Jersey, New York, Connecticut, Massachusetts, and Vermont rank high in the list, with an annual production of from 39 to 46 gallons per acre of farm land. In Maine, Maryland, and Delaware, milk production is relatively small in proportion to the farm acreage.

GALLONS OF MILK PRODUCED
PER ACRE OF LAND IN FARMS
IN EACH OF THE ELEVEN
NORTHEASTERN STATES, 1930

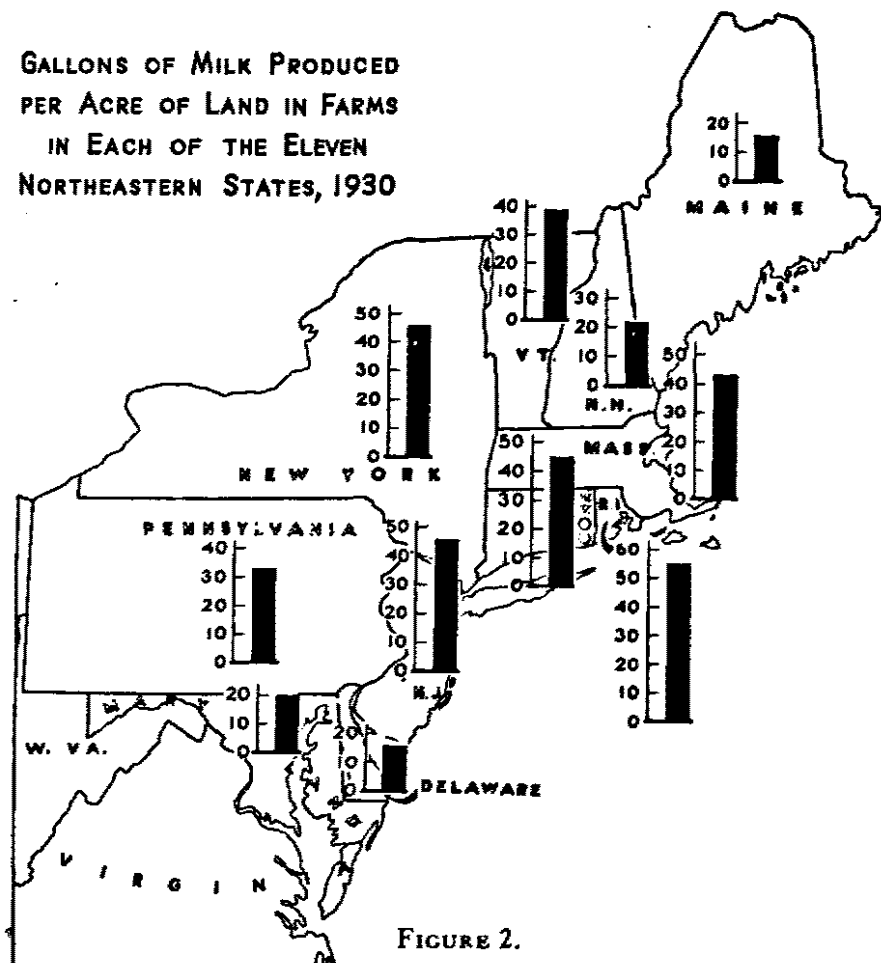


FIGURE 2.

Production of milk per acre of land in farms varied from 16 gallons in Delaware and Maine to 55 gallons in Rhode Island. Average production for the Northeastern States was 35 gallons or $3\frac{1}{2}$ times that for the rest of the country.

GALLONS OF MILK PRODUCED
PER CAPITA IN EACH OF THE
ELEVEN NORTHEASTERN STATES,
1930

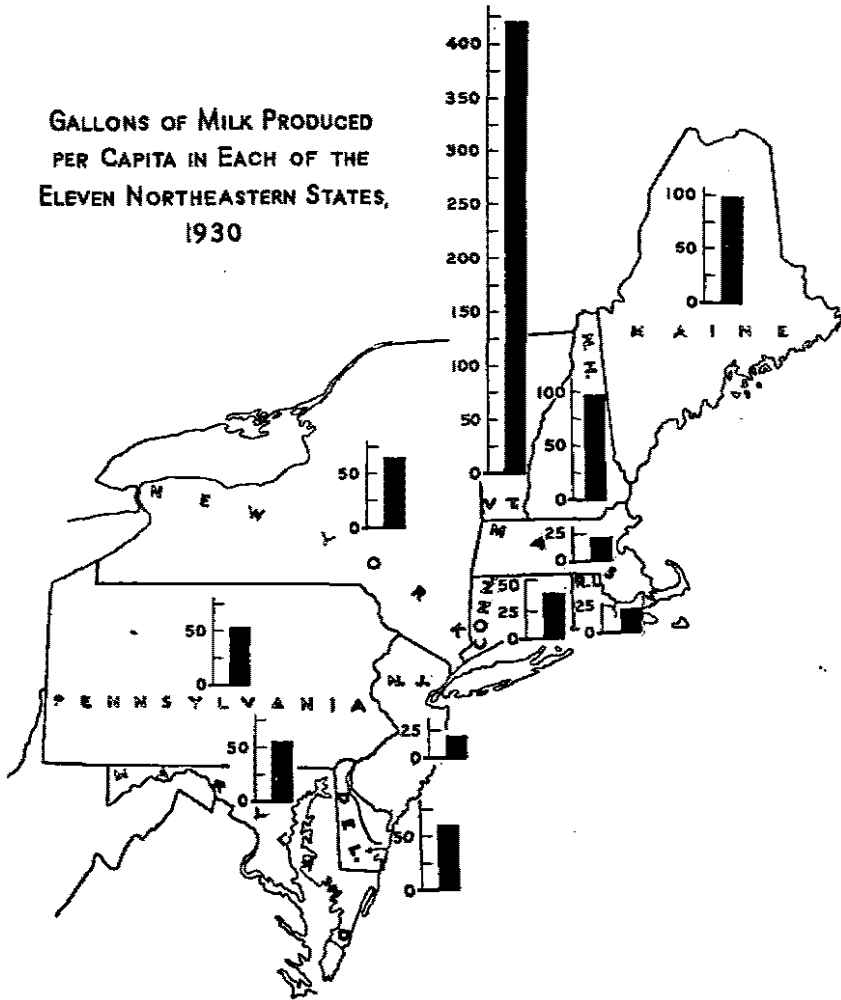


FIGURE 3.

The concentration of population in the 11 Northeastern States makes for low production of milk per capita. Vermont, New Hampshire, and Maine are exceptions.

Although these Northeastern States constitute one of the most important dairy regions in the United States, the number of cows and the supply of milk is not large in proportion to the population (fig. 3). In fact, the 11 States have less than half as many cows per thousand people as the average for the country as a whole. The quantity of milk produced annually amounts to 54 gallons per capita; whereas, the annual consumption of milk in all dairy products is nearly twice as much. In general, these States produce all the fluid milk and most of the fluid cream consumed within their borders, but a large proportion of the butter, cheese, evaporated milk, and milk products used in ice cream are imported from other States.

TABLE 2.—PERCENTAGE OF MILK DISPOSED OF IN VARIOUS WAYS BY FARMERS IN THE NORTHEASTERN STATES, AND IN OTHER STATES, 1934

Method of disposal	11 North-eastern States ¹	Other States	United States
Milk used on farms:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
As milk or cream.....	7.2	13.1	12.1
For making butter.....	6.1	11.8	10.8
For feeding calves.....	2.8	2.7	2.7
Total used on farms.....	16.1	27.6	25.6
Milk separated for sale as butterfat.....	3.7	39.8	33.6
Sold as milk and market cream:			
Retail.....	12.4	6.0	7.1
Wholesale.....	67.8	26.6	33.7
Total.....	100.0	100.0	100.0

¹ Includes the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, and Delaware.

Source: Compiled from data in U. S. Department of Agriculture, Bureau of Agricultural Economics, MILK PRODUCTION TRENDS, Statistical Supplement No. 8, May 1933.

TABLE 3.—RELATION OF PRODUCTION AND DISPOSAL OF MILK BY FARMERS IN THE NORTHEASTERN STATES TO PRODUCTION AND DISPOSAL BY FARMERS IN THE UNITED STATES, 1934

Area	Percentage of United States total				
	Milk production	Milk and cream used on farms	Milk separated for sale as butterfat	Sales of milk and market cream	
				Retail	Wholesale
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Northeastern States ¹	17.1	10.7	1.9	30.0	34.5
Other States.....	82.9	89.3	98.1	70.0	65.5
United States.....	100.0	100.0	100.0	100.0	100.0

¹ Includes the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, and Delaware.

Source: Computed from data reported in MILK PRODUCTION TRENDS, June 1933, issued by the U. S. Department of Agriculture, Bureau of Agricultural Economics.

Milk Production and Disposal by Farmers

MAINLY because of the large demand for market milk and the relatively intensive system of dairying in these States, an unusually high proportion of the milk is sold by farmers in fluid form. In 1934, about one-eighth of the milk was retailed by farmers, and nearly two-thirds was sold as whole milk to dealers (table 2). In this region, very little cream is skimmed on farms for sale to butter factories, and the quantity required for household use and the feeding of calves on farms is a small part of the total.

In 1934, the total production of milk in the Northeastern States was 17 percent of the total for the entire country, but the quantity sold by northeastern farmers as whole milk was about one-third the United States total (table 3).

Total Supply and Utilization of Milk

Supply and Utilization for 1934

THE northeastern market-milk producing area has been largely self-contained with respect to the supply and consumption of the more perishable kinds of dairy products. The supply of milk produced within this area has been supplemented, to a limited extent only, by milk and cream drawn by the Washington market from nearby counties in Virginia and West Virginia, and by cream shipped from a number of Midwestern States to the eastern markets. As the population and the demand for these perishable dairy products increase, it is not unlikely that the eastern markets will depend to a greater extent upon more distant sources of supply. Of course, the major part of the butter, cheese, evaporated milk, and other less perishable kinds of dairy products consumed in these markets already comes from the more remote dairy regions, chiefly the Central West. Practically all the milk produced in the Northeastern States is consumed in one form or another within the area.

In 1934, the most recent year for which such data are available, the total supply of milk and cream produced or shipped into this area was nearly 18 billion pounds. Nearly 95 percent of this supply was produced on the farms in the area; an additional 2 percent was from cows kept in the cities and villages. Western cream accounted for less than 3 percent of the total (table 4).

About two-thirds of the entire supply was consumed as fluid milk and cream by people living in cities and villages or on farms where no cows were kept. An additional 7 percent was used in fluid form by

TABLE 4.—SUPPLY AND UTILIZATION OF MILK AND CREAM IN THE NORTHEASTERN STATES, 1934

Item	Total milk	Per-centage of total milk	States where production exceeds consumption of fluid milk and cream							States where production is less than consumption of fluid milk and cream				
			Maine	New Hampshire	Vermont	New York	Pennsylvania	Maryland	Delaware	Mas-sachusetts	Conn-ecticut	Rhode Island	New Jersey	Dis-trict of Columbia
	Million pounds	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent
Supply:														
Production on farms ¹	16, 948	94. 8	96. 6	95. 3	99. 0	98. 5	94. 4	96. 4	97. 0	41. 1	83. 9	46. 0	46. 9	-----
Production by cows not on farms ²	345	1. 9	3. 4	4. 7	1. 0	. 7	2. 9	2. 2	. 8	2. 8	2. 0	1. 8	. 9	-----
Milk and cream from Virginia and West Virginia ³	114	. 6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	64. 0
Western cream ⁴	486	2. 7	-----	-----	-----	. 8	2. 7	1. 4	2. 2	10. 2	3. 1	3. 6	3. 8	10. 1
Shipments of milk and cream from other North-eastern States in excess of shipments to them.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	45. 9	11. 0	48. 6	48. 4	25. 9
Total.....	17, 893	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0

Utilization:														
Used on farms: ⁵														
Fluid milk and cream	1,250	7.0	11.7	8.0	5.2	5.3	9.0	12.5	12.1	3.1	5.9	2.2	3.0	-----
Butter	1,027	5.7	24.0	8.6	2.9	4.6	7.3	9.3	6.8	.8	1.6	.4	.8	-----
Fed to calves	476	2.7	2.0	2.1	2.3	3.4	2.3	1.9	2.2	.9	2.4	1.1	.9	-----
Other fluid consumption ⁶	11,961	66.9	36.9	38.7	7.5	63.2	51.9	53.3	43.6	88.7	81.8	90.5	89.6	89.9
Manufactured (net) ⁷	2,745	15.3	1.8	1.0	3.8	20.1	18.8	10.2	6.0	5.4	6.2	4.7	4.5	10.1
Waste and unaccounted for ⁸	434	2.4	2.5	2.6	2.5	2.5	2.4	2.5	2.2	1.1	2.1	1.1	1.2	-----
Shipments of milk and cream to other North-eastern States in excess of shipments from them			21.1	39.0	75.8	.9	6.3	10.3	27.1					-----
Total	17,893	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

¹ Estimates for 1934, MILK PRODUCTION TRENDS, June 10, 1935, U. S. Department of Agriculture, Bureau of Agricultural Economics.

² Estimates for 1933, MILK PRODUCTION TRENDS, Supplement No. 8, May 1933, p. 43, U. S. Department of Agriculture, Bureau of Agricultural Economics.

³ Estimates by Maryland-Virginia Milk Producers' Association.

⁴ Records of cream shipments supplied by railroad companies.

⁵ Includes estimated quantities so used on nonfarm places keeping cows, as per Special Report, U. S. Department of Agriculture, Bureau of Agricultural Economics, MILK PRODUCED AND MILK USED IN THE NORTHEASTERN STATES IN 1931, June 30, 1933.

⁶ Number of persons estimated as follows: Total population of each State as per U. S. Census of Population, 1930, less the estimated number living on farms reporting milk produced in 1929; plus population growth estimated at 3 times the average annual percentage for the 10-year period 1920-30. Consumption per capita estimated as follows: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, and New York, 42 gallons; New Jersey, 39 gallons; Pennsylvania, Maryland, and Delaware, 32 gallons; District of Columbia, 38 gallons. These estimates are based on data reported by the U. S. Bureau of Agricultural Economics, New York State College of Agriculture, and Pennsylvania State College.

⁷ Quantities of dairy products manufactured in 1934 as reported by the U. S. Bureau of Agricultural Economics, converted to the whole milk equivalent; less allowance for butter made from whey cream, also butter and concentrated milk used in the manufacture of ice cream, plus milk and cream used in the manufacture of milk chocolate. Similar data for the years 1929-33 are reported in MILK EQUIVALENT OF PRODUCTION OF MANUFACTURED DAIRY PRODUCTS BY STATES, Mimeographed Report, Bureau of Agricultural Economics, June 1935.

⁸ Total for the entire area, representing difference between the total supply and estimated utilization, prorated among the several States in proportion to the amounts produced.

farm families who had their own cows. Between 5 and 6 percent of the milk was used in butter making on farms, and between 2 and 3 percent for feeding calves. Altogether, nearly one-sixth of the entire milk supply of the Northeastern States was used on the farms where produced. A little more than one-seventh of the milk was converted into manufactured products at dairy plants.

Although the region as a whole is nearly self-sufficient, there are large interstate movements of milk within the area. Massachusetts, Connecticut, Rhode Island, New Jersey, and the District of Columbia depend on other States of the group for part of the milk required for consumption as fluid milk and cream. Massachusetts and New Jersey, particularly, are large importers of milk and cream from other States. In New York State the quantity of milk produced is matched almost exactly by the quantities consumed in fluid form or used for manufacture within the State. In 1934 shipments out of the State exceeded the in-shipments by a small margin. Vermont, Pennsylvania, and Maine are the largest exporters of milk and cream to markets outside their own borders. Vermont, with three cows to each four people, ships three-fourths of its milk output to markets in Massachusetts, New York, and other States.

In the several deficit States, from 82 percent to 90 percent of the total milk supply in 1934 was used in the cities and villages for consumption in fluid form. In some of the States whose production exceeds the local demand, a considerable proportion of the milk is used for manufacture. In New York State, for example, about 20 percent of the milk supply for 1934 was used for manufacture. More recently a still larger proportion has been so used. New York State and Pennsylvania are outstanding with respect to the quantities of milk used for manufacture. Although these two States accounted for only 59 percent of the milk consumed in fluid form in this area, they supplied 85 percent of the total volume that was used for manufacture.

Milk Used in Manufactured Dairy Products

Manufactured dairy products, as they relate to the problem of surplus milk, are of two kinds. The highly perishable products, such as ice cream and cream cheese, must be produced in or near the large centers of population. Because of the advantages of manufacturing these products in close proximity to market, and the need for raw materials of high quality, plants manufacturing ice cream and cream cheese usually have first call on milk supplies in excess of the demand for fluid milk and cream. Many plants engaged in the manufacture of these products obtain some of the required milk fat and other milk solids in the form of cream, condensed milk, butter, and powdered

skim milk shipped from the more remote dairy regions. In general, the quantity of locally produced milk that is used by such plants depends upon the current local demand for ice cream and cream cheese, rather than upon the quantity of milk that is available for such uses. Plants manufacturing milk chocolate are in a similar position, except that they make a wider distribution of the finished product.

As to the less perishable products, such as butter, American cheese, and evaporated milk, the locality of production is determined chiefly by the volume and cost of available milk supplies. Such products can be, and for the most part are, produced in dairy regions remote from the principal markets. However, they afford an outlet for seasonal and other surpluses in sections devoted primarily to the production of market milk. The quantity of milk used in the manufacture of these products in the market-milk areas is determined mainly by the excess of current production over the demand for fluid milk and cream. In other words, the quantity of butter, cheese, and evaporated milk being made in market-milk areas such as the Northeastern States, at any time, is a reflection of the quantity of surplus milk in those areas.

In the Northeastern States considerably more milk is used in the production of ice cream, cream cheese, and milk chocolate than is used in the less perishable products, such as butter and cheese (table 5). In 1936, plants in the Northeastern States accounted for nearly one-half the total quantity of milk used in the manufacture of the perishable products (ice cream, cream cheese, plain condensed milk, and milk chocolate) but for only 3 percent of the total output of the less perishable products in the United States. Sweetened condensed milk is the only one in the latter group of whose national output the Northeastern States produced as much as 20 percent.

The total milk equivalent of all products manufactured in this area in 1936 was a little more than $3\frac{1}{2}$ billion pounds. This is equal to the total milk production of Maine, New Hampshire, Vermont, and Connecticut.

Nearly 30 percent of the milk fat used in the ice cream and milk chocolate was obtained from butter, condensed milk, and milk powder, the major quantities of which were shipped in from States farther west. The figures also include a small duplication in the form of butter churned from whey cream. The net milk equivalent of all dairy products manufactured in the Northeastern States in 1936, excluding the butter and concentrated milk used in ice cream and milk chocolate as well as the butter churned from whey cream, was a little more than 3 billion pounds.

TABLE 5.—TOTAL MILK EQUIVALENT OF DAIRY PRODUCTS MANUFACTURED IN THE UNITED STATES AND IN THE NORTHEASTERN STATES, 1936

Product	Whole milk equivalent		North-eastern States output in percentage of United States total
	United States	North-eastern States	
<i>Highly perishable products:</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Percent</i>
Ice cream ¹	3, 629. 5	1, 481. 1	40. 8
Cream cheese.....	404. 5	223. 2	55. 2
Plain condensed milk.....	315. 9	133. 2	42. 2
Milk chocolate ¹	397. 9	373. 9	94. 0
Total.....	4, 747. 8	2, 211. 4	46. 6
<i>Less perishable products:</i>			
Creamery butter ¹	33, 096. 5	650. 4	2. 0
American cheese.....	4, 982. 7	259. 6	5. 2
Other cheese.....	1, 059. 1	77. 1	7. 3
Evaporated milk.....	4, 384. 9	483. 3	11. 0
Sweetened condensed milk:			
Case goods.....	104. 4	32. 9	31. 5
Bulk goods.....	107. 5	23. 4	21. 8
Powdered whole milk.....	137. 0	26. 2	19. 1
Powdered cream.....	3. 4		
Malted milk.....	49. 5		
Total.....	43, 925. 0	1, 552. 9	3. 5
All manufactured products.....	48, 672. 8	3, 764. 3	7. 7

¹ Net milk equivalents, excluding butter and concentrated milk used in ice cream and milk chocolate; also butter made from whey cream were as follows (in millions of pounds):

	United States	Northeastern States
Ice cream.....	2, 873. 3	1, 086. 7
Milk chocolate.....	279. 5	277. 3
Butter.....	32, 647. 0	609. 0

Source: Based on data compiled by the U. S. Bureau of Agricultural Economics.

Much of the western cream shipped into the Northeastern States is used in the manufacture of ice cream, cream cheese, and milk chocolate. The total volume of western cream coming into these States in 1936 was equal to one-third the total milk equivalent in these products.

About 7 percent more milk and cream was used in the manufacture of dairy products in the Northeastern States during 1936 than in 1929. There was a sharp decline from 1929 to 1932, but this was more than made up by the steady increase which began in 1933 (fig. 4). The net quantity of milk used in the manufacture of ice cream, cream cheese, and plain condensed milk decreased about one-third from 1929 to 1933. During the same period there was little change in the output of the less perishable kinds of dairy products. By 1936 the manufacturers of ice cream, cream cheese, and plain condensed milk were using practically the same quantity of milk as they did in 1929. The quantity of surplus milk used in production of the less perishable dairy products during 1936 was 200 million pounds greater than the quantity so used in 1929, and about 320 million pounds greater than the quantity for 1932.

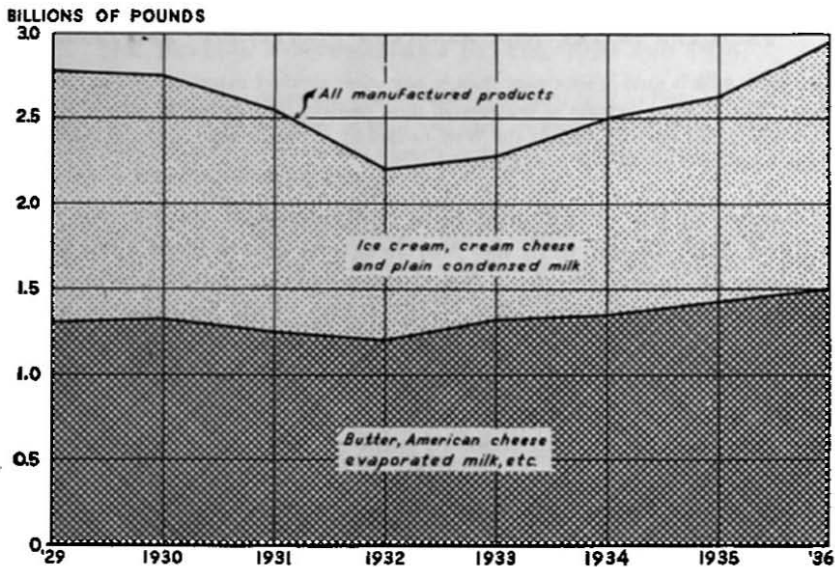


FIGURE 4.—TOTAL MILK EQUIVALENT OF DAIRY PRODUCTS MANUFACTURED IN THE NORTHEASTERN STATES ANNUALLY, 1929-36.

