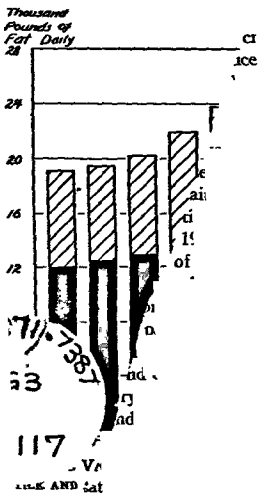
The Maine Agricultural Experiment Station

ORONO

BULLETIN 367

An Economic Study and Utilization



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CONTENTS

BULLETIN 367

AN ECONOMIC STUDY OF THE PRODUCTION AND UTILIZATION OF MILK IN MAINE

GEORGE F. DOW[1]

INTRODUCTION

IMPORTANCE OF THE DAIRY INDUSTRY IN MAINE

Milk production in 1930 accounted for approximately one-fifth of the total cash income from farm production in Maine (Table 1). The cash income from milk was estimated at $12,896,-

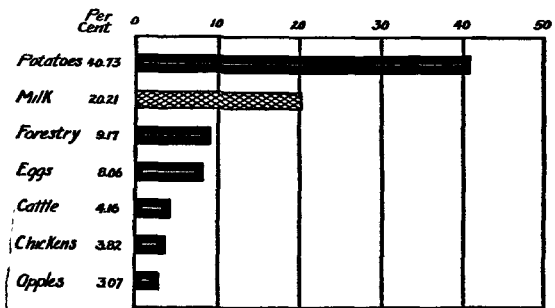

FIG. 102. RELATIVE IMPORTANCE OF THE CASH INCOME OF THE CHIEF COMMODITIES PRODUCED ON MAINE FARMS IN 1930

Milk production accounts for 20.21 per cent of the total cash income, and was exceeded in value only by that of potatoes. (Based on data in Table 1.)

[1] The author wishes to acknowledge and to express his appreciation of the coöperation given by the owners, managers, and others of the milk plants and creameries, who made available their records and assisted in distributing questionnaires to dairymen; the dairymen who answered questionnaires concerning their dairy herds; C. M. White and C. P. Osgood of the Maine Dept. of Agr., who furnished information from their records; Dr. C. H. Merchant who offered helpful suggestions and criticisms; M. S. Parsons who assisted in securing data from the larger dairy dealers in 1929; and Miss Magretta Blackmore who assisted in analyzing the data.

000, which was exceeded in value only by that of potatoes. The return from milk was more than twice as large as that from eggs and six and one-half times that from apples. The relative cash income from each of these commodities has varied considerably during the last few years, but the values given for 1930 are more typical of average conditions than those of either 1929 when potato prices were high or 1931 when potato prices were low.

TABLE 1

Cash Income From Farm Production in Maine, by Commodities, in 1930[2]

(In thousands of dollars, i.e., 000 omitted)

Commodity	1930 (Preliminary)	
	Cash income	Per cent of total
Livestock and livestock products		
Milk	$12,896	20 21
Eggs (chicken)	5,144	8 06
Cattle and calves	2,657	4 16
Chickens	2,437	3 82
Hogs	1,249	1 96
Sheep and Wool	317	49
Honey and beeswax	35	.05
Total livestock	$24,735	38 75
Crops		
Potatoes	$25,994	40 73
Forest products	5,845	9 17
Apples	1,961	3 07
Truck crops	1,918	3 00
Hay	1,815	2 84
Dry edible beans	437	.68
Other crops	1,130	1 76
Total crops	$39,100	61 25
Grand total	$63,835	100.00

Dairy cows and two-year-old heifers accounted for nearly one-half of the total number of animal units of livestock kept on farms on April 1, 1930 (Table 2). When dairy calves and herd bulls were included, the total for all dairy cattle represented ap-

[2] Farm Value, Gross Income, and Cash Income from Farm Production. Part III. State Summaries of Income Estimates, 1929-1930. Bur. Agr. Econ., U. S. Dept. Agr. Mimeographed report, p. 26. 1931.

proximately 57 per cent of all animal units. Horses, mules, and colts constituted about one-fifth of the total. Chickens, beef animals, and sheep were relatively unimportant as compared with dairy cattle. Chickens amounted to only 4.98 per cent of the total number of animal units; beef cows and two-year-old heifers were 2.17 per cent; and sheep and goats were 3.99 per cent. On the basis of all productive animal units, dairy cattle represented nearly three-fourths of the total.

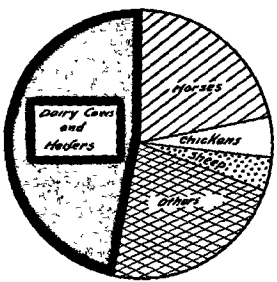

FIG. 103. RELATIVE IMPORTANCE OF THE KINDS OF LIVESTOCK KEPT ON MAINE FARMS

Dairy cows and two-year-old heifers represented 47.73 per cent of all animal units kept. (Based on data in Table 2.)

TABLE 2

Number of Livestock on Maine Farms, April 1, 1930[8]

Kind of livestock	Number of animals	Number of animal units*	Per cent of total animal units	Per cent of total productive animal units†
Horses, mules, and colts	61,549	61,154	21.01	17
Yearling cattle and calves	85,699	42,850	14 72	18 63
Dairy heifers (2-year-olds)	27,951	13,976	4.80	6 07
Dairy cows	124,952	124,952	42 93	54 24
Bulls	6,094	6,094	2 09	2 65
Beef heifers (2-year-olds)	2,763	1,382	47	60
Beef cows	4,954	4,954	1 70	2 15
Steers	4,635	4,635	1 59	2 01
Sheep and goats	100,190	11,520	3 99	5 04
Swine	45,712	5,000	1 72	2 17
Chickens	1,451,035	14,510	4 98	6 30
Total	1,915,534	291,127	100 00	100.00

* An animal unit is equivalent to one horse, mule, cow, bull, or steer, two colts, calves, or heifers, five breeding sows, seven ewes, rams, or goats, ten hogs, twenty lambs, or one hundred chickens This classification is made on the basis of feed eaten and value of manure produced.

† Productive animal units include all livestock except horses and mules. Horses and mules are kept for work purposes rather than for direct production purposes. Colts, however, are considered as productive animal units

[8] Computed from data of Bureau of Census, U. S. Dept Commerce. Fifteenth Census of the United States, 1930. Agriculture, Vol II, Part The Northern States, p. 123.

During 1928, an estimated total of 133 thousand milk cows in Maine produced 626 million pounds of milk. This amount represented 16.37 per cent or about one-sixth of all milk produced in New England (Table 3). Maine produced about one-half as much milk as Vermont, and one and two-thirds times as much as New Hampshire. The estimated milk production per cow in Maine was 4,710 pounds, which was 30 pounds higher than that of Vermont, but 473 pounds less than the average for all New England. These figures, however, may be somewhat unfair in indicating the quality of Maine dairy cows, because a relatively high proportion of the cows in Maine belong to breeds that produce milk containing a high butterfat content.

TABLE 3

Total Milk Produced and Average Production per Cow in Maine and the Other New England States in 1928[4]

State	Number of cows milked (thousands)	Milk per cow (pounds)	Total milk produced (million lbs.)	Per cent of total milk produced
Maine	133	4,710	626	16.37
New Hampshire	72	5,220	376	9.83
Vermont	277	4,680	1,296	33.88
Massachusetts	130	6,050	790	20.65
Rhode Island	21	6,400	133	3.35
Connecticut	105	5,800	609	15.92
New England	738	5,183	3,825	100.00

PURPOSE OF STUDY

The purpose of this study is to present production and marketing data of milk produced in Maine. An urgent need has existed for such information because only a relatively small field of knowledge has been covered in previous publications dealing with this phase of the dairy industry in the State.

[4] Farm Value, Gross Income, and Cash Income from Farm Production. Part I. Estimates by Commodities and by States, together with Production, Disposition, and Price Data Used, 1924-1928. Sec. II. Livestock and Livestock Products. A preliminary report. Bur. Agr. Econ., U. S. Dept. Agr. Mimeographed report, p. 335. 1930.

Census data have included the number of dairy cows kept on Maine farms, their total milk production, butter made on farms, amount of butterfat sold, and volume of milk and cream sold. This information for 1925 has been tabulated by towns,[5] but the census data for the sales of butterfat, milk, and cream are not sufficiently complete to be adapted to a study of the utilization of milk by towns or for the State as a whole.

The Maine Department of Agriculture also publishes annually a two-page report, "Maine Dairy Statistics,"[6] which is based on questionnaires sent to dairy dealers.

The Bureau of Agricultural Economics of the United States Department of Agriculture publishes various reports on the amount of dairy products manufactured in each state. Manufactured products, however, contain only a small proportion of the total butterfat sold as milk and cream by Maine dairymen.

The purpose of this bulletin is, therefore, to make available to dairymen, to extension and research workers, and to others much additional information concerning the production and utilization of milk in Maine. It is also hoped that this study will be of especial value to coöperative and private dairy marketing organizations.

METHOD AND SCOPE OF STUDY

The scope of this study includes various phases of the marketing process, starting with (1) the production of milk at the farm, and followed by (2) the sale of milk and cream to dairy dealers, (3) plant utilization of milk and cream, and finally (4) the consumption of milk and cream in Maine, dairy products manufactured in the State, and out-of-State shipments of milk and cream. Farm production embraces the location and concentration of dairy cows, description of dairy herds, and the farm utilization of milk for home consumption and for sale. To supplement data previously published relative to farm production of milk, 6,450 questionnaires were distributed to dairymen during 1931, through the coöperation of the larger milk plants and creameries. Of this

[5] Merchant, Charles H. Maine Agriculture, A Statistical Presentation. Maine Agr. Exp. Sta. Bul. 338, pp. 73-90, 1927.

[6] White, Charles M. Maine Dairy Statistics. Div. of Markets, Maine Dept. Agr., Augusta.

number, dairymen returned 1,802 replies, or 28 per cent of the total. Each reply contained information as to the size of the herd, number of purebred cows, breed of cows, butterfat content of product sold, and other information.

Detailed data of dairymen's sales of milk and cream were obtained from the larger dealers (those dealers who handled an equivalent of 500 or more quarts of milk daily). Each dealer was interviewed either in 1929 or 1930, and all cooperated so that the figures for the larger dealers are complete for the entire State. From records kept by these dealers, data were secured on the total amount and value of milk and cream purchased from dairymen each month during 1928 and, in many instances, during 1927 and 1929. The number of producers, prices paid, butterfat content, and the final utilization of milk and cream within the State were also obtained. This information was obtained from carefully kept records for 97 per cent of the butterfat purchased, and the remaining 3 per cent was estimated and carefully checked by the several dealers who did not have records available.

In order that the trend in the seasonal variation of milk and cream purchases could be followed in ensuing years after this study was made, the Maine Department of Agriculture expanded the questionnaire that it sends annually to the larger dealers in Maine. The reports from 1929 to 1931 inclusive, that were returned by dealers, have been made available for this study,[7] and thus enable a comparison of the trend in the seasonal variation of milk and cream purchased by thirteen of the larger dealers from 1928 to 1931.

The record of the amount of milk and cream handled by small retailers[8] was also secured through the courtesy of the Maine Department of Agriculture,[9] which made available the application cards for milk and cream licenses that are required annually of retailers. Each application card contained a statement of the average amount of milk and cream sold daily, the sources from which milk and cream were obtained, market where sold, and the

[7] Courtesy of Charles M. White. Unpublished data. Div. of Markets, Maine Dept. Agr., Augusta.

[8] Small retailers include all dealers who handled an equivalent of less than 500 quarts of milk daily.

[9] Courtesy of Clayton P. Osgood, State Dairy Inspector. Unpublished data. Maine Dept. Agr., Augusta.

number of cows kept. This information supplemented that secured from the larger dealers and thus made possible the computation of the total milk and cream sold by all dairymen in Maine and the utilization of this milk and cream within the State.

LOCATION AND CONCENTRATION OF DAIRY COWS IN MAINE

NUMBER AND LOCATION OF DAIRY COWS

Dairy cows are kept in considerable numbers in each of the important farming towns of southwestern and south central Maine (Figure 104). Practically no cows are kept in the northwestern and southeastern sections of the State, because these two sections, including about ten million acres of land, comprise the Maine Forestry District, in which very little farming of any kind is attempted. These areas are indicated in Figure 104 by towns that are not shaded. The northeastern part of Maine, in Aroostook County, also is not an intensive dairy area. The topography, soil, and climate of this section are particularly adapted to growing potatoes, which is the principal source of farm income. Therefore, cows are kept in Aroostook County primarily to supply the local demand for dairy products.

The counties of Penobscot, Kennebec, Aroostook, and Somerset contained the largest number of dairy cows per county (Table 4). The dairy counties, however, that have the densest dairy cow population are Cumberland, Androscoggin, Kennebec, and York. Aroostook and Washington Counties have the least intensive dairying. For the State as a whole, there was an average of 28 cows per 100 acres of all land in farms.[10]

The more intensive dairy areas within the southwestern and south central sections of the State are due, in part, to favorable factors of production, such as good climate and abundant, low-priced hay and pasture land and, in some instances, to the stimulating effect of local retail markets which return relatively high prices. The largest number of dairy cows, per 100 acres of all land in farms, occurred in the vicinities of such important retail

[10] The figures for each of the towns in which dairying was important are given in the Appendix, Table 1.

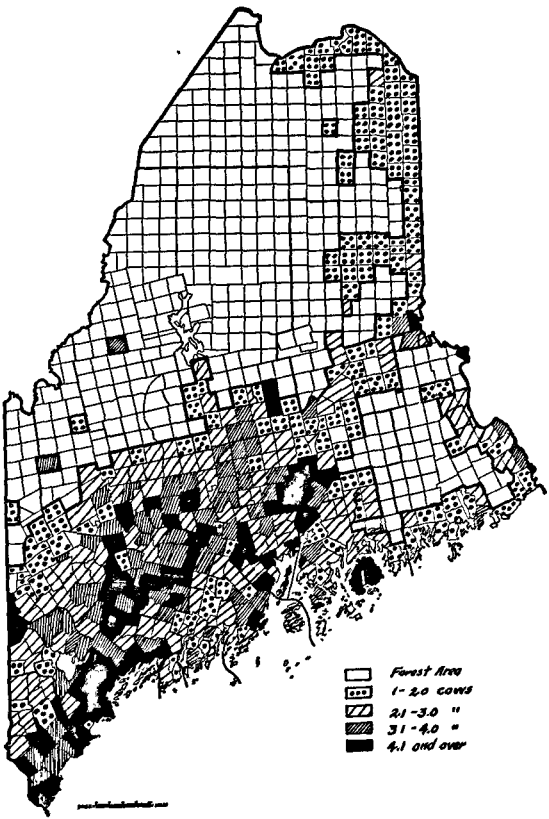

FIG 104. NUMBER OF COWS MILKED IN MAINE DURING 1929 PER 100 ACRES OF ALL LAND IN FARMS

The areas that are solid black represent towns in which dairying was relatively intensive. The dotted areas are towns with relatively few cows.

markets as Portland, Lewiston-Auburn, Bangor-Brewer, Biddeford-Saco, Augusta, Waterville, and Sanford.

TABLE 4

Number of Cows and Concentration of Dairying in Maine, by Counties, in 1929[11]

County	Number of cows milked	Cows per 100 acres of land in farms	Total milk produced (thousand lbs.)	Per cent of total milk
Cumberland	10,170	4 80	50,265	8 22
Androscoggin	9,081	4.21	42,123	6 89
Kennebec	14,800	4 05	68,770	11 25
York	8,108	3 71	39,243	6 42
Franklin	6,990	3 17	31,822	5 20
Penobscot	15,955	3 16	76,322	12 48
Somerset	12,325	3 02	56,367	9 22
Waldo	8,777	2.99	39,277	6 42
Knox	4,258	2 95	19,511	3 19
Sagadahoc	2,567	2 81	12,570	2.06
Oxford	10,113	2 57	43,060	7 04
Hancock	3,729	2.50	18,931	3 10
Piscataquis	3,627	2 38	16,676	2 73
Lincoln	3,936	2.32	15,740	2 57
Aroostook	13,417	1.54	62,247	10 18
Washington	3,673	1 53	18,543	3 03
State	131,426	2.83	611,467	100 00

RELATION OF CLIMATE TO DAIRYING

Climate is an important factor in determining the location of dairying within any farming area. Both temperature and rainfall must be favorable for the production of forage crops if dairying is to succeed The southern half of the State has an average of 110 to 150 days from the last killing frost in the spring to the first killing frost in the fall (Figure 105). This growing season permits good yields of sweet corn and silage corn, and thus makes possible a more intensive production of dairy roughages on many farms. In the northern half of the State, the average growing season is only 90 to 110 days, which is not sufficiently long, at prevailing temperatures, to permit the economical production of sweet corn or silage corn.

The average rainfall during the growing season is favorable, throughout the farming area of the State, for the production of

[11] Same as footnote 3, pp. 118, 119, 133, 134.

high yields of hay and pasturage. An average precipitation of 18 to 21 inches occurs during April to September inclusive in nearly all sections of Maine, with the exception of the northwest (largely a forest area) which receives a corresponding precipitation of 21 to 24 inches (Figure 106).

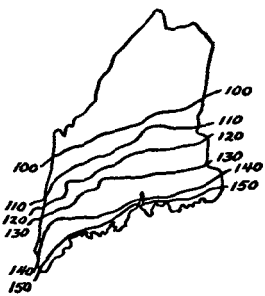

FIG. 105 AVERAGE NUMBER OF DAYS BETWEEN THE LAST KILLING FROST IN THE SPRING AND THE FIRST KILLING FROST IN THE FALL[12]

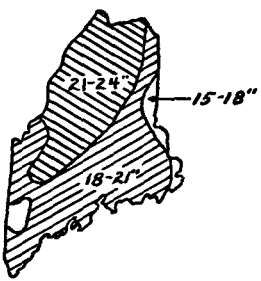

FIG. 106 AVERAGE WARM SEASON PRECIPITATION, IN INCHES, APRIL TO SEPTEMBER INCLUSIVE[13]

RELATION OF UTILIZATION OF FARM LAND TO DAIRYING

Areas that are best adapted to intensive dairying must have not only a favorable climate but also a relatively large proportion of the acreage in crop and pasture land.[14] A high proportion of

[12] Reed, W. G. Atlas of American Agriculture, Part II. Climate. Sec. I. Frost and Growing Season. U. S. Dept. Agr, Office of Farm Management, Wash., D. C., p. 11. 1918.

[13] Kincer, J. B. Atlas of American Agriculture, Part II. Climate. Sec A. Precipitation and Humidity. U. S. Dept. Agr., Office of Farm Management, Wash., D. C., p. 39. 1918.

[14] A relatively large acreage of crop and pasture land is the resultant of several important factors, including soil and topography. No attempt is made here to study the relationship of soil to dairying, because soil surveys have been made in only extremely limited areas of the State. The importance of soil and topography, in determining land utilization, is indicated by the fact that, of the total farm land in Maine, 30 per cent is non-tillable

the total land in crop land is essential for the production of large enough quantities of hay and other forage for intensive dairying. As is indicated in Table 5, the counties with the greatest concentration of dairy cows per 100 acres of farm land tended to have the highest proportion of farm acreage used as crop land, with the exception of Aroostook County.