The slight decrease in output of butter, evaporated milk, and other nonperishable products in 1931 and 1932, and the upward trend since 1932, reflect changes in the quantity of surplus milk in the Northeastern milksheds. The output of ice cream, cream cheese, and plain condensed milk has varied with the demand for these products.

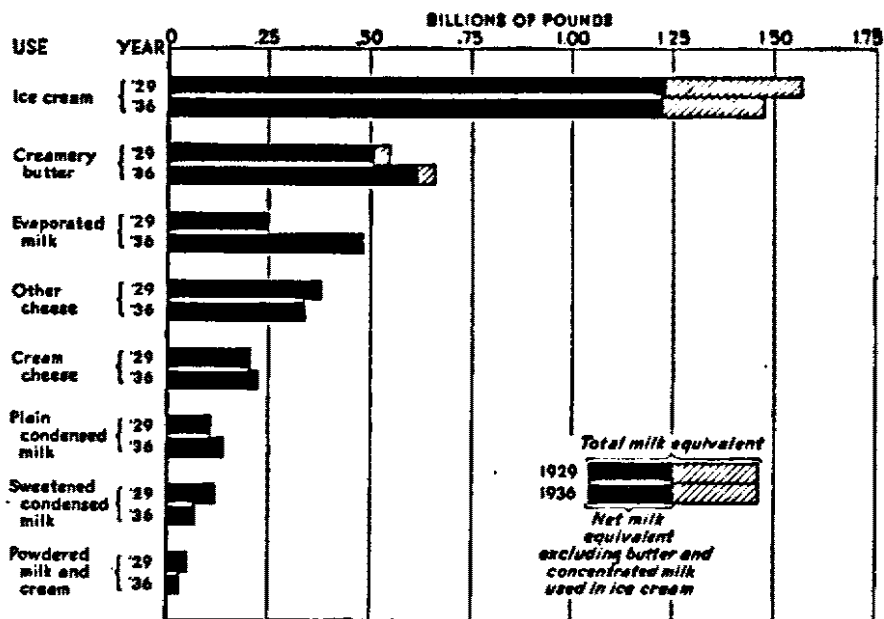


FIGURE 5.—MILK EQUIVALENT OF VARIOUS DAIRY PRODUCTS MANUFACTURED IN THE NORTHEASTERN STATES, 1929 AND 1936.

Much more milk is used in ice cream than in any other product manufactured in the Northeast. The striking increase in evaporated milk resulted from the large surplus of milk in this region, the reduced pack in the West caused by severe drought, and the gradual shift from sweetened condensed to evaporated milk.

Changes in the output and milk equivalents of the several manufactured dairy products in the Northeastern States from 1929 to 1936 were very dissimilar (fig. 5). Nearly twice as much milk was converted into evaporated milk in 1936 as in 1929. This increase is in part abnormal and temporary. Because of the severe drought which curtailed milk production in the central western dairy region during the summer of 1936, the manufacturers of evaporated milk purchased more than the usual quantities of milk at their eastern plants. The increased production of evaporated milk in recent years has been offset in part by decreased production of sweetened condensed milk, and powdered milk.

The quantity of milk used in creamery butter, plain condensed milk, and cream cheese has increased. Slightly less milk was used in ice cream and hard cheeses during 1936 than in 1929.

In 1936, dairy plants in New York State and Pennsylvania handled three-fourths of the milk that was used in the manufacture of ice cream, cream cheese, and plain condensed milk in all the Northeastern States. New York and Pennsylvania plants also handled 90 percent of the milk that was used in the manufacture of butter, evaporated milk, hard cheeses, and other nonperishable dairy products. The New York dairy plants used about one-fourth more milk than the

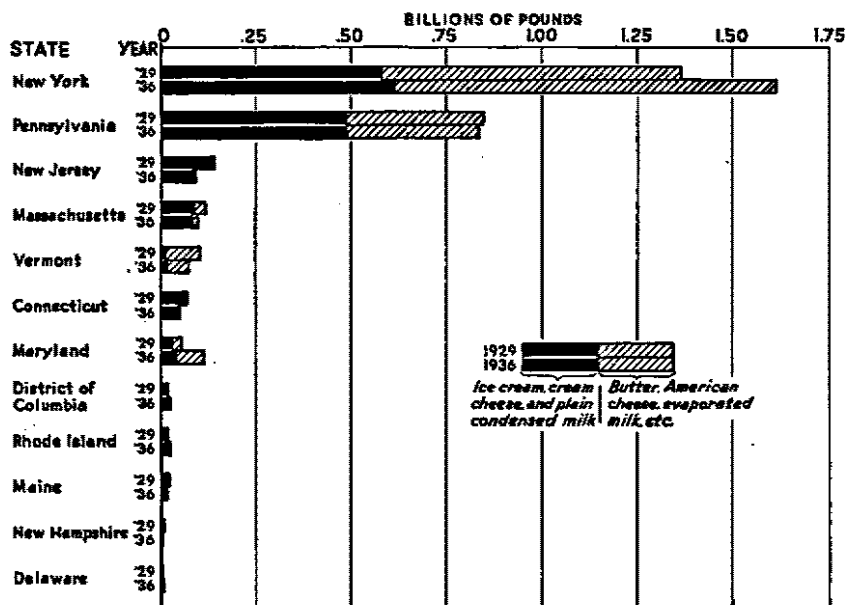


FIGURE 6.—MILK EQUIVALENT OF DAIRY PRODUCTS MANUFACTURED IN THE SEVERAL NORTHEASTERN STATES, 1929 AND 1936.

The large output of butter, American cheese, and evaporated milk in New York and Pennsylvania reflect the large surpluses of milk that exist in those States, more particularly in the New York milkshed. The amount of surplus milk used for manufacture in New York State has increased considerably since 1929.

Pennsylvania plants for ice cream, cream cheese; and plain condensed milk, and nearly three times as much milk as the Pennsylvania plants for butter, hard cheeses, and evaporated milk (fig. 6). Marked decreases in quantities of milk used for the more perishable products are recorded for New Hampshire, Connecticut, and New Jersey, and significant increases for Maryland, Delaware, and the District of Columbia. Sharp decreases in the quantities of milk used for the less perishable products, such as butter and evaporated milk, are noted for the New England States and New Jersey. Striking increases are shown for New York and Maryland.

It is apparent, from the data presented in this section, that New York State and the New York milkshed have a disproportionately large surplus; also that the amount of surplus milk has been increasing in New York, Maryland, and Delaware, while decreasing in other States of the northeastern dairy region.

Seasonal Utilization of Milk

The consumption of fluid milk and cream in the Northeastern States varies less according to season than the farm sales of milk and cream or the total supply of milk and cream including shipments from

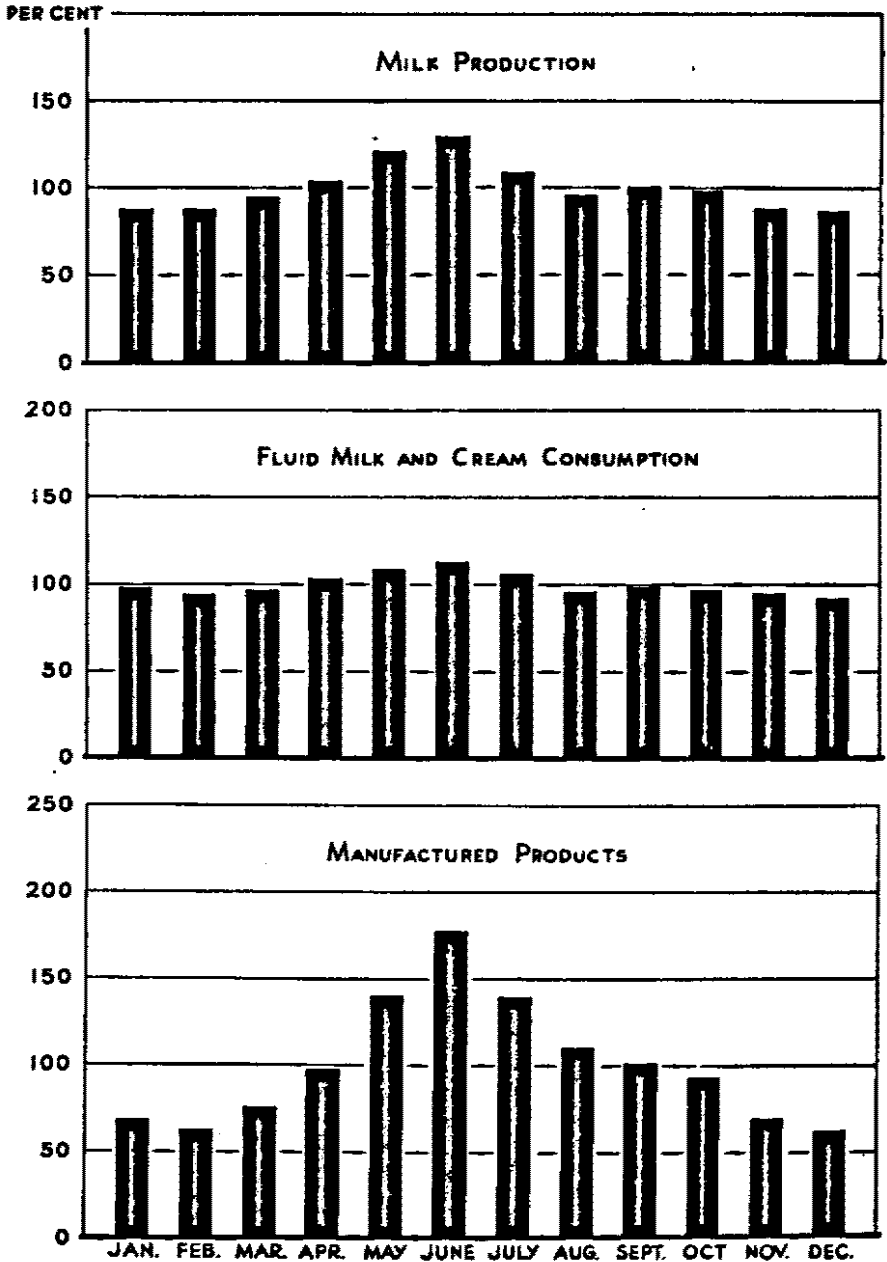


FIGURE 7.—SEASONAL VARIATION IN PRODUCTION AND UTILIZATION OF MILK IN THE NORTHEASTERN STATES, AVERAGES FOR 1933 AND 1934.

Daily Average for the 2 Years = 100

Milk produced for sale as milk and cream by farmers varies more than does fluid consumption. As manufactured products must absorb the excess over fluid consumption they show a high seasonal variation.

outside the area. In consequence, the volume of surplus milk and the quantity of dairy products manufactured from this surplus vary even more than the milk and cream sales by farmers (fig. 7). When the daily averages for 1933 and 1934 equal 100, the quantities of milk and cream sold by farmers in this area varied from 129 in June to 87 in December, a range of 42 points; the consumption of fluid milk and cream varied from 113 in June to 92 in December, a range of only 21 points; and the milk equivalent of all dairy products manufactured in the area varied from 178 in June to 62 in December, a range of 116 points.⁴

There are marked differences in the seasonal output of the several manufactured dairy products. As previously stated, the production of ice cream, cream cheese, and milk chocolate is closely correlated with consumption, while the output of the less perishable products, such as American cheese, butter, and evaporated milk, depends on the quantity of surplus milk that happens to be available.

Ice cream production has a seasonal peak in May, June, July, and August (fig. 8). The daily output in these months is about three times the average for the period October to March, inclusive. For the year 1933, 27.8 percent of the milk fat used in the ice cream produced in this area was obtained from butter and concentrated milk, and 72.2 percent from milk and cream. Incomplete monthly data for 1933 indicate that from 70 to 78 percent of the total milk fat used by the ice cream manufacturers in May, July, August, and September was derived from milk and cream, and from 22 to 30 percent from butter and various forms of concentrated milk. In other months of the year, from 83 to 88 percent of the fat used was derived from milk and cream, and 12 to 17 percent from butter and concentrated milk. Therefore, if only the milk and cream used directly in the manufacture of ice cream are considered, the seasonal volume was relatively less in May, July, August, and September, and relatively more in all the other months, as compared with the total output of ice cream.

The heavy demand from ice cream manufacturers in the spring and early summer fits in well with the high production and normally large surpluses of milk in those months. However, it is often difficult to fill the requirements of the ice cream manufacturers from local sources in the late summer and early fall. At such times they use more western cream, or milk solids stored in some convenient form such as frozen cream, butter, or concentrated milk.

⁴ In computing the milk equivalent of dairy products on a monthly basis, it was impracticable to give effect to seasonal changes in the butterfat test of milk as produced. The amount of error caused by the assumption of a uniform test throughout the year may be judged from the fact that in New York State, where the variation probably is greatest, the average butterfat test of milk delivered to plants in 1933 ranged from 3.65 percent in April to 3.91 percent in December.

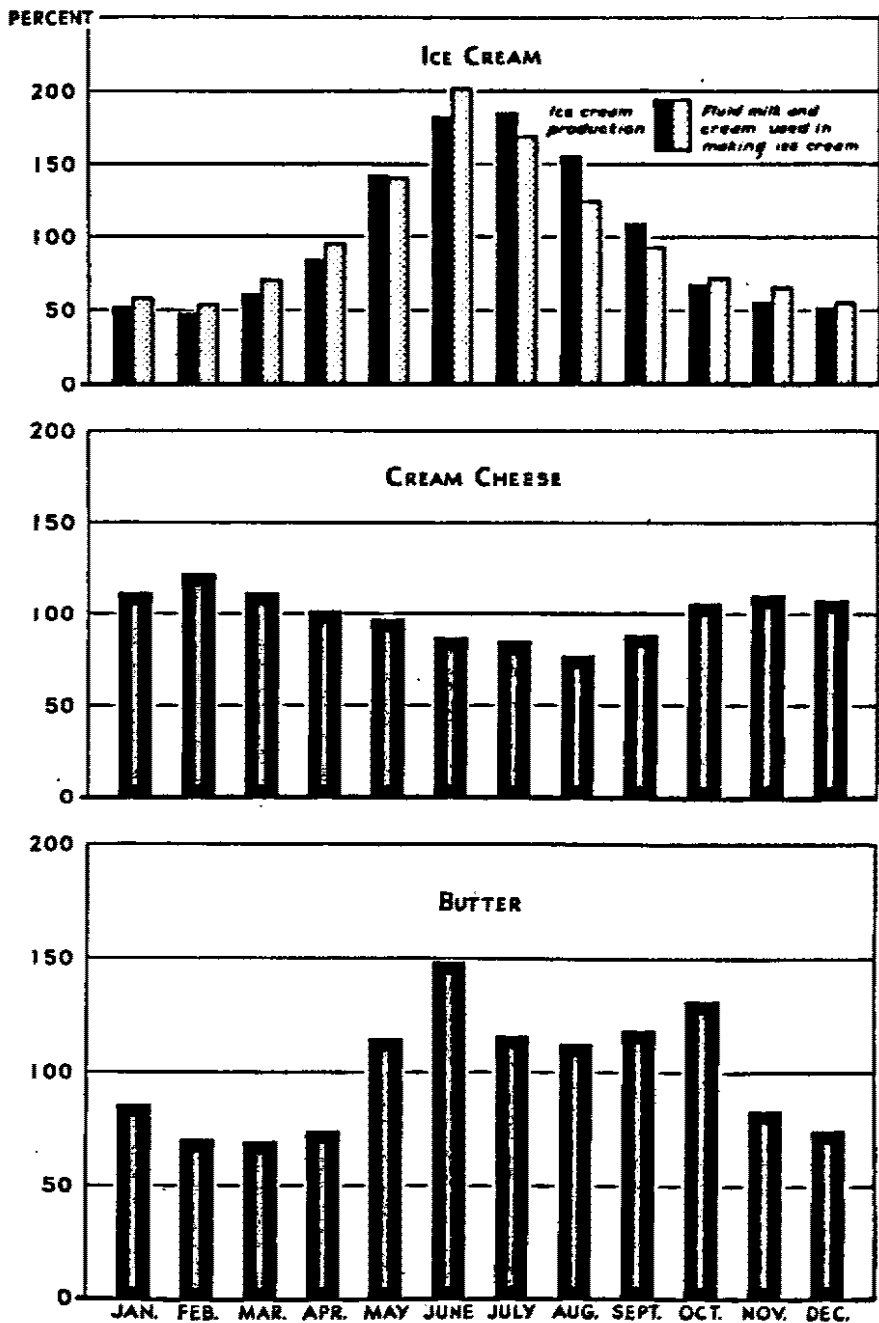


FIGURE 8.—SEASONAL VARIATION IN MILK EQUIVALENT OF ICE CREAM, CREAM CHEESE, AND BUTTER MANUFACTURED IN THE NORTHEASTERN STATES, 1933 AND 1934.

Daily Average for the 2 Years = 100

The quantities of milk and cream used by manufacturers of ice cream and cream cheese follow closely the seasonal volume of sales of these products to consumers. Butter production follows the seasonal output of both farm-separated cream, and cream produced under city inspection for which more profitable outlets are not available.

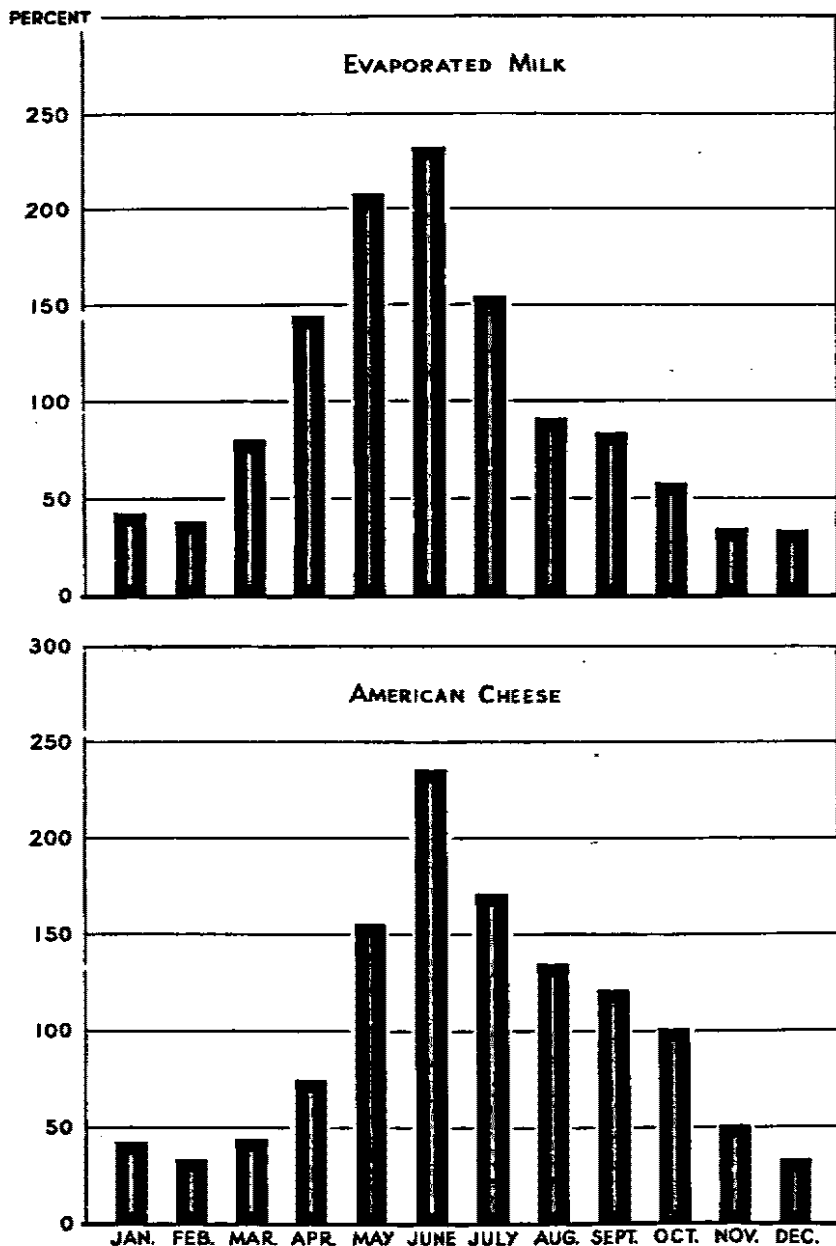


FIGURE 9.—SEASONAL VARIATION IN MILK EQUIVALENT OF EVAPORATED MILK AND AMERICAN CHEESE MANUFACTURED IN THE NORTHEASTERN STATES, AVERAGES FOR 1933 AND 1934.

Daily average for the 2 years=100.

There is a wide seasonal variation in the manufacture of evaporated milk and American cheese. These products are made when there is a large excess of milk over fluid requirements.

No data were available concerning the seasonal changes in the manufacture of milk chocolate. The larger chocolate factories, as well as some of the ice-cream manufacturers, follow the practice of putting away milk fat and solids in some concentrated form when surplus milk is available at low prices.

The output of cream cheese is much less variable according to season than the output of ice cream, and production tends to run lower in summer than in winter. This does not conform at all to the seasonal production of milk or to the seasonal volume of surplus in the area. Nevertheless, the relatively large requirements of cream cheese manufacturers in the late winter and early spring afford a means of disposal for surplus milk at a season when other outlets are most limited. Cream cheese factories have been an especially important outlet for frozen cream which has been carried through the season to insure against shortages of market milk and cream.

The fact that less cream cheese is produced during the summer months is attributed to the difficulties of merchandising this perishable product successfully in hot weather. As refrigeration becomes more economical and more widespread in delivery trucks, in retail stores, and in homes, the output of cream cheese during the summer probably will increase.

The unusual and irregular trend of seasonal output of butter in this region results from a combination of two types of production. Something like half the total volume is made from farm-skimmed cream by specialized creameries. Very probably the seasonal trend of production of this butter is similar to that of American cheese (fig. 9). The remainder of the creamery butter is made from surplus milk in dairy plants approved for city milk supplies, and in a few large creameries to which surplus cream is diverted when more profitable outlets are not available. This production is relatively large during the winter months when the demand for milk and cream by producers of evaporated milk, ice cream, and frozen cream usually is low.

As indicated in figure 9, the manufacture of American cheese and of evaporated milk follows similar seasonal trends with high peaks in May, June, and July, and very low production in winter. The condenseries take relatively more milk than the cheese factories during March, April, and May, and less in the late summer. Most of the condensery milk in these States is qualified for use as market milk or cream. During the spring months large quantities of surplus milk are transferred from fluid-milk plants to condenseries, while in the late summer and fall, much of the regular supply at the condenseries is required for fluid use.