TABLE 5

Utilization of all Land in Farms in 1929, and Average Value Per Acre in 1930[15]

County	Number of cows per 100 acres of farm land	Per cent of all farm land			Average value per acre of all land in farms
		Crop land	Pasture land*	Woodland and other land	
Cumberland	4 80	30 15	19 70	50 15	$27 59
Androscoggin	4 21	31 06	18 95	49 99	18 68
Kennebec	4.05	31 33	22 89	45 78	14 46
York	3 71	26 63	18 22	55 16	23 43
Franklin	3 17	24 01	21 10	54 89	12 28
Penobscot	3 16	30 85	18 58	50 57	12 28
Somerset	3 02	28 42	21 73	49 85	12 14
Waldo	2 99	28 05	15 63	56 32	9 31
Knox	2 95	25 49	18 68	55 83	16 08
Sagadahoc	2 81	29 81	13 41	56 78	11 87
Oxford	2 57	20 44	15 40	64.16	14 20
Hancock	2 50	18 12	11 46	70 42	14 56
Piscataquis	2 38	22 69	16 87	60 44	11 01
Lincoln	2 32	24 95	13 94	61 11	10 93
Aroostook	1 54	46 11	10 27	43 62	47 78
Washington	1.53	18 26	9 63	72 11	11 00
State average	2 83	30.21	16 35	53 44	$20 61

* Woodland pastured has been included under woodland and other land.

Although Aroostook County farms have a high percentage of crop land, they have relatively little pasture land to supply cheap, economical feed during the summer. The topography, soil, and climate of the farming area in this county, as previously stated, are particularly adapted to intensive potato production, so that tillable land has been too valuable for extensive use as pasturage. In Hancock and Washington Counties only a small proportion of the farm land was used as crop and pasture land. In

pasture and approximately another 30 per cent is in woodland. Much of the large forest area in the State also is not adapted to farming largely because of either soil, topography, or both. Same as footnote 3, p. 118.

[15] Same as footnote 3, pp. 118, 119, 122.

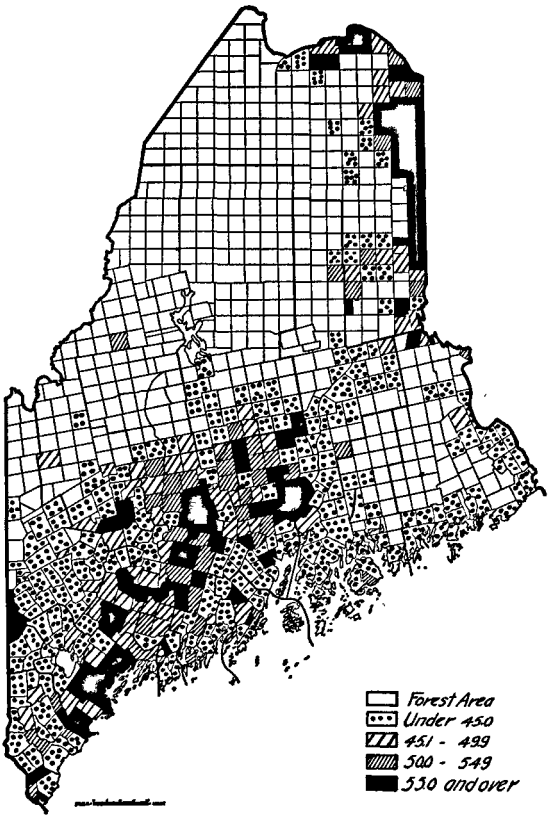

FIG 107. PROPORTION OF ALL LAND IN FARMS THAT WAS CROP LAND AND CLEARED PASTURE LAND COMBINED

With the exception of Aroostook County in northeastern Maine, the proportion of land that was in crops and cleared pasture tended to correspond closely with the density of cow population, as indicated by a comparison with Fig 104. (Based on data in Table 1 of the Appendix.)

Aroostook, Hancock, and Washington Counties only 10.27, 11.46, and 9.63 per cent respectively of the total land was in cleared pasture as compared with percentages ranging from 13.41 to 22.89 for the other counties of the State. Of all cleared pasture land in the State, 65.83 per cent or about two-thirds was not plowable and, therefore, was not adapted to the production of crops other than pasturage.[16]

The combined amount of crop land and cleared pasture land (that is, nearly all farm land except woodland) serves as a good indication of the relative intensity of dairying in most areas. In Figure 107 is shown the proportion of all land in farms that was crop and cleared pasture land. The towns in which there was a relatively high proportion of crop and cleared pasture land correspond closely with those towns in Figure 104 in which dairying was most intensive. This relationship is especially noticeable in the vicinities of Portland, Lewiston, Auburn, Augusta, Waterville, and Bangor. Aroostook County, which also had a high proportion of crop and pasture land combined, is an exception because potato production has been considered more profitable, and dairying was handicapped by the combined factors of too short a growing season for corn and a relatively high value per acre of land for growing hay and pasturage.

The average value per acre of all farm land in each of the important dairy counties in 1930 was only about one-half of that in Aroostook County. The average value per acre was $18.68 in Androscoggin County, $27.59 in Cumberland County, $14 46 in Kennebec County, $12.28 in Penobscot County, and an average of $20.61 for the State as a whole, as compared to $47 78 in Aroostook County.

DESCRIPTION OF DAIRY HERDS

Information concerning Maine dairy herds is based on 1,802 completed questionnaire records received from dairymen in 1931. These reports were grouped into 15 areas, of which 8 were milk areas and 7 were cream areas (Figure 108).[17] The milk areas in-

[16] Same as footnote 3, p. 118.

[17] The classification of milk and cream areas was based primarily on whether the majority of the butterfat was sold as milk or as cream. This

cluded 1,013 of the herds studied, with 78.87 per cent of the dairymen selling milk. In the cream areas, in which the study included 789 herds, cream was sold by 70 72 per cent of the dairymen.

SIZE OF HERDS

The average number of cows kept in each area varied from 10.6 cows per herd in the Portland area (II) to 6.7 cows per herd in both the Charleston area (XV) and the Belfast-Wiscasset area (XIII).[18] As shown in Table 6, five of the eight milk areas had larger average herds than did any of the cream areas. The average for the State was 8.2 cows per herd, but herds in the milk areas averaged 8.6 cows as compared with 7.6 cows in herds in the cream areas.[19]

In considering the size of dairy herds, it is also interesting to note in which areas dairymen were raising a relatively large number of heifers to freshen during the year ending July or August, 1932. In the milk areas of Dexter (VIII) and Gardiner-Bath (III), and in the cream areas of Strong-Solon (X) and Hiram-Waterford (IX), a relatively large number of heifers were expected to freshen. The average for all milk areas was 24 7 heifers to freshen per 100 cows as compared with an average of 27.4 heifers for all cream areas. The higher proportion of heifers

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was determined largely from data illustrated in Figure 111 Milk and cream areas should not be understood to exist in such clearly defined limits as the boundary lines in Figure 108 indicate. For example, in towns adjacent to a boundary line, there may be a blending of milk and cream areas rather than any sharp dissimilarity between the adjoining towns. Also, within a cream area, for example, there may be small local milk areas that are too small to be considered as separate areas, and, therefore, are not shown.

[18] Figures in Roman Numerals refer to area numbers, the locations of which are given in Figure 108.

[19] An important characteristic in size of herds is that they normally change, moving in cycles with an average duration of 14 to 16 years from one peak to the next. Cow numbers in Maine reached a low point in the cycle during 1929. By 1931 (the year this section of the study was made), dairymen had increased the size of their herds, but the high peak in the number of cows probably will not be attained for several additional years. The number of yearling heifers reached a low point in the cycle during 1927. In 1930, the number of yearlings was probably half way between the low and the high points of the cycle.

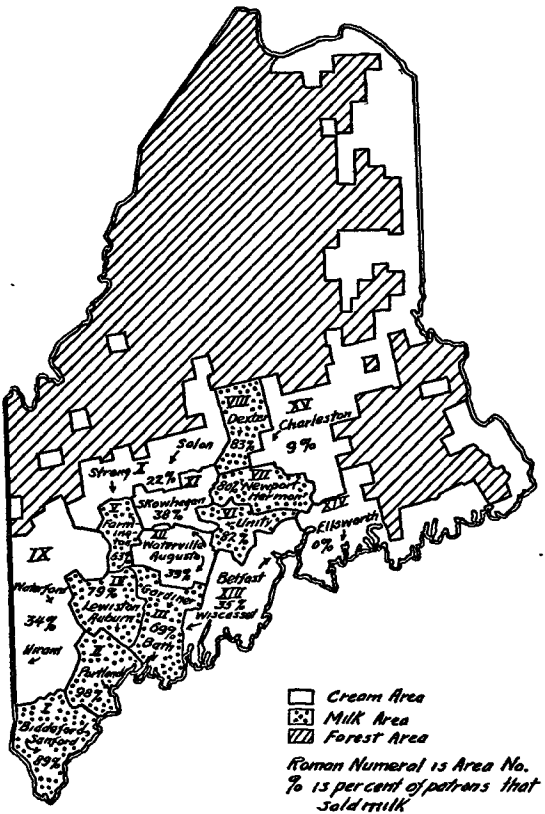

FIG. 108. LOCATION OF THE AREAS USED IN STUDYING MAINE DAIRY HERDS

In Areas I to VIII, the majority of the dairymen sold milk and in Areas IX to XV, the majority sold cream.

TABLE 6

Average Size of Dairy Herds in Each Area in Maine in 1931

Area	Number of herds in study	Cows per herd	Heifers to freshen per 100 cows*	Extra cows per herd that could be	
				Stabled	Fed
Milk areas					
Portland, II	103	10 6	21 6	4 4	4 9
Dexter, VIII	114	9 4	28 7	5 7	7 4
Farmington, V	116	9 3	25 2	4 8	5 1
Lewiston-Auburn, IV	100	8 8	24 6	4 9	4 3
Unity, VI	194	8 5	25 6	5 2	6 3
Gardiner-Bath, *III*	68	7 5	30 6	5 5	6 1
Newport-Harmon, VII	220	7 4	21 0	4 9	4 8
Biddeford-Sanford, I	38	7 2	24 8	4 4	5 3
All milk areas	1,013	8 6	24 7	5 0	5 5
Cream areas					
Waterville-Augusta, XII	112	8 1	25 8	4 7	5 5
Ellsworth, XIV	50	8 1	22 5	3 5	2 8
Strong-Solon, X	139	8 0	31 3	4 6	4 8
Skowhegan, XI	156	8 0	26 8	4 7	6 0
Hiram-Waterford, IX	106	7 8	28 6	6 1	6 1
Charleston, XV	64	6 7	25 6	4 6	4 2
Belfast-Wiscasset, XIII	162	6 7	26 8	4 0	3 8
All cream areas	789	7 6	27 4	4 6	4 9
All areas in the State	1,802	8 2	25 8	4 8	5 2

* Includes only those heifers that were expected to freshen during the year ending July or August, 1932

to freshen in the cream areas, however, may not result in a corresponding increase in the size of the herds, because there usually is a tendency to raise more heifers on cream farms than on milk farms. That is, on farms where cream was sold, the available skimmilk is a stimulating factor in encouraging dairymen to raise a greater proportion of their heifer calves, either for replacement purposes in their own herds or for sale as milch cows.

Dairymen were asked how many more cows they could stable and for how many more cows their farms could provide feed other than grain. The answers to these two questions indicate that Maine dairymen could increase the size of their herds without much additional expense. In the milk areas, dairymen stated that they could house an average of 5.0 more cows and could feed an additional 5.5 cows per herd. The average increase on cream farms was limited to 4 6 extra cows that could be stabled and 4.9 more cows that could be fed. The areas in which the greatest increase in the size of herds was readily possible were the milk areas of

Dexter (VIII) and Gardiner-Bath (III) and the cream area of Hiram-Waterford (IX). It is interesting to note in Table 6 that these three areas were also areas in which a relatively large number of heifers were being raised.

The variation in the size of Maine dairy herds is indicated in Table 7. Only about 5 per cent of the dairymen kept herds of more than 16 cows per herd. Herds with 5 or 6 cows were the most common. This group included about one-fourth of all herds. Herds with 7 to 8 cows were the next most common and included about one-fifth of all herds.

TABLE 7

Variation in the Size of 1,802 Maine Dairy Herds in 1931

Number of cows per herd	Number of herds	Per cent of total herds	Number of cows	Per cent of total cows
1 — 4	328	18 20	1,117	7.60
5 — 8	838	46 51	5,393	36.64
9 — 12	389	21 58	3,968	26 97
13 — 16	156	8 77	2,262	15 37
17 — 20	50	2.77	927	6.30
21 and over	39	2 17	1,048	7 12
All herds	1,802	100 00	14,715	100.00

The dairymen with the smallest number of cows per herd were planning a relatively greater increase in the size of their herds than were the larger dairymen, as indicated by the number of heifers expected to freshen during the year ending July or August, 1932. For example, the herds of less than 5.0 cows had an average of 35.0 heifers to freshen per 100 cows as compared with only 20 5 heifers in herds of over 20.0 cows (Table 8). In other words, the smallest herds were to have about 75 per cent more heifers freshen per 100 cows than were the largest herds.

The increase in size of herds, however, is limited to an average of about five cows per herd, unless additional investments are made in both larger barns and more, or better fertilized, crop land. A large increase in the average size of Maine dairy herds cannot be expected unless the price of milk is sufficiently high to encourage these dairymen to make an additional farm investment in land and buildings. Nevertheless, if Maine dairymen should increase the size of their herds so that their present farms and

crop land were used at full capacity, the total increase in the number of cows kept would amount to about 60 per cent.

TABLE 8

Relation of the Size of Herds to the Number of Heifers Expected to Freshen and to the Additional Cows That Could be Kept in 1931

Number of cows per herd	Number of herds	Cows per herd	Heifers to freshen per 100 cows*	Extra cows per herd that could be		Per cent of herds machine milked
				Stabled	Fed	
1 — 4	328	3 4	35 0	4 6	4 0	1 83
5 — 8	838	6 4	27 8	4 8	4 8	2 74
9 — 12	389	10 2	25 3	5 1	6 1	15 68
13 — 16	158	14 3	23 4	4 4	5 4	39 24
17 — 20	50	18 5	17 0	5 7	7 0	38 00
21 and over	39	26.9	20 5	6 3	12 5	69 23
All herds	1,802	8 2	25 8	4 8	5.2	10 99

* Includes only those heifers that were expected to freshen during the year ending July or August, 1932.

The use of milking machines, as would be expected, was much more prevalent in the larger than in the smaller herds About 2.5 per cent of the herds with less than 9 cows were milked by machine as compared to 69.23 per cent of the herds with over 20 cows (Table 8).

The larger herds, on the average, were kept by dairymen who sold milk and cream to large local retail dealers. Their herds contained an average of 9.6 cows as compared to 8.2 cows per herd for the entire State. Producers delivering to plants that received mostly milk, primarily to be shipped out of the State as milk or cream, had the next largest herds. These herds contained an average of 8.5 cows, or one less cow per herd than the patrons of the large local retailers. Farmers selling to independent cream plants and ice cream plants had an average of 8 0 and 7 9 cows per herd respectively. The smallest herds were those of dairymen selling to cream plants that shipped out of the State. The average for this group was 7.3 cows per herd or about one less cow than in herds selling to milk plants that shipped out of the State.

The farmers selling to the cream plants were expecting to have the most heifers freshen during the ensuing year. As previously explained, however, this may not result in a correspond-

ing increase in the size of these herds, because cream farms always tend to raise more cattle to sell.

TABLE 9

Relation of the Type of Plant Buying Milk and Cream to the Average Size of the Dairy Herd in 1931

Type of plant	Number of herds	Cows per herd	Heifers to freshen per 100 cows	Extra cows per herd that could be	
				Stabled	Fed
Large local retail plants	161	9.6	23.7	4.4	4.7
Milk plants shipping out-of-State	741	8.5	24.2	5.2	5.4
Cream plants, local trade	78	8.0	29.1	5.0	5.9
Ice cream plants	353	7.9	26.3	4.9	5.3
Cream plants shipping out-of-State	453	7.3	29.1	4.5	5.0
All plants*	1,802	8.2	25.8	4.8	5.2

* The total for all plants includes 16 additional herds whose owners sold milk to the same cheese factory. These were omitted in order not to show data for any individual plant.

PROPORTION OF ALL COWS THAT WERE PUREBRED

Of all the cows included in this study, 15.02 per cent were purebred (Table 10). The proportion of purebreds was relatively high in the milk area of Dexter (VIII) and in the cream areas of Charleston (XV) and Hiram-Waterford (IX).

When herds were grouped according to the type of plant, at which milk or cream was sold, it was found in each case that dairymen selling cream kept a larger proportion of purebred cows than did those selling milk. The proportion of purebred cows on cream farms, including most of the herds in the cream areas and a few in the milk areas, was 17.58 per cent, whereas the average on milk farms was 13.32 per cent. The reason for this difference was due to several factors. First, many breeders of purebred livestock preferred to sell cream rather than milk because they recognized the feeding value of skimmilk and wished to retain it on the farm to feed to the calves. Second, some dairymen who did not have economical marketing facilities for milk or cream, depended on the sale of purebred livestock for a large part of their income. In these cases, it was often more economical to market cream rather than milk, and such dairymen tended to be cream patrons.

TABLE 10

*Proportion of All Cows That Were Purebred in Each Area in Maine in 1931**

Milk Areas			Cream Areas		
Area	Number of herds	Per cent of cows purebred	Area	Number of herds	Per cent of cows purebred
Dexter, VIII	114	20 30	Charleston, XV	64	27 70
Farmington, V	116	15 71	Hiram-Waterford, IX	106	22 50
Lewiston-Auburn, IV	160	14.52	Strong-Solon, X	139	18 70
Unity, VI	194	13 23	Belfast-Wiscasset, XIII	152	14 81
Portland, II	103	12 00	Skowhegan, XI	156	14 75
Biddeford-Sanford, I	38	11 31	Ellsworth, XIV	50	13 83
Newport-Hermon, VII	220	10 57	Waterville-Augusta, XII	112	11 55
Gardiner-Bath, III	68	9 66			
All milk areas	1,013	13 70	All cream areas	789	16 93
			All areas in the State	1,802	15 02

*For key map of area locations, see Figure 108.

Although purebred cattle have often been advocated as more economical producers than ordinary grade cows, only 5.11 per cent of all herds consisted entirely of purebred animals. In addition to this number, however, there were 21.03 per cent of the dairymen that kept some purebred cows even though their herds were not entirely purebred. In these herds, slightly over one-third of the cows, on the average, were purebred. Within the remaining 73.86 per cent of the herds, all the cows were grades. It should not be inferred, however, that the quality of the majority of these grades was greatly inferior to that of the purebred cows, because many dairymen have built up the quality of their grade herds through the continued use of purebred sires.

In the herds in which all cows were grades, dairymen sold an average of 204 pounds of butterfat per cow annually (Table 11). In comparison, the producers who kept only purebred cows sold an average of 228 pounds of butterfat per cow during the year. This rather small difference in favor of the purebred cows is probably accounted for in several ways. First, many of the grade herds were of excellent quality, and, on the other hand, no doubt some of the purebred herds contained inferior milk producers. Second, the amount of milk and cream sold may not be a fair measure of milk production, because varying amounts of milk

may be consumed and fed on the farm. For example, purebred calves, which are of higher value per head than grades, may be fed whole milk for a longer period before they are weaned, and thus reduce the amount of butterfat sold per cow. In a previous study[20] of Maine dairy herds, it was found that purebred cows produced an equivalent of 5,854 pounds of four per cent milk per cow as compared to 4,986 pounds in grade herds. The purebred cows, in other words, exceeded the grades by 868 pounds of milk containing 35 pounds of butterfat per head.

TABLE 11

Proportion of All Herds That Were Purebred and the Relation of Purebreds to the Size of Herds and Butterfat Sold Per Cow in 1931

Type of herd	Number of herds	Per cent of total herds	Cows per herd	Heifers to freshen per 100 cows	Pounds of butterfat sold per cow
Herds, all cows grade	1,331	73 86	7 6	24.8	204
Herds, mixed	379	21 03	9 9	27 1	211
Herds, all cows purebred	92	5.11	9 8	31 5	228
All herds	1,802	100.00	8.2	25 8	207

Purebred herds contained an average of 2.2 more cows than did grade herds. Also, in the former, a larger proportion of heifers was being raised to freshen during the ensuing year. In purebred herds, 31.5 heifers were expected to freshen per 100 cows, whereas, in grade herds, only 24.8 heifers were to freshen. It was profitable to raise a greater proportion of heifers from purebred herds because purebred heifers were more valuable.

BREEDS OF COWS KEPT

The three breeds of cows that were most numerous in Maine were the Jersey, Holstein, and Guernsey. The breeds of cows, however, were considerably mixed in a number of herds. In fact, 42.64 per cent of the cows were in herds that contained more than one breed, or else were the progeny resulting from the crossbreed-

[20] Dow, George F. Costs and Returns in Producing Milk, Raising Heifers, and Keeping Herd Bulls in Maine. Maine Agr. Exp Sta. Bul. 361, p. 120. 1932.

ing of two or more breeds (Table 12). In dairy herds, other than those of more than one breed or of crossbreeds, the proportion of total cows was 53 89 per cent Jersey, 24 97 per cent Holstein, 16 61 per cent Guernsey, 2.52 per cent Ayrshire, 1 74 per cent Shorthorn, and .27 per cent Brown Swiss.

TABLE 12

Breeds of Dairy Cows Kept in Maine in 1931

Breed of cows	Number of herds	Number of cows	Per cent of total cows	Per cent of cows not in mixed herds
Jersey	576	4,548	30 91	53 89
Holstein	237	2,107	14 32	24 97
Guernsey	173	1,402	9 53	16 61
Ayrshire	22	213	1 45	2 52
Shorthorn	19	147	1 00	1 74
Brown Swiss	3	22	.15	27
Mixed herds*	773	6,276	42 64	
Total	1,802	14,715	100 00	100 00

* Includes herds in which more than one breed of cows was kept and herds of crossbreeds.

The proportion of cows that were in herds of mixed breeds was extremely high in the milk area of Portland (II). In this area 74.27 per cent of all cows were in herds of mixed breeds, whereas the average for the State was 42.64 per cent (Table 13). The Holstein breed predominated as the most important of the dairy breeds in the milk areas of Newport-Hermon (VII) and Dexter (VIII). The Holstein breed was of little importance, on the other hand, in the milk area of Farmington (V) and the cream area of Skowhegan (XI). The cream areas of Strong-Solon (X) and Waterville-Augusta (XII) also had a relatively small proportion of Holstein cows. There was a distinct tendency in the milk areas to keep more herds of Holsteins than were kept in cream areas. In the milk areas, Holsteins represented 32.28 per cent of the cows included in the three most important breeds, while in cream areas the proportion of Holsteins was only 18.34 per cent.

The Guernsey breed apparently had its greatest popularity in the areas of Biddeford-Sanford (I), Gardiner-Bath (III), and Ellsworth (XIV), but it might be well to recognize that Areas I and XIV included rather a small number of records and therefore these herds may not be representative of their entire areas.

The Jersey breed was by far the most important of the three leading dairy breeds in the milk areas of Lewiston-Auburn (IV) and Farmington (V), and in the cream areas of Strong-Solon (X), Skowhegan (XI), and Waterville-Augusta (XII).

TABLE 13

Breeds of Cows Kept in Each Area in Maine in 1931

Area	Number of herds	Per cent of cows in herds of mixed breeds	Per cent of cows in the three major breeds that were		
			Jersey	Guernsey	Holstein
Milk areas:					
Biddeford-Sanford, I	38	53.29	9 38	52 34	38.28
Portland, II	103	74.27	55.22	28.36	16 42
Gardiner-Bath, III	68	51.48	31 05	46.12	22.83
Lewiston-Auburn, IV	160	35.13	79 81	7.36	12 83
Farmington, V	116	38.08	73 89	20 00	6.11
Unity, VI	194	45 06	56 49	11 37	32 14
Newport-Harmon, VII	220	46.65	33 57	14 02	52.41
Dexter, VIII	114	27.97	31.28	8.29	60.43
All milk areas	1,013	45.08	52.25	15.47	32.28
Cream areas:					
Waterford-Hiram, IX	106	37.18	50 00	17 92	32.08
Strong-Solon, X	139	27.37	76.56	11 91	11.53
Skowhegan, XI	156	42 18	65 92	27.68	6.40
Waterville-Augusta, XII	112	45.96	67 80	21 53	10 67
Belfast-Wiscasset, XIII	162	52 69	51 40	16.00	32 60
Ellsworth, XIV	50	34.07	53 18	31.46	15 36
Charleston, XV	64	20.42	47.59	18.97	33.44
All cream areas	789	39.14	61.80	19 66	18.34
All areas in the State	1,802	42.64	56 45	17.40	26 15

The average size of the dairy herd varied slightly for each breed of cattle (Table 14). The average Holstein herd contained one more cow per herd than the average of Jersey herds, and .7 of a cow more than the average of Guernsey herds. The Ayrshire breed, as represented by the few herds included in this study, had the largest sized herds, comprising an average of 9.7 cows as compared with 8.2, the average size of all herds.

Breeders of Jersey cows were expecting approximately the same number of heifers to freshen per 100 cows as the average expected by breeders of all herds. In herds of mixed breeds, three less heifers were to freshen per 100 cows than the average in all herds. The Ayrshire, Holstein, Guernsey, and Shorthorn breed-

ers were expecting a relatively large number of heifers to freshen.

TABLE 14

Relation of Breed of Cows to the Average Size of Dairy Herds and to the Per Cent of Cows That Were Purebred in 1931

Breed of cows in herd	Number of herds	Cows per herd	Heifers to freshen per 100 cows	Per cent of cows purebred
Ayrshire	22	9 7	37 6	46 48
Holstein	237	8 9	30 0	21 92
Guernsey	172	8 2	30 3	20 11
Mixed*	776	8 1	22 8	5 57
Jersey	576	7 9	25 7	20 87
Shorthorn	19	7 7	36 0	17 01
All breeds	1,802	8.2	25 8	15 02

* Includes three herds of Brown Swiss.

The per cent of cows in each breed that were purebred is given in Table 14. In the herds of Holsteins, Guernseys, and Jerseys, the proportion of all cows that were purebred was slightly over 20 per cent.

Detailed information concerning the number of purebreds in each breed of dairy cattle was determined for the State in 1920 At that time, the Holstein breed contained 45.95 per cent of all the purebred cows in dairy breeds (Table 15). Jerseys were second with 31 88 per cent, Guernseys were third with 11 71 per cent, and Ayrshires were fourth with 7.23 per cent. All other breeds included only about three per cent of the total number of purebred cattle.

In 1931, according to breeders' replies to the State Department of Agriculture, Jerseys were first with 34.24 per cent of the total number of purebred dairy cattle; Guernseys, second with 27.46 per cent; Holsteins, third with 26.15 per cent; and Ayrshires, fourth with 7.58 per cent. On this basis, purebred Holstein cattle in Maine have moved from first place in importance in 1920 to third place in 1931.

The trend for each breed is also indicated by the number of dairymen sending their names to the State Department of Agriculture in 1925 and 1931, who made a business of breeding and

raising purebred stock to sell. These figures, which are given in Table 15, indicate a very definite downward trend in Holstein breeders and a slight decrease in Jersey and Ayrshire breeders. The Guernsey breed, on the other hand, definitely advanced in popularity during the six-year period, 1925-1931.

TABLE 15

Number of Purebred Dairy Cattle Classified According to Breed in 1920 and 1931, and Number of Breeders in 1925 and 1931

Breed of cattle	Number of cattle in 1920[21]	Per cent of total cattle	Number of cattle in 1931[22]	Per cent of total cattle	Number of breeders listed	
					1925[22]	1931[22]
Holstein	7,206	45 95	3,444	26 15	477	262
Jersey	4,999	31 88	4,510	34 24	430	396
Guernsey	1,836	11.71	3,616	27 46	235	321
Ayrshire	1,134	7 23	998	7 58	94	79
All other breeds and not specified	508	3 23	602	4 57	41	47
Total	15,683	100 00	13,170	100 00	1,277	1,105

The average pounds of butterfat sold per cow during the year varied only a little between each of the important dairy breeds. In the Guernsey and Ayrshire herds, 219 pounds of butterfat were sold per cow as compared with 216 pounds for Jerseys, 208 pounds for Holsteins, and 199 pounds for herds of mixed breeds. Ayrshire and Holstein cows, which produced milk with a low butterfat content, produced a larger quantity of milk than any of the other breeds.

Of the total butterfat sold on Guernsey and Jersey farms, about one half was sold as milk and the remaining half as cream. In the case of Holstein herds nearly three-fourths of the butterfat was sold as milk; and in Ayrshire herds milk sales represented over four-fifths of the total butterfat sold. The majority of dairymen who kept Holstein or Ayrshire cows evidently preferred to

[21] Dairy Statistics, Year Ending Dec. 31, 1926, with Comparable Data for Earlier Years U. S. Dept. Agr., Statistical Bul. 25, Table 4, p. 13. 1929.

[22] Tucker, H. M. List of Breeders of Purebred Stock. Div. of Animal Ind., Maine Dept. Agr. Biannual Reports, 1927 and 1931.

TABLE 16

Relation of Breed of Cows to the Amount of Butterfat Sold Per Cow Annually and to the Type of Product Sold in 1931

Breed of cows	Number of herds	Pounds of butterfat sold per cow	Per cent of total butterfat for each breed sold as	
			Milk	Cream
Jersey	576	216	51 09	48 91
Holstein	237	208	73 95	26 05
Guernsey	172	219	44 21	55 79
Ayrshire	22	219	85 90	14 10
Shorthorn	19	161	50 19	49 81
Mixed breeds	776	199	67 71	32 29
All breeds	1,802	207	61.03	38 97

sell milk rather than cream On the other hand, Jerseys and Guernseys were considered good breeds when cream was sold and were kept also in large numbers on farms where milk was sold. During 1931, for example, on farms where milk was sold the number of Jersey and Guernsey cows was approximately twice as large as that of Holstein cows (excluding herds of mixed breeds).

This large number of Jerseys and Guernseys on milk farms was probably the result of either one or two factors. First, dairymen who now sell milk but formerly sold cream may have been hesitant to change to a different breed producing a lower test milk, and have thus retained their former breed from force of habit or because of personal preferences. Second, under previous prices, dairymen have found the Jersey and Guernsey breeds to be as profitable as the Holstein and Ayrshire breeds.

The test of milk that is most profitable to produce depends, of course, on whether a sufficiently high price premium is paid for high test milk. In a previous study,[22] it was found that milk prices from 1920 to 1930 inclusive, as paid by the New England Milk Producers' Association, slightly favored high test breeds, with the exception of the year 1930. It was concluded further that future prices, if determined on a similar basis, would probably tend to be approximately of the same advantage to all breeds, regardless of the butterfat test of milk produced.

[22] Same as footnote 20, p. 9.

BUTTERFAT CONTENT OF MILK AND CREAM SOLD PER HERD

The butterfat test of milk sold in all of the milk areas, averaged for the herds represented by the questionnaires, was 4.21 per cent (Table 17). The average test of milk varied from 3.80 per cent in the vicinity of Dexter (VIII), which was a concentrated Holstein section, to 4.65 per cent in the area of Farmington (V), where the Jersey breed was predominant.

In the cream areas, the average cream test varied from 16.22 per cent in the Belfast-Wiscasset area (XIII) to 26.52 per cent in the Charleston area (XV). The Ellsworth area (XIV) also had a high average butterfat test of 26.24 per cent. The average butterfat test for all cream sold in the cream areas was 20.24 per cent.

The average test of milk and cream sales, combined for all herds that reported, was 6.12 per cent.

TABLE 17

The Butterfat Content of Milk and Cream Sold in Each Area in Maine in 1931

Area	Average butterfat test of product sold		
	Milk	Cream	Total
Milk areas:			
Portland, II	4.18	25.77	4.22
Farmington, V	4.65	16.84	6.70
Dexter, VIII	3.80	20.62	4.37
Lewiston-Auburn, IV	4.58	17.75	5.50
Unity, VI	4.17	16.85	4.62
Biddeford-Sanford, I	4.30	26.13	4.81
Gardiner-Bath, III	4.39	16.84	5.43
Newport-Hermon, VII	4.04	20.94	4.81
All milk areas	4.21	18.19	4.94
Cream areas:			
Ellsworth, XIV	——	26.24	26.24
Skowhegan, XI	4.44	19.59	8.68
Strong-Solon, X	4.39	20.92	10.63
Hiram-Waterford, IX	4.29	20.40	8.03
Waterville-Augusta, XII	4.67	19.13	8.15
Charleston, XV	4.05	26.52	17.06
Belfast-Wiscasset, XIII	4.48	16.22	8.63
All cream areas	4.45	20.24	9.63
All areas in the State	4.26	19.59	6.12

Of the total butterfat sold in the form of milk, only about 16 per cent was in milk with a butterfat test of less than 3.8 per

cent, even though most large dealers quote milk prices in terms of 3.7 per cent milk. Approximately one-half of the total butterfat sold as milk was in milk testing from 3.8 to 4.5 per cent, and the remaining 32 48 per cent was in milk testing from 4 6 to 6 0 per cent (Table 18).

TABLE 18

Frequency Distribution of the Butterfat Content of Milk and Cream Sold by Maine Dairymen in 1931

Milk Sold			Cream Sold		
Butterfat test (per cent)	Number of herds	Per cent of total butterfat sold	Butterfat test (per cent)	Number of herds	Per cent of total butterfat sold
Under 3 8	160	15 95	Under 15 0	103	12 71
3.8 — 4.1	276	24 74	15 0 — 19 9	219	25 24
4 2 — 4 5	279	26 83	20 0 — 24 9	260	33 50
4 6 — 4 9	141	14 77	25 0 — 29 9	126	15 82
5 0 — 6 0	174	17 71	30 0 and over	64	9 73
Total milk	1,030	100 00	Total cream	772	100 00

The most common butterfat content of cream sold was between 20 and 25 per cent. Of the total butterfat sold as cream, 12.71 per cent was in cream that tested under 15 per cent and, at the other extreme, 9.73 per cent that tested 30 per cent or more.

UTILIZATION AND SALE OF MILK AT THE FARM

In Table 19 is presented an estimate made by the Bureau of Agricultural Economics of the United States Department of Agriculture showing the utilization and sale at the farm of all milk produced in Maine. It was estimated that, during 1928, about 30 per cent of all milk produced was fed and consumed on the farm. Of this amount, about one-fourth was whole milk fed to calves and about three-fourths was milk equivalent consumed on the farm as butter, milk, and cream. The amount of dairy products sold represented nearly 70 per cent of all milk produced. This

was comprised of approximately one-fifth sold as farm butter and four-fifths sold in other forms, such as milk and cream.

TABLE 19

Utilization and Sale at the Farm of Milk Produced in Maine During 1928

Use of milk	Total for all cows[24]		178 dairy herds[25]	
	Million pounds	Per cent of total pounds	Cwt. per herd	Per cent of total
Whole milk fed to calves	46	7.35	42	7.22
Milk equivalent consumed on the farm:				
Farm butter	72	11 50	7	1.20
Milk and cream	73	11.66	37	6.36
Milk equivalent sold				
Farm butter	90	14.38]	496	85.22
Other milk products	345	55.11]		
Total milk products	626	100.00	582	100 00

The proportion of all milk that was fed and consumed on Maine farms was relatively high (30.51 per cent), because that study included many farms that kept only a few cows for the primary purpose of supplying dairy products for home consumption. On farms where dairying was an important farm enterprise, the proportion of dairy products used on the farm was much smaller due to the increased quantity produced. On 178 Maine dairy farms during the year ending March 31, 1928, it was found that only 14.78 per cent of the total milk was used on the farm and that 85.22 per cent was sold (Table 19). The proportion fed to calves was approximately the same as on all farms in the State, but the proportion used in the home was about one-third of that for the entire State The relative importance of dairy products used on the farm and the amount sold are shown in Figure 109.

[24] Farm Value, Gross Income, and Cash Income from Farm Production, Part I. Estimates by Commodities and by States, together with Production, Disposition, and Price Data Used, 1924-1928. Sec. II. Livestock and Livestock Products. A preliminary report. Bur. Agr. Econ., U. S. Dept. Agr. Mimeographed report, pp 331-332. 1930.

[25] Computed from data of George F. Dow. The Costs and Returns in Producing Milk, Raising Heifers, and Keeping Herd Bulls in Maine. Maine Agr. Exp. Sta. Bul. 361, pp. 122, 139, 141. 1932.

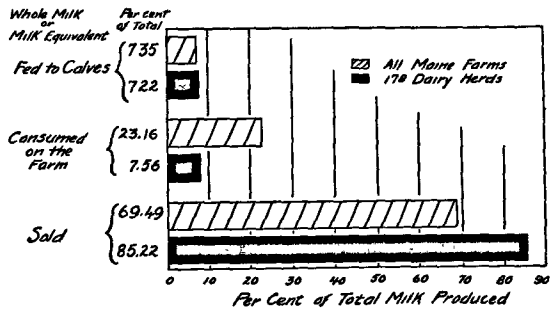

FIG. 109 UTILIZATION AND SALE AT THE FARM OF MILK PRODUCED ON ALL MAINE FARMS DURING 1928 AND ON 178 DAIRY FARMS DURING THE YEAR ENDING MARCH 31, 1928

(Based on data in Table 19)

The total pounds of milk and cream sold by Maine dairymen in 1928 were found in this study to equal a milk equivalent of 350 million pounds of four per cent milk. This amount is only about 1.5 per cent larger than that estimated by the United States Bureau of Agricultural Economics in Table 19. Of the 350 million pounds sold, 187 million, which were 31 per cent of all milk produced, were sold to the larger dealers (those who purchased an equivalent of 500 or more quarts of milk daily). The remaining 163 million pounds, which were 27 per cent of all milk produced in Maine, were sold to the smaller dealers, mostly local retailers (those who purchased an equivalent of less than 500 quarts of milk daily).