In the aggregate, large quantities of milk qualified for sale as market milk and cream are used in the production of American cheese, but the major part of the cheese is made from uninspected milk. Cheese

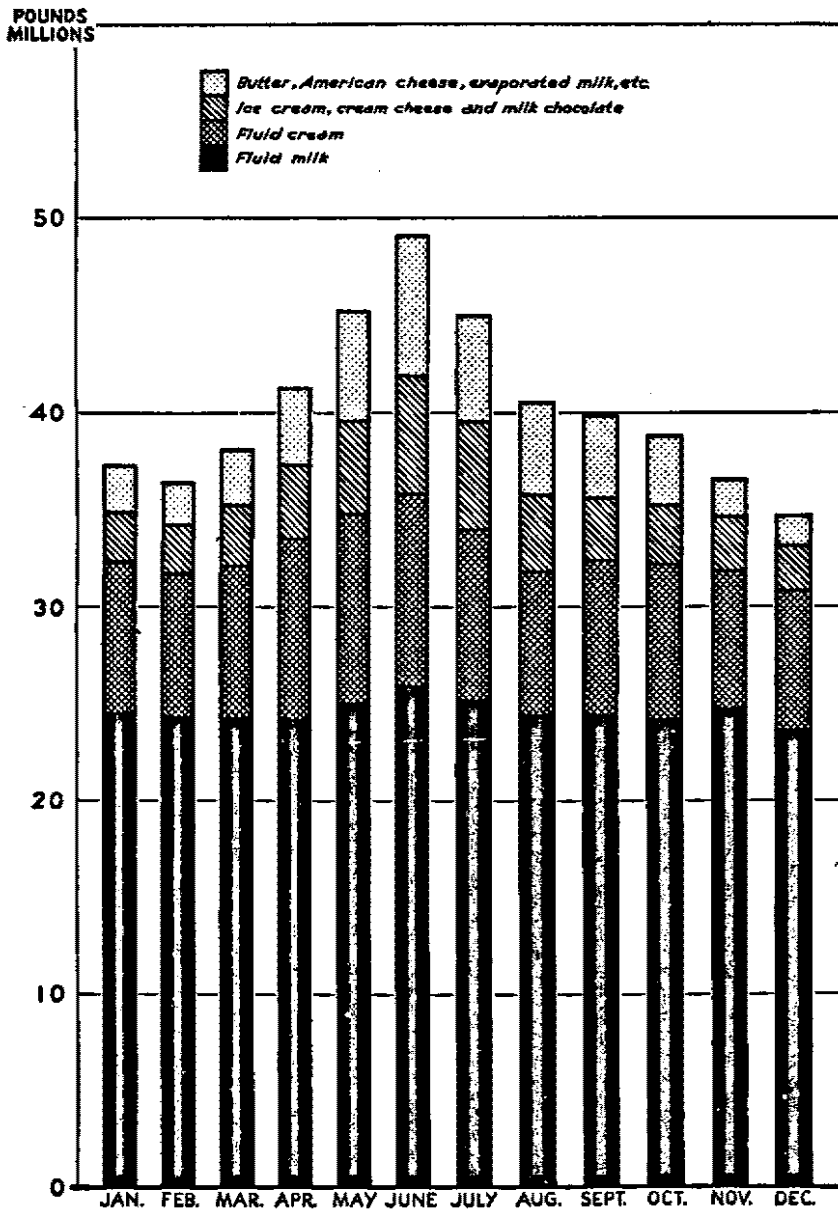


FIGURE 10.—DAILY SUPPLY AND UTILIZATION OF MILK IN THE NORTHEASTERN STATES, BY MONTHS, 1934.

The volume of milk utilized for each of the major purposes was at the seasonal peak in June and at the lowest level in November or December.

factories, therefore, do not stand in the same complementary relationship to the fluid-milk industry of the Northeastern States as do the condenseries.

In 1934, the volume for each of the major uses of milk in the Northeastern States was at the seasonal peak in June, and at or near the lowest level in December (fig. 10). The one exception is cream for fluid use, the quantity of which was slightly less in November than in December. A part of the normal increase in milk production from December to June is required to supply the greater demand for fluid milk and cream, but the major portion finds its way into ice cream, evaporated milk, and other manufactured dairy products.

When the milk used on farms is not considered, over 80 percent of the remaining 1934 supply in the Northeastern States was consumed as fluid milk and fluid cream. Fluid milk alone accounted for 61 percent (table 6). In June, 73 percent of the supply was used as fluid milk and cream, and in November 87 percent. Milk and cream used in the manufacture of ice cream, cream cheese, and milk chocolate amounted to 12.3 percent of the supply in July but dropped to 6.8 percent in December and January. Surplus milk converted into butter, American cheese, evaporated milk, and similar products, amounted to 14.9 percent of the supply in June, but only 4.6 percent in December.

TABLE 6.—MONTHLY UTILIZATION OF MILK SOLD FROM FARMS IN THE NORTHEASTERN STATES, 1934

Month	Percentage of total sales				
	Milk for fluid use	Cream for fluid use	Ice cream, cream cheese, and milk chocolate ¹	Butter, American cheese, evaporated milk, etc. ¹	Total
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
January.....	65.7	20.7	6.8	6.8	100.0
February.....	66.7	20.5	6.9	5.9	100.0
March.....	63.6	20.8	8.1	7.5	100.0
April.....	58.6	22.5	9.1	9.8	100.0
May.....	55.4	21.6	10.4	12.6	100.0
June.....	52.8	20.2	12.1	14.9	100.0
July.....	55.9	19.7	12.3	12.1	100.0
August.....	60.2	18.3	9.6	11.9	100.0
September.....	61.2	20.1	8.0	10.7	100.0
October.....	62.3	20.6	7.7	9.4	100.0
November.....	67.4	19.5	7.6	5.5	100.0
December.....	67.9	20.7	6.8	4.6	100.0
Year.....	61.0	20.4	9.0	9.6	100.0

¹ Net milk equivalent of dairy products manufactured in the Northeastern States, computed from reports by the Bureau of Agricultural Economics, U. S. Department of Agriculture.

Evidently the surplus problem springs largely from the lack of close adjustment between seasonal production of milk and the seasonal consumption of fluid milk and cream.

Cream Shipped to Principal Markets

As indicated in table 2 of this report, comparatively little milk is separated on farms in the Northeastern States. The small quantity of cream which still is produced and sold by farmers goes mainly to butter factories. A number of dairy plants handling market cream in New England have continued to accept farm-separated cream, but the quantity of such cream has become quite small. On the other hand, large quantities of milk are separated at country milk plants,

TABLE 7.—MILK EQUIVALENT OF CREAM SHIPPED FROM EACH STATE TO THE BOSTON, NEW YORK, AND PHILADELPHIA MARKETS, 1930 AND 1936

State of origin	1936 shipments to—				1930 shipments to the three markets	1936 shipments as a percentage of total milk and cream sales by farmers
	Boston	New York	Philadelphia	All three markets		
	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Percent
Maine.....	32.0			32.0	83.7	8.0
New Hampshire.....	13.9			13.9	25.7	4.7
Vermont.....	241.4	89.9		331.3	351.5	29.7
Massachusetts.....	1.7			1.7	7.5	.3
Connecticut.....		1.8		1.8	6.5	.3
New York.....	31.8	1,084.2	3.0	1,119.0	1,278.1	18.1
New Jersey.....		22.5		22.5	15.5	3.3
Pennsylvania.....		132.5	67.9	200.4	264.0	5.5
Maryland.....			27.8	27.8	35.8	4.8
Delaware.....		1.1		1.1	3.8	1.1
District of Columbia.....			.2	.2		
Total, Northeastern States.....	320.8	1,332.0	98.9	1,751.7	2,072.1	12.4
Virginia.....					25.6	
West Virginia.....					1.6	
Other States ¹	173.0	42.0	81.4	296.4	415.2	
Total, all sources.....	493.8	1,374.0	180.3	2,048.1	2,514.5	

¹ Western cream.

and most of this is shipped to the large cities. There it is distributed as table cream or used in the manufacture of ice cream. At times considerable quantities of cream separated from surplus milk are used in the manufacture of cream cheese and butter.

Records of the quantities of cream received, and the sources of shipments, are available for only the three largest markets, namely, Boston, New York, and Philadelphia. In 1936, the milk equivalent of the cream received at these markets was 2,048 million pounds, or about one-eighth of the total milk and cream supply of the Northeastern States (table 7).

Cream shipments from Vermont to Boston and New York amounted to more than one-fourth the total quantity of milk and cream sold by the farmers of the State. All three of the large markets received cream from New York State in 1936. The combined quantities received in these markets from New York State were more than one-half the total receipts of the markets from all sources, and nearly one-fifth of the total sales of milk and cream by New York State farmers. About one-seventh of the total cream receipts at the three markets, in 1936, came from outside the Northeastern States.

Supply and Use of Milk in the Several Milksheds

Markets and Milksheds in the Northeastern States

ONE of the ways in which the marketing situation for milk differs from that for other commodities is that the various markets draw their milk supplies from well-defined and comparatively limited areas. This is partly because milk is very bulky and perishable, and therefore cannot be shipped far without excessive cost and deterioration in quality. Sanitary regulations enforced by the municipal and State departments of health also tend to fix definite boundaries for the areas that supply milk to each market or group of markets. Such an area is commonly known as a milkshed.

The size of each milkshed is determined principally by the demands of the consuming population in the market, and by the intensity of milk production in the adjacent farming areas. The intensity of milk production in the several Northeastern States is discussed on pages 5 to 7 of this report. The population of the several markets in these States gives a rough indication of the quantities of milk required for use as fluid milk and cream. The relative size of the principal cities in this area is indicated in figure 1. However, within the areas from which some of these leading cities draw their milk supplies, are smaller markets which add considerably to the population and to the demand for fluid milk and cream.

Primary and Secondary Markets

In the Boston milkshed are such important cities as Lawrence, Lowell, Springfield, Worcester, Fall River, New Bedford, Providence, and Portland. Prices and other conditions of marketing in these places are dominated by those in the primary market, Boston. The large Boston dealers operate in most or all of these markets and the New England Milk Producers' Association represents the farmers as bargaining agent. Likewise, in the New York milkshed are such important centers as Scranton, Wilkes-Barre, Albany, Utica, Syracuse, Rochester, Buffalo, and a number of others. In all of these the Dairymen's League Cooperative Association is the principal representative of the organized dairymen. Prices in these cities are directly related to those in New York City.

The population of the primary metropolitan market and of the secondary markets of 10,000 or more in each milkshed is shown in table 8. In the Boston milkshed the secondary markets have a total population larger than that of metropolitan Boston. The population of primary and secondary markets in the New York milkshed is equal to that of the other five milksheds combined. There are no secondary markets in the Baltimore or Washington milksheds, and in Connecticut there is no dominant primary market.

TABLE 8.—POPULATION OF PRIMARY MARKET AND SECONDARY MARKETS OF 10,000 OR MORE POPULATION IN EACH MILKSHED, 1930

Milkshed	Primary market ¹	Secondary markets of 10,000 population or more	Total
Boston.....	1, 998, 000	2, 649, 000	4, 647, 000
Connecticut.....		1, 082, 000	1, 082, 000
New York.....	10, 600, 000	3, 300, 000	13, 900, 000
Philadelphia.....	2, 231, 000	1, 448, 000	3, 679, 000
Baltimore.....	1, 200, 000	-----	1, 200, 000
Washington.....	621, 000	-----	621, 000
Total.....	16, 650, 000	8, 479, 000	25, 129, 000

¹ Metropolitan.

Sources: U. S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS, CENSUS OF POPULATION, 1930.

Places of less than 10,000 population are excluded from the present discussion for several reasons. In most of these places a major part of the distribution is handled by producer-dealers. The larger cooperative associations, which represent farmers in collective bargain-

ing and other activities in the principal markets, usually are not active in the smaller towns. Finally, since the supply of milk for the smaller markets is rather closely adjusted to the demand, surplus milk is not a serious problem with them.

Extent and Boundaries of the Milksheds

A large proportion of the milk distributed in the larger markets, such as Boston, New York, and Philadelphia, is first received at country plants which are operated by dealers or cooperatives for convenience in cooling and shipping the milk. Most of these plants ship milk or cream regularly to one market, although at times a few of them use their entire supply for manufacture. The location of the country plants that ship milk to each of the markets indicates the layout of the supply area or milkshed, except for nearby territory in which milk goes direct from farms to city plants. The locations of dairy plants that ship milk to each important market in the North-eastern States are shown in figure 11.

PLANTS SHIPPING MILK TO PRINCIPAL MARKETS
IN THE NORTHEASTERN STATES
1937



FIGURE 11.

The New York market receives nearly all of its milk and cream from country plants, and the location of these shows clearly the layout of the milkshed. Connecticut markets receive all, and the others a considerable part, of their supply by direct haul from the farms. The milkshed boundaries are quite irregular.

The approximate boundaries of the several milksheds are indicated in figure 12. The Boston milkshed occupies nearly all of New England, with the exception of northern Maine, part of the western side of Vermont, and most of Connecticut. It also occupies two small areas in New York State, one just north of Troy, the other in Clinton County, along the Canadian border.

The New York milkshed takes in practically all of New York State, also several counties along the west side of Vermont, a little territory in western Massachusetts and Connecticut, the northern section of New Jersey, and about two-thirds of Pennsylvania. The New York and Boston milksheds overlap in western Vermont and eastern New York, also in northern New York. In these areas neighboring farms supply milk to different markets. With changes in prices and transportation rates, some of the country milk plants have shifted their sales outlets from one market to the other.

The Connecticut milkshed lies between the Boston and New York sheds. It occupies most of the State of Connecticut, excluding the northeast portion. It also takes in a small area in southeastern New York. The Connecticut and New York milksheds overlap at this point, and also in western Connecticut.

The Philadelphia milkshed (fig. 12) occupies about one-third of Pennsylvania, principally the southeast portion, the southern half of New Jersey, all of Delaware, the eastern shore and a section in western Maryland. A few country plants whose chief product is cream are maintained by Philadelphia dealers in northwestern Pennsylvania. The milksheds of Philadelphia and New York overlap throughout much of central and southeastern Pennsylvania.

The Baltimore milkshed is very compact. It lies mostly to the north and west of Baltimore, extending into southern Pennsylvania, principally York County. In southern Pennsylvania, Baltimore competes with both Philadelphia and New York for its milk supply.

The Washington milkshed also is rather small and compact. About two-thirds of it lies across the Potomac in northern Virginia, one-third in Maryland, west of Baltimore. A small group of dairymen sending milk to Washington are located north of Baltimore, directly within the Baltimore milkshed.

The Pittsburgh milkshed, which is outside the territory that receives chief attention in this report, occupies a number of counties of western Pennsylvania and eastern Ohio. Pittsburgh competes for milk supplies with Philadelphia and New York to a limited extent only, in the extreme northwest portion of Pennsylvania.

Except for a few important changes these milkshed boundaries were the same in 1936 as they had been for 20 years. In the last several years the boundary between the Boston and New York sheds has

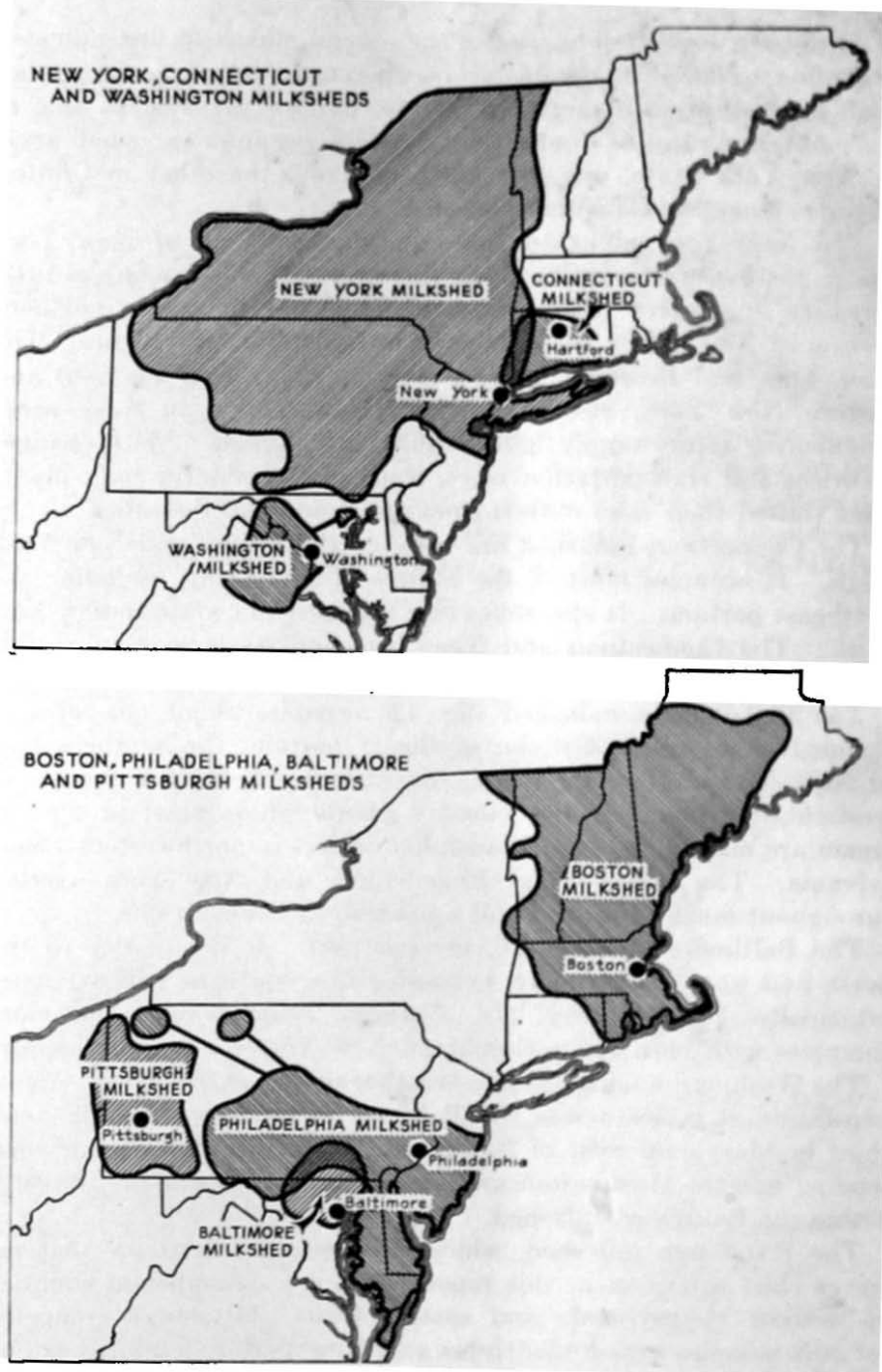


FIGURE 12.—MILKSHEDS IN THE NORTHEASTERN STATES.

The size of the milkshed depends upon the demand of the market and the intensity of production within the area. Milksheds of the large eastern markets overlap in several places.

moved eastward. More of the milk produced in western Vermont and eastern New York now goes to the New York market and less to Boston. One reason for this is the fact that Boston and other New England markets now get a large share of their cream supply from the West. This takes the place of cream formerly supplied by farms in New England and the Province of Quebec. Furthermore, it appears that the Boston dealers made a more prompt and vigorous effort to keep the local supply of milk in line with the demand during the period of increasing production and decreasing consumption following 1929.

The New York milkshed also has expanded considerably in central and southern Pennsylvania. The development in the central part of the State consisted mainly in bringing under New York City inspection, farms which previously had been producing milk only for manufacture. In the southern part of the State, however, several thousand farms, formerly supplying fluid milk to Philadelphia dealers, shifted to New York. This change began early in 1930, with the adoption by the city of Philadelphia of an ordinance excluding milk from dairy herds not free from tuberculosis. It was encouraged and facilitated by the development of economical and dependable long-haul trucking of milk. Most parts of the areas mentioned have a shorter haul to New York by highway than by rail. Furthermore, while the hauling distance from some of these localities is greater to New York than to Philadelphia, the areas are nearer to New York than many places that have been shipping fluid milk to that market for years.

Beginning about 1926, the Philadelphia market, like Boston, began to get a large share of its cream supply from the Central West. For this reason, and because of increased local production and sharply reduced consumption after 1929, Philadelphia was able to release part of her milkshed without difficulty.

Milk Supply and Disposal

Sources of Information

From the foregoing it is clear that the milkshed boundaries do not correspond to those of the States, counties, or other political divisions. In many counties where milksheds join or overlap, milk is supplied to two or more primary markets, or to markets secondary to them. On the other hand, the statistics pertaining to the production and utilization of milk, which are compiled and published by the United States Department of Agriculture, the various State departments of agriculture, and similar agencies, are available only on a State-wide or county basis. Consequently, in order to obtain a complete statistical summary of the supply and use of milk in the several milksheds, the figures

already compiled by these departments must be supplemented by direct information from dealers, cooperative associations, and individuals familiar with conditions in each milkshed. The data here presented have been compiled in this manner.

Number of Producers

The total number of farmers supplying milk to the primary and secondary markets in the six northeastern milksheds, in 1934, was approximately 154,000 (table 9). About half of these producers were

TABLE 9.—APPROXIMATE NUMBER OF FARMERS PRODUCING MILK FOR PRIMARY MARKETS, AND SECONDARY MARKETS OF 10,000 OR MORE POPULATION IN EACH MILKSHED, 1934

Milkshed	Members of the principal cooperative	Producer-dealers	Other producers	Total
Primary markets: ¹				
Boston.....	14, 200	400	3, 400	18, 000
New York.....	33, 500	700	38, 800	73, 000
Philadelphia.....	7, 100	100	4, 600	11, 800
Baltimore.....	3, 500	20	200	3, 720
Washington.....	1, 140	19	140	1, 299
Total.....	59, 440	1, 239	47, 140	107, 819
Secondary markets: ²				
Boston.....	7, 000	2, 000	3, 500	12, 500
Connecticut.....	2, 800	1, 900	1, 800	6, 500
New York.....	6, 000	800	11, 200	18, 000
Philadelphia.....	700	400	8, 200	9, 300
Total.....	16, 500	5, 100	24, 700	46, 300
Both primary and secondary markets:				
Boston.....	21, 200	2, 400	6, 900	30, 500
Connecticut.....	2, 800	1, 900	1, 800	6, 500
New York.....	39, 500	1, 500	50, 000	91, 000
Philadelphia.....	7, 800	500	12, 800	21, 100
Baltimore.....	3, 500	20	200	3, 720
Washington.....	1, 140	19	140	1, 299
Total.....	75, 940	6, 339	71, 840	154, 119

¹ Hartford and New Haven are the principal markets in the Connecticut milkshed, but since there is not a clear distinction between primary and secondary markets in that area, all are grouped under the heading of secondary markets.

² There are no secondary markets in the Baltimore and Washington milksheds.

members of the principal cooperative bargaining associations in the several milksheds. Less than 5 percent of the total number were distributing their own milk. Nearly half the farmers who were selling milk to dealers were not represented in the principal bargaining associations, although a considerable proportion of them were members of other cooperative groups.

In the Baltimore and Washington milksheds, 90 percent or more of the producers were members of the cooperative, but members of the leading association of producers in the Philadelphia, Connecticut, and New York sheds constituted less than half the total number of producers. In Connecticut, about 30 percent of the market milk producers were producer-dealers, but in the other milksheds this group was much less important.

Seventy percent of the producers supplied the primary markets such as Boston, New York, and Philadelphia, and the other 30 percent supplied secondary markets in the six milksheds. In general the leading cooperative bargaining associations were less strongly represented in the secondary markets. Their membership constituted only 35 percent of the total number of producers supplying those markets. Producer-dealers were a greater factor in the secondary markets, where they constituted about 11 percent of the total number of producers.