In Table 20, dairymen's sales of milk and cream to the larger dealers and smaller retailers have been computed by counties. The remainder of the estimated total milk production is considered as milk used on the farm and sold as farm butter. In Aroostook and Washington Counties, the percentage used on the farm and made into butter was relatively large, amounting to 89.79 and 74.50 per cent respectively of the total milk production. In contrast, less than one-fourth of the milk produced in Androscoggin, Franklin, and Cumberland Counties was used on the farm or made

TABLE 20

Utilization and Sale at the Farm, by Counties, of all Milk Produced in Maine During 1928

(Thousands of pounds, i.e., 000 omitted)

County	Total pounds of milk produced[26]	Pounds of milk equivalent sold as milk and cream to		Per cent of total production		
		Larger dealers	Smaller retailers	Sold to larger dealers	Sold to smaller retailers	Farm use and farm butter
Androscoggin	31,000	15,948	11,493	51 45	37 07	11.48
Aroostook	75,764	865	6,874	1.14	9.07	89 79
Cumberland	48,995	17,789	20,283	36 31	41 40	22.29
Franklin	23,473	14,067	5,499	59 92	23 42	16 66
Hancock	18,284	4,760	7,141	26 03	39 06	34.91
Kennebec	62,093	21,461	20,149	34 56	32 45	32 99
Knox	17,422	3,323	9,209	19 07	52.86	28 07
Lincoln	18,040	5,954	3,063	33 00	16 98	50.02
Oxford	46,200	12,572	8,451	27 21	18 29	54.50
Penobscot	78,737	30,892	22,868	39.24	29 04	31 72
Piscataquis	18,537	4,325	3,602	23 33	19 43	57 24
Sagadahoc	10,296	1,490	4,949	14 47	48 07	37.46
Somerset	48,991	25,574	7,287	52 21	14.87	32 92
Waldo	38,370	22,420	2,737	58 43	7.13	34.44
Washington	23,329	633	5,317	2.71	22 79	74.50
York	43,344	4,923	24,295	11.36	56 05	32 59
State	602,880	186,996	163,217	31.02	27.07	41.91

into farm butter. Sales of milk and cream to smaller retailers were relatively large in York, Knox, Sagadahoc, and Cumberland Counties. Sales to the larger dealers represented a majority of the total milk produced in Franklin, Waldo, Somerset, and Androscoggin Counties.

The remainder of this bulletin deals with dairymen's sales of milk and cream, plant utilization in Maine, and the subsequent sale of dairy products within the State.

MILK AND CREAM SOLD BY MAINE DAIRYMEN TO THE LARGER DEALERS IN 1928

Dairymen's sales, in this section, include the total amount of milk and cream delivered in 1928 to all dealers who bought an equivalent of 500 or more quarts of milk daily in Maine.

[26] Maine Crop and Livestock Review, 1928. Maine Dept. Agr., Augusta. Mimeographed report, p. 20.

TOTAL AMOUNT OF MILK AND CREAM SOLD

The total supply of milk and cream sold to the larger dealers in 1928 is shown in Table 21. The total for the State during the year was 109,776,462 pounds of milk and 17,626,324 pounds of cream, or a milk equivalent of approximately 187 million pounds of four per cent milk. The majority of these sales, or 63.73 per cent of the total, was to plants that shipped milk and cream out of the State. An additional 16.55 per cent of the milk and cream sold was received by dealers who were primarily local retailers. Plants that purchased cream to sell within the State and plants that had an important ice cream business accounted for 4.26 per cent and 12.85 per cent respectively of total sales. Milk and cream sold to butter, and cheese plants represented only 2.10 per cent of the total sales. Miscellaneous plants include several plants of varying type that were in the business only part of the year.

The most important counties, in terms of the total pounds of butterfat sold to dairy dealers, were Penobscot, Somerset, Waldo, Kennebec, Cumberland, Androscoggin, Franklin, and Oxford, in order of decreasing importance (Table 22). In Washington and Aroostook Counties, the total sales of milk and cream were very small. Total sales, however, do not indicate the intensity of sales as well as do the average pounds of butterfat sold per 100 acres of farm land. On the basis of the concentration of sales, Cumberland County ranked first, closely followed by Waldo, Androscoggin, Franklin, Somerset, Penobscot, and Kennebec Counties.

The relative concentration of butterfat sold to dairy dealers in each town, during 1928, is illustrated in Figure 110. Towns, in which the largest amount of butterfat was sold per 100 acres of farm land, were in the areas north of Portland and northeast of Lewiston and Auburn; and in the vicinities of Farmington, Unity, Hermon, Newport, and Dexter. The concentration of sales was relatively low in the vicinities of Sanford, Hiram, Waterford, Rumford, Solon, Augusta, Ellsworth, and in the towns of northeastern Maine. The amount of butterfat sold in each town is given in Table 1 of the Appendix. The areas of greatest concentration of butterfat sales do not always correspond with those of the densest cow population (Figure 104), because butterfat sales to the larger dealers are only a part of the total milk production which also includes dairy products retailed by small local dealers and those consumed on the farm.

TABLE 21

Total Pounds and Butterfat Content of Milk and Cream Sold by Maine Dairymen to the Larger Dairy Dealers During 1928

Type of plant buying milk or cream	Milk sold		Cream sold		Total four per cent milk equivalent		
	Pounds milk	Pounds butterfat	Pounds cream	Pounds butterfat	Total pounds	Pounds butterfat	Per cent of total
Local retail plants	28,695,800	1,141,670	443,293	96,014	30,942,103	1,237,684	16.55
Milk plants shipping out-of-State	66,306,696	2,731,813	2,281,406	300,357	75,804,255	3,032,170	40 54
Cream plants shipping out-of-State	7,033,512	303,706	9,745,605	1,431,166	43,371,808	1,734,872	23.19
Cream plants, local trade	1,006,000	71,862	1,141,170	248,955	7,970,410	318,816	4 26
Ice cream plants	4,545,613	197,303	3,514,763	763,877	24,029,504	961,180	12.85
Butter, and cheese plants	1,650,249	68,531	448,588	88,234	3,919,855	156,795	2 10
Miscellaneous plants	539,592	25,193	51,499	13,155	967,993	38,319	.51
Total all plants	109,776,462	4,540,078	17,626,324	2,939,758	186,995,908	7,479,836	100 00

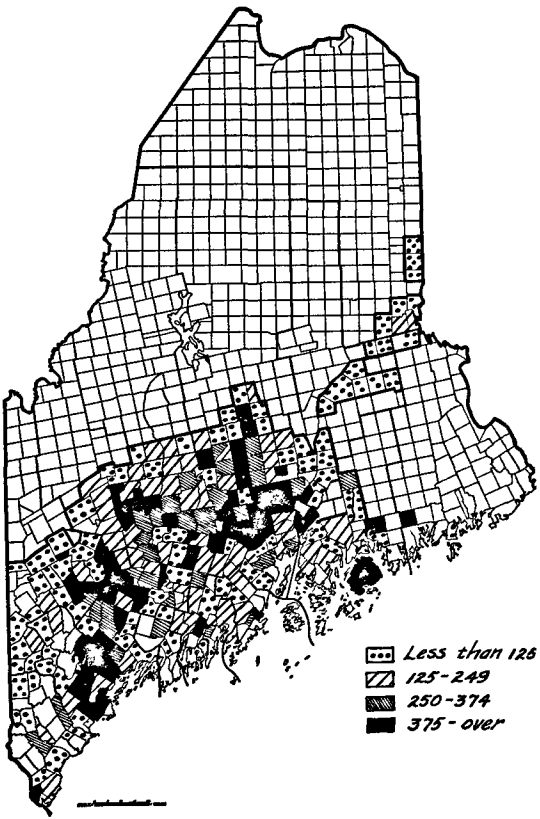

FIG. 110 POUNDS OF BUTTERFAT SOLD TO THE LARGER MAINE DAIRY DEALERS PER 100 ACRES OF FARM LAND, BY TOWNS, IN 1928

The most concentrated sales of butterfat were in the towns north of Portland, northeast of Lewiston and Auburn, and in the vicinities of Farmington, Unity, Hermon, Newport, and Dexter

TABLE 22

Total Pounds of Butterfat Sold to the Larger Dealers, and Relative Concentration of Sales by Counties in 1928

County	Total pounds of butterfat sold	Pounds butterfat sold per 100 acres of farm land[27]	Per cent of total butterfat sold as	
			Milk	Cream
Cumberland	711,566	336	88.88	11.12
Waldo	896,799	306	77.07	22.93
Androscoggin	637,910	296	76.14	23.86
Franklin	562,668	255	46.67	53.33
Somerset	1,022,960	251	34.75	65.25
Penobscot	1,235,658	245	74.29	25.71
Kennebec	858,437	235	43.47	56.53
Lincoln	238,170	140	45.92	54.08
Oxford	502,860	128	58.80	41.20
Hancock	190 417	127	4.31	95.69
Piscataquis	173,010	113	70.04	29.96
Knox	132 917	92	35.66	64.34
York	196,934	90	89.93	10 07
Sagadahoc	59,602	65	92.16	7.84
Washington	25,327	11	15.20	84.80
Aroostook	34,601	4	11.20	88.80
State	7,479,836	161	60.70	39.30

In about one-third of the towns represented in Figure 110, less than 125 pounds of butterfat were sold per 100 acres of farm

TABLE 23

Concentration of Butterfat Sales to the Larger Dealers by Towns, and Relation to the Proportions Sold as Milk and as Cream in 1928

Pounds of butterfat per 100 acres of farm land	Number of towns	Per cent of total towns	Total pounds of butterfat sold	Per cent of butterfat in each group sold as		Average pounds of butterfat sold per patron
				Milk	Cream	
Under 125	96	36 64	602,996	37 96	62.04	899
125 — 249	99	26.34	1,769,075	42.04	57.96	1,000
250 — 374	36	13.74	1,502,115	55.88	44.12	1,189
375 and over	61	23.28	3,605,650	75.66	24.34	1,253
State	262	100.00	7,479,836	60.70	39.30	1,137

[27] Acres of farm land, which were used in this computation, were obtained from data of the Bur. of Census, U. S. Dept. Commerce. Fifteenth Census of the United States, 1930. Agriculture, Vol. II, Part I. The Northern States, pp. 118, 119.

land during 1928 (Table 23). Butterfat sales amounted to 375 pounds or more per 100 acres of farm land in only 23.28 per cent of the towns.

The concentration of butterfat sales in each town was definitely related to the type of product sold. In towns where the sales were small and scattered, there was a tendency to sell cream, and in towns where the sales were large and concentrated, the majority of butterfat was sold as milk. For example, in towns where less than 125 pounds of butterfat were sold per 100 acres of farm land, milk sales represented only slightly over one-third of the butterfat sold; but in the towns of greatest concentration, milk sales represented about three-fourths of the total butterfat sold (Table 23).

The percentage of total butterfat sales that were delivered as milk is shown in Figure 111 for each town in the State.[28] Towns that are solid black are those in which practically all of the butterfat sold was delivered as milk. Towns which are dotted are those in which cream sales predominated and in which milk sales were relatively unimportant. The sections, in which the majority of butterfat was sold as milk rather than as cream, combine into two distinct areas. One of these milk areas extends from Kittery, at the extreme southwestern end of Maine, up through Portland, Lewiston, and Auburn to Farmington. The other area extends eastward from Albion through Unity to Bangor, and northward through Dexter to Dover-Foxcroft. The cream areas include the towns surrounding and between the two important milk areas.

The relative amount of butterfat sold as milk and as cream, by counties, is shown in Table 22. The five counties in which milk sales represented the highest proportion of the total butterfat sold were Sagadahoc, York, Cumberland, Waldo, and Androscoggin. The five counties in which cream sales were proportionally the highest were Hancock, Aroostook, Washington, Somerset, and Knox. Of the total butterfat sold to the larger dealers in the State as a whole, 60.7 per cent was delivered as milk and 39.3 per cent, as cream.

[28] Since 1928, there has been a definite shift from cream to milk in the vicinities of Harmony and Skowhegan, and from milk to cream in the vicinity of Wiscasset.

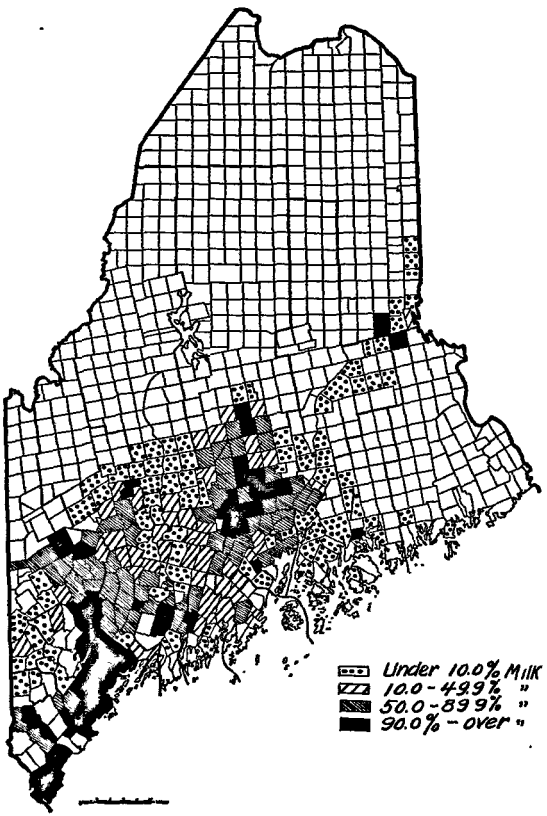

FIG 111. PERCENTAGE OF TOTAL BUTTERFAT SOLD TO THE LARGER DEALERS THAT WAS DELIVERED AS MILK, BY TOWNS, IN 1928

Areas that are solid black represent towns in which milk sales predominated. Towns that are dotted are those in which cream sales were much more important than were milk sales. (Based on data in Table 1 of the Appendix)

NUMBER AND SIZE OF PRODUCERS

A total of 6,580 Maine milk producers[29] sold milk or cream to the larger dairy dealers during 1928 (Table 24). Of this number, 53.45 per cent sold milk and 46 55 per cent sold cream. The plants that shipped a large proportion of their dairy products out of the State received milk and cream from 4,236 dairymen, or from nearly two-thirds of the total number of producers. Plants that sold large quantities of ice cream purchased milk and cream from nearly one thousand dairymen. Butter, and cheese plants had a total of only 231 patrons.

TABLE 24

Number and Size of Producers Who Sold Milk and Cream to the Larger Dairy Dealers in Maine in 1928

Type of plant buying milk or cream	Total number of producers			Pounds of butterfat sold per producer		
	Milk	Cream	Total	Milk	Cream	Average
Local retail plants	650	74	724	1,756	1,306	1,711
Milk plants shipping out-of-State	2,222	282	2,504	1,230	1,063	1,211
Cream plants shipping out-of-State	264	1,468	1,732	1,148	975	1,001
Cream plants, local trade	60	288	348	1,208	857	917
Ice cream plants	208	781	989	946	978	971
Butter, and cheese plants	80	151	231	857	584	679
Miscellaneous plants	33	19	52	762	711	744
Total all plants	3,517	3,063	6,580	1,291	960	1,137

On the average, each dairyman sold 1,137 pounds of butterfat during 1928 The largest producers were those who sold milk and cream to local retail plants (Table 24). The patrons of local retail plants sold an average of 1,711 pounds of butterfat per producer The next largest producers were those who sold to milk plants shipping out of the State. These dairymen sold an average of 1,211 pounds of butterfat and were followed, in order of decreasing size, by producers selling to cream plants ship-

[29] The number of producers was computed as the average between the total number of dairymen in June and in November.

Dairymen in Maine who sell to a dairy dealer are frequently called the patrons of that dealer. Therefore, the term patron, as used in this bulletin, refers to the producers who supply the dealer with milk or cream.

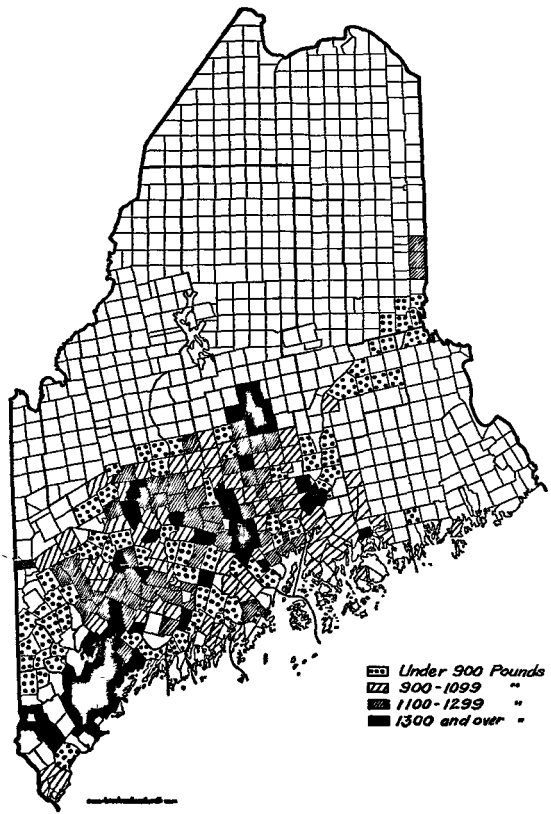

FIG. 112. POUNDS OF BUTTERFAT SOLD PER DAIRYMAN TO THE LARGER MAINE DEALERS DURING 1928, BY TOWNS

Sales per dairyman were largest near the retail markets of Sanford, Biddeford, Portland, Auburn, Waterville, and Bangor, and near the wholesale centers of Farmington, Unity, and Dover-Foxcroft (Based on data in Table 1 of the Appendix)

ping out of the State, ice cream plants, cream plants with local trade, and butter, and cheese plants. The latter group sold an average of only 679 pounds of butterfat per producer.

Dairymen who delivered milk sold a larger average amount of butterfat during the year than did those who delivered cream. The average sales per milk patron in Maine during 1928 were 1,291 pounds of butterfat as compared to 960 pounds sold per cream patron This relationship existed for each type of plant, with the exception of ice cream plants. It was also found that milk patrons sold about one-third more butterfat per dairyman than did cream producers in areas of both low and high concentrated dairy sales.

The relative amount of butterfat sold per producer is shown, by towns, in Figure 112. The largest sales per patron, as indicated by the solid black areas, were near the retail markets of Sanford, Biddeford, Portland, Auburn, Waterville, and Bangor. Dairy sales were also relatively large in the wholesale milk areas in the vicinities of Farmington, Unity, and Dover-Foxcroft. Producers in the cream area in the vicinities of Norridgewock, Skow-

TABLE 25

Total Number of Dairymen Selling Milk and Cream to the Larger Dealers, and the Average Pounds of Butterfat Sold Per Dairyman, by Counties, in 1928

County	Number of dairymen selling			Pounds of butterfat sold per dairyman
	Milk	Cream	Total	
Cumberland	362	104	466	1,528
York	120	24	144	1,364
Piscataquis	85	49	134	1 293
Androscoggin	348	160	508	1 256
Waldo	519	211	730	1,228
Franklin	179	300	479	1,175
Kennebec	297	480	777	1,105
Somerset	302	634	936	1,092
Penobscot	804	332	1,136	1,088
Sagadahoc	49	7	56	1,064
Knox	35	95	130	1,019
Hancock	2	194	196	972
Oxford	277	259	536	938
Aroostook	5	34	39	887
Lincoln	128	146	274	869
Washington	5	34	39	651
State	3,517	3,063	6,580	1,127

hegan, and Madison also had fairly large sales of butterfat per patron.