Estimates of Fluid Sales and Surplus

The volume of milk and milk equivalent of cream handled by milk dealers in the six milksheds was approximately 410,000 forty-quart cans daily in June, and 290,000 cans daily in November 1934 (table 10). Considerably more than half this volume was produced in the New York milkshed.

In this northeast region the seasonal peak of milk production occurs regularly in June, and as a rule the low point comes in November; that is, taking the six milksheds as a group, the total volume in November was 70 percent of the June volume. In the New York milkshed, November production was only 62 percent of June production, while in each of the other five sheds, the November-June ratio was 82 percent or higher.

The milk supplies for secondary markets showed less seasonal variation than those for the large primary markets. The total November supply for secondary markets in the six milksheds was 85 percent of their June supply.

Fluid-milk sales in the six milksheds dropped only 5 percent from June to November, but cream sales dropped one-third. The quantity of milk used for manufacture was only one-fourth as much in November as in June.

TABLE 10.—SUPPLY AND DISPOSAL OF MILK IN THE SIX NORTHEASTERN MILKSHEDS, JUNE AND NOVEMBER, 1934 ¹

Milkshed	Quantity of milk used daily			
	Fluid milk	Fluid cream	Milk manufactured	Total
June 1934:	<i>½0-quart cans</i>	<i>½0-quart cans</i>	<i>½0-quart cans</i>	<i>½0-quart cans</i>
Boston.....	45, 400	20, 600	7, 300	73, 300
Connecticut.....	10, 100	3, 300	2, 900	16, 300
New York.....	120, 000	53, 000	82, 500	255, 500
Philadelphia.....	29, 300	6, 300	11, 600	47, 200
Baltimore.....	5, 300	1, 700	2, 100	9, 100
Washington.....	4, 700	1, 800	2, 000	8, 500
Total.....	214, 800	86, 700	108, 400	409, 900
November 1934:				
Boston.....	43, 300	15, 600	3, 100	62, 000
Connecticut.....	9, 800	2, 200	2, 500	14, 500
New York.....	113, 800	31, 200	14, 800	159, 800
Philadelphia.....	29, 000	6, 200	3, 500	38, 700
Baltimore.....	5, 000	1, 400	1, 100	7, 500
Washington.....	4, 600	1, 500	1, 200	7, 300
Total.....	205, 500	58, 100	26, 200	289, 800
Percentage of total supply				
June 1934:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Boston.....	62	28	10	100
Connecticut.....	62	21	17	100
New York.....	47	21	32	100
Philadelphia.....	62	13	25	100
Baltimore.....	58	19	23	100
Washington.....	55	21	24	100
Average.....	58	20	22	100
November 1934:				
Boston.....	70	25	5	100
Connecticut.....	68	15	17	100
New York.....	71	20	9	100
Philadelphia.....	75	16	9	100
Baltimore.....	67	18	15	100
Washington.....	64	20	16	100
Average.....	69	19	12	100

¹ Includes milk handled in fluid-milk plants and in condenseries and other manufacturing plants approved for city milk supply.

In June, 58 percent of the supply in the six milksheds was utilized as fluid milk, 20 percent as cream, and 22 percent for manufacture. In November, 69 percent of the supply was used as fluid milk, 19 percent as cream, and only 12 percent for manufacture. There were wide differences in the use of milk in the several milksheds. The percentage of total supply used as fluid milk in June varied from 47 percent in New York to 62 percent in Boston, Connecticut, and Philadelphia. The percentage used for manufacture varied from 10 percent in the Boston milkshed to 32 percent in the New York shed. In November, however, New York was near the top in the proportion of total supply used as fluid milk. Connecticut used as large a proportion of its milk for manufacture in November as in June.

In the secondary markets a larger proportion of the supply was used as fluid milk and a smaller proportion as cream. Taking these markets as a group, in June, 70 percent of the supply was used as fluid milk, and 17 percent as cream. In November, 80 percent was used as fluid milk, and 13 percent as cream.

The proportion of total supply utilized as fluid milk was much higher for the producer-dealers than for the other groups of producers. In June 1934, producer-dealers in the six milksheds disposed of nearly 90 percent of their supply as fluid milk (table 11).

TABLE 11.—PERCENTAGE OF MILK SUPPLY PROVIDED BY EACH GROUP OF PRODUCERS, WHICH WAS UTILIZED AS FLUID MILK, JUNE 1934

Milkshed	Members of the leading cooperative association	Other producers selling to dealers	Producer-dealers	All producers
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Boston.....	62	45	88	62
Connecticut.....	62	47	88	62
New York.....	37	53	78	47
Philadelphia.....	69	56	89	62
Baltimore.....	58	56	81	58
Washington.....	58	42	90	55
Average.....	58	50	87	58

In all except the New York milkshed, the percentage of total supply utilized as fluid milk was higher for members of the leading cooperative associations than for other producers selling their milk to dealers. In the Boston milkshed, for example, 62 percent of the milk supplied by members of the New England Milk Producers' Association was used as fluid milk, while only 45 percent of the milk supplied by other producers (not including producer-dealers) was so used. On the other

hand, only 37 percent of the milk supplied by members of the Dairymen's League, in June, was utilized as fluid milk, while other producers selling to dealers enjoyed fluid milk outlets for 53 percent of their supply. At other seasons, there was less difference in utilization.

The situation in the Boston milkshed has changed considerably since 1934. The two largest distributors have discontinued buying milk from the New England Milk Producers' Association in the Boston market. In consequence, during 1937, fluid milk sales constituted a smaller percentage of the milk produced by members of that association than was true of the production of other farmers selling milk to dealers in the Boston milkshed. On the other hand, in the New York milkshed, a gradually increasing proportion of the milk supplied by members of the Dairymen's League has been disposed of as fluid milk. Fluid milk sales have increased from 32 percent of the League's total supply, in June 1931, to 41 percent in June 1937.

The facts presented in this section of the report show that wide differences exist as to the actual and relative amounts of surplus milk in the several milksheds of the northeast region. It is evident that the surplus problem is far more serious in the New York milkshed than in any of the others.

The effects of the large surplus in the New York milkshed have not been limited entirely to its own markets. In recent years a large proportion of the surplus milk in this area has been disposed of as cream, to manufacturers of ice cream and cream cheese, both within and without the milkshed, and to cream buyers in Boston, Philadelphia, and other outside markets (appendix, tables 41 and 42). At times the sale of this cream has had a depressing effect upon cream prices in those markets. Since nearly all the surplus milk produced in the other milksheds is utilized as cream, producers' returns have been affected to some extent by this situation.

Two reasons for the greater surplus in the New York shed are fairly obvious. In the first place, this is the only one of the six northeastern milksheds in which there has been no systematic effort to level out the seasonal production of milk.⁵ In each of the others some form of basing price plan has been in effect during much of the time since 1918. Seasonal swings in production have been reduced by this means. Seasonality of production in the New York milkshed has declined slightly, but the volume for June still is nearly double that for November.

A further reason for the large surplus in the New York milkshed is the fact that its principal market, New York City, has been a

⁵ During the past two years, however, the Dairymen's League Cooperative Association has offered a premium to its members for increasing their deliveries of milk in November. *News for Farmer Cooperatives*, June 1938, p. 19.

closed cream market. Rules of the New York City Department of Health have required that all cream for table use, and milk products used in the manufacture of ice cream, meet practically the same requirements as milk for fluid use. These requirements and the fact that the New York City Department of Health has not extended inspection to plants or farms west of New York State and Pennsylvania have prevented the use of western cream to supplement the supply from local sources during seasons of shortage.⁶ Consequently, the dealers and cooperatives have maintained under city inspection a sufficient number of dairies to supply all the milk and cream necessary at all times for fluid use and for ice cream manufacture. The dairies required to supply these demands at the season when production and consumption are most nearly in balance (usually the month of November) produce much more than is needed at other times.

In each of the other important markets of the Northeastern States, western cream is admitted for use in the manufacture of ice cream and cream cheese. In all except Baltimore, Washington, and upstate cities of New York State, western cream also may be distributed for table use. Thus, in all except the New York milkshed, peak demands can be filled, and unforeseen shortages can be relieved by cream brought from outside sources. In those milksheds it is not necessary to maintain large reserve supplies, which when not required for fluid use, constitute a surplus.

Sharing of Surplus in the New York Milkshed

THE uneven distribution of surplus milk among the several milksheds is paralleled by striking differences in actual and relative quantities of surplus carried by various producer groups in the same milkshed. This is particularly true in the New York milkshed, in which the total volume of surplus is exceptionally large.

An analysis of licensed milk dealers' reports to the New York Division of Milk Control for the month of June 1934 shows a wide variation in the utilization of milk purchased. Some dealers used practically their entire supply as milk for fluid use, while others utilized all of their supply for manufacture. Since the dealers were required to pay for the milk at prices classified according to use, these differences in utilization affected directly the price returns to producers and the competitive position of dealers.

⁶ From November 2, 1937, until January 10, 1938, special permits were issued by the New York City Department of Health for importation of cream, for manufacturing purposes, from other than usual sources. This is the first time since 1925 that cream has been admitted by the Department from sources outside the regular milkshed.

With the exception of the dealers buying from the Dairymen's League Cooperative Association, each dealer paid his producers in accordance with his own utilization of milk. The Dairymen's League pools the returns from all milk sold for its members and pays a uniform price to all, subject to certain differentials for location, grade, butter-fat, and plant volume.

Insofar as the payments to producers were made by dealers in accordance with the established class prices,⁷ those dealers disposing of a large proportion of milk in fluid sales paid higher net prices to the producers than dealers disposing of a smaller proportion of milk in this form. Probably the class prices established by the New York Division of Milk Control, and effective in the month of June 1934, indicate approximately the normal differences in returns for that season of the year under New York conditions. Class prices to be paid producers for 3.5 percent Grade B milk delivered to stations in the 201-210-mile freight zone, as established by the New York Division of Milk Control, and effective June 11-30, 1934, were as follows:

1. Fluid milk.....	\$2. 45
2A. Fluid cream.....	1. 40
2B. Plain condensed milk.....	1. 40
2C. Ice cream, New York City.....	1. 40
2D. Ice cream, outside New York City.....	1. 00
2E. Cream cheese.....	. 95
3. Evaporated milk.....	1. 24
4A. Butter.....	. 85
4B. American cheese.....	. 985

TABLE 12.—ILLUSTRATION OF THE DIFFERENCES IN PRICES PAID TO PRODUCERS BECAUSE OF DIFFERENCES IN UTILIZATION BY THE DEALER

Classification	Price per 100 pounds of milk ¹	Dealer A		Dealer B	
		Percentage of total purchased	Value	Percentage of total purchased	Value
	<i>Dollars</i>	<i>Percent</i>	<i>Dollars</i>	<i>Percent</i>	<i>Dollars</i>
Class 1—Fluid milk.....	2. 45	80	1. 960	40	0. 980
Class 2A—Fluid cream.....	1. 40	10	. 140	30	. 420
Class 4A—Butter.....	. 85	10	. 085	30	. 255
Total.....		100	2. 185	100	1. 655

¹ Class prices for 3.5 percent grade B milk, 201-210-mile zone, established by the New York Division of Milk Control, effective June 11-30, 1934.

⁷ From May 1933 to March 1937 inclusive, prices to be paid by milk dealers to farmers were fixed by the New York Milk Control Board (later New York Division of Milk Control). Since July 1937, these prices have been established by conference between bargaining agencies of producers and distributors. Neither in June 1934 nor in more recent months were the established class prices adhered to by all dealers in making payments to producers.

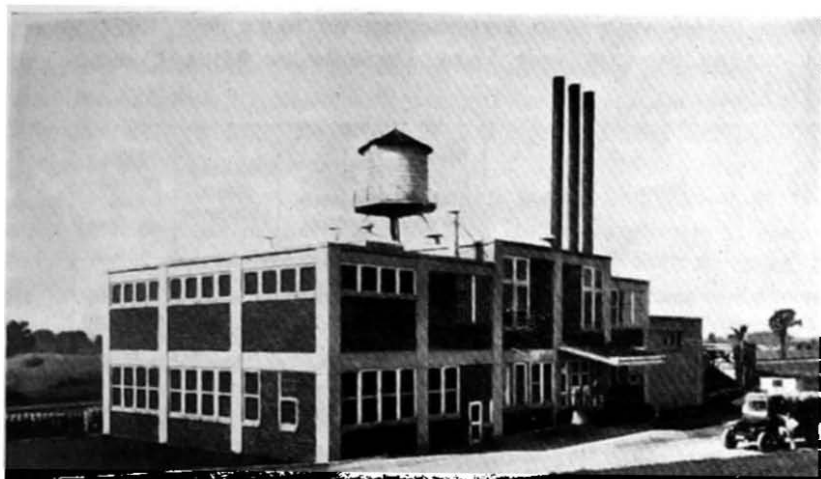


FIGURE 13.—PLANT EQUIPPED FOR CONVERTING SURPLUS MILK INTO WHOLE MILK POWDER, OR CREAM AND DRY SKIM MILK.

Such a plant requires a large investment in building and equipment.

The illustration in table 12 shows the effect of the utilization of milk on prices paid producers. Dealer A, using 80 percent of his supply in Class 1 milk and 10 percent in Class 2A and 10 percent in Class 4A, should have returned producers \$2.185 per 100 pounds for 3.5 percent Grade B milk at the 201-210-mile freight zone. Dealer B, using 40 percent of his supply in Class 1 and 30 percent in each of the other two classes, should have returned producers \$1.655, or 53 cents less than Dealer A. In many instances the prices actually paid by New York dealers were not determined entirely in accordance with the class prices established by the Division of Milk Control. However, blended prices calculated on this basis indicate the approximate differences in returns which dealers could afford to make to their producers, depending upon the manner in which their supplies were utilized. These differences in price returns for milk, depending on the method of its disposal, vary from time to time and place to place in accordance with conditions of supply and demand.

The supply of milk and cream received from producers during June, and the differences in its utilization by four groups of dealers classified by location and type of business, are shown in table 13. The 79 metropolitan distributors, as a group, were the largest dealers. Forty-six of these were small dealers who obtained their milk entirely by direct delivery from nearby farms. Nevertheless the average volume for the 79 distributors was more than 2,600 40-quart cans daily. Dealers designated as country-plant shippers handled an average of more than 700 cans of milk daily. Manufacturing dealers received about one-fourth as much cream as milk, and the combined milk

TABLE 13.—SUPPLY AND UTILIZATION OF MILK FOR 1,024 DEALERS LICENSED BY THE NEW YORK DIVISION OF MILK CONTROL, JUNE 1934

Item	Metro- politan distrib- utors ¹	Up- State distrib- utors	Country- plant shippers	Manu- factur- ing dealers	All groups
Dealers, licensed.....number.	79	820	40	85	1,024
Daily receipts per dealer...cans ²	2,664	31	739	190	275
Percentage of total supply					
Classification: ³					
1. Fluid milk.....	39.7	58.1	32.2	-----	38.2
2A. Fluid cream.....	16.1	22.8	29.9	-----	17.3
2B. Plain condensed.....	.4	.1	.5	-----	.4
2C. Ice cream, New York City.....	4.9	-----	6.9	16.8	5.4
Total premium milk....	61.1	81.0	69.5	16.8	61.3
2D. Ice cream, outside New York City.....	6.0	11.6	6.6	1.6	6.3
2E. Cream cheese.....	2.5	.2	12.7	4.9	3.5
3. Evaporated milk....	15.7	.2	1.3	19.1	13.0
4A. Butter.....	11.2	5.5	4.7	27.1	10.9
4B. American cheese.....	3.5	1.5	5.2	30.5	5.0
Total surplus milk....	38.9	19.0	30.5	83.2	38.7
All milk.....	100.0	100.0	100.0	100.0	100.0
Dollars per 100 pounds					
Blended returns: ³					
Premium milk.....	2.08	2.15	1.89	1.40	2.05
Surplus milk.....	1.05	.96	.96	.99	1.03
All milk.....	1.68	1.93	1.61	1.06	1.66

¹ The supply and utilization by metropolitan distributors is affected by including in this group the entire supply of the Dairymen's League Cooperative Association, a considerable proportion of which is disposed of in up-State markets. This was done because the available records did not permit segregation of the League operations by markets.

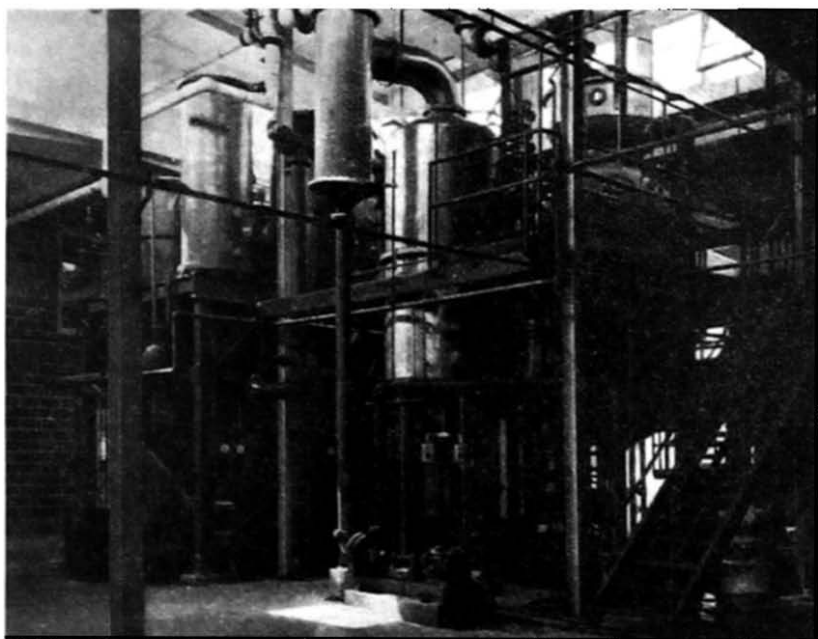
² Includes minor quantities of milk and cream purchased from dealers.

³ Milk received from producers only.

equivalent amounted to just under 200 cans a day per dealer. In this group are included a number of small dealers operating butter and cheese plants, together with several large manufacturers. Up-State distributors had the smallest average volume, with a daily average of only 31 cans per dealer.

Up-State distributors utilized a much larger proportion of their supply as fluid milk and cream than did the other groups of dealers. Of their total supply, 81 percent was disposed of as milk or cream for fluid use, while the proportion so utilized by metropolitan distributors was 56 percent, and by country plant shippers 62 percent. The manufacturing dealers had no fluid sales.

The blended returns calculated on the basis of class prices given in table 13 varied from \$1.93 per 100 pounds for milk purchased by up-State distributors to \$1.06 per 100 pounds for milk purchased by manufacturing dealers. These differences were the result both of variations in the proportions of premium milk⁸ and surplus and differences in utilization within each of these brackets. The highest returns for milk in the premium classes were realized for fluid-milk



COURTESY OF FOOD INDUSTRIES.

FIGURE 14.—INTERIOR VIEW OF A MILK BYPRODUCTS PLANT IN THE NEW YORK MILKSHED.

Numerous byproducts are made from skim milk and whey. The butterfat is marketed as cream.

⁸ "Premium milk" and "premium classes" of milk are terms here used to designate milk put to those uses for which only milk from sources under inspection by the New York City Department of Health is qualified

sales. Other premium uses returned more money than surplus milk but considerably less than fluid milk. Calculated at prices given above (p. 40), the blended price for premium milk for up-State distributors was \$2.15 per 100 pounds, for metropolitan distributors \$2.08, for country plant shippers \$1.89, and for manufacturing dealers only \$1.40.

In general, the highest returns for surplus milk were realized for that used in the manufacture of evaporated milk; the lowest returns, for milk used in the manufacture of butter. This is nearly always true. On the basis of the class prices established by the New York Division of Milk Control, the metropolitan distributors made the best use of surplus milk. The average surplus price for this group was \$1.05 per 100 pounds, while the corresponding price for manufacturing dealers was \$1, and for each of the other two groups only 96 cents.

Metropolitan Distributors

Of the 79 metropolitan distributors in this tabulation, 33 purchased milk at country plants and 46 received their supply from nearby producers. Those distributors receiving milk from nearby producers handled very small volumes in comparison with the quantities of milk purchased by the 33 who operated country plants (table 14). The distributors receiving their supply from nearby producers handled no surplus milk. Ninety-six percent of their milk was sold for fluid use, and 4 percent for use as fluid cream.

The Dairymen's League Cooperative Association, which operates several distribution branches in New York City, and the Sheffield Farms Co. were the two largest metropolitan distributors buying milk



FIGURE 15.—EVAPORATED MILK PLANT IN NORTHERN NEW YORK.

This plant is under New York City inspection, and ships cream or milk when supplies from regular shipping plants are inadequate for market needs.

directly from producers. During the month of June 1934, the Dairy-
men's League marketed an average of 113,000 cans of milk daily
(table 15). The Sheffield Farms Co. purchased about 60,000 cans of
milk per day, including small quantities of milk and cream from other
dealers. Thirty-one other metropolitan distributors who operate
country plants purchased about 1,300 cans of milk per day, most of
which was received from producers at their own country plants.

TABLE 14.—SUPPLY AND UTILIZATION OF MILK IN JUNE 1934 FOR 79
METROPOLITAN DISTRIBUTORS

Item	Dealers operating country plants	Dealers supplied by nearby producers	Total or average
Dealers licensed.....number	33	46	79
Daily receipts per dealer.....cans	6, 351	20	2, 664
Classification: ¹	Percentage of total receipts		
1. Fluid milk.....	39.4	96.1	39.7
2A. Fluid cream.....	16.2	3.9	16.1
2B. Plain condensed.....	.4	-----	.4
2C. Ice cream, New York City.....	5.0	-----	4.9
Total premium milk.....	61.0	100.0	61.1
2D. Ice cream, outside New York City.....	6.0	-----	6.0
2E. Cream cheese.....	2.5	-----	2.5
3. Evaporated milk.....	15.7	-----	15.7
4A. Butter.....	11.3	-----	11.2
4B. American cheese.....	3.5	-----	3.5
Total surplus milk.....	39.0	-----	38.9
All milk.....	100.0	100.0	100.0
Blended returns: ²	Dollars per 100 pounds		
Premium milk.....	2.08	2.41	2.08
Surplus milk.....	1.05	-----	1.05
All milk.....	1.68	2.41	1.68

¹ Milk received from producers only.

² Class prices for 3.5 percent grade B milk, 201-210-mile zone, weighted by utilization.

TABLE 15.—SUPPLY AND UTILIZATION OF MILK HANDLED BY THE DAIRYMEN'S LEAGUE COOPERATIVE ASSOCIATION, INC., SHEFFIELD FARMS CO., INC., AND 31 OTHER METROPOLITAN DISTRIBUTORS OPERATING COUNTRY PLANTS, JUNE 1934

Item	Dairy- men's League	Shef- field Farms	Other distrib- utors	Total or average
Firms reporting.....number.....	1	1	31	33
Daily receipts per firm.....cans.....	112, 882	59, 839	1, 272	6, 420
Percentage of total supply				
Classification: ¹				
1. Fluid milk.....	37.1	39.8	45.6	39.4
2A. Fluid cream.....	15.2	13.7	23.1	16.2
2B. Plain condensed.....	.7		.1	.4
2C. Ice cream, New York City.....	6.8		7.2	5.0
Total premium milk.....	59.8	53.5	76.0	61.0
2D. Ice cream, outside New York City.....	7.4	.1	11.1	6.0
2E. Cream cheese.....	3.6	1.4	1.2	2.5
3. Evaporated milk.....	14.8	26.9	.9	15.7
4A. Butter.....	13.4	10.1	6.7	11.3
4B. American cheese.....	1.0	8.0	4.1	3.5
Total surplus milk.....	40.2	46.5	24.0	39.0
All milk.....	100.0	100.0	100.0	100.0
Dollars per 100 pounds				
Blended returns: ²				
Premium milk.....	2.05	2.18	2.03	2.08
Surplus milk.....	1.03	1.10	.96	1.05
All milk.....	1.64	1.68	1.77	1.68

¹ Milk received from producers only.

² Class prices for 3.5 percent grade B milk, 201-210-mile zone, weighted by utilization.

Both the Dairymen's League and the Sheffield Farms Co. utilized a smaller proportion of their total supply as fluid milk and cream than did the 31 other metropolitan distributors included in this tabulation. The 31 other metropolitan distributors utilized a particularly large proportion of their supply as fluid cream. Undoubtedly these dis-

tributors supplied cream to other dealers who made no purchases directly from producers.

Nearly half of the milk used in surplus milk classes by the 31 distributors other than Dairymen's League and Sheffield Farms Co. was disposed of for use in ice cream sold outside of the metropolitan market. According to prices established by the New York State Division of Milk Control, this use returned 24 cents less per hundredweight than milk used in the manufacture of evaporated milk. More than half the surplus of the Sheffield Farms Co. and more than one-third the surplus of the Dairymen's League was utilized in the manufacture of evaporated milk.

The blended return for all milk for the 31 distributors was 9 cents higher than for Sheffield Farms Co. and 13 cents higher than for the Dairymen's League Cooperative Association. In that month the Dairymen's League had the least favorable utilization of milk, both in the premium classes and in the surplus classes.

When the metropolitan distributors other than Sheffield Farms Co. and the Dairymen's League Cooperative Association were subgrouped by volume of business, it was found that the larger distributors had more surplus in proportion to their fluid sales. The metropolitan distributors selling less than 1.5 million pounds of milk in the form of milk and cream during June utilized 88 percent of their supply in the premium milk classes (table 16). Those whose fluid sales were more than 3 million pounds disposed of only 73 percent in the premium classes. The blended return for the small distributors was \$1.91 per hundred pounds; and for the large distributors was \$1.73, a difference of 18 cents. This difference was due almost entirely to differences in the proportionate shares of surplus milk; the blended returns for premium milk and for surplus milk were approximately the same for both groups of dealers.

Up-State Distributors

Of the 820 up-State distributors buying directly from producers, six were operating country plants. All the country plant operators were relatively large dealers whose receipts of milk during June 1934 averaged more than 1,200 forty-quart cans a day. The average volume for distributors not operating country plants was only 25 cans a day (table 17). Of the total supply of the distributors not operating country plants, 96 percent came directly from producers. Dealers operating country plants obtained 75 percent of their total supply directly from producers and the remainder from other plants.

Nearly two-thirds of the supply of the distributors not operating country plants was sold for use as fluid milk, compared with one-fourth so utilized by country plant operators. The latter distributors

TABLE 16.—RELATION OF VOLUME TO UTILIZATION OF MILK FOR 31 INDEPENDENT METROPOLITAN DISTRIBUTORS OPERATING COUNTRY PLANTS, JUNE 1934

Item	Milk equivalent of milk and cream sold			
	Less than 1.5 million pounds	1.5 to 2.9 million pounds	3 million or more pounds	All groups
Dealers licensed.....number.....	9	13	9	31
Daily receipts per dealer.....cans.....	379	1, 086	2, 433	1, 272
Percentage of total supply				
Classification: ¹				
1. Fluid milk.....	54.2	46.9	43.4	45.0
2A. Fluid cream.....	21.4	29.5	19.6	23.1
2B. Plain condensed.....		.2		.1
2C. Ice cream, New York City.....	12.7	1.6	9.6	7.2
Total premium milk.....	88.3	78.2	72.6	76.0
2D. Ice cream, outside New York City.....	3.3	11.1	12.3	11.1
2E. Cream cheese.....	4.5	.7	.9	1.2
3. Evaporated milk.....		2.7		.9
4A. Butter.....	3.4	4.0	8.9	6.7
4B. American cheese.....	.5	3.3	5.3	4.1
Total surplus milk.....	11.7	21.8	27.4	24.0
All milk.....	100.0	100.0	100.0	100.0
Dollars per 100 pounds				
Blended returns: ²				
Premium milk.....	2.04	2.03	2.03	2.03
Surplus milk.....	.94	1.00	.95	.96
All milk.....	1.91	1.80	1.73	1.77

¹ Milk received from producers, only.

² Class prices for 3.5 percent grade B milk, 201-210-mile zone, weighted by utilization.

used 41 percent of their supply as fluid cream and 36 percent in the surplus classes, largely for ice cream. The much higher proportion of surplus carried by the dealers with country plants brought their blended returns more than 50 cents per hundredweight below those

TABLE 17.—SUPPLY AND UTILIZATION OF MILK FOR 820 UP-STATE DISTRIBUTORS BUYING MILK FROM INDEPENDENT PRODUCERS, JUNE 1934

Item	Dealers operating country plants	Dealers not operating country plants	Total or average
Dealers licensed.....number	6	814	820
Daily receipts per dealer.....cans	1, 228	25	34
Percentage of total supply			
Classification: ¹			
1. Fluid milk.....	23.1	66.2	58.1
2A. Fluid cream.....	41.0	18.5	22.8
2B. Plain condensed.....	.2		.1
2C. Ice cream, New York City.....			
Total premium milk.....	64.3	84.7	81.0
2D. Ice cream, outside New York City.....	33.4	6.3	11.6
2E. Cream cheese.....		.2	.2
3. Evaporated milk.....		.3	.2
4A. Butter.....	2.3	6.5	5.5
4B. American cheese.....		2.0	1.5
Total surplus milk.....	35.7	15.3	19.0
All milk.....	100.0	100.0	100.0
Dollars per 100 pounds			
Blended returns: ²			
Premium milk.....	1.78	2.22	2.15
Surplus milk.....	.99	.94	.96
All milk.....	1.50	2.03	1.93

¹ Milk received from producers, only.

² Class prices for 3.5 percent grade B milk, 201-210-mile zone, weighted by utilization.

for the small dealers without such plants, although the latter group made less favorable use of the surplus which they had.

The up-State distributors not operating country plants were sub-grouped by volume of business as measured by the amount of fluid sales of milk and cream. There were 684 distributors with fluid sales of less than 75,000 pounds for the month; 113 with fluid sales of more than 75,000 but less than 300,000 pounds; and 17 with fluid

sales of more than 300,000 pounds (table 18). The proportion of surplus increased with the volume of fluid sales, the smaller distributors utilizing only 5 percent of their supply in the surplus classes, as compared with 23 percent so utilized by the largest dealers. Not only were the fluid sales of the larger distributors a smaller proportion of their total supply, but of their fluid sales a smaller proportion was

TABLE 18.—RELATION OF VOLUME TO UTILIZATION OF MILK FOR 814 DISTRIBUTORS IN UP-STATE MARKETS BUYING FROM INDEPENDENT PRODUCERS AT CITY PLANTS, JUNE 1934

Item	Milk equivalent of milk and cream sold			
	less than 75,000 pounds	75,000 to 299,999 pounds	300,000 or more pounds	All groups
Dealers licensed..... number	684	113	17	814
Daily receipts per dealer..... cans	11	63	327	25
Percentage of total supply				
Classification: ¹				
1. Fluid milk.....	79.1	63.0	52.5	66.2
2A. Fluid cream.....	16.1	16.6	24.2	18.5
2B. Plain condensed.....		.1		
2C. Ice cream, New York City.....				
Total premium milk.....	95.2	79.7	76.7	84.7
2D. Ice cream, outside New York City.....	1.3	8.3	10.5	6.3
2E. Cream cheese.....			.8	.2
3. Evaporated milk.....	.1	.3	.7	.3
4A. Butter.....	3.3	10.9	5.3	6.5
4B. American cheese.....	.1	.8	6.0	2.0
Total surplus milk.....	4.8	20.3	23.3	15.3
All milk.....	100.0	100.0	100.0	100.0
Dollars per 100 pounds				
Blended returns: ²				
Premium milk.....	2.27	2.23	2.12	2.22
Surplus milk.....	.90	.92	.97	.94
All milk.....	2.21	1.96	1.85	2.02

¹ Milk received from producers, only.

² Class prices for 3.5 percent grade B milk, 201-210-mile zone, weighted by utilization.

fluid milk, and a larger proportion was fluid cream. Many of the small distributors buy cream from other dealers.

The blended return for the smallest distributors was \$2.21 per 100 pounds; and for the largest distributors, \$1.85; a difference of 36 cents. However, the largest distributors in the up-State cities made the best use of surplus milk. The blended return for surplus for this group was 97 cents per 100 pounds, compared with 90 cents for the group of smallest distributors.

Country-Plant Shippers

Only two of the country plant shippers buying from independent producers during June 1934 handled more than 5 million pounds of milk, including the milk equivalent of cream (table 19). Twenty had between 1 and 5 million, and 18 had less than 1 million pounds. The smallest shippers handled proportionately the least surplus, and the largest shippers the most. Country plant shippers, particularly the larger ones, ship fluid cream to independent distributors who obtain their fluid-milk supplies directly from producers. The two groups of larger dealers reported that 6 and 14 percent respectively of their receipts from producers were utilized in ice cream for sale in New York City.

The blended return for all milk was 23 cents more per hundred pounds in the case of the smallest shippers than it was for the group of largest shippers. In this instance the smaller dealers also made more favorable use of surplus milk than the larger ones.

Significant Trends and Relationships

The foregoing data show that the Dairymen's League has been caring for much more than its share of the surplus in the New York milkshed. It is further indicated that a major part of the surplus which, in the previous section, was credited to independent groups, has been handled by the Sheffield Farms Co. In June 1934, this company had as large a surplus in proportion to fluid sales as the Dairymen's League.

During the last 2 years, however, the Sheffield Farms Co. has taken definite steps to reduce its surplus volume. Several country plants in southwestern New York and in northern New York have been sold or leased to other dealers. In addition, a number of plants formerly operated by this company in northern New York have been leased to a subsidiary company which is concerned chiefly with manufacturing evaporated milk and other milk products. The effect of this arrangement was to eliminate a large number of dairymen from participation in the Sheffield blended price. These changes, together with the curtailment of milk receipts due to a farmers' strike, have greatly reduced Sheffield's surplus in recent months.

TABLE 19.—RELATION OF VOLUME TO UTILIZATION OF MILK FOR 40 COUNTRY PLANT SHIPPERS BUYING FROM INDEPENDENT PRODUCERS, JUNE 1934

Item	Milk equivalent of total supply			
	Less than 1.0 million pounds	1.0 to 4.9 million pounds	5.0 million or more pounds	All groups
Dealers licensed.....number	18	20	2	40
Daily receipts per dealer.....cans.	234	975	3, 245	755
	Percentage of total supply			
Classification: ¹				
1. Fluid milk.....	45.4	31.4	26.3	32.3
2A. Fluid cream.....	27.7	31.3	27.1	29.8
2B. Plain condensed.....		.7		.5
2C. Ice cream, New York City.....		5.8	14.4	6.9
Total premium milk.....	73.1	69.2	67.8	69.5
2D. Ice cream, outside New York City.....	17.0	6.4	.4	0.6
2E. Cream cheese.....	3.7	10.2	25.9	12.7
3. Evaporated milk.....	.4	1.9		1.3
4A. Butter.....	2.9	5.7	3.2	4.7
4B. American cheese.....	2.9	6.6	2.7	5.2
Total surplus milk.....	26.9	30.8	32.2	30.5
All milk.....	100.0	100.0	100.0	100.0
	Dollars per 100 pounds			
Blended returns: ²				
Premium milk.....	2.05	1.88	1.81	1.89
Surplus milk.....	.98	.97	.94	.96
All milk.....	1.76	1.60	1.53	1.61

¹ Milk received from producers, only.

² Class prices for 3.5 percent grade B milk, 201-210-mile zone, weighted by utilization.

The data presented in this section also confirm the fact that, in general, distributors in the secondary markets carry much less surplus than those operating in the primary (metropolitan) markets. This explains why the surplus problem has appeared to be more serious

in the very large markets than in the smaller ones. One reason for the smaller June surpluses of distributors in the up-State markets in New York is the fact that the production of milk for these markets is more nearly uniform throughout the year. Another reason is the fact that it has been permissible to use cream from uninspected sources in the manufacture of ice cream for these cities, thereby reducing the amount of reserve milk supply that it was necessary to maintain for emergencies.

Even more significant is the tendency shown by these data for the amount of surplus in proportion to fluid sales to increase with the size of the dealer's business (as measured by volume of fluid sales). This tendency shows itself very definitely in each of three groups of dealers; namely, metropolitan distributors, up-State distributors, and country plant shippers. There are two obvious reasons for this relationship: In the first place, the larger dealers require relatively larger reserve supplies for protection against a possible shortage. If a dealer selling the equivalent of 200 40-quart cans of milk a day should suddenly find himself 10 percent short, he would have the relatively simple task of locating and purchasing 20 cans of extra milk for the emergency. It would be much more difficult for a 5,000-can dealer to obtain 500 cans of extra milk to meet a similar emergency.

The second reason why the larger dealers carry relatively greater surpluses is that they are able to process the milk and market the resulting products more efficiently. It is not economical to ship surplus milk long distances to city plants for processing. Consequently, distributors in a large metropolitan market, who do not have country plants, cannot handle much surplus. This includes practically all metropolitan distributors handling less than 1,000 cans of milk daily.

It is significant in this connection that the larger dealers in the New York milkshed were utilizing relatively more of the surplus in ways that yielded the higher returns. While the data presented here pertain to a single month, it is believed that this relationship is not at all unusual. The fact that large aggregations of capital and large volumes of milk per plant are essential for economical production of evaporated milk, for example, is an important limitation on the output of this commodity. Due largely to this limitation of output, as compared with American cheese or creamery butter, evaporated milk normally yields higher returns for surplus than the uses open to the smaller dealers.

Large dealers or cooperatives also have an advantage over the smaller ones, in handling surplus milk, in that they can maintain specialized manufacturing plants and can operate these plants at or near full capacity during several months of the year. For the smaller dealers who have only one or two country plants this is impractical.

A large volume of business also makes it possible to maintain more effective sales and research organizations for products manufactured from surplus milk.

As a result of these conditions, it follows that the smaller dealers do not attempt to compete with the larger ones in handling surplus milk.

Differences in the utilization of milk by various dealers and cooperatives in the New York milkshed during the month of June have been responsible for inequalities of as much as 50 cents per hundredweight in their blended returns as calculated on the basis of uniform prices for each class of milk. Lesser inequalities have resulted in months when the surplus is smaller. It has not been determined definitely how the low-surplus dealers dispose of the extra income which they seem to obtain for a given quantity of milk. But some knowledge of this matter is essential to a wise choice of measures for dealing with the problem of surplus milk.

There are four possible ways in which this apparent extra income may be dissipated: (1) In higher prices paid to producers; (2) in lower selling prices; (3) in higher costs of operation; (4) in larger profits of dealers.

The records of prices paid by dealers in the New York milkshed indicate that, in general, the dealers with small surpluses have paid more than the Dairymen's League, which, during most of the time in the past 16 years, has had the largest proportion of surplus milk. However, the prices paid by dealers with small surpluses generally have been about the same or only slightly higher than the prices paid by the Sheffield Farms Co.,⁹ which for a number of years has had a high proportion of surplus (table 20).

The available information on selling prices and relative surpluses of various milk dealers is inadequate to show conclusively whether these two items are related—that is, whether the dealers with small surpluses sell milk at lower prices. There are some instances, at least, where this is true. In the large markets, such as New York City, the smaller dealers (who also have relatively small surpluses) have generally sold milk to wholesale customers at lower prices than those charged by the largest distributors. For several years, milk of unadvertised brands has been sold to stores and out of stores in New York City, for 1 or 2

⁹ From May 1933 to March 1937, inclusive, orders of the New York Milk Control Board required dealers to pay uniform classified prices for all milk purchased in New York State. During the first year or two of this price control, differences in prices paid to farmers approximated the differences in blended returns as computed here. Later the smaller dealers resumed their former practice of paying flat prices approximately equal to the blended price paid by the Sheffield Farms Co.

TABLE 20.—NET PRICES PAID PRODUCERS BY VARIOUS DEALERS AND COOPERATIVES IN THE NEW YORK MILKSHED FOR 3.5 PERCENT MILK, 201-210-MILE FREIGHT-ZONE BASIS, MONTH OF JUNE 1931-37

	1931	1932	1933	1934	1935	1936	1937
Dairymen's League ¹	\$1. 40	\$0. 96	\$1. 26	\$1. 45	\$1. 46	\$1. 55	\$1. 40
Sheffield Farms.....	1. 63	1. 08	1. 38	1. 575	1. 45	1. 585	1. 40
Renken Dairy.....	1. 62	1. 11	1. 455	1. 535	1. 65	1. 58	1. 43
Queensboro Farm Products.....	1. 35	1. 07	1. 70	1. 45	1. 44	1. 62	1. 42
Dellwood Dairy.....				1. 865	1. 67	1. 60	1. 45
12 other firms:							
Average.....	1. 38	1. 04	1. 43	1. 53	1. 44	1. 55	1. 41
Highest.....	1. 63	1. 085	1. 77	2. 15	1. 61	1. 625	1. 53
Lowest.....	1. 015	. 92	1. 035	1. 22	1. 325	1. 435	1. 355

¹ Includes average rate of extra payments for nearness to market and plant volume.

cents a quart less than milk that was put out under the labels of the large well-known dealers.¹⁰ Provision for a differential of 1 cent a quart based on whether or not the milk was sold under a well-known trade name was written into the milk control law of New York in 1933. All the well-known trade names recognized under this provision belonged to the larger dealers and the Dairymen's League, who were carrying most of the surplus milk.

To some extent the more general price concessions by the small dealers have resulted from their advantages in buying milk. However, it has been demonstrated that a large proportion of the consumers in New York City will buy milk of the well-known brands in preference to milk of the same official grade, even when the latter is offered at a 1-cent lower price.

In general, the smaller dealers (who also have less surplus milk) sell relatively less milk of special grades at premium prices, and relatively less cream for table use than is true of the large distributors. This tends to reduce the average profit margin of the smaller dealers.

The results of various studies of the costs of processing and distributing milk indicate that small milk dealers generally pay lower salaries and wages, work longer hours, economize on maintenance of buildings and equipment and on quality control, but handle fewer quarts of milk per man and per dollar of investment.¹¹ There are so many

¹⁰ Report of Joint Legislative Committee to Investigate the Milk Industry in New York. Legislative Document No. 114 (1933), pp. 253-261.

¹¹ A Survey of Milk Marketing in Milwaukee. Agricultural Adjustment Administration, 1937.

differences in type of business or service, and in conditions under which various milk dealers operate, that it is difficult to make accurate comparisons of unit costs. Usually the costs of processing milk are lower in large plants than in small ones.¹² In New York City, milk is distributed at a lower cost per quart from larger distributing plants or sales branches.¹³ In general, the small plants with higher costs are operated by small-volume, small-surplus dealers. A recent investigation in the Boston market revealed that retail deliveries were made at lower cost per quart by small dealers.¹⁴ This was explained by the fact that the small dealers paid much lower wages to their delivery men. The small dealers had higher than average costs for city plant operation and wholesale delivery.

Evidence is lacking as to whether any of the extra income received by dealers who enjoyed an especially favorable utilization of milk has been retained by them as extraordinary profits. Considering the competitive nature of the milk business in most cities, and the rapid turn-over among small distributors, there is only a remote possibility that small-surplus dealers could enjoy more than normal profits over a period of time.

The fact is that differences in the utilization of milk by various dealers, and differences of income resulting therefrom, are one of many variable factors that have entered into the development of competing business units in this field. If equality in respect to one or more of these important factors of income or expense were enforced among the milk dealers of any large city, there is a strong probability that many of them would be forced out of business. Many dealers and cooperatives now engaged in marketing milk owe their existence to the inequalities in utilization, in selling prices, wage rates, or other conditions. It is not unlikely that enforcement of uniform buying prices and equal sharing of surplus in any of the large milksheds would eliminate fully half the dealers and cooperatives in a few years' time.

¹² *Costs of Handling Fluid Milk and Cream in Country Plants.* Cornell University Experiment Station Bull. 473, by O. K. Tucker, 1925; also *Milk Marketing in Pennsylvania—Shipping Station Operations.* Pennsylvania State College Agricultural Experiment Station Bull. 219, by R. W. Hartlett, 1926.

¹³ *An Economic Study of the Cost of Selling and Delivering Milk in the New York Market,* by C. J. Blanford. Cornell University Experiment Station Bull. 666, 1936.

¹⁴ *Summary Report on Cost of Distributing Milk in the Boston Market,* prepared by Charles F. Hittenshouse & Co. for the Massachusetts Milk Control Board, 1936.

Part II. Western Cream

WHILE in this report chief consideration is given to the utilization of milk and cream produced in the Northeastern States, supplies coming to the eastern markets from outside sources should not be ignored. Those supplies compete with the milk and cream produced locally and help to determine its price. Changes in the price, the volume, and the quality of outside supplies also affect the amount and the uses of surplus milk in these northeastern milksheds.

In the terminal markets a can of cream usually has from four to six times the value of a can of milk, yet the transportation charge for an equal distance is only one-fourth greater. Cream is much less bulky than whole milk; that is, it occupies less space and weighs less per unit of value. Cream for shipment usually contains 40 percent butterfat, or 33 pounds of butterfat per 40-quart can. From 10 to 11 cans of ordinary milk are required to supply the fat contained in 1 can of cream. Consequently the supply areas for market cream are in general more extensive than those for milk.

Development of Trade in Western Cream

NOT until the early 1920's was there any need or inducement for the eastern cities to go farther for cream than the outskirts of their milk-shipping zones. In the decade following the World War, however, there was a remarkable increase in the demand for fluid milk and cream. Milk production in the dairy States of the Northeast did not keep pace with this demand. The quantity of milk produced on farms in the 11 Northeastern States in 1929 was only 5 percent greater than the production in 1919.

A low point in the cycle of cow numbers occurred in 1927. During this period market milk dealers and cooperatives rapidly took over the adjacent territory which had been occupied previously by condenseries, or cheese and butter factories. They expanded also into the Canadian Provinces of Ontario and Quebec, whose shipments of cream and milk to United States markets showed a striking increase up to 1926. In that year more strict sanitary regulations were adopted for dairies and dairy plants exporting milk or cream to the United States. Three years later the import duties were increased by 50 percent, and still higher rates were established in 1930. As a result of these changes the eastern markets became more attractive outlets for cream produced in the central western dairy regions.