The number and average size of producers in each county are presented in Table 25. The dairymen with the largest sales, on the average, were located in the counties of Cumberland, York, Piscataquis, Androscoggin, and Waldo. In each of these counties during 1928, an average of over 1,200 pounds of butterfat was sold per dairyman.

SEASONAL VARIATION IN MILK AND CREAM SOLD BY DAIRYMEN

Seasonal variation in sales during 1928

The amount of milk and cream sold in 1928 by dairymen varied from month to month (Figure 113). There was a gradual

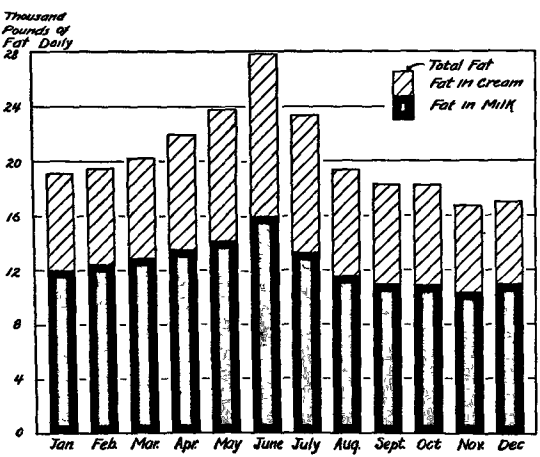

FIG. 113. SEASONAL VARIATION IN THE TOTAL POUNDS OF BUTTERFAT SOLD DAILY AS MILK AND AS CREAM BY MAINE DAIRYMEN TO THE LARGER DEALERS IN 1928

The sales of both milk and cream reached their highest point in June. June sales were 28.42 per cent higher for milk and 48.61 per cent higher for cream than the average daily sales for the year.

increase in sales during the five months from January through May, followed by a rapid increase in June. After sales reached their highest peak in June, they declined rapidly during July and August, and then remained at a comparatively low level from September through December. During 1928, the average amount of butterfat sold daily as milk and as cream reached its lowest point in November, with 16,735 0 pounds of butterfat as compared with 27,866.5 pounds sold in June. In other words, June sales were about 66 per cent higher than sales in November.

Although the seasonal variation in the sale of both milk and cream was somewhat similar, milk sales had less seasonal variation than cream sales. As shown in Table 26, milk sales varied from a high point in June, which was 128 42 per cent of the daily average for the year, to a low point of 83 58 per cent in November. Cream sales, on the other hand, varied from 148.61 per cent in June to 74 91 per cent in December The maximum spread in these percentages, which are frequently termed index numbers, was 45 points for milk as compared with 74 points for cream.

TABLE 26

Seasonal Variation in the Amount of Butterfat Sold Daily by Maine Dairymen to All the Larger Dealers in 1928

Month	Pounds of butterfat sold daily as			Per cent of daily average for the year		
	Milk	Cream	Total	Milk	Cream	Total
January	11,992 8	7,117 8	19,110 6	96 68	88 62	93 51
February	12,401 8	7,100 0	19 501 8	99 98	88 40	95 43
March	12,818 2	7,418 6	20,236 8	103 33	92 36	99 02
April	13,529 5	8,384 1	21,913 6	109 07	104 38	107 23
May	14,199 1	9,572 8	23,771 9	114 47	119 18	116 32
June	15,929 6	11,936 9	27,866 5	128 42	148 61	136 36
July	13,289 6	10,026 9	23,316 5	107 13	124 84	114 09
August	11.507 4	7.826 1	19,333 5	92 77	97 44	94 60
September	10.958 6	7.302 3	18,260 9	88 34	90 91	89 35
October	10 908 7	7,316 2	18,224 9	87 94	91 09	89 18
November	10,368 0	6 367 0	16,735 0	83 58	79 27	81 99
December	10,989 3	6,016 6	17,005 9	88 59	74 91	83.21
Average for 1928	12,404.6	8,032 1	20,436 7	100 00	100 00	100 00

Trend of seasonal variation in sales from 1927 to 1931 inclusive

The available records of thirteen large dealers[30] in Maine during the five-year period from 1927 to 1931 made possible a study of the trend in these sales (Figure 114). During 1927 and 1928, when sales were very similar, the index number of milk sales during the June peak was 131.31. In the following years, however, there was a decrease in the relative amount of June sales and an increase in sales for September to December inclusive.[31] The June index for 1929 and 1930 averaged 117.88, or 13.43 points less than the June average of the two previous years. The index of June milk sales in 1931 was 121.06 which was only 21.06 per cent above the average daily milk sales for that year.[32] The month of lowest average daily milk sales also changed during these five years from the month of November in 1927 and 1928 to September in 1929 and 1930 and to August in 1931.

The seasonal variation in cream sales by Maine dairymen did not show any definite change during the five-year period from 1927 to 1931 (Figure 114). There has not been any special program to secure more uniform cream sales, and dairymen continue to sell a relatively large amount of cream in June, followed by a rapid decline in sales to a low point in November.

This comparison of the seasonal variation in milk and cream sales for each year of the five-year period 1927 to 1931 indicates

[30] The figures for 1929 to 1931 inclusive were furnished through the courtesy of Charles M White, Chief, Div of Markets, Maine Dept. Agr, who obtained these data by enlarging the questionnaire which he distributed annually to Maine dealers.

[31] The greater uniformity of milk sales since 1928 has been due, in part, to a program sponsored by organizations, such as the New England Milk Producers' Association. Starting in 1930, the modified sales plan was used by several of the larger dealers who paid each of their producers the low surplus price for such milk as was delivered in excess of twice the producer's average sales for the preceding months of October, November, and December. Again in 1931, a more uniform production throughout the year was encouraged by the adoption of the basic rating plan by the New England Milk Producers' Association. Under this price policy, each dairyman had to bear his own surplus, receiving the surplus price for all milk delivered in excess of his rating, which was based on market requirements in the months when sales are low.

[32] Due to the drop in milk prices during 1931, milk sales during the last half of 1931 were probably relatively lower than normally occur, thus influencing the seasonal variation in sales for that year.

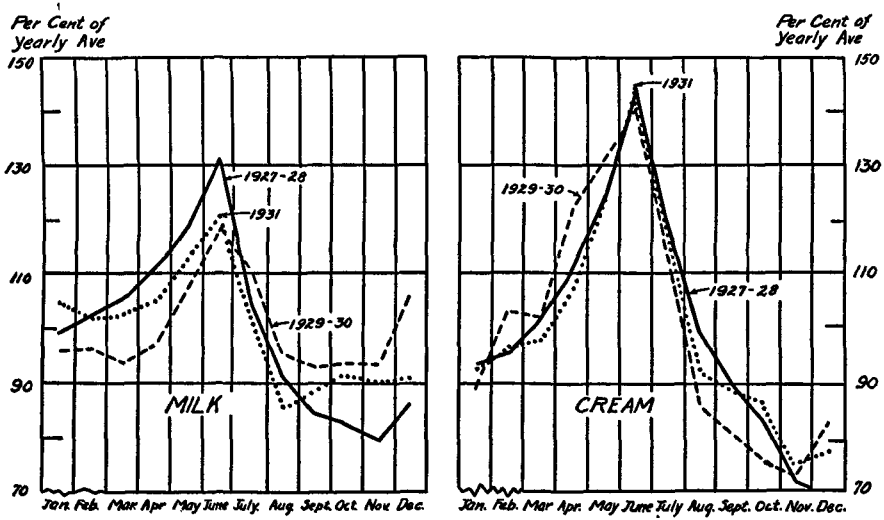

FIG. 114. SEASONAL VARIATION IN MILK AND CREAM SOLD BY DAIRYMEN TO THIRTEEN MAINE DEALERS, 1927-1931 INCLUSIVE

Milk Sales have become more uniform than they were in 1927 and 1928, and the month of lowest daily sales has shifted from November in 1927 and 1928 to August in 1931 The seasonal variation in cream sales has held relatively constant from 1927 to 1931.

that in 1928, the year on which this study was primarily based, there was a normal seasonal variation in Maine, with the exception that milk sales have tended to become somewhat more uniform.

TABLE 27

Seasonal Variation in the Amount of Milk and Cream Sold Daily by Dairymen to Thirteen Maine Dealers During the Five-Year Period, 1927-1931*

(Expressed as per cent of average of period)

Month	Milk			Cream		
	1927-28	1929-30	1931	1927-28	1929-30	1931
January	99 64	95.80	104.96	93.53	88.92	92 68
February	102.58	95.96	101.92	95.74	103.37	96 60
March	106.30	93.78	102.66	101.06	102.24	97.47
April	111 02	97.26	104.97	110.26	121 71	107.01
May	118.60	106.34	113.35	123.94	131 00	123.34
June	131.31	117.88	121.06	144.24	141.32	148 60
July	106.20	110.48	100.99	118.60	114.06	114.66
August	91.59	95.10	87.74	96 70	85.86	91 99
September	84.54	93.07	89 01	89 96	80 68	88.34
October	82.91	93.39	91.76	82 84	75 67	86 71
November	79.62	93.36	90.87	71.80	73.14	75 14
December	86.12	107.24	91.09	69.54	82.90	77.74
Average for period	100.00	100.00	100 00	100 00	100 00	100.00

* These dealers operated 45 dairy plants in Maine during 1928 and handled 78.2 per cent of the total butterfat purchased by the larger Maine dairy dealers.

Comparison of seasonal variation in dairymen's sales in Maine, Vermont, and New York

Sales of both milk and cream in Maine were much more uniform than in either Vermont or New York (Figure 115). The spread between the index numbers of milk sales, averaged for the high months of May and June and also for the low months of November and December, was only 35 points for Maine as compared with 42 points for Vermont and 67 points for New York. In a similar way, cream sales in Maine varied 57 points as compared with 82 and 111 points in Vermont and New York respectively. Maine dairymen, on the average, have an advantage under a basic rating price plan, because they have a smaller proportion of surplus to be sold at surplus prices, and, therefore, receive a relatively higher value for all of their milk. The sea-

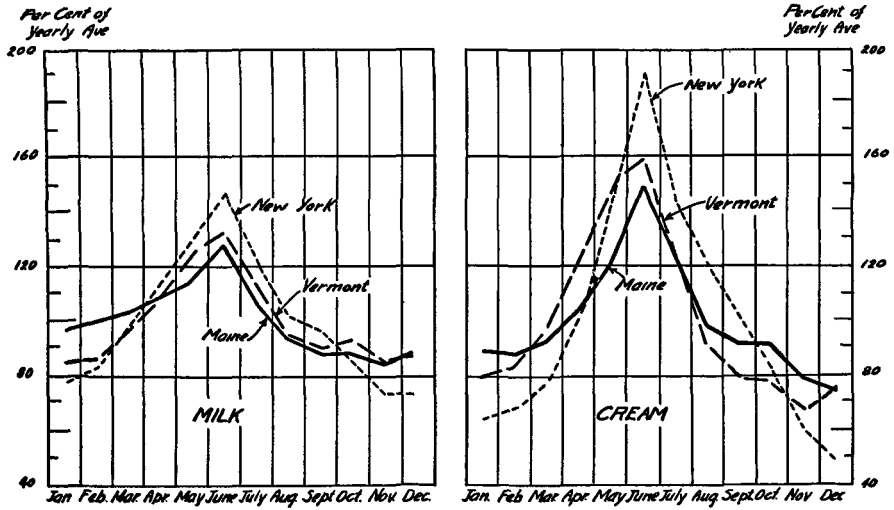

FIG 115 THE SEASONAL VARIATION IN ALL MILK AND CREAM SOLD BY MAINE DAIRYMEN TO THE LARGEST DEALERS IN 1928 AS COMPARED TO DAIRYMEN'S SALES IN NEW YORK DURING 1928 AND IN VERMONT DURING 1929

The sales of both milk and cream were much more uniform in Maine than in either Vermont or New York

sonal variation in sales in Maine also is advantageous to dealers, because the greater uniformity of Maine production permits dealers to sell in their regular market outlets a greater proportion of the total milk and cream purchased during the year.

TABLE 28

Relation of Seasonal Variation in All Milk and Cream Sold by Maine Dairymen to the Larger Dealers in 1928 as Compared with Sales by Dairymen in New York During 1928 and in Vermont During 1930

(Expressed as per cent of yearly average)

Month	Milk			Cream		
	Maine	Vermont[83]	New York[84]	Maine	Vermont[83]	New York[84]
January	96 68	84 85	78 37	88.62	79 58	69 76
February	99 98	86 31	83 32	88 40	83 37	67.75
March	103 33	96 93	96 86	92 36	97 05	77 11
April	109 07	108 90	113 89	104 38	121 01	100 75
May	114 47	125 29	131 10	119.18	147 74	140 19
June	128 42	132 60	147 39	148 61	159 05	190 64
July	107 13	113 28	121 87	124 84	122 45	144 63
August	92 77	94 58	101 03	97 44	90 51	120 86
September	88 34	89 69	95 55	90 91	78 89	102 30
October	87 94	93.32	85 37	91 06	77 55	82 41
November	83 58	85 02	72 51	79 27	66 96	60 08
December	88 59	88.43	72 93	74 91	75 04	49 19
Average for year	100 00	100 00	100 00	100.00	100 00	100 00

Seasonal variation in sales to each type of dairy plant in 1928

The seasonal variation in dairymen's sales of milk and cream was not identical for all types of plants. Milk sales were the most uniform from month to month in the case of dairymen who sold to local retail plants Next in order of decreasing uniformity were sales of milk to plants shipping out of the State, to ice cream plants, and lastly to cheese plants, which made the majority of their cheese during the pasture season. As shown in Figure 116,

[83] Computed from unpublished data furnished through the courtesy of H. E Bremer, Supervisor of Creamery Inspection. Vermont State Dept. Agr, Montpelier.

[84] Computed from Statistics Relative to the Dairy Industry in New York State, 1930-1931. Dept. Agr. and Markets of the State of New York. Agr. Bul. 253, p. 88. 1931.

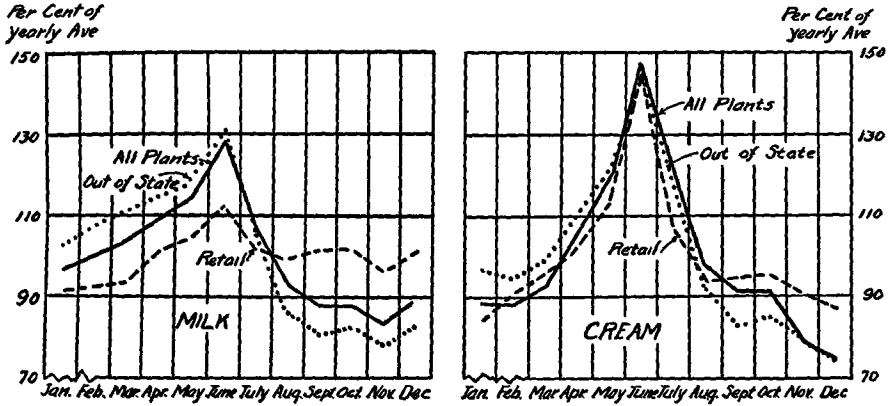

FIG. 116. RELATION OF TYPE OF PLANT TO THE SEASONAL VARIATION IN MILK AND CREAM SOLD BY DAIRYMEN TO RETAIL PLANTS, TO PLANTS SHIPPING OUT OF THE STATE, AND TO ALL PLANTS OF THE LARGER DEALERS

Retail plants buy from dairymen a relatively uniform supply of milk throughout the year, but their cream sales vary similarly to those of all plants.

milk sales to local retail plants increased during June only 12.90 per cent above the yearly average as compared with 31 00 per cent for milk received at plants shipping out of the State and 28 42 per cent for all milk. Evidently local retailers require their dairymen to produce milk fairly uniformly throughout the year in order to conform more closely to their market demands.

Cream receipts by local retail plants were very similar, in their seasonal variation, to receipts by plants shipping out of the State and to receipts at all plants combined (Figure 116). Retail dealers were not as particular concerning a uniform seasonal production of cream as they were of milk. At many plants, these dealers did not buy much of their cream directly from dairymen, but secured their cream supply, to a large extent, by separating surplus milk or by purchasing from other dealers who handled cream.

The average seasonal variations in milk and cream sales to cream plants with local trade and to ice cream plants were very similar but were not as uniform from month to month as the sales of milk and cream to all plants (Figure 117). These creameries and ice cream plants had a spread in receipts, during the year, of 90 and 78 points respectively, as compared with 54 points for all milk and cream received. Sales of milk and cream to butter, and cheese plants had the highest June peak and the lowest level of sales in the winter of any type of plant. The maximum spread in sales to butter, and cheese plants was 111 points or slightly more than twice as much as the average of 54 points for plants of all types (Table 29). Sales to butter, and cheese plants showed an unexpected increase

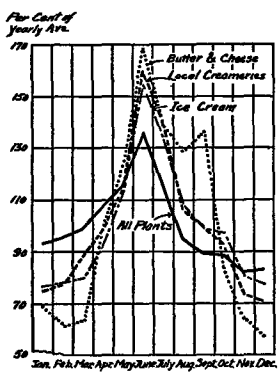

FIG. 117 RELATION OF TYPE OF PLANT TO THE SEASONAL VARIATION IN BUTTERFAT SOLD BY DAIRYMEN TO CREAM PLANTS WITH LOCAL TRADE, TO ICE CREAM PLANTS, TO BUTTER, AND CHEESE PLANTS, AND TO ALL PLANTS OF THE LARGER DEALERS

in September. The cause of this increase was due to the return in September of a number of producers to one butter plant. During the summer vacation months, these producers had sold their milk and cream at nearby summer camps instead of at the butter plant.

TABLE 29

Comparisons Between Types of Plants in the Seasonal Variation in Butterfat Sold Daily by Dairymen to the Larger Dealers in Maine in 1928
(Expressed as per cent of yearly average)

Month	Local retail plants		Plants shipping out-of-State		Cream plants with local trade	Ice cream plants	Butter and cheese plants
	Milk	Cream	Milk	Cream			
January	91 70	84 22	102 13	96 83	75 19	77 05	69 79
February	92 32	91 19	107 39	94 71	77 12	78 55	60 78
March	94 25	95 84	111 07	99 03	88 43	80 18	63 66
April	100 98	102 02	113 77	111 01	98 61	93 05	101 77
May	104 59	113 34	118 69	121 96	114 79	114 51	125 42
June	112 90	144 99	131 00	144 47	160 65	155 46	168 11
July	101 60	107 59	105 54	118 61	140 84	134 81	139 94
August	99 59	93 52	86 21	91 93	106 62	108 84	129 27
September	101 55	94 78	80.92	83 03	99 93	99 69	136 06
October	102 67	95 35	82 47	85 61	93 19	98 16	84 20
November	96 61	90 54	78 33	78 85	73 53	81 17	63 75
December	101.20	87 15	83.07	74 11	70 66	78 08	50 84
Average	100 00	100 00	100.00	100 00	100 00	100 00	100 00

The seasonal variation in sales, as shown in Figures 113 to 117 inclusive, represents the variation in the total supply each month rather than the average sales per individual producer. The variation during the year in the number of producers and average sales per producer, however, is pertinent to this study because the basic rating price plan used by the larger milk dealers is based on individual sales. In Table 30, the total number of dairymen and average sales per producer for June, the month of highest total sales, are compared with those for November, the month of lowest total sales. In June, 1928, the total number of dairymen selling to Maine dealers was 11.02 per cent higher than the number in November. This increase in number during the pasture season, when milk production was high, probably was due to two groups of producers. One of these groups includes dairymen who supplied local retail markets, but who sold their summer surplus milk to dealers. The other group includes small dairymen whose cows

freshen in the spring for summer sales; and then, during the winter, produce only sufficient milk for home consumption.