Cream shipped from plants in the Central West has been an important factor on the larger eastern markets since about 1924. During the year ending April 1925, records obtained from two railroad companies showed shipments of cream from several States west of New York and Pennsylvania to the New York market, amounting to 172,000 cans of 40 quarts each.¹⁵ These shipments were equivalent to 14 percent of all cream received at the New York market during that period.

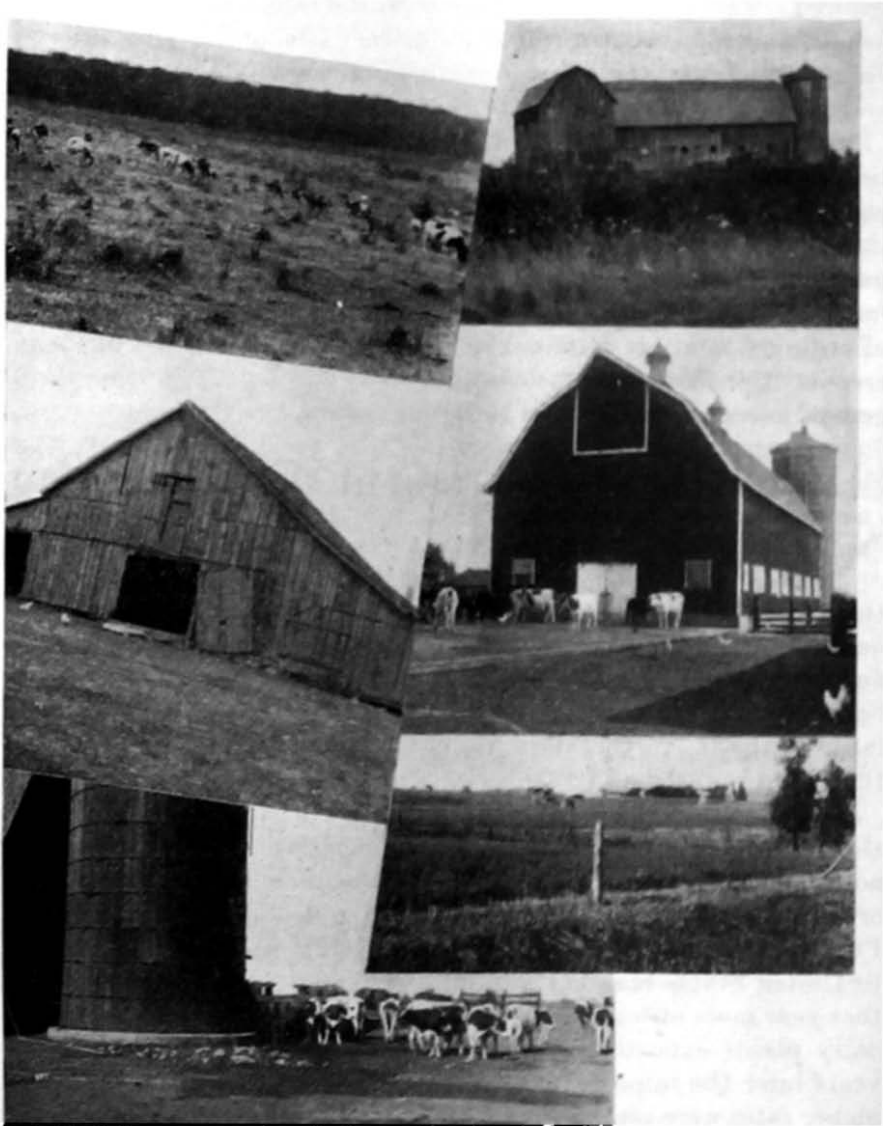


FIGURE 16.—FARM SCENES IN THE WESTERN-CREAM TERRITORY.

In many localities dairying is a minor enterprise on the farms.

¹⁵ Farm Economics, New York State College of Agriculture, December 1925, page 308.

In the months from November to February, inclusive, western cream constituted 29 to 39 percent of the total cream receipts. Later, shipments of western cream to the New York market were curtailed drastically as the result of regulations enforced by the New York City Department of Health. Cream receipts by States of origin at all three of the principal eastern markets were first reported by the Bureau of Agricultural Economics in 1931. In that year the receipts of western cream amounted to 441,000 cans, or 15.7 percent of the total receipts of cream from all sources. During 1937 these markets received 377,000 cans, or practically the same percentage of their total cream supply, from the Central West (table 21).

Reports of shipments of western cream handled by all interested railroad lines showed the total volume of such traffic to be 618,000 cans in the 12 months ending June 1933; and 694,000 cans during

CREAM SHIPPED TO EASTERN MARKETS
SEPTEMBER 1935 - AUGUST 1936
 (Thousands of 40-quart cans)

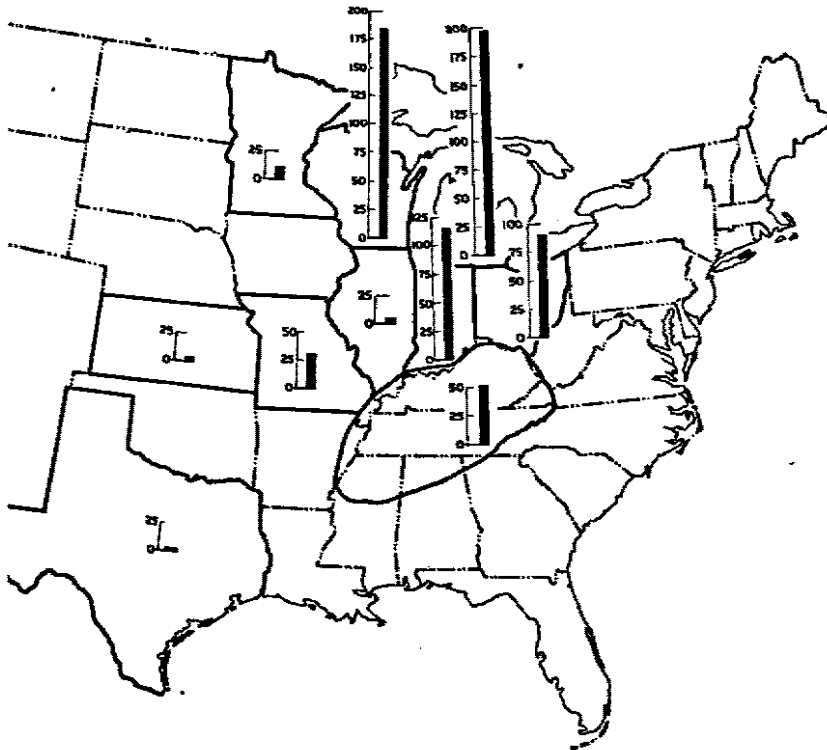


FIGURE 17.

Cream for eastern markets originated in 12 dairy States of the Central West, a high proportion of the total coming from Michigan, Wisconsin, Indiana, and Ohio.

TABLE 21.—RECEIPTS OF WESTERN CREAM AT BOSTON, NEW YORK, AND PHILADELPHIA, 1931 AND 1937

Market	Quantity received		Percentage of total cream receipts	
	1931	Year ending October 1937	1931	Year ending October 1937
	<i>1,000 40-quart cans</i>	<i>1,000 40-quart cans</i>	<i>Percent</i>	<i>Percent</i>
a Boston.....	164	244	27.8	42.3
New York.....	49	55	2.6	3.5
Philadelphia.....	228	78	68.3	34.3
Total.....	441	377	15.7	15.8

TABLE 22.—SHIPMENTS OF WESTERN CREAM TO EASTERN MARKET AREAS, FOR 12-MONTH PERIODS ENDING JUNE 1933 AND AUGUST 1936

Market area	Shipments during 12-month period—	
	Ending June 1933	Ending August 1936
	<i>1,000 40-quart cans</i>	<i>1,000 40-quart cans</i>
Boston metropolitan area.....	210	176
Upper New England.....	10	24
Connecticut.....	23	46
Rhode Island.....	22	2
New York metropolitan area.....	102	90
Up-State New York.....	52	87
Philadelphia metropolitan area.....	151	138
Other New Jersey.....	4	6
Other Pennsylvania.....	20	16
Maryland.....	6	36
Delaware.....	5	16
Washington metropolitan area.....	10	37
Other Virginia.....	3	20
Total.....	618	694

the 12 months ending August 1936 (table 22). The latter volume represents a quantity greater than the total volume of milk sold in 1 year from all the farms in Maryland and Delaware, or in Maine and New Hampshire. During the year ending August 1936, cream originating in 12 Midwestern States was shipped to more than 50 destinations in the Northeastern States. In the table these are grouped into certain districts which are significant particularly with respect to differences in sanitary regulations. It will be noted that the three principal markets received less than 60 percent of total shipments. The remaining 40 percent, plus some that was redistributed from the metropolitan areas, was used in the smaller cities and towns throughout this territory.

Quality Requirements of Eastern Cream Markets

MANUFACTURERS of ice cream and cream cheese have been the principal buyers of western cream. The quality requirements for cream for these uses are less exacting than those of cream for table use. Good body and flavor, as well as low acidity and bacteria count in the cream, are of much greater importance in marketing cream for table use than cream for manufacture. Of course, there are wide differences in the requirements of individual buyers, among both manufacturers and distributors. Most of the municipal and State health authorities also have been less particular about the sanitary quality of cream used in manufactured dairy products. Prior to 1933 little of the western cream received at eastern markets was acceptable to the more exacting distributors of milk and cream. Although there has been much improvement in the quality of western cream since then most of the large fluid-milk and cream distributors show a preference for cream produced locally, under close supervision.

The policies of municipal and State health authorities with respect to cream have varied from exclusion by the city of New York of all cream produced outside the local milkshed, to almost complete noninterference by the city of Boston. On middle ground are the State of Pennsylvania, the city of Newark, N. J., and others, which grant permits to shippers who comply with certain requirements as determined by periodic inspections of plants and dairies. Another group of cities, including Baltimore, Washington, and up-State cities in New York State, while maintaining very strict requirements for table cream, admit cream for manufacture with comparatively little regulation of sources. During the last few years there has been a general tightening of requirements.

Many of the western cream plants have been working on extensive improvement programs, preparing both plants and farms to meet



FIGURE 18.—FACILITIES FOR HANDLING AND COOLING MILK ON MIDWESTERN FARMS.

Milk houses that meet the requirements of eastern health officials are rapidly taking the place of outside water tanks for cooling and storing milk at the farm.

inspection, particularly for the important cream markets in Pennsylvania and New Jersey. Large sums have been spent for remodeling of plants. A number of the dealers have financed the construction of milk houses and the remodeling of stables—the cost to be refunded by deductions from milk checks, and these deductions offset in part, or even wholly, by premiums for inspected milk. (See fig. 18.) Several of the plants employed men to supervise improvements on the farms, supplied materials at wholesale prices, and in some instances had crews of men do the work at cost. One of the largest shippers has built an entirely new plant designed to meet all eastern requirements and has succeeded in getting dairies of a large number of its patrons ready for inspection. The milk from these patrons now is received and handled in this auxiliary plant. At several other plants trucks with inclosed insulated bodies are being used to collect milk from the farms (fig. 19).

At present there is a great range in sanitary standards of the various plants. In some cases these standards remain at the usual level for dairy manufacturing plants, and certain markets remain open to them without inspection. On the other hand, a few plants and the farms which furnish their supplies compare favorably with grade-A plants

and dairies in the East. In general, the conditions which make for cream of high quality are being established rapidly in the western territory, and an increasing proportion of the supply from that area meets the more exacting requirements for table cream.

Differences in sanitary regulations of the various inspection agencies for the eastern markets, also the insistence by some officials upon

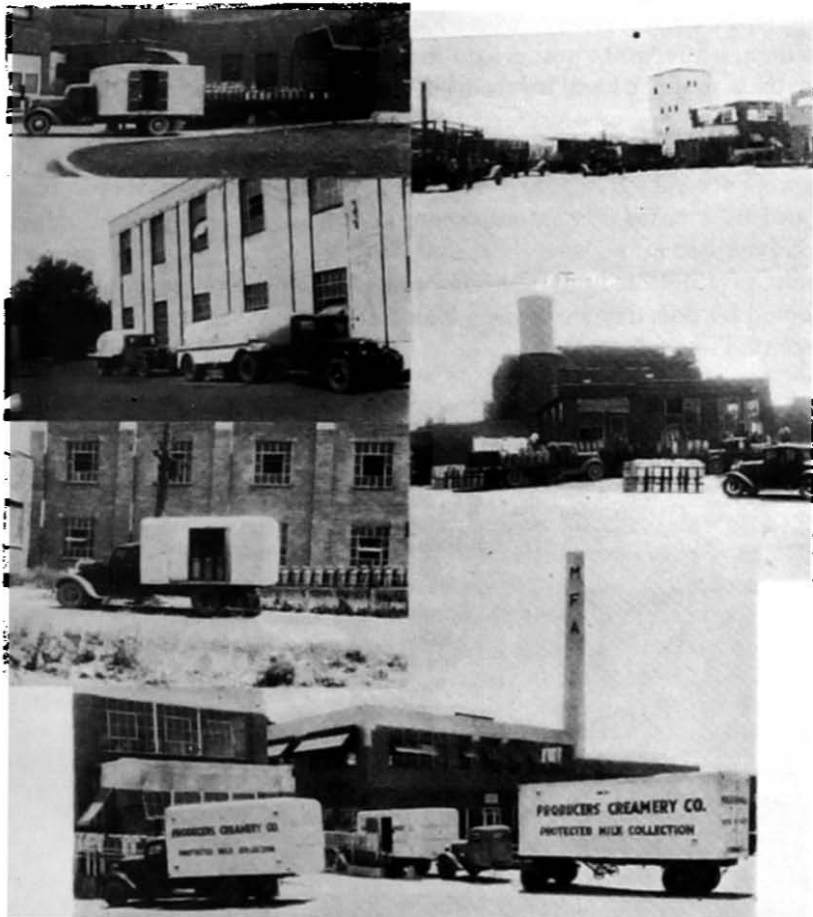


FIGURE 19.—TYPES OF TRUCKS USED FOR COLLECTING MILK FROM THE FARMS AND HAULING IT TO MIDWESTERN CREAM PLANTS.

Trucks with enclosed insulated bodies are rapidly becoming standard equipment. Tank trucks are generally used for interplant hauling.

unreasonable expenditures for reconstruction of buildings and replacement of equipment, are serious problems for the shippers. Harmony in sanitary requirements is more important in reference to western cream plants than for eastern milk plants, because the former are called upon to serve so many markets.

Seasonal Variation in Shipments

WESTERN cream is definitely supplementary to the cream supplies available in the several milksheds of the Northeastern States. When large quantities of surplus milk appear in these eastern milksheds, the price of cream usually drops to a point where the western shippers find other outlets more profitable and cut down their shipments. Conversely, when local supplies are inadequate to meet the demand for milk and cream in these eastern markets, cream prices rise to a point where this outlet becomes attractive to the western plants, and their cream shipments increase.

Under these circumstances the shipments of western cream to eastern markets are very irregular. As a rule, the eastern markets receive the largest quantities of western cream at the time of short local supplies in November and December, and during July and August when ice-cream production is at the seasonal peak and the local milk flow is affected by hot, dry weather. These tendencies are shown by the data presented in table 23.

TABLE 23.—SEASONAL VARIATION IN SHIPMENTS OF WESTERN CREAM TO EASTERN MARKETS

Month	Total shipments ¹ as a percentage of the monthly average for—		Receipts at Boston as a percentage of—	
	Year ending December 1933	Year ending August 1936	Monthly average 1933-37	Total cream receipts 1933-37
January.....	69	90	91	39
February.....	102	90	102	46
March.....	87	117	90	33
April.....	98	101	63	22
May.....	128	124	88	24
June.....	112	100	52	15
July.....	136	139	124	35
August.....	214	137	172	51
September.....	99	30	91	24
October.....	51	44	58	24
November.....	51	127	152	58
December.....	53	99	118	48
Total for year.....	100	100	100	35

¹ As reported by railroads.

Sources of Western Cream

RECORDS of shipments of fresh cream during the 12 months ending with August 1936 show that varying quantities originated at 75 shipping points in 12 States, extending from Ohio and Indiana southwest through Kentucky and Tennessee to Mississippi, Texas, Kansas, and Missouri; and from Michigan west to Minnesota, including Wisconsin and Illinois. Michigan, Wisconsin, and Indiana supplied between 100,000 and 200,000 cans each (fig. 17). During the year mentioned, shipments of fresh cream to eastern markets were reported from 30 stations in Wisconsin and from 13 stations in Michigan.

The sources of western cream are widespread even today, but less so than they were formerly. A map for 1929 similar to figure 17 would have indicated that such States as Minnesota and Texas were shipping relatively more cream at that time than they are at present.

Western Cream Plant Operations

A SURVEY conducted as a part of this study, during the summer of 1936, included about 30 dairy plants in the Central Western States, and detailed records of operations are available for 24 of these.

Milk and Cream Supplies

All the plants included in the survey received at least the major part of their butterfat in whole milk. Only six plants received any farm-separated cream, and the volume was less than 2 percent of the total receipts of butterfat (table 24). In some cases the farm-separated cream was segregated for manufacture, but in other cases it was mixed with cream separated at the plants and shipped as fresh cream. Seven of the plants received milk and seven received cream transferred from other plants. Six of the twenty-four plants received transfers of milk from their own substations or affiliated plants. A few plants in the group bought or handled cream for other plants, and several bought skim milk for manufacture. However, 71 percent of the butterfat in November 1935 was received as whole milk direct from farmers, and 81 percent in June 1936.

The supply of milk at these plants varied seasonally, depending on the location. At most of the plants the seasonal peak of receipts came in May or June, and the seasonal low point between November and February. In most cases the peak volume was between two and three times the volume at the season of smallest receipts. Some of these plants drew their supplies from rather wide areas. Direct hauls of 30 miles or more were common. In several cases, hauling by the

plants for less than cost, or subsidies paid to hired haulers had the effect of extending the territory and thereby increasing the volume handled by the plants.

TABLE 24.—SOURCES OF BUTTERFAT RECEIVED AT 24 DAIRY PLANTS IN THE CENTRAL WEST, SHIPPING CREAM TO EASTERN MARKETS

Source	Plants reporting	Total receipts of butterfat	
		November 1935	June 1936
Direct from farmers:	<i>Number</i>	<i>Percent</i>	<i>Percent</i>
Milk.....	24	70.7	81.0
Cream.....	6	1.6	1.8
From other plants:			
Milk.....	7	10.9	11.3
Cream.....	7	10.8	5.5
Frozen cream from storage.....	2	6.0	.4
Total.....		100.0	100.0

Size of Plants

Practically all western cream is shipped in carloads of 200 cans of 40 quarts each. The cream is standardized to contain 40 percent of butterfat. It is impractical to ship cream from these western plants at the higher rates charged for smaller quantities, yet prompt shipment is essential if top-quality cream is to be delivered to the eastern buyers. There is much advantage to the western cream plants, therefore, in having sufficient volume to load a car of cream every day, or at least three or four times a week.

In June 1936, 10 of the 24 plants included in the detailed survey were able to ship at least one full carload of cream every day. Part of the milk fat included in this volume was brought in from other plants, but five plants received enough milk direct from farmers to make up a carload of cream each day throughout the month of June. Only 1 of the 24 plants would require as much as 4 days to accumulate a carload of cream. Actually the cream produced at this plant was shipped at more frequent intervals along with cream from another plant under the same management.

In this connection it is of interest to compare the volumes handled by cream-shipping plants in the New York milkshed. In June 1937, only 11 of the 88 New York plants had sufficient volume to load a car of cream every day, and one-third of the plants could load only 1 car

in 4 days (table 25). Of course, within the New York milkshed, there is less disadvantage in shipping cream at the l. c. l. rates, and also more competition among country milk plants for the milk produced in each locality.

TABLE 25.—DAILY RECEIPTS OF CREAM PLANTS IN CENTRAL WESTERN STATES AND IN THE NEW YORK MILKSHED

Cream equivalent of total daily receipts of butterfat (40-quart cans of 40 percent cream ¹)	Percentage of plants having the indicated volume	
	24 western cream plants, June 1936	98 cream plants in New York milkshed, June 1937
	<i>Percent</i>	<i>Percent</i>
Less than 50.....	4	33
50-99.....	16	29
100-149.....	16	19
150-199.....	24	8
200-249.....	16	5
250 and over.....	24	6
Total.....	100	100

¹ The quantity of cream was computed at the rate of 33.2 pounds of butterfat per can of cream.

Size of Dairies

From the standpoints of economical operation and quality of products, there is much advantage to cream or fluid-milk plants in drawing supplies from dairies of good size. There are wide differences among the midwestern cream plants as to the size of dairies from which they draw their milk supplies. Many of these plants are located in the less intensive dairy sections, where small dairies predominate. At one-fifth of the plants included in the 1936 survey, the average quantity delivered per patron during the month of June was less than 60 quarts a day (table 26). At only one-eighth of the plants was the average quantity delivered per patron 160 quarts or more daily.

In contrast to this, none of the New York cream plants was supplied by dairies averaging under 60 quarts a day in June, and more than half of them were supplied by dairies whose average daily volume was 160 quarts or more. It is significant that the plants supplied by the smallest dairies have not qualified for the shipment of cream to those eastern markets which have strict sanitary requirements.

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Total.....		100.0	100.0

Size of Plants

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	<i>Percent</i>	<i>Percent</i>
Less than 50.....	4	33
50-99.....	16	29
100-149.....	16	19
150-199.....	24	8
200-249.....	16	5
250 and over.....	24	6
Total.....	100	100

¹ The quantity of cream was computed at the rate of 33.2 pounds of butterfat per can of cream.

Size of Dairies

From the standpoints of economical operation and quality of products, there is much advantage to cream or fluid-milk plants in drawing supplies from dairies of good size. There are wide differences among the midwestern cream plants as to the size of dairies from which they draw their milk supplies. Many of these plants are located in the less intensive dairy sections, where small dairies predominate. At one-fifth of the plants included in the 1936 survey, the average quantity delivered per patron during the month of June was less than 60 quarts a day (table 26). At only one-eighth of the plants was the average quantity delivered per patron 160 quarts or more daily.

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TABLE 26.—SIZE OF DAIRIES SUPPLYING MILK TO CREAM PLANTS IN THE CENTRAL WEST AND IN THE NEW YORK MILKSHED

Average daily milk delivery per farm (40-quart cans)	Percentage of plants supplied by dairies of indicated size	
	24 western cream plants, June 1936	98 cream plants in New York milkshed, June 1937
Less than 0.5.....		
0.5-0.9.....		
1.0-1.4.....	21	
1.5-1.9.....	8	2
2.0-2.4.....	17	9
2.5-2.9.....	4	8
3.0-3.4.....	17	13
3.5-3.9.....	21	14
4.0-4.4.....	12	20
4.5-4.9.....		18
5.0 and over.....		20
Total.....	100	100

Flexible Operations

Most plants that ship cream to the eastern markets are equipped for flexible operation; that is, they can readily shift between two or more methods of disposal of butterfat, and in some cases also can vary the disposal of skim milk. As a rule, these plants ship cream to the East only when this outlet, together with the disposal of skim milk, yields a higher return than other methods of disposal readily open to them.