Of the producers who sold to dealers only during the pasture season, the majority delivered cream rather than milk. For example, the number of dairymen who sold cream to plants of larger dealers in June was 22.89 per cent higher than in November, but milk patrons increased only 1.66 per cent. The number of dairymen selling milk to retail plants, in fact, did not increase at all in June but rather decreased slightly. Plants shipping out of the State had 3.19 per cent more milk producers in June than in November. Butter, and cheese plants, due primarily to the latter, had the greatest variation in the total number of producers, with 45.74 per cent more in June than in November. Miscellaneous plants were not considered in this comparison because they were in operation only part of the year.

TABLE 30

Seasonal Variation Between June and November in the Number of Dairymen and Average Sales Per Producer in 1928

	Number of dairymen in		Extra producers in June		Average pounds of butterfat sold per producer		Per cent increase in June sales
	June	Nov	Number	Per cent	June	Nov.	
Local retail plants							
Milk	628	672	− 44	− 6 55	168 2	134 5	25 06
Cream	82	65	+ 17	+26 15	139 1	109.6	26.92
Plants shipping out-of-State							
Milk	2,525	2,447	+ 78	+ 3 19	129 1	79 6	62 19
Cream	1,918	1,583	+335	+21 16	106 9	70.7	51.20
Cream plants, local trade	381	314	+ 67	+21 34	110 2	61 2	80 07
Ice cream plants	1,100	879	+221	+25 14	111 3	72.7	53 09
Butter, and cheese plants	274	188	+ 86	+45 74	78 9	43 6	80.96
Miscellaneous plants	15	88	− 73	−82 95	124 2	72 2	72 02
All plants							
Milk	3,546	3,488	+ 58	+ 1 66	134 8	89 2	51 12
Cream	3,377	2,748	+629	+22 89	106.0	69.5	52 52
Total	6,923	6,236	+687	+11.02	120 8	80 5	50 06

The increase in the number of milk and cream producers who sold to dealers in June was responsible for some of the seasonal variation in sales. For example, total sales of milk and cream in June were about 66 per cent larger than in November,

but, on the basis of the average sales per producer, the sales in June were only 50 per cent larger than in November. The greater seasonal variation in the total sales of cream as compared with milk may likewise be due to the fact that the number of producers varied much more for cream than for milk. In Table 26, it was shown that total sales of cream to dealers increased in June to a relatively much higher level than sales of milk; but, on the basis of sales per dairyman, there was very little difference in the seasonal variation of milk and cream. For example, the increase of sales per producer in June over those in November was 51.12 per cent for milk and 52.52 per cent for cream (Table 30). Retail plants likewise furnish additional evidence of the fact that the change in number of producers is primarily responsible for total cream sales varying more than total milk sales. Their increase in June over November sales per producer was 25.06 per cent for milk and 26.92 per cent for cream. At plants shipping milk and cream out of the State, the sales of cream actually varied less than those of milk.

On the basis of milk and cream sales per producer, the retail plants had the least seasonal variation per producer, fol[illegible] plants shipping out of the State, and ice cream plants [illegible] with local trade, and butter, and cheese plants had [illegible] seasonal variation in sales per producer.

BUTTERFAT CONTENT OF MILK AND CREAM SOLD BY DAIRYMEN

The average butterfat test of all milk and cream sold by dairymen to dealers in 1928 was 4 14 per cent for milk and 16.68 per cent for cream (Table 31). The average butterfat content of milk did not vary much between the more important types of plants The lowest average milk test was 3.99 per cent and was for local retail plants. The highest average milk test was 4.34 per cent and was for ice cream plants. Cream tests varied from an average of 14.40 per cent for plants shipping out of the State to 21.73 per cent for ice cream plants. Milk and cream tests, as shown by data secured from the Maine Department of Agriculture,[35] have not varied appreciably for any of the larger dealers during the eight-year period from 1924 to 1931 inclusive.

[35] White, Charles M. Original data used in compiling annual reports of Maine Dairy Statistics, 1924-1931. Div. of Markets, Maine Dept. Agr., Augusta.

TABLE 31

Average Butterfat Content of Milk and Cream Sold to the More Important Types of Plants, and Variation in the Butterfat Test During 1928

Type of plant	Butterfat test		
	Lowest month	Highest month	Average for year
Milk			
Local retail plants	3 93	4.06	3 99
Milk plants shipping out-of-State	4.05	4.24	4.14
Ice cream plants	4.23	4.52	4.34
All milk to the larger dealers	4.07	4 20	4.14
Cream·			
Cream plants shipping out-of-State	13 43	15 73	14.40
Cream plants, local trade	20 08	23 27	21 04
Ice cream plants	20 07	23 98	21.73
Butter plants	18.56	20 41	19.67
All cream to the larger dealers	15.38	18.01	16.68

Butterfat tests varied slightly from month to month due to such factors as the freshening of heifers, stage of the lactation period, and weather conditions. In the case of cream, the cream screw adjustment and speed of the separator may affect the test. The average milk test for local retail plants had the least variation, with a spread of only .13 per cent between the months of lowest and highest tests (Table 31). The variation in the test of milk at plants shipping out of the State was slightly under .20 per cent and at ice cream plants, about .30 per cent. In the case of cream, the test varied about two to three per cent during the year.

The average seasonal variation in the butterfat test for milk and cream sold by Maine dairymen to the larger dealers is shown by months in Table 32. The test of milk, which averaged 4.14 per cent for the year, varied from 4.20 per cent in June and November to 4.07 per cent in May, July, and August. With the exception of June, the test of milk tended to decrease as milk production increased during the spring and early summer months. From August to November the test increased, again reaching a peak in November. This seasonal trend in the butterfat content of milk was similar to that for the State of New York, except that Maine had a temporary increase in the butterfat test of milk during June. This temporary increase in June existed for each type of plant.

TABLE 32

Seasonal Variation in the Butterfat Test of Milk and Cream Sold by Maine Dairymen to the Larger Dealers in 1928 and Comparisons with Similar Figures for New York State in 1930

Month	Butterfat test of milk		Butterfat test of cream	
	Maine	New York[36]	Maine	New York[36]
January	4 17	3 68	15 38	30.7
February	4 15	3 63	15 80	30 8
March	4 14	3 59	15 80	30 8
April	4 10	3 53	15 03	31 4
May	4 07	3 55	16 98	31 8
June	4 20	3 52	18 01	32 1
July	4 07	3 55	17 89	29 2
August	4 07	3 62	17 25	31.1
September	4 13	3 70	17 08	31 4
October	4 16	3 73	16 85	31.0
November	4 20	3 75	16 27	30 1
December	4 18	3 72	15 93	30.1
Average for year	4 14	3 62	16 68	31 0

The average butterfat test of cream, contrary to that of milk, tended to be highest during the summer months and lowest during the winter period. Its test in Maine varied from a low point of 15 38 per cent in January to a high point of 18.01 per cent in June. Cream tests in Maine, although lower than for New York, had a similar seasonal variation. In both States, the cream test was highest in June, and the lowest test in Maine occurred in January as compared to November and December for New York.

PRICES RECEIVED BY DAIRYMEN FOR MILK AND CREAM

Milk and cream prices varied considerably between individual dealers in the amount paid to dairymen, in the method of payment, and in the seasonal variation of prices from month to month.

Average prices paid in 1928 at each type of plant

The average price received, during 1928, for milk containing an average of 4.14 per cent of butterfat was $2.875 per hundredweight A fair comparison of this average price with that for individual companies or for types of plants requires a price adjust-

[36] Same as footnote 34, p. 107.

TABLE 33

Comparison Between Types of Plants in the Average Price Paid by the Larger Dealers Per Hundredweight for Milk and Per Pound of Butterfat for Cream in 1928

Type of plant	Average butterfat test of milk	Hundredweight price of milk adjusted for		Average butterfat test of cream	Cream price per pound of butterfat	
		4 14 per cent milk	Collection cost by company		Average price	Including collection cost by company
Local retail plants	3 99	$3 302	$3.369	21.66	$ 615	$ .623
Milk plants shipping out-of-State	4 12	2 732	2 774	13 16	563	.574
Cream plants shipping out-of-State	4 32	2 604	2 627	14 69	.558	581
Cream plants, local trade	6 56	2 681	2 846	21 04	.528	.534
Ice cream plants	4 34	3 002	3 033	21 73	.546	563
Butter, and cheese plants	4 13	2,320	2,320	19.67	.471	.517
Total all plants	4.14	$2.875	$2 923	16 68	$ 552	$ .571

ment for variations in the butterfat content of milk delivered and for collection costs not paid by the producer An adjustment has been made in Table 33 on the basis of milk with an average test of 4 14 per cent In computing these prices, there was added to or subtracted from the original price 4 75 cents for each one-tenth that the milk test was below or above the average test of 4 14 per cent [37] Next, a second adjustment was made in the price of milk to allow for collection costs borne by dealers, so that the resulting price would represent that paid for 4 14 per cent milk delivered at the plant This last adjustment gave an average price for all milk of $2 923 per hundredweight The lowest average price for milk was paid by butter, and cheese plants Their price, which was $2 320 per hundredweight, was about 60 cents lower than the average for all plants Local retail plants paid the highest price which averaged slightly over seven cents a quart, or $3.369 per hundredweight Ice cream plants paid the next highest price, which was $3 033 per hundredweight, or 11 cents more than the average for all milk. Plants buying milk primarily for out-of-State shipments in 1928 paid an average of $2 774 per 100 pounds of milk

The adjusted price paid for cream, averaged for all plants on a butterfat basis, was 57.1 cents per pound of butterfat The highest cream price, which was 62 3 cents per pound of butterfat, was paid by local retail plants Cream plants that shipped dairy products out of the State paid the next highest price. The average price paid by these cream plants was 58 1 cents per pound of butterfat as compared with 56 3 cents paid by ice cream plants, 53 4 cents paid by cream plants with a local trade, and 51 7 cents paid by butter, and cheese plants.

Bases of paying for milk and cream

Dairy dealers employed five different bases for paying for milk, although two methods accounted for over three-fourths of all the milk bought One of these two methods was based on a hundredweight price for milk of a given butterfat content with adjustments made in price for milk of a lower or higher butterfat

[37] The average price differential of 4 75 cents per one-tenth per cent of butterfat was the yearly average differential paid by dealers buying through the New Eng Milk Prod Assn

content. This method, which is designated in Table 34 as "hundredweight price with butterfat differential," was used at 16 plants, 12 of which shipped milk and cream out of the State. The price usually quoted was based on 3.7 per cent milk, which is the basis adopted by the New England Milk Producers' Association; but several independent dealers stated their price in terms of 4.0 per cent milk. The milk price quoted by the New England Milk Producers' Association[88] for 1928, in the Tenth Zone, averaged $2.68 per hundredweight plus or minus a butterfat differential of 4.75 cents for each one-tenth that the butterfat test was above or below 3.7 per cent.

The second important method of paying for milk was based both on a price per hundredweight of milk and on a price per pound of butterfat. During 1928, the average price for two large companies using this method was 74 cents per hundredweight of milk and an additional 49 cents per pound of butterfat. Although a few producers received the hundredweight price for only the skim content of their milk, the majority received it for the total pounds of milk. This method of payment was used by 18 plants that shipped out of the State and by 11 other plants including several ice cream plants In 1929, the amount of milk purchased on this basis was greatly reduced because one large dealer changed over to the basis of hundredweight price with butterfat differential.

The third most important method of paying for milk was on the basis of a flat price per hundredweight, or per quart, for milk of all tests. This method, used in payment for 14 60 per cent of all milk purchased, was employed at 19 out of 30 local retail plants. This method was suited to the use of the smaller of these retailers because each had only a small number of producers who were selected carefully in order to obtain milk of the desired butterfat content. Six local retailers, who did not find this method well adapted to their use because they had some producers with a low butterfat test and others with a relatively high test, paid a special bonus for the high test milk and had a lower price for low test milk. Two dealers paid a bonus for quality of milk, including such factors as butterfat test, keeping quality, and sediment.

[88] Bronson, W. H. Monthly Letter on Dairy Conditions and Outlook New Eng. Milk Prod. Assn., Boston, Mass.

Only 1 49 per cent of the total milk was purchased on the basis of butterfat price alone, without paying any hundredweight price.

TABLE 34

Bases Employed by the Larger Maine Dealers in Paying Dairymen for Milk and Cream in 1928

Basis of payment	Number of plants buying	Number of patrons	Per cent of total butterfat	Average butterfat test	Adjusted price per cwt.*
Milk					
Cwt price, all tests	25	298	14 60	3 94	$3 466
Cwt price, with bonus	6	178	6 04	4 12	3 389
Cwt price, with butterfat differential	16	1,148	32 95	3 94	2 776
Butterfat and cwt price	29	1,814	44 92	4 37	2 814
Butterfat price alone	2	79	1 49	4.12	2 312
All milk	78	3,517	100 00	4 14	$2 923
Cream					
Cwt price, fixed test	6	14	1 49	37 46	$ .663
Cwt price, with butterfat differential	13	608	19 00	11 65	.585
Butterfat and cwt price	31	1,270	41 60	16 33	.562
Butterfat price alone	17	1,171	37 31	21 64	.569
All cream	67	3,063	100 00	16 68	$ .571

* Adjusted to include collection costs borne by dealers, and based on a uniform test of 4.14 per cent for milk and 16 68 per cent for cream.

Four different bases were used in purchasing cream. The method used to the greatest extent was the butterfat and hundredweight price, which included 41.60 per cent of all cream bought from Maine dairymen (Table 34). The average price in 1928 for three large dealers using this method was 71 cents per hundredweight of cream plus 54 cents per pound of butterfat. About one-third of the producers who were paid on this basis received the hundredweight price for skimmilk instead of for the total pounds of cream.

The second most popular basis of paying for cream was the use of a butterfat price alone, which represented 37.31 per cent of all cream purchased. This method has the advantage of ease of computation and encourages dairymen to retain their skimmilk on the farm for feeding purposes. Its use has become more prevalent during 1929 to 1931 and is now used by a majority of Maine cream plants.

In 1928, about one-fifth of the total cream was bought by two dealers with 13 plants on the basis of a hundredweight price with a butterfat differential. This method, however, was discontinued in 1929, when these two dealers changed their method of payment. Another method of payment, which included slightly over one per cent of all cream, was based on a flat price per hundredweight, or per quart, with the understanding that the cream test should be maintained at a level of approximately 40 per cent.

The basis of paying for milk or cream may have an important effect upon the butterfat content of milk or cream sold. If the method of payment is based solely on a butterfat price, dairymen in many cases will find it advantageous to keep Jersey or Guernsey cows and to sell high test milk or cream. If, however, a hundredweight price is paid, it may be advantageous for dairymen to sell low test milk or cream whenever the butterfat differential or butterfat price is relatively low. As discussed on page 312, the average butterfat differential for milk has been of about equal advantage to both low and high test cows, in recent years. A comparison of the average butterfat tests in Table 34 indicates that the butterfat and hundredweight price method has tended to encourage dairymen to sell milk with a relatively high butterfat test and to sell cream with a relatively low test. The average butterfat test of cream purchased on a butterfat and hundredweight basis was 16.32 per cent as compared with 21.64 per cent for cream bought on the basis of a butterfat price alone. For the three most important types of cream plants, the average butterfat test of cream was from 3.6 to 7.6 points higher with a butterfat price alone than with other methods which employed a hundredweight price.

Seasonal variation in milk and cream prices

The seasonal variation in milk and cream prices in 1928 varied from a low point in June, which was about 12 per cent below the yearly average, to a high point in December, which was about 11 per cent above the average price for the year (Table 35). Prices tended to decrease from March to June as production increased; and then prices increased rapidly from June to November as production decreased (Figure 118). In other words, the seasonal variation in the average prices for all milk and cream sold by

dairymen to Maine dealers was related inversely to the total amount of milk and cream sold.

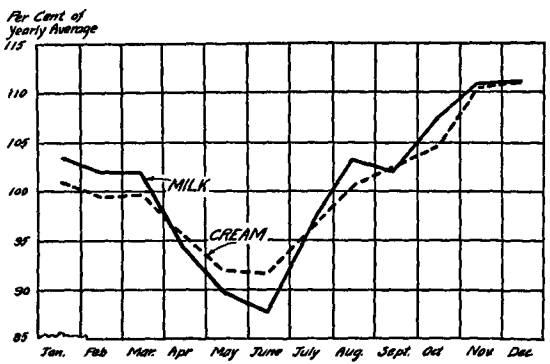

FIG. 118. THE SEASONAL VARIATION IN PRICES FOR ALL MILK AND CREAM SOLD BY DAIRYMEN TO THE LARGER MAINE DEALERS DURING 1928

Prices, which were inversely related to the total amount of milk and cream sold, reached their low point in June and their high point in November and December. Cream prices varied slightly less than milk prices.

The seasonal variation in milk prices in 1928 was fairly similar to that of the average for the eight-year period 1924 to 1931. Milk prices during the year studied, using New England Milk Producers' Association prices as an example, dropped to a relatively lower point in June and increased relatively higher during November and December than the average for the eight-year period 1924 to 1931 (Table 35). Although the line for seasonal variation in milk prices in 1928, as plotted in Figure 118, shows a slight increase in March and a slight decrease in the September price, these do not normally occur. The eight-year average for milk prices shows that prices normally have a gradual decrease in March and a continued increase from August through September.

Cream prices in 1928 had a seasonal variation similar to that for milk. The relative price of cream, however, did not vary as much as did that of milk. The spread in the index numbers be-

tween the months of lowest and highest prices was 19.20 points for cream as compared with 23.48 points for milk.

out the

TABLE 35

Seasonal Variation in Prices Received by Maine Dairymen for Milk and Cream Delivered at Plants of the Larger Dealers in 1928
(Expressed as per cent of yearly average)

Month	Milk prices			Cream prices		
	All plants in 1928	New Eng. Milk Prod. Assn.[89]		All plants in 1928	Four large cream dealers	
		1928	1924-31		1928	1924-31
January	103 58	108.58	107 56	101.81	98.52	105 00
February	102.09	104.10	103.44	100.18	97 50	103.40
March	102.16	102 61	99 18	100.36	97.28	101.22
April	94.40	88.06	92 90	96.20	95 25	97.50
May	89 67	83.56	87.51	92 93	94 01	94.61
June	87.85	80.22	82.88	92.39	94.01	92 61
July	96.38	91.79	92 60	96 74	96.49	94.92
August	103 34	103.36	102.52	101.09	100.33	98.75
September	101 98	101.87	107.51	102 90	103 48	101 38
October	107.58	105.97	108 02	105 25	104.39	103.14
November	110 96	116 42	116.39	111.23	108.45	104.37
December	111.34	112.69	105.71	111.59	110.26	103.12
Average for year	100.00	100.00	100.00	100 00	100 00	100 00

Cream prices in 1928, using prices for four large cream dealers as an example, were relatively lower during January to March and relatively higher during November and December than the average for the eight-year period 1924 to 1931 (Table 35). Otherwise the relative cream prices from month to month during 1928 were fairly representative of normal seasonal variation.

The type of products sold by dealers had an important influence on the seasonal variation of milk and cream prices. The relative difference in the seasonal variation of prices between the more important types of plants is shown in Figure 119. The prices paid for milk delivered at retail plants and at ice cream plants were, on the average, very uniform from month to month. The spread in the index numbers of prices between June and November was only 5.85 points for retail plants and 8.23 points for ice cream plants; whereas the corresponding spread for milk plants shipping out of the State was 32.37 points (Table 36).

[89] Same as footnote 38.

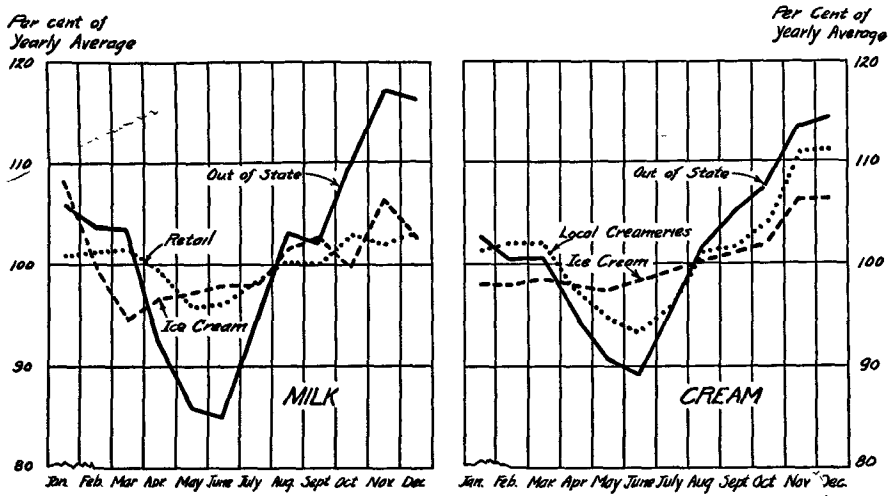

FIG. 119 SEASONAL VARIATION IN MILK AND CREAM PRICES PAID BY TYPES OF PLANTS IN 1928

Prices paid by local retail plants and by ice cream plants were relatively uniform from month to month. Plants shipping milk [illegible] ice cream out of the State had the greatest seasonal variation in prices paid.

Local retail plants, in most cases, purchased from a selected group of dairymen and paid a uniform price with the understanding that the dairymen produce a uniform amount of milk throughout the year. In fact, 19 out of the 30 local retail dealers paid a uniform price throughout the year. Six other retailers paid a uniform price during the winter months and then a uniform price at a lower level during the summer months. Five of the largest local retailers, who on the average did not purchase from such a selected group of dairymen, varied their price each month in relation to existing prices of large competing dealers.

Ice cream plants did not materially lower their prices during the summer months, because they desired to receive a fairly large amount of milk during the hot summer months when the demand for ice cream was at a peak. Three ice cream plants bought milk on the basis of a uniform price throughout the year; one paid a decreased price during the summer; and four varied the price from month to month.

The milk price paid by plants shipping out of the State varied each month, reaching a low point in June at about 15 per cent below the average price for the year. The highest average milk price paid by these plants occurred in November when the price was about 17 per cent above the yearly average.

TABLE 36

Comparison Between Types of Plants in the Seasonal Variation of Milk and Cream Prices Received by Maine Dairymen in 1928
(Expressed as per cent of yearly average)

Month	Milk sales to plants			Cream sales to plants			
	Retail trade	Ship out-of-State	Ice cream	Ship out-of-State	Local trade	Ice cream	Butter
January	100 87	105 77	108 14	102 86	101 33	98 17	102 12
February	101 11	103 57	98.97	100 36	102 27	97 99	102.12
March	101 33	103 46	94 61	100 54	102.27	98 53	98.30
April	99 44	91 76	96 58	95 17	97.35	97 80	96 39
May	95 79	85 44	97 19	90.52	94 70	97.62	92 14
June	96 10	84 92	98 00	89.09	93 37	98 53	94 06
July	98.11	94 04	98.03	95 71	95 64	99 27	98.09
August	100 19	103 16	101 39	101 79	100.95	100 18	100 64
September	100 06	101 91	102 45	105 01	101.70	100 92	104.25
October	102.91	110 48	99 64	107.51	103 98	102 01	106 37
November	101 95	117.29	106 23	113 80	110 80	106.41	110 40
December	103.03	116.22	102 62	114.49	110.98	106 04	106.37
Average for year	100.00	100.00	100.00	100 00	100.00	100 00	100.00

Cream prices, similar to those for milk, had their greatest seasonal variation at plants shipping out of the State, and only a relatively small variation at ice cream plants (Figure 119). The spread between June and November in the index numbers of cream prices was 24.51 points for plants shipping out of the State, 17.43 points for cream plants with a local trade, and only 7 88 points for ice cream plants. At ice cream plants, with the exception of January, 1928, the relative monthly prices for cream were similar to those paid for milk. Prices paid by plants shipping milk and cream out of the State were the best adapted to encourage dairymen to decrease their June production and to increase fall and early winter production. As a result of the relatively low June price and the high November price paid at these plants, their dairymen have achieved a more uniform sale of milk and cream than have plants that pay a relatively uniform price throughout the year.

SOUR MILK AND CREAM

The majority of the dairy plants in Maine will not accept sour milk or cream delivered at their plants. About 94 per cent of all milk producers and 61 per cent of all cream producers, as indicated by butterfat sales in Table 37, were restricted from delivering any sour dairy products in 1928. None of the plants shipping out of the State and none of the cheese plants accepted any sour milk At ice cream plants, 28 per cent of the dairymen sold milk to plants that would accept slightly sour milk. The price paid for sour milk at these plants was considerably less and, as a result, very few of these dairymen delivered any sour milk. When slightly sour milk and cream were delivered, the products were converted into butter.

Slightly sour cream was allowed to be delivered by about 25 per cent of the cream producers selling to plants shipping out of the State, by about 87 per cent of those selling cream to cream plants with local trade, and by 61 per cent of those selling to ice cream plants. Although these plants would receive sour cream, it was usually understood that only a small quantity would be accepted. The majority of these dairymen delivered no sour cream due to the lower price paid for sour products.

TABLE 37

*Policies Adopted at the Larger Dairy Plants Relative to Sour Milk and Cream, and the Per Cent of Total Butterfat Delivered by Dairymen Under Each Policy in 1928**

Policy adopted at each plant	Local retail plants	Plants shipping out-of-State	Cream plants local trade	Ice cream plants	Butter and cheese plants	All plants combined
Milk purchased						
Won't receive sour	86 94	100 00	10 72	71.98	100 00	93 81
Receive sour, same price	——	——	13 26	——	——	.21
Receive sour, reduced price	13 06	——	76 02	28.02	——	5 98
Total milk	100 00	100 00	100 00	100 00	100 00	100 00
Cream purchased						
Won't receive sour	100.00	75 06	12 65	39 39	89 66	61 47
Receive sour, same price	——	——	26.11	——	10 34	2.50
Receive sour, reduced price	——	24 94	61.24	60 61	——	36 03
Total cream	100.00	100 00	100 00	100 00	100 00	100 00

*These percentages do not indicate the amount of sour milk and cream delivered but the amount of all milk and cream sold to plants where each price policy prevailed.

One cream plant with a local trade permitted its dairymen to deliver small quantities of sour milk and cream with no reduction in price. This policy, however, which did not penalize dairymen for careless handling of their milk or cream, was not successful; and the next year the policy was changed to that of paying no hundredweight price and ten cents less per pound of butterfat in sour products. The only other plant that received sour products in 1928 without a reduction in price was a small butter plant which was closed during the following year.

At nine plants, which kept a record of the pounds of sour cream received, only 2.8 per cent of the total cream delivered was sour. The percentage of the total cream that was delivered as sour cream at all Maine plants probably amounted to less than one per cent. The year after this study was made, the percentage of sour cream was further reduced, due to a concerted effort by Maine dealers to increase the quality of cream by more frequent collection.

The low proportion of all cream that was sour was accomplished partially by inspection of Maine dairies by health officials, and by educational programs sponsored by dealers and dairy or-

ganizations to encourage dairymen to use more ice and to take better care of their dairy utensils. Probably the chief reason, however, was the refusal of dealers to accept sour milk and cream, or the payment of a considerably lower price for sour products.

Dealers who refused to receive any sour milk or cream claimed that their policy was the most satisfactory, because their dairymen, as a whole, took greater precautions to prevent having any sour products; and thus they delivered a higher quality product. These dealers claimed for example that, if they received sour cream, some dairymen would take less care of their cream; and, although the product might not be sour, it would be of lower quality. Also some dealers did not receive sour products because they did not have the equipment for converting sour cream into butter.

The average reduction in cream price due to souring amounted to 11.5 cents per pound of butterfat. This reduction varied from five cents per pound of butterfat at one plant to fifteen cents per pound of butterfat at several plants. The larger price reduction was effective in reducing the proportion of sour cream received. At the plants with the reduction of fifteen cents per pound of sour butterfat, only 1.04 per cent of the cream received was sour; whereas at plants with a reduction of eight or nine cents about three per cent was sour; and at the plant with a reduction of five cents about twelve per cent was sour.

The seasonal variation in the pounds of butterfat delivered daily as sour cream at nine plants in 1928 is given in Table 38. There was a rapid increase in the receipts of sour cream as the temperature increased from April to July inclusive. In March, the total pounds of butterfat in sour cream delivered at the nine plants was only about 20 pounds daily as compared with 85 pounds in May and 121 pounds in July. During August and September, dairymen had slightly less sour cream than in July due, in part, to decreased production and to lower temperature. In October, however, the average pounds of butterfat in sour cream increased to a point slightly in excess of the high point in July. The reason for this increase in October was due primarily to a shortage in the ice supply on some farms, indicating a need to store a larger quantity of ice. With the approach of cold weather in November, the deliveries of sour cream were greatly reduced, averaging only 29 pounds of butterfat daily as compared to 122 pounds in October.

TABLE 38

Seasonal Variation in the Total Pounds of Butterfat in Sour Cream Delivered Daily by Dairymen to Nine Maine Plants That Purchased Sour Cream at a Lower Price in 1928

Month	Pounds of butterfat daily	Month	Pounds of butterfat daily
January	22.14	July	121 41
February	18.95	August	111 25
March	19 67	September	109 34
April	37 57	October	122 37
May	84.95	November	29 17
June	106.37	December	27.70

LOCATION OF DAIRY PLANTS OF THE LARGER DEALERS

LOCATION AND TYPES OF PLANTS

A total of 92 dairy plants were buying an equivalent of 500 or more quarts of milk daily per plant in Maine during 1928. Of this number, 30 were local retail plants which bought from dairymen an average of 2,818 pounds or 1,311 quarts of milk equivalent daily per plant (Table 39). Of this amount, 92.24 per cent was milk and 7.76 per cent was cream. At 18 of these local retail plants, only milk was purchased from dairymen. Although these plants were all grouped as retail plants, there were several that had a relatively large volume of wholesale business, such as to stores and restaurants.

Thirty-seven plants purchased milk or cream primarily to supply out-of-State markets. Of this number, 22 purchased mostly milk and 15 were primarily cream plants. The former plants were designated as milk plants shipping out of the State, but this does not signify that the shipments from each of these plants were primarily milk. At that time, when Boston dealers had a surplus milk supply at their New England plants, they frequently separated part of the milk at their Maine plants and shipped cream instead of milk. Of the total butterfat purchased by plants shipping out of the State, 63.68 per cent was as milk and 36.32 per cent, as cream. These milk plants had the largest

daily purchases per plant, averaging 9,414 pounds of milk equivalent as compared with 7,900 pounds for cream plants shipping out of the State and 5,776 pounds for all plants.

TABLE 39

Number of Dairy Plants Buying an Equivalent of Five Hundred or More Quarts of Milk Daily in Maine, and Average Pounds Purchased Daily Per Plant, by Type of Plant in 1928

Type of plant	Number of plants	Average pounds milk equivalent daily per plant	Per cent of total butterfat purchased as	
			Milk	Cream
Local retail plants	30	2,818	92 24	7 76
Milk plants shipping out-of-State	22	9,414	90 09	9 91
Cream plants shipping out-of-State	15	7,900	17 51	82 49
Cream plants, local trade	5	4,355	22 54	77 46
Ice cream plants	12	5,471	20 53	79 47
Butter, and cheese plants	4	2,678	43 73	56 27
Miscellaneous plants	4	654	65.67	34.33
All plants	92	5,776*	60 70	39 30

* Miscellaneous plants were operated during only part of the year studied, and for that reason were omitted in computing the average volume per plant

Five cream plants handled cream primarily to sell in local markets or to other dairy dealers. Twelve additional plants were grouped as ice cream plants. In five of these plants practically all the sales consisted of ice cream, but, in the other seven, sales also included large quantities of milk and cream. Purchases of butterfat by ice cream plants from dairymen were approximately one-fifth milk and four-fifths cream.

During 1928, there were only four plants in Maine that manufactured primarily butter or cheese. These plants had, on the average, a small volume of business as indicated by daily purchases of 2,678 pounds of milk equivalent per plant as compared with 5,776 pounds, the average for all plants.

The location of each of the 92 dairy plants is given in Table 40 and is shown in Figure 120. The local retail plants were distributed in the larger towns and cities of Maine, including thirteen at Portland and South Portland, four at Auburn and Lewiston, four at Bangor and Brewer, and one or two at each of seven other large towns and cities.

TABLE 40

Location of All Plants Purchasing an Equivalent of Five Hundred or More Quarts of Milk Daily in Maine in 1928

Location	Name of Plant
ANDROSCOGGIN COUNTY	
Auburn	Fernwood Dairy
"	Turner Centre System
Lewiston	Dumont, E. & Company
"	Emond, David
"	Hemond, Alphonse
"	Wiseman Farms
Livermore Falls	New England Creamery Company
AROOSTOOK COUNTY	
Houlton	Houlton Ice Cream Company
CUMBERLAND COUNTY	
Portland	Deering Dairy Company
"	Deering Ice Cream Company
"	Maine Dairy Company
"	Oakhurst Dairy
"	Old Tavern Farms
"	Portland Dairy Company
"	Shaw, A. W *
"	*Simmons* & Hammond Manufacturing Company
"	Stockman, H. O.
"	Turner Centre System
"	Welt, L. W.*
South Portland	Cloverdale Dairy
"	Cotton, H. F. & Son
"	Great Meadow Farms
"	Lund, Fred J
"	Thornton Heights Dairy
FRANKLIN COUNTY	
Farmington	Turner Centre System
Strong	New England Creamery Company*
HANCOCK COUNTY	
Bucksport	Whiting Milk Companies*
Ellsworth	Hancock County Cooperative Creamery
"	Winslow Dairy Products Company
KENNEBEC COUNTY	
Albion	Elm City Creamery Company
Augusta	Rose Creamery Company
Benton	Turner Centre System*
Gardiner	Pine Tree Dairy Company
Hallowell	Pinehurst Dairy*
Oakland	New England Creamery Company†
Waterville	Home Dairy Company
"	Simmons & Hammond Manufacturing Company
"	Virgue, A. W.
"	Webber's Dairy
Winthrop	Hood, H P & Sons*
KNOX COUNTY	
Rockland	Davis, R. W. & Sons
LINCOLN COUNTY	
Newcastle	Hood, H. P. & Sons*
Winslow Mills‡	Hood, H P & Sons*
Wiscasset	Turner Centre System

TABLE 40—Concluded

Location	Name of Plant
OXFORD COUNTY	
Hiram	Hiram Creamery Company
Mexico	Ferland, Arthur
South Paris	Turner Centre System*
Rumford	Turner Centre System
Waterford	Waterford Creamery Company
PENOBSCOT COUNTY	
Bangor	Keene Ice Cream Company
"	Rogers, E M
"	Simmons & Hammond Manufacturing Company
"	Turner Centre System†
"	Winterport Creamery Company
Brewer	Footman's Dairy
Carmel	Turner Centre System*
Charleston	Turner Centre System*
Corinna	Whiting Milk Companies*
Corinth	Keene Ice Cream Company*
Dexter	Whiting Milk Companies*
Etna	Whiting Milk Companies*
Exeter	Whiting Milk Companies*
Hampden	Cole, Ernest H
Hermon	Whiting Milk Companies*
Newburg	Newburg Cheese Company*
Newport	Turner Centre System†
Old Town	Old Town Creamery Company
Winn	Cossar, Joe*
PISCATAQUIS COUNTY	
Dover-Foxcroft	Whiting Milk Companies*
SAGADAHOC COUNTY	
Richmond	Turner Centre System*
SOMERSET COUNTY	
Detroit	Elm City Creamery Company
Fairfield	Fairfield Creamery Company
Harmony	Solon Creamery Company†
Hartland	Elm City Creamery Company†
Madison	Somerset Dairy Association†
Norridgewock	Solon Creamery Company†
Pittsfield	Whiting Milk Companies*
Skowhegan	Skowhegan Jersey Creamery†
Solon	Solon Creamery Company*
WALDO COUNTY	
Belfast	Hood, H P & Sons†
Brooks	Hood, H P & Sons†
Burnham	Elm City Creamery Company
Jackson	Turner Centre System*
Monroe	Monroe Cheese Company
Thorndike	Whiting Milk Companies*
Unity	Turner Centre System
"	Hood, H P & Sons*
WASHINGTON COUNTY	
Danforth	Danforth Creamery Company*
YORK COUNTY	
Biddeford	Landry, W. A.
Sanford	Sanford Dairy
Springvale‡	Nason, W. H
Portsmouth, N H	Badger Farms

* Plant closed between 1928 and 1932
† Transfer of ownership between 1928 and 1932.
§ Located in town of Waldoboro
‡ Located in town of Sanford.

Milk plants shipping out of the State were located primarily in relatively large dairy areas, such as in the vicinities of Farmington, Newport, Dexter, and Unity. Cream plants shipping out of the State were located under similar conditions, but tended to draw their supply from dairy areas that were less intensive than those in which milk plants were situated.

Ice cream plants were situated near the larger centers of population in order to economically and efficiently serve their customers. Some of the most important ice cream plants, for example, were located at Portland, Lewiston, Waterville, Bangor, and Houlton. The four butter, and cheese plants were situated in dairy sections which did not have local retail markets or advantageous facilities for shipping milk and cream to out-of-State markets.

All except 7 of the 92 milk plants and creameries that served the dairy sections of Maine in 1928 were located on railroad lines (Figure 120). Nearby railroad facilities have been an important requirement during past years in the economical operation of plants that shipped milk or cream to consuming markets. The railroad also has been an important method of transporting milk and cream from the more distant dairymen to the receiving plants. Railroads thus made it possible for many plants to draw their supply economically from a relatively large area and thereby obtain a larger volume of business. Of the seven plants, during 1928, that were not on railroad lines, two were cheese factories and one was primarily a butter plant. From 1928 to 1932, five of the seven plants without railway facilities discontinued operation.