The 24 plants may be classified in seven groups according to method of disposal of butterfat, as follows:

	<i>Number of plants¹⁴</i>
1. Cream only.....	3
2. Whole milk and cream.....	2
3. Evaporated milk and cream ¹⁷	2
4. Cream and butter.....	10
5. Cream, bulk condensed milk, and ice-cream mix.....	2
6. Whole-milk powder and cream.....	3
7. Cream cheese and cream.....	2

¹⁴ One of the cream plants is affiliated with a group which has flexible operations. One of the evaporated-milk and cream plants makes also butter and American cheese. Some of the cream and butter plants make also American cheese, and one of the whole-milk-powder and cream plants makes butter as well.

¹⁷ Cream results from the standardization of whole milk to the desired butterfat content before evaporating.

Eight of these plants were surplus plants for Chicago, Milwaukee, Akron, or Pittsburgh, and several of them shipped fluid milk at certain times during the year. Another outlet open to a number of these plants was the sale of concentrated whole milk to evaporated milk plants. One condensing company, in Wisconsin, buys large quantities of such milk every season. Still another alternative is frozen cream, which may either be frozen by the shipper or put up for freezing by one of the large manufacturers of ice cream or cream cheese.

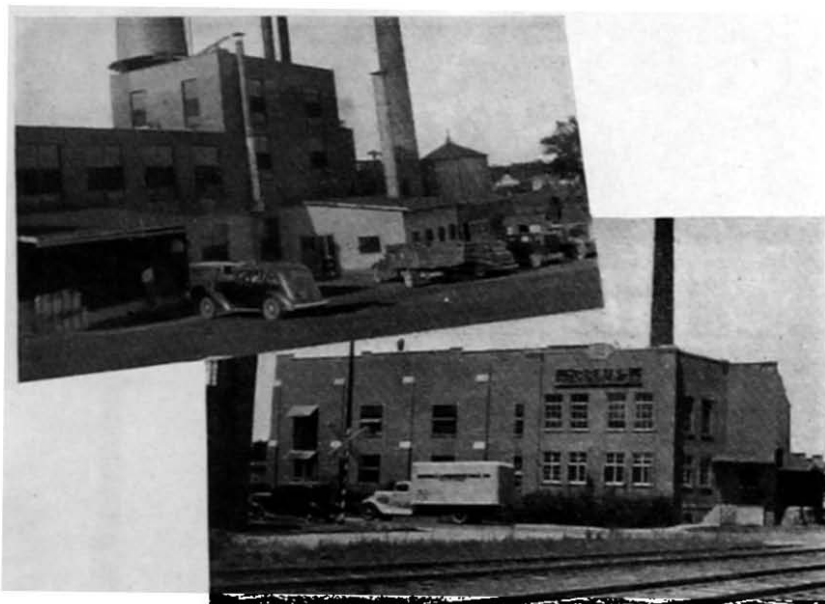


FIGURE 20.—TWO INDIANA DAIRY PLANTS SHIPPING CREAM TO EASTERN MARKETS.

Upper. In addition to shipping cream this plant makes both whole-milk and skim-milk powder.

Lower. This plant holds permits from Newark, N. J., and the State of Pennsylvania. It also sells ice-cream mix and condensed skim milk.

Most of the western plants which have been shipping cream to the eastern markets utilize the major part of their butterfat in the form of cream, and most of the skim milk in the form of milk powder (table 27). Among the 24 plants in the survey, 15 shipped cream to eastern markets in November 1935, and 11 utilized this outlet in June 1936. In November 1935, 41 percent of all butterfat handled by the 24 plants was marketed as cream in the East. The comparable figure for June 1936 was 24 percent.

In addition to dry skim milk, several of the plants utilized skim milk and buttermilk in the form of condensed milk, casein, and cottage

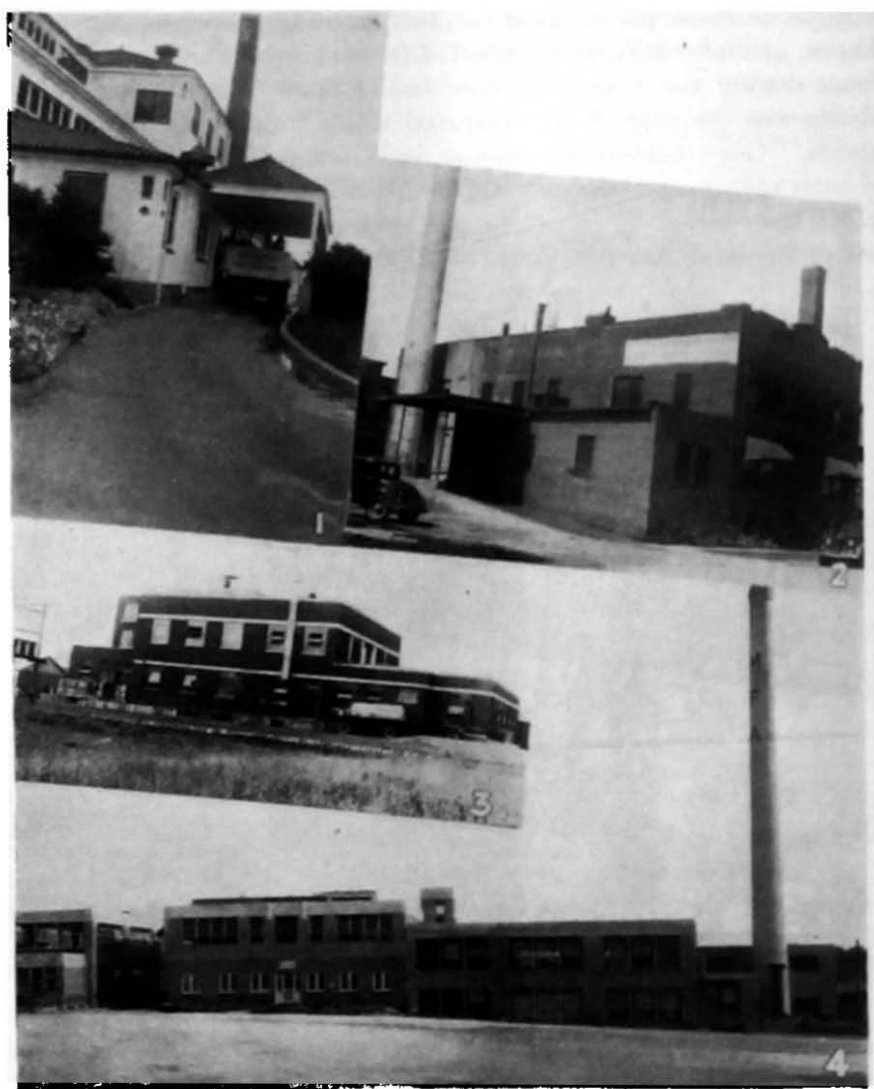


FIGURE 21.—WISCONSIN AND MISSOURI DAIRY PLANTS THAT SHIP CREAM TO EASTERN MARKETS

1. Grade A plant of a Philadelphia milk distributor.
2. Cooperative plant producing evaporated milk and cream.
3. Cooperative plant producing butter and cream.
4. Cooperative plant in Missouri producing butter, cream, and powdered milk.

cheese. One or two plants used skim milk to standardize the whole milk which was to be evaporated (table 28).

Western-cream plants are complementary to the eastern milksheds. Few of them have continuous outlets in the eastern markets for a major part of their butterfat. Likewise, few if any eastern manufacturers or distributors depend upon midwestern plants exclusively

as sources of cream. Undoubtedly some cream has been shipped east when the butterfat and skim-milk solids could have been used to better advantage in other ways; that is, when the needs of the eastern mar-

TABLE 27.—UTILIZATION OF BUTTERFAT BY 24 DAIRY PLANTS IN THE CENTRAL WEST, SHIPPING CREAM TO EASTERN MARKETS

Product	Number of plants		Percentage of total butterfat used	
	November 1935	June 1936	November 1935	June 1936
Whole milk.....	9	6	6.2	0.5
Fresh cream, for eastern sale.....	15	11	41.4	23.6
Fresh cream, other.....	17	15	26.1	15.2
Frozen cream.....	4	11	1.6	18.1
Ice-cream mix.....	4	4	1.9	3.8
Butter.....	8	11	5.2	22.8
Cheese.....	7	6	11.8	9.1
Evaporated milk.....	6	4	4.0	5.0
Dry whole milk.....	4	4	1.8	1.9
Total.....	24	24	100.0	100.0

TABLE 28.—UTILIZATION OF SKIM-MILK SOLIDS BY 24 DAIRY PLANTS IN THE CENTRAL WEST, SHIPPING CREAM TO EASTERN MARKETS

Product	Number of plants reporting		Percentage of total skim-milk solids used	
	November 1935	June 1936	November 1935	June 1936
Fluid skim milk.....	2	3	0.5	2.6
Condensed skim milk.....	13	10	13.0	8.9
Dry skim milk:				
Roller process.....	11	15	21.9	35.0
Spray process.....	11	12	53.4	40.5
Casein.....	1	3	1.2	7.5
Cottage cheese.....	3	3	7.3	2.8
Evaporated milk.....	3	2	2.7	2.7
Total.....	24	24	100.0	100.0

kets could have been supplied more economically from local sources. On the other hand, as the demand for milk and cream in the eastern markets expands, the necessary surplus in the New York milkshed, and perhaps in other milksheds, could be reduced if western cream were admitted to meet peak requirements. The possibility of coordinating the operations of plants producing western cream more closely with those of dairy plants in the eastern milksheds deserves serious consideration, particularly by the eastern producers' price-bargaining associations.

Potential Shipments

Few midwestern cream plants have been shipping as much cream to eastern markets as they could ship if prices were more attractive (table 29). In the survey, the proprietor of each plant was asked to estimate the number of cans of cream he could have shipped each month had the cream prices been high enough to attract all the butterfat not having a preferred market, such as local outlets for milk, cream, or ice-cream mix. These estimates, when totaled and averaged for the year, indicated potential shipments by these plants of 3,100 cans daily. The actual volume was 1,100 cans daily. The potential increase in cream shipments varies with the season. In September the plants included in the survey could have shipped about five times as much cream as they did ship; in November and March, only double the actual volume.

TABLE 29.—QUANTITIES OF CREAM WHICH COULD BE SHIPPED TO EASTERN MARKETS BY 24 WESTERN DAIRY PLANTS, AND ACTUAL SHIPMENTS, SEPTEMBER 1935 TO AUGUST 1936

Month	Actual daily shipments	Potential daily shipments
	<i>40-quart cans</i>	<i>40-quart cans</i>
September.....	598	2,979
October.....	705	2,741
November.....	1,112	2,596
December.....	1,079	2,632
January.....	981	2,407
February.....	1,059	2,496
March.....	1,345	2,778
April.....	1,079	3,256
May.....	1,514	4,148
June.....	1,176	4,528
July.....	1,640	4,025
August.....	1,145	3,119
Average.....	1,119	3,142

These figures do not take into account the increased shipments which might result from larger supplies of milk or cream at these plants. Many of the plants now shipping cream could handle additional butterfat and skim milk, and could attract more milk if market conditions permitted them to offer prices comparing more favorably with those returned by small butter and cheese factories or by condenseries. Of course, the potential volume of cream that may become available as more plants prepare to participate in this trade is practically unlimited. On the other hand, shipments from several of the plants now shipping may be seriously curtailed as a result of adoption by the remaining "open" markets of more strict sanitary requirements.

Another factor that will affect future shipments of cream from the western plants is the trend of demand for milk, cream, and ice cream in the midwestern cities. The situation in Michigan is a good illustration of this. From about 1930 to 1934, inclusive, the amount of surplus milk in Michigan was greatly increased as a result of depressed industrial activity in that area. At that time the principal surplus plant for Detroit and other Michigan cities became the largest shipper of western cream to the eastern markets. But during the past 2 or 3 years increased demand for milk and milk products in the Michigan cities has caused a marked reduction in cream shipments to the East. If the consumption of milk, cream, and ice cream in all the midwestern cities recovers to the levels that prevailed in 1929, many of the plants that have been participating in the eastern cream trade will have to curtail or discontinue their shipments.

During recent years the net returns from cream shipped to eastern markets have not exceeded the returns from other outlets for butterfat by a sufficient margin to encourage rapid expansion of this trade among the dairy plants in the Central West. It is likely that competition on the part of western shippers will seriously depress cream prices in those markets where strict sanitary requirements are enforced.

Management Control

Eight of the 24 plants included in the survey were operated by the two Nation-wide dairy corporations. Three others were operated by leading milk distributors of Chicago and Philadelphia. The remaining 13 were controlled locally. Six of these were cooperative plants.

Methods of Selling Cream

Aside from cream shipped to plants controlled by the same companies, cream from 6 plants was sold direct; cream from 17 plants was sold through brokers; and cream from 1 plant was sold through a sales agent.

As a rule, each shipper who used a broker sold all or most of his cream through the same broker continuously. In at least one case, the broker had an interest in the plant.

Formal contracts do not play a large part in the sale of western cream. As a rule, sales are made on a daily basis, or perhaps several cars may be sold at once, to be delivered within a week's time. Usually the agreed price is so much per can f. o. b. the buyer's station. Not infrequently this price is based on the Chicago or the New York butter market with a premium over. The amount of this premium varies, depending upon the quality, location, alternative outlets, importance of keeping the customers, and other factors. In November 1936 one of the more distant plants, not qualified for the higher-priced markets, was selling cream at 8 cents over Chicago extras, f. o. b. shipping point.

Costs of Making and Shipping Cream

The cost of cream delivered to eastern buyers includes the cost of milk and cream received at the shipper's plant,¹⁸ less the net return for the skim milk; the costs of plant operation properly allocated to cream; also the expenses for icing of cars, replacement of cans, brokerage, and other selling expenses, and freight. The time and funds available for this study did not permit a detailed analysis of such costs. However, estimates by the plant proprietors were recorded, and these, together with some data from their accounting records, provide the basis for the information given in this section of the report.

The prices paid producers at these western plants vary widely, depending upon the location, market outlets, quality of product, and other factors. At times the prices paid at those plants having outlets for fluid milk or cream in nearby cities were much above the average. The prices for these plants are excluded from the comparisons made in table 30. It will be noted that the range between the highest and lowest prices paid at the 18 western cream plants in June and November for several years has averaged about 30 percent.

In general the prices paid at the western cream plants seem to differ but little from the net returns that could be obtained by converting the milk into butter and dry skim milk of good quality.

Usually the prices paid at the western cream plants have been well below the net prices paid farmers who deliver to dairy plants under New York City inspection. The difference has been much less in June than in November. In June 1937 the prices paid at the 18 western plants exceeded the New York price by an average of 14 cents per 100 pounds.

¹⁸ In some instances net returns obtainable from other uses of the product, such as butter, or ice-cream mix, may establish the product cost at a level higher than the price paid. In the case of cooperative plants, the product cost is more often the price that would have to be paid to hold the supply against competing plants.

The net cost of making cream at these plants varied widely, even when differences in method of computation were eliminated. When costs of plant operation were properly allocated to cream and to other products, the normal range in cost of handling and processing cream was from about \$1.25 to \$1.50 per can. A fair average would be \$1.40 a can. This amount includes the icing of cars, can losses, and losses on bad accounts, but does not include freight and brokerage.

The icing of cars is a large item of expense in the summer season, and is paid by the shipper. The quantity used ranges from 3 to 5 tons per car in summer and will average around 3½ tons for the year. Reports on the cost of ice varied from \$1 to \$5 per ton. The average would be about \$3.50 a ton.

TABLE 30.—PRICES PAID TO FARMERS FOR 3.5 PERCENT MILK AT WESTERN CREAM PLANTS, COMPARED WITH THE BUTTER VALUE OF MILK, AND WITH PRICES PAID PRODUCERS OF GRADE B MILK IN NEW YORK

Month and year	Price per 100 pounds at 18 western cream plants ¹			Butter value per 100 pounds ²	New York grade-B price per 100 pounds 201-210-mile zone	Amount by which the price paid at western plants fell under or exceeded	
	High	Low	Average			Butter value	New York grade B price
June:							
1934.....	\$1. 30	\$1. 00	\$1. 14	\$1. 13	\$1. 45	+\$0. 01	-\$0. 31
1935.....	1. 32	1. 02	1. 16	1. 14	1. 38	+. 02	-. 22
1936.....	1. 61	1. 19	1. 44	1. 53	1. 49	-. 09	-. 05
1937.....	1. 68	1. 33	1. 46	1. 41	1. 32	+. 05	+. 14
November:							
1934.....	1. 40	1. 15	1. 28	1. 33	1. 78	-. 05	-. 50
1935.....	1. 64	1. 12	1. 47	1. 56	1. 90	-. 09	-. 43
1937.....	2. 00	1. 62	1. 79	1. 66	2. 30	+. 13	-. 51

¹ Quality premiums at certain plants have been included, although these were not paid to all producers. These premiums raised the average price about 7 cents per hundredweight in 1937, and smaller amounts in the prior years.

² 4.2 times the wholesale price per pound of 92 score butter at Chicago, less 3 cents; plus 8 times the price per pound of unadvertised brands highly soluble dry skim milk in carlots less 3¼ cents.

Can losses are rather heavy. They average between 1 and 2 percent, or from 2 to 4 cans per carload of cream shipped. In many cases the cans get badly mixed up, particularly when the cream goes to large buyers who receive cream from many shippers. Sometimes an entire shipment or part of a shipment is held in the buyer's cold room for days, or even weeks, before the cans are emptied and returned. In nearly all cases the cans are owned by the shipper.

Brokerage, with few exceptions, is 25 cents a can, and is paid by the shipper.

Only a few shippers reported any losses from bad accounts. For the most part, the buyers have been large, reliable firms.

Freight rates from western cream plants to the Atlantic seaboard ranged from about \$1 to \$1.85 per 40-quart can in carlots (table 31). These rates are equivalent to from 10 to 19 cents per 100 pounds of milk. Cream prices usually are quoted f. o. b. the buyer's station.

Freight charges on western cream have been reduced considerably during the past several years but remained unchanged during 1937. Substantial savings can be made by shipping cream in frozen form or as "plastic" cream. Frozen cream usually is shipped in tins con-

TABLE 31.—CARLOT FREIGHT RATES ON FRESH CREAM IN 40-QUART CANS FROM WESTERN PLANTS TO EASTERN MARKETS, DECEMBER 1936

Point of origin	Freight rate per 40-quart can to indicated destination			
	Boston, Mass.	Newark, N. J.	Philadelphia, Pa.	Washington, D. C.
Michigan:				
Adrian.....	\$1. 115	\$1. 05	\$0. 97	\$0. 94
Homer.....	1. 155	1. 065	1. 015	
Ohio:				
Columbus.....	1. 13	. 97	. 895	. 845
Toledo.....	1. 105	1. 015	. 945	. 895
Indiana:				
Bluffton.....	1. 185	1. 085	1. 015	. 97
Shelbyville.....	1. 25	1. 115	1. 04	. 98
Illinois:				
Vandalia.....	1. 375	1. 26	1. 195	1. 155
Wisconsin:				
Fond du Lac.....	1. 685	1. 59	1. 52	1. 475
Cameron.....	1. 875	1. 775	1. 71	1. 665
Minnesota:				
Minneapolis.....	1. 895	1. 795	1. 73	1. 685
Missouri:				
St. Louis.....	1. 425	1. 31	1. 25	1. 195
Springfield.....	1. 75			
Kansas:				
Ottawa.....	1. 725			
Tennessee:				
Fayetteville.....	1. 68	1. 46	1. 375	
Texas:				
Mount Pleasant.....		1. 85		

taining 50 pounds of cream with 50 percent of butterfat. "Plastic" cream contains about 80 percent of butterfat, or twice as much as fresh cream of the usual grade. Both of these products are shipped by freight rather than in express train service. Consequently the rates are much lower than the rates on fresh cream. However, these products have more limited outlets and sell at lower prices per pound of butterfat than fresh cream.

One of the western cream plants has tried shipping cream in tank cars similar to those used for the transportation of milk. The capacity of these cars (each one has two 3,000-gallon tanks) is much too great for general use by cream shippers. Cars carrying several demountable tanks of between 250 and 1,000 gallons capacity, however, might be used successfully. While the savings from the use of such tanks undoubtedly would be less than those effected by shipping milk in tank cars, a reduction of from 25 to 50 cents per can in the costs of shipping and handling cream appears to be within the range of possibility.

Net Returns

As previously indicated, most of the western cream plants are equipped for flexible operations. The manner in which they utilize the butterfat and skim milk received is determined in each case by a comparison of the net returns expected from the different possibilities that are open to them. Generally these comparisons are based on rough estimates rather than results of careful determinations of costs, yields, and probable selling prices.

A method of estimating the net return per 100 pounds of milk, in a typical plant where all the milk received is converted into cream for eastern shipment, and dry skim milk, is shown in table 32.

The calculation of net returns from cream is based on a wholesale price of \$18 per can in the eastern markets. Out of this the western shipper has to pay freight of about \$1.50 per can, brokerage of 25 cents per can, and processing expense of about \$1.40 per can. The total expense, therefore, is about \$3.15 a can, leaving net proceeds of \$14.85. This is equivalent to \$1.77 per 100 pounds of 4-percent milk.

During the month of December 1937, dry skim milk designated as "highly soluble," but not sold under well-known brands, was priced at about 6½ cents a pound delivered. The freight paid by the shipper would average about 0.6 cent a pound, and processing costs, including the container, about 3 cents a pound. The yield of powder from 100 pounds of 4-percent milk is about 7.8 pounds, which figured at the net proceeds of 2.9 cents a pound for the powder is equivalent to 22.6 cents per 100 pounds of 4-percent milk.

TABLE 32.—METHOD OF CALCULATING NET PROCEEDS FROM SHIPMENTS OF CREAM AND MANUFACTURE OF DRY SKIM MILK AT WESTERN CREAM PLANTS ¹

Item	Proceeds from 10,000 pounds of 4-percent milk		
	Amount per unit	Total	Net amount per 100 pounds of milk
Cream:			
Gross sales value (11.9 cans).....	\$18. 00	\$214. 20	\$2. 142
Freight.....	1. 50	17. 85	. 178
Brokerage.....	. 25	2. 98	. 030
Processing, ice, etc.....	1. 40	16. 66	. 167
Total expense.....	3. 15	37. 49	. 375
Net proceeds.....	14. 85	176. 71	1. 767
Dry skim milk:			
Gross sales value (780 pounds)....	. 065	50. 70	. 507
Freight.....	. 006	4. 68	. 047
Processing, package, etc.....	. 030	23. 40	. 234
Total expense.....	. 036	28. 08	. 281
Net proceeds.....	. 029	22. 62	. 226
Total net proceeds.....		199. 33	1. 993

¹ The cost and yields here shown are typical, but vary considerably in different plants and at different seasons.

The sum of the net proceeds for cream and milk powder gives a return of \$1.99 per 100 pounds of 4-percent milk. This represents the price which the western cream plant could afford to pay its producers on the basis of the stated prices, yields, and costs. The value of 3.5-percent milk would be about 20 cents less per 100 pounds, or \$1.79. This happens to be exactly the same as the average of the prices paid by 18 western cream plants for milk received in November 1937.

By using this method, but substituting appropriate yields and costs based on actual experience and accounting records, the management of any plant can determine, with a small margin of error, the probable net returns from the different uses of milk which are possible. When this is done, the management can select with greater assurance the method of disposition which will yield the greatest profit, or in the case of a cooperative, the highest returns for the members' milk.

Need for Uniform Grading of Cream

THE outstanding problem with respect to cream that is produced for more than one market is that of developing an effective and satisfactory system of sanitary control and grading. The solution of this problem would be of great benefit to fluid milk cooperatives in the East, to cooperatives that ship cream from the Central West, to cream shippers and buyers generally, and to the consuming public in eastern markets.

The primary purpose of the supervision and control exercised by municipal and State health authorities over cream supplies is to prevent the sale of unwholesome or unhealthful cream in their respective markets. Their usual method is to grant permits only to plants and dairies whose equipment and methods of production and handling are, in their opinion, reasonably certain to yield cream that is wholesome and safe from the standpoint of health. A further purpose of some health officials is to establish standards of sanitation in the plants and dairies that will result in improvement of cream quality from the standpoint of flavor, keeping quality, and freedom from contamination or adulteration.

On the whole, these methods of sanitary control have brought about much improvement in cream quality and have given the consumers of most cities a reasonable degree of protection. However, the present system of sanitary control over western cream by numerous municipal and State health authorities has some serious defects. Many cream plants, both in the West and in the East, and the dairies supplying milk to them, are inspected periodically by two or more agencies. This involves excessive cost for the services performed. Differences in requirements by the several agencies make it difficult or impossible for some of the best plants to qualify for certain markets where their product is in demand. These markets may be forced to rely upon less dependable sources of supply. Moreover, the conflicting requirements of different health authorities raise serious doubts in the minds of plant operators and dairymen as to the reasonableness of the regulations, and make them less willing to cooperate in measures that are essential for quality improvement.

Some of the eastern cities and States have not appropriated the funds necessary for adequate supervision of cream supplies originating at distant sources. The result is that consumers in those areas are not assured of a uniformly wholesome and healthful cream supply, while nearby producers are forced to compete with low-quality, low-priced cream from the Central West.

The present system of sanitary control over western cream provides for only one grade that is acceptable from the standpoint of public health. The data collected and analyzed in this study indicate there is need for a series of definite grades based upon physical properties and flavor, as well as sanitary considerations. Four grades would probably fill the present requirements of different buyers; namely, grade A table cream; grade B table cream, and two grades of cream for use by manufacturers of ice cream and cream cheese. The lowest grade might be eliminated within a comparatively short time, after further progress in improvement of cream quality in the western territory.

It is conceivable that such a system of grading might be initiated through the efforts of an association of the western-cream shippers and the State dairy inspection departments of the various States cooperating with the United States Department of Agriculture. Uniform specifications for the various grades and uniform standards for sanitary conditions conceivably could be readily worked out by a committee representing the various interested parties. The application of such standards, established first as tentative standards, would enable weaknesses or deficiencies in the standards to be ascertained so that eventually official Federal standards could be established.

Although special considerations are involved in the establishment of sanitary and quality standards for the production and shipment of sweet cream, the problem of applying such grades to sweet cream does not differ greatly from that of grading butter, cream for churning, and other products for which tentative or official grades have been promulgated by the United States Department of Agriculture. If suitable official Federal grades for sweet cream were promulgated and such cream, when shipped in interstate commerce, was required to be labeled with its proper U. S. grade, health authorities of the several Eastern States and municipalities could readily specify the grades that would be permitted to be used for table cream, ice cream, and for other uses. Western shippers would know the markets to which they could ship each of the various grades, and each of the markets would have access to sources of supplies of cream of definite grades at numerous western plants. Under such an arrangement fewer plants would need to be kept under inspection by the various municipalities, and there would be less pressure to market western cream in the East when local supplies were adequate. Such a program for cream grading, worked out through cooperation of the various agencies, would be a long step forward in solving a very difficult problem which has for a number of years confronted the cream shippers, the health departments of the eastern cities, and the buyers of cream in those cities who have need for western cream to supply the requirements of their various classes of trade.

Appendix

Basic Statistical Data

TABLE 33.—SUPPLY AND UTILIZATION OF MILK AND CREAM IN THE NORTHEASTERN STATES, 1934

(Million pounds)

Item	States where production exceeds consumption of fluid milk and cream							States where production is less than consumption of fluid milk and cream				
	Maine	New Hampshire	Vermont	New York	Pennsylvania	Maryland	Delaware	Massachusetts	Connecticut	Rhode Island	New Jersey	District of Columbia
Supply:												
Production on farms ¹ .	628	307	1,240	7,149	4,405	758	129	707	594	127	748	
Production by cows not on farms ²	22	18	13	54	138	17	1	48	14	5	15	
Milk and cream from Virginia and West Virginia ³												114
Western cream ⁴				58	128	11	3	176	22	10	60	18
Milk and cream from other Northeastern States (net) ⁴								791	78	134	771	46
Total.....	650	385	1,259	7,261	4,761	786	133	1,722	708	276	1,594	178

Utilization:												
Used on farms: ⁶												
Fluid milk and cream	76	31	65	388	427	98	16	53	42	6	48	-----
Butter	156	33	37	332	349	73	9	14	11	1	12	-----
Fed to calves	13	8	29	250	108	15	3	15	17	3	15	-----
Other fluid consumption ⁷	240	149	94	4,589	2,468	410	58	1,527	579	250	1,428	160
Manufactured (net) ⁸	12	4	48	1,456	896	80	8	94	44	13	72	18
Waste and unaccounted for ⁹	16	10	32	181	116	20	3	19	15	3	19	-----
Milk and cream to other Northeastern States (net) ¹⁰	137	150	954	65	397	81	36	-----	-----	-----	-----	-----
Total	650	385	1,259	7,261	4,761	786	133	1,722	708	276	1,594	178

¹ Estimates for 1934, MILK PRODUCTION TRENDS, June 10, 1935, U. S. Department of Agriculture, Bureau of Agricultural Economics.

² Estimates for 1933, MILK PRODUCTION TRENDS, Supplement No. 8, May 1933, p. 43, U. S. Department of Agriculture, Bureau of Agricultural Economics.

³ Estimates by Maryland-Virginia Milk Producers' Association.

⁴ Records of cream shipments supplied by railroad companies.

⁵ Amount necessary to effect balance between total supply and total utilization.

⁶ Includes estimated quantities so used on nonfarm places keeping cows, as per Special Report, U. S. Department of Agriculture, Bureau of Agricultural Economics, MILK PRODUCED AND MILK USED IN THE NORTHEASTERN STATES IN 1931, June 30, 1933.

⁷ Number of persons estimated as follows: Total population of each State as per United States Census of Population, 1930, less the estimated number living on farms reporting milk produced in 1929; plus population growth estimated at 3 times the average annual percentage for the 10-year period 1920-30. Consumption per capita estimated as follows: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, and New York, 42 gallons; New Jersey, 39 gallons; Pennsylvania, Maryland, and Delaware, 32 gallons; District of Columbia, 28 gallons. These estimates are based on data reported by the U. S. Bureau of Agricultural Economics, New York State College of Agriculture, and Pennsylvania State College.

⁸ Quantities of dairy products manufactured in 1934 as reported by the U. S. Bureau of Agricultural Economics, converted to the whole-milk equivalent; less allowance for butter made from whey cream, also butter and concentrated milk used in the manufacture of ice cream, plus milk and cream used in the manufacture of milk chocolate. Similar data for the years 1929-33 are reported in MILK EQUIVALENT OF PRODUCTION OF MANUFACTURED DAIRY PRODUCTS BY STATES, Mimeographed Report, U. S. Bureau of Agricultural Economics, June 1935.

⁹ Total for the entire area, representing difference between the total supply and estimated utilization, prorated among the several States in proportion to the amounts produced.

¹⁰ Amount necessary to effect balance between total supply and total utilization.

TABLE 34.—MILK EQUIVALENT OF ALL DAIRY PRODUCTS MANUFACTURED IN THE NORTHEASTERN STATES, 1929-36¹
(Million pounds)

State	1929	1930	1931	1932	1933	1934	1935	1936
Maine.....	20.3	19.3	16.0	10.9	9.3	12.2	11.6	13.9
New Hampshire.....	8.3	8.2	7.8	5.6	3.7	4.1	4.4	4.9
Vermont.....	105.8	99.8	82.0	57.0	58.9	48.3	71.7	74.1
Massachusetts.....	117.3	125.1	102.6	82.6	80.8	93.7	94.2	99.9
Connecticut.....	71.7	65.0	55.3	48.1	42.4	43.6	43.5	48.2
Rhode Island.....	17.9	14.9	14.2	11.4	12.3	12.9	15.6	18.5
New York.....	1,364.7	1,393.7	1,338.9	1,223.9	1,314.0	1,414.9	1,432.4	1,616.2
New Jersey.....	139.9	117.7	113.6	70.2	58.2	71.9	68.9	87.6
Pennsylvania.....	843.1	831.4	745.2	628.2	616.0	682.5	740.3	841.1
Maryland.....	55.3	48.2	40.4	40.5	65.5	80.0	106.7	114.8
Delaware.....	5.5	9.1	8.9	7.7	7.7	8.0	9.4	11.6
District of Columbia.....	18.6	18.2	18.2	15.5	15.3	17.7	19.3	24.0
Total.....	2,768.4	2,750.6	2,543.1	2,201.6	2,284.1	2,489.8	2,618.0	2,954.8

¹ Milk chocolate and some minor products not included.

Source: Data from reports on MILK EQUIVALENT OF PRODUCTION OF MANUFACTURED DAIRY PRODUCTS, U. S. Bureau of Agricultural Economics.

TABLE 35.—MILK EQUIVALENTS OF THE VARIOUS DAIRY PRODUCTS MANUFACTURED IN THE NORTHEASTERN STATES, 1929-36¹
(Million pounds)

Product	1929	1930	1931	1932	1933	1934	1935	1936
Creamery butter.....	552.0	555.9	552.4	522.4	641.1	666.6	664.3	650.4
American cheese.....	291.3	337.3	293.4	248.5	299.6	295.9	244.3	259.6
Other cheese.....	281.7	293.1	269.6	253.3	263.9	293.7	307.0	300.3
Evaporated milk (case goods).....	250.4	250.1	255.6	303.2	278.1	260.9	359.3	483.3
Plain condensed milk.....	100.5	77.4	75.1	59.8	64.4	86.9	81.1	133.3
Sweetened condensed milk:								
Case goods.....	95.5	87.1	71.7	55.8	46.0	43.7	40.8	32.9
Bulk goods.....	18.3	13.2	12.0	14.0	16.2	18.0	21.2	23.4
Ice cream.....	1,560.0	1,513.7	1,388.3	1,037.5	966.5	1,165.1	1,243.2	1,481.1
Powdered whole milk.....	47.7	45.1	27.5	22.7	16.1	20.4	37.1	26.2
Powdered cream.....	3.4	3.3		0.3	0.7	0.2	0.3	
Total.....	3,200.8	3,176.2	2,945.6	2,517.5	2,592.6	2,851.4	2,998.6	3,390.5
Duplications ²	432.4	425.6	402.6	315.9	308.5	362.4	380.6	435.7
Net total.....	2,768.4	2,750.6	2,543.0	2,201.6	2,284.1	2,489.0	2,618.0	2,954.8

¹ Including Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, and District of Columbia.

² Butter made from whey cream, also butter and concentrated milk used in the production of ice cream.

Source: Compiled from reports of the U. S. Bureau of Agricultural Economics.

TABLE 36.—SEASONAL VARIATION IN SALES OF MILK AND CREAM BY FARMERS IN THE NORTHEASTERN STATES, 1933-34¹
(Daily average for each month in percentage of daily average for the year)

State	1933						1934					
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
Maine.....	100	94	103	104	95	89	93	87	95	104	109	125
New Hampshire.....	97	85	100	111	96	93	98	93	96	100	109	119
Vermont.....	111	93	98	99	86	84	85	83	94	106	124	134
Massachusetts.....	100	100	102	102	98	97	97	95	99	99	104	105
Connecticut.....	101	101	102	102	98	97	97	95	99	99	104	105
Rhode Island.....	101	101	102	102	98	97	97	95	99	99	104	105
New York.....	111	89	101	99	84	83	83	82	93	107	127	141
New Jersey.....	101	101	98	100	93	95	96	97	99	99	112	110
Pennsylvania.....	109	104	99	94	87	87	80	92	95	101	120	123
Maryland.....	105	105	97	97	94	93	92	92	94	96	116	119
Delaware.....	106	102	93	91	93	88	88	105	105	107	109	117
Weighted average.....	108.3	95.5	100.1	98.3	87.6	86.7	87.5	87.4	94.7	103.7	120.8	129.4

¹ The seasonal indices for Vermont, Connecticut, New York, New Jersey, Pennsylvania, and Maryland are based on records of monthly deliveries to dairy plants, representing a high percentage of the total sales by farmers. The indices for Maine, New Hampshire, Massachusetts, Rhode Island, and Delaware are less reliable.

TABLE 37.—MONTHLY SALES OF MILK AND CREAM FROM FARMS IN THE NORTHEASTERN STATES, 1933 AND 1934¹

(Daily average for each month in thousands of pounds)

Month	Maine	N. H.	Vt.	Mass.	Conn.	R. I.	N. Y.	N. J.	Pa.	Md.	Del.	Total
January.....	985	794	2, 670	1, 657	1, 415	316	14, 246	1, 716	8, 738	1, 452	248	34, 237
February.....	921	753	2, 607	1, 623	1, 386	310	14, 074	1, 734	9, 033	1, 452	296	34, 189
March.....	1, 006	778	2, 953	1, 691	1, 444	323	15, 963	1, 770	9, 327	1, 483	296	37, 034
April.....	1, 101	810	3, 329	1, 691	1, 444	323	18, 365	1, 770	9, 916	1, 515	302	40, 566
May.....	1, 154	883	3, 895	1, 776	1, 517	339	21, 798	2, 003	11, 782	1, 830	307	47, 284
June.....	1, 324	964	4, 209	1, 793	1, 532	342	24, 201	1, 967	12, 076	1, 878	330	50, 616
July.....	1, 059	786	3, 487	1, 708	1, 474	329	19, 052	1, 806	10, 702	1, 657	299	42, 359
August.....	995	688	2, 921	1, 708	1, 474	329	15, 276	1, 806	10, 211	1, 657	288	37, 353
September.....	1, 091	810	3, 078	1, 742	1, 488	333	17, 336	1, 752	9, 720	1, 531	262	39, 143
October.....	1, 101	899	3, 110	1, 742	1, 488	333	16, 992	1, 788	9, 229	1, 531	257	38, 470
November.....	1, 006	778	2, 701	1, 674	1, 430	319	14, 418	1, 663	8, 542	1, 483	262	34, 276
December.....	943	753	2, 638	1, 657	1, 415	316	14, 246	1, 699	8, 542	1, 468	248	33, 925
Year.....	1, 059	810	3, 141	1, 708	1, 459	326	17, 164	1, 788	9, 818	1, 578	282	39, 133

¹ Estimates computed by prorating farm sales of milk and cream throughout the year on basis of seasonal index given in table 30.

TABLE 38.—SEASONAL VARIATION IN THE SALES OF MILK AND CREAM BY FARMERS, IN THE CONSUMPTION OF FLUID MILK AND CREAM, AND IN THE MILK EQUIVALENT OF ALL DAIRY PRODUCTS MANUFACTURED IN THE NORTHEASTERN STATES, AVERAGE FOR 1933 AND 1934

[Daily average for the 2 years = 100]

Month	Total sales of milk and cream by farmers ¹	Consumption of fluid milk and cream ²	Milk equivalent of all manufactured dairy products ³
January.....	87.5	98.2	68.2
February.....	87.4	94.8	62.7
March.....	94.7	97.1	75.8
April.....	103.7	103.2	98.0
May.....	120.8	108.6	140.2
June.....	129.4	112.7	177.8
July.....	108.3	105.9	139.2
August.....	95.5	96.0	110.2
September.....	100.1	98.8	101.1
October.....	98.3	97.0	93.4
November.....	87.6	95.1	69.2
December.....	86.7	92.1	62.2

¹ From table 36.

² Based on dealers' sales of milk and cream for fluid use as reported to Division of Milk Control, New York State Department of Agriculture and Markets.

³ Computed from special monthly tabulation of Dairy Products Manufactured in the Northeastern States, Bureau of Agricultural Economics. Duplications consisting of butter and concentrated milk used in ice cream, and butter churned from whey cream, excluded.

TABLE 39.—SEASONAL VARIATION IN MILK EQUIVALENT OF DAIRY PRODUCTS MANUFACTURED IN THE NORTHEASTERN STATES, AVERAGE FOR 1933 AND 1934

[Daily average for the 2 years = 100]

Month	Milk equivalent of—					
	Ice cream		Cream cheese	Creamery butter	Evaporated milk ¹	American cheese
	Gross	Net ²				
January.....	52.3	58.1	111.7	85.7	42.6	42.8
February.....	48.1	53.9	121.9	70.2	38.0	33.6
March.....	61.0	70.2	111.6	69.5	80.6	44.2
April.....	84.6	95.2	101.3	74.0	144.7	74.5
May.....	142.4	140.5	96.4	114.6	207.0	155.2
June.....	182.3	201.2	86.4	148.6	231.2	235.4
July.....	185.2	168.9	84.9	115.8	154.3	170.8
August.....	155.7	124.6	76.4	112.2	91.0	134.6
September.....	109.3	92.4	88.0	118.4	83.6	120.8
October.....	67.6	71.7	105.7	131.4	57.2	100.8
November.....	55.7	65.2	110.0	83.1	33.7	50.6
December.....	52.0	55.3	107.4	74.6	33.1	32.8
Year.....	100.0	100.0	100.0	100.0	100.0	100.0

¹ Excluding estimated quantities of butter and concentrated milk used in ice-cream manufacture.

² Includes condensed milk and powdered milk.

Source: Computed from special monthly tabulation of Dairy Products Manufactured in the Northeastern States, by the U. S. Bureau of Agricultural Economics.

TABLE 40.—MONTHLY QUANTITIES OF MILK USED FOR CONSUMPTION IN FLUID FORM AND FOR MANUFACTURE IN THE NORTHEASTERN STATES, 1934¹

(Daily average for each month, in millions of pounds)

Month	Milk for fluid use	Cream for fluid use	Ice cream, cream cheese, and milk chocolate ²	Butter, American cheese, and evaporated milk ²	Total
January.....	24.5	7.8	2.5	2.5	37.3
February.....	24.3	7.4	2.5	2.2	36.4
March.....	24.2	7.9	3.1	2.9	38.1
April.....	24.2	9.3	3.8	4.0	41.3
May.....	25.0	9.8	4.7	5.7	45.2
June.....	25.9	9.9	6.0	7.3	49.1
July.....	25.2	8.8	5.5	5.5	45.0
August.....	24.4	7.4	3.9	4.8	40.5
September.....	24.4	8.0	3.2	4.3	39.9
October.....	24.2	8.0	3.0	3.6	38.8
November.....	24.7	7.1	2.8	2.0	36.6
December.....	23.6	7.2	2.3	1.6	34.7
Year.....	24.6	8.2	3.6	3.9	40.3

¹ Does not include milk used or manufactured on farms.

² Net milk equivalent of dairy products manufactured in the Northeastern States.

TABLE 41.—CREAM SHIPPED BY NORTHEASTERN COOPERATIVES TO MARKETS OUTSIDE THEIR OWN MILKSHEDS, JULY 1934 TO DECEMBER 1935

(40-quart cans)

Month	New England Dairies	Dairy-men's League	Maryland Cooperative Milk Producers, Inc.	Maryland and Virginia Milk Producers' Association	Total
1934:					
July.....	None	17,983.0	608.8	None	18,591.8
August.....	None	10,319.0	261.5	None	10,580.5
September.....	None	9,028.0	1,274.0	None	10,302.0
October.....	None	14,951.0	1,481.2	None	16,432.2
November.....	None	5,021.0	737.0	None	5,758.0
December.....	None	59.0	398.0	None	457.0
1935:					
January.....	None	500.0	446.8	None	946.8
February.....	None	-----	160.0	13.5	173.5
March.....	None	2,600.0	-----	6.0	2,606.0
April.....	None	1,400.0	-----	339.0	1,739.0
May.....	None	-----	1,800.0	2,681.0	4,481.0
June.....	140.0	950.0	3,300.0	3,148.0	7,538.0
July.....	136.0	11,592.0	109.0	908.0	12,745.0
August.....	138.0	9,414.0	1,200.0	1,223.0	11,975.0
September.....	853.0	7,054.0	350.0	544.7	8,801.7
October.....	734.0	6,885.0	202.3	679.4	8,500.7
November.....	662.5	-----	55.8	314.5	1,032.8
December.....	602.0	-----	1,478.2	473.0	2,553.2
Total for 1935.....	3,265.5	40,395.0	9,102.1	10,330.1	63,092.7

TABLE 42.—CREAM SHIPPED BY NORTHEASTERN COOPERATIVES TO EACH MARKET OUTSIDE THEIR RESPECTIVE MILKSHEDS,
JULY 1934 TO DECEMBER 1935

(40-quart cans)

Month	Boston	Other Massachusetts and New England	New York City	North Jersey	Up-State New York	South Jersey	Philadelphia	Other Pennsylvania	Baltimore	Washington	Virginia and North Carolina	Total
<i>1934</i>												
July.....	5,967.0	2,847.0					9,761.8	16.0				18,591.8
August.....	3,229.0	1,575.0					5,776.5					10,580.5
September.....	4,450.0	2,120.0			1,150.0		2,558.0	24.0				10,302.0
October.....	5,315.0	5,483.0			1,350.0		4,168.0	116.2				16,432.2
November.....	1,808.0	2,137.0				265.0	1,353.0	22.0			173.0	5,758.0
December.....						286.0	152.0	19.0				457.0
<i>1935</i>												
January.....						240.0	690.0	16.8				946.8
February.....						160.0	10.0				3.5	173.5
March.....							2,600.0				6.0	2,606.0
April.....		97.0					1,403.0		25.0		214.0	1,739.0
May.....					200.0		1,971.0	200.0	10.0	1,400.0	700.0	4,481.0
June.....	700.0	265.0			200.0		2,618.0	3,300.0			455.0	7,538.0
July.....	4,739.0	3,828.0					3,460.0	610.0	108.0			12,745.0
August.....	3,900.0	3,398.0		180.0			3,152.0	1,000.0	145.0		200.0	11,975.0
September.....	2,050.0	2,993.0	20.0	180.0	704.0		2,090.0	350.0	46.0	50.0	318.7	8,801.7
October.....	2,550.0	1,938.0	559.0				2,754.4	460.0	20.0	75.1	144.2	8,500.7
November.....		216.5	446.0				292.5		22.0	30.6	25.2	1,032.8
December.....		157.0	445.0	100.0			331.0	1,368.2	2.0	110.0	40.0	2,553.2
Total for 1935.....	13,939.0	12,892.5	1,470.0	460.0	1,104.0	400.0	21,371.9	7,305.0	378.0	1,665.7	2,106.6	63,092.7

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Circular No. C-104, *T. G. Stitts and Wm. C. Welden*

Cooperative Fluid-Milk Associations in Iowa

Circular No. C-105, *Paul E. Quintus and T. G. Stitts*

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