At the present time, the railroads are not as essential to many plants as in past years due to the improvement of roads and to the prevalent practice of keeping roads open to automobile traffic during the winter. Automobile trucks, in fact, have now largely replaced the railroads as one of the methods of delivering the dairyman's milk and cream to the plant. Trucks are also now used extensively in place of railroads for short hauls of milk and cream from plants to relatively nearby markets and from small plants to larger centralized plants. In several areas, moreover, the local receiving plants have been closed, and collection routes transport milk and cream by truck direct from the farm to the centralized plant. For example, the plants of one company at Carmel, Corinna, Dexter, Dover-Foxcroft, Etna, Hermon, and

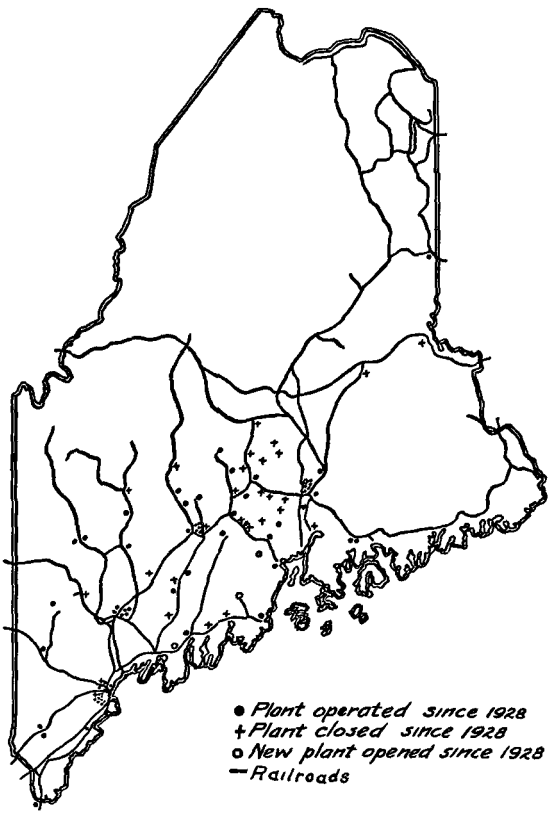

FIG. 120 LOCATION OF PLANTS BUYING AN EQUIVALENT OF 500 OR MORE QUARTS OF MILK DAILY IN 1928, AND RELATION OF RAILROADS TO LOCATION OF PLANTS

Pittsfield have been closed, and milk and cream are now trucked direct to Newport. Another example is the closing of plants at West Benton, Winthrop, South Paris, and Richmond, with milk and cream now being trucked direct to Auburn. The railroads, however, continue to be used for practically all of the long distance hauls, such as out-of-State shipments of milk and cream. Most plants that ship out of the State, therefore, continue to find that it is advantageous to be located on a railroad.

From 1928 to 1932, a total of 28 plants discontinued operation in Maine and only 4 new ones were opened, thus giving a net reduction of 24 plants, or 26 per cent of the total. Nine of the closed plants discontinued business due to such factors as small volume of business, unprofitable markets, or poor locations. A few plants were also closed due to a merger or an exchange of ownership of competing plants. For example, Turner Centre System and H. P. Hood & Sons each had a plant located at Unity in 1928, but, due to a merging of these interests, it became possible to close one of the two competing plants. The closing of other plants resulted from a consolidation of local plants owned by larger dealers in order primarily to achieve economy through increased efficiency of plant operation. As indicated in the preceding paragraph, many of the smaller plants that were operated in 1928 have been closed, and milk and cream are now trucked directly to the larger plants. This has resulted in economy to the dealers because they have been able to reduce their overhead for land, buildings, and equipment, and to lower their operating costs per unit of product. Another advantage to the dealers from this consolidation has been due to the direct assembling of milk at several plants in sufficient quantity for the economical use of tank cars for out-of-State shipments.

RELATION OF PLANT LOCATION TO THE PRICES PAID FOR MILK AND CREAM TO BE SHIPPED OUT OF THE STATE

Because the majority of dairymen who sell milk to plants shipping out of the State are paid on the basis of fluid milk delivered at Boston,[40] Maine dairy interests are concerned in the

[40] This basis of payment is now used in Maine by all dealers buying milk through the New Eng. Milk Prod. Assn., but in 1928 one large dealer had a somewhat modified zoning system for milk prices.

effect of distance to Boston on prices, and in the relative amount of milk sold in Maine at given distances from Boston. In determining freight rates to Boston, New England territory has been divided into zones which are spaced off at 20-mile intervals from Boston. For example, Auburn is 143 miles from Boston and is in Zone 8; West Farmington is 197 miles from Boston, in Zone 10, and Newport is 223 miles from Boston, in Zone 12. All of the milk plants in Maine that shipped dairy products out of the State were located between Zones 8 to 13 inclusive. Milk sales were of about average importance in each zone from 8 to 11 inclusive, were relatively large in Zone 12, and were small in Zone 13 (Table 41) The weighted average zone for all milk delivered at these plants was 10 67, or an average distance of about 194 miles from Boston

The price paid for milk in each of these zones decreased due to an increase in the freight rate with each additional zone from Boston The additional deduction for freight in each zone from the eighth to the thirteenth was 1 7, 2 3, 2.3, 1 2, and 2 3 cents per hundredweight respectively. For example, the milk price in the twelfth zone was 7.5 cents (1.7 + 2 3 + 2 3 + 1.2) less per hundredweight than in the eighth zone.

TABLE 41

Importance of Milk and Cream Receipts Within Each Zone from Boston at Plants That Shipped Out-of-State in 1928

Zone number	Miles from Boston	Milk		Cream		Per cent of butterfat in each zone as	
		Average number patrons	Per cent of total butterfat	Average number patrons	Per cent of total butterfat	Milk	Cream
8	141 — 160	374	14 33	48	2 80	89 96	10 04
9	161 — 180	354	11 96	396	21 78	49 05	50 95
10	181 — 200	286	13 34	340	18 92	55 28	44 72
11	201 — 220	433	17 56	308	19 30	61 46	38 54
12	221 — 240	944	38 30	408	23 63	73 96	26 04
13	241 — 260	95	4.51	193	10 29	43 47	56 53
14	261 — 280	——	——	57	3 28	——	100 00
Total		2,486	100.00	1,750	100 00	63 68	36 32

Cream prices, in contrast to those for milk, do not vary according to zones in the case of plants shipping out of the State.

The zones in which cream is produced are important, however, because the present cream areas may become milk areas in the near future, if the milk requirements of New England markets continue to expand. The cream supply at plants shipping out of the State was all included within Zones 8 to 14 inclusive. Cream sales were distributed fairly evenly in Zones 9 to 12 inclusive, were relatively smaller in Zone 13, and were very small in Zones 8 and 14 (Table 41).

The ratio of milk to cream delivered in each zone was apparently not much affected by the relative distances from Boston. The total butterfat sold in the ninth zone was approximately one-half in the form of milk and one-half as cream. In the twelfth zone, however, at a greater distance from Boston, nearly three-fourths of the butterfat was sold as milk and only one-fourth as cream. In the thirteenth zone the ratio of milk to cream was about 43 per cent to 56 per cent respectively. Evidently the distance from Boston has not been an important factor in determining whether to sell milk or cream. The weighted average zone for cream delivered at plants shipping out of the State was 10.84 as compared with 10.67 for milk.

PLANT UTILIZATION OF MILK AND CREAM RECEIVED BY THE LARGER DEALERS IN 1928

Plant utilization includes a summary of the total amount of milk and cream purchased by dealers, and the amount marketed in each form in which dairy products were sold Purchases include not only milk and cream received from Maine dairymen but also milk, cream, and skimmilk shipped into Maine from other states. The utilization of these supplies includes milk, cream, and skimmilk sold locally in Maine and shipped out of the State, and also dairy products used for manufacturing purposes, such as ice cream, butter, and cheese. Data for sales, on the average, do not have quite as high a degree of accuracy as do data for purchases of milk and cream, which were obtained from detailed records for 97 per cent of the butterfat purchased. However, at plants where detailed records of sales were not available, sales were carefully estimated and checked against purchases.

LOCAL RETAIL PLANTS

At local retail plants, the receipts of milk and cream correspond fairly closely with the total amount of milk and cream sold in local markets. About 28 6 million pounds of milk were purchased from Maine dairymen, and milk sold locally amounted to about 27.6 million pounds (Table 42). To supply the local demand for cream, these plants had to supplement their cream purchases from their regular dairymen with considerable quantities of milk and cream from other dealers Purchases from other dealers in Maine and out of the State amounted to nearly one-fourth of the total butterfat received. Receipts, however, were so regulated that only about two per cent of the total butterfat was shipped out of the State or converted into manufactured products.

TABLE 42

Plant Utilization of Milk and Cream Received at Thirty Local Retail Plants in Maine in 1928

Type of dairy product	Total pounds	Average butterfat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products				
Milk from dairymen	28,595,800	3 99	1,141,670	69 55
Cream from dairymen	443,293	21 66	96,014	5 85
Dairy products from out-of-State	915,607	4 57	41,806	2 55
Dairy products from Maine dealers	2,961,333	12 22	361,945	22 05
Total receipts	32,916,033	4 99	1,641,435	100 00
Utilization of dairy products				
Milk sold locally	27,572,467	3 90	1,076,405	65 58
Cream sold locally	1,695,532	31 33	531,167	32 36
Skimmilk sold locally	937,795	——	——	——
Buttermilk sold locally	820,167	——	——	——
Cream shipped out-of-State	78 054	40.00	31,222	1 90
Skimmilk shipped out-of-State	691,306	——	——	——
Cream into butter	10 123	30 00	3,037	.18
Dairy products unaccounted for	1,109,989	——	— 396*	— .02*
Total sales	32,916,033	4.99	1,641,435	100 00

* Total sales of butterfat were in excess of total receipts due to slight errors in estimating the amount of butterfat content of dairy products sold at some plants.

The seasonal utilization of dairy products at local retail plants is shown in Figure 121, which is based on Table 3 of the Appendix Purchases of milk from dairymen were approximately equal to the amount of milk sold locally during January to March inclusive, during the month of July, and from September to December

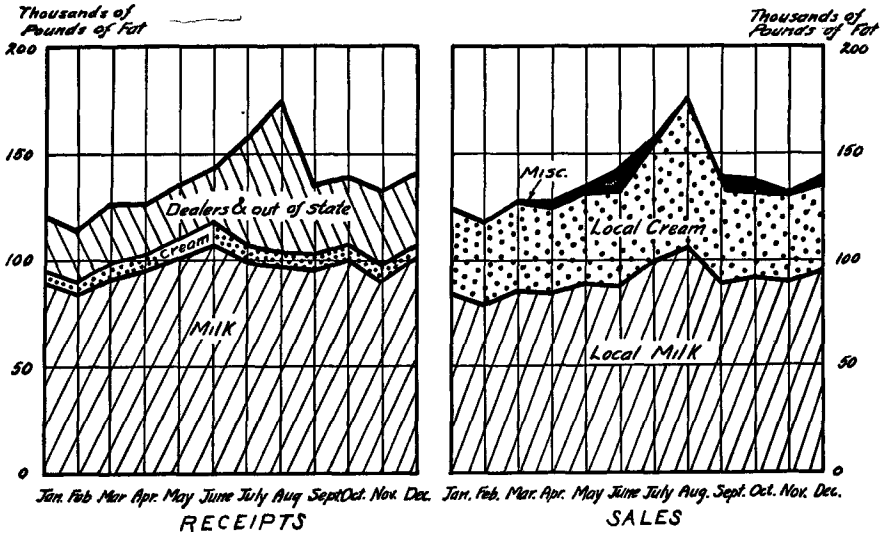

FIG. 121. PLANT UTILIZATION OF BUTTERFAT RECEIVED AT 30 LOCAL RETAIL PLANTS IN MAINE IN 1928

Receipts of both milk and cream were approximately equal to the local demand

inclusive. Milk purchased from dairymen in April, May, and June was from 12 per cent to 20 per cent in excess of milk sales. In August, however, purchases from farmers were about 8 per cent less than the market demand for milk, and additional supplies were required from other Maine dealers or from other states. The local sales of cream were much in excess of cream purchased from dairymen each month and required large purchases of dairy products from other dealers.

MILK AND CREAM PLANTS SHIPPING OUT OF THE STATE

At milk plants shipping out of the State, milk was the primary dairy product purchased. Of the total butterfat utilized, 74 53 per cent was shipped out of the State, 12 97 per cent was sold locally, 8 82 per cent was used in manufactured products, and 3 67 per cent was sold to other Maine dealers (Table 43). Although 80 63 per cent of the total butterfat was purchased from dairymen as milk, the combined amount of milk sold locally and milk shipped out of the State was only 33.32 per cent of the total

TABLE 43

Plant Utilization of Milk and Cream Received at Twenty-Two Milk Plants Shipping Out-of-State in 1928

Type of dairy product	Total pounds	Average butter-fat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products				
Milk from dairymen	66,306,696	4 12	2,731,814	80 63
Cream from dairymen	2,281,406	13 17	300 357	8 86
Dairy products from out-of-State	977,446	36 43	356,049	10 51
Total receipts	69,565,548	4 87	3,388,220	100.00
Utilization of dairy products				
Milk sold locally	3,279,387	3 72	121,885	3 60
Cream sold locally	906,102	35 05	317,565	9 37
Skimmilk sold locally	4 578,196	——	——	——
Milk shipped out-of-State	23,905,482	4 21	1,006,880	29 72
Cream shipped out-of-State	4 294,523	35 36	1,518,360	44 81
Skimmilk shipped out-of-State	8,870,770	——	——	——
Dairy products into ice cream	1,958,589	7 58	148,437	4 38
Cream into butter	489,587	29 81	145,931	4 31
Milk into condensed milk	118,780	3 58	4,257	13
Skimmilk into condensed skimmilk	4,185,194	——	——	——
Skimmilk into powdered skimmilk	514,301	——	——	——
Skimmilk into casein	13,530,705	——	——	——
Dairy products to Maine dealers	1,398,172	——	124,523	3 67
Dairy products unaccounted for	1,535,759	——	382	.01
Total sales	69,565,548	4.87	3,388,220	100 00

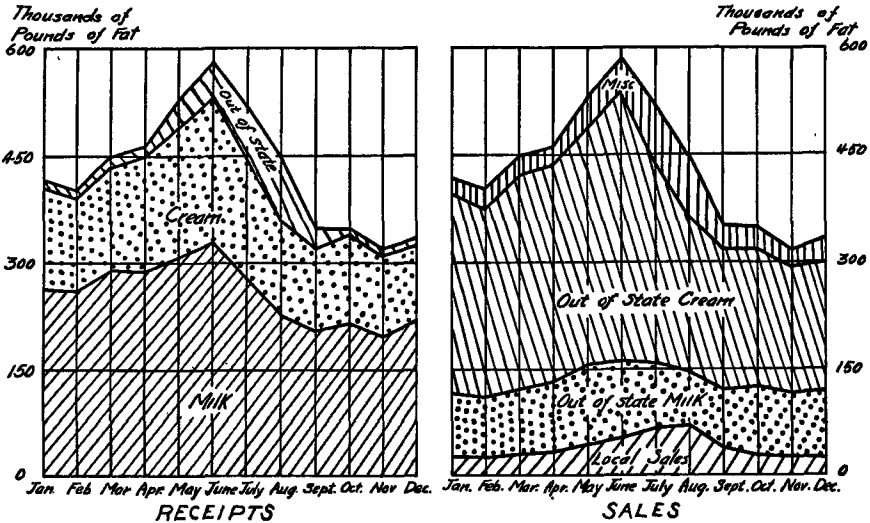

FIG 122 PLANT UTILIZATION OF BUTTERFAT RECEIVED AT 37 PLANTS SHIPPING DAIRY PRODUCTS OUT OF THE STATE IN 1928

Large quantities of the milk received from dairymen were separated and shipped as cream to out-of-State markets
(Based on data in Table 5 of the Appendix)

sales. Milk sales were low because large quantities of milk were separated and shipped as cream to out-of-State markets. Large quantities of the skimmilk, which was obtained from plant separation of milk and low test cream, were sold locally at relatively low prices to dairymen for feeding livestock Also large amounts of skimmilk were shipped out of the State or manufactured into condensed skimmilk, powdered skimmilk, and casein.

Of the total receipts of butterfat at cream plants shipping out of the State, 82 49 per cent was in cream purchased from dairymen (Table 44). Over 90 per cent of the total butterfat at these plants was utilized as cream shipped to out-of-State markets. Only very small quantities of dairy products were sold locally or used in manufactured products.

TABLE 44

Plant Utilization of Milk and Cream Received at Fifteen Cream Plants Shipping Out-of-State in 1928

Type of dairy product	Total pounds	Average butterfat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products				
Milk from dairymen	7,033,512	4 32	303,706	17 51
Cream from dairymen	9,745,605	14 68	1,431,166	82 49
Total receipts	16,779,117	10 34	1,734,872	100 00
Total sales of dairy products				
Milk sold locally	66,257	5 13	3,398	20
Cream sold locally	51,222	36 89	18,896	1 09
Skimmilk sold locally	1,687 020			
Milk shipped out-of-State	2,267,814	4 00	90,666	5 23
Cream shipped out-of-State	5,523,747	28 36	1,566,791	90 31
Skimmilk shipped out-of-State	6,339,688			
Cream into butter	43,140	20 00	8,628	50
Dairy products to Maine dealers	889 265		46,285	2 66
Dairy products unaccounted for	— 89,036*		208	01
Total sales	16,779,117	10 34	1,734,872	100 00

* Total sales were in excess of total receipts due to slight errors in estimating the amount of dairy products sold at some plants

The seasonal utilization of milk and cream received at all plants primarily shipping out of the State is shown in Figure 122. Purchases of butterfat in milk were much larger than in cream. Of the total butterfat utilized, however, butterfat in cream shipped to out-of-State markets was by far the most important and absorbed practically all of the seasonal variation in dairymen's

sales, which reached a peak in June. Local sales of butterfat, which were chiefly in the form of cream, were relatively small and reached a peak in August. Shipments of milk out of Maine were fairly uniform throughout 1928 and contained more butterfat than local sales of dairy products, but were relatively small as compared to cream shipments.

CREAM PLANTS WITH LOCAL TRADE

Creameries that primarily bought cream to supply the local demands in Maine employed several market outlets in utilizing their dairy products Nearly 20 per cent of the total butterfat was sold directly to local markets. As shown in Figure 123, the local sales were fairly uniform from month to month An additional 37 81 per cent of the butterfat was sold to other Maine dealers to supply their local cream demands (Table 45). These sales, which were relatively high during June to September inclusive, were 300 per cent higher in July than in January. Local markets did not absorb all of the supply of dairy products at these cream plants, and as a result 39.68 per cent of the total butterfat was shipped to out-of-State markets. These shipments reached a peak in June and were also relatively high during October.

TABLE 45

Plant Utilization of Milk and Cream Received at Five Cream Plants with Local Trade in 1928

Type of dairy product	Total pounds	Average butterfat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products				
Milk from dairymen	1,096,000	6.56	71,862	22 54
Cream from dairymen	1,141,170	21 64	246,955	77 46
Total receipts	2,237,170	14 25	318,817	100 00
Utilization of dairy products				
Milk sold locally	86,629	4 01	3,475	1 09
Cream sold locally	156,363	38 44	60,112	18.85
Skimmilk sold locally	238,482	——	——	——
Cream shipped out-of-State	316,310	40 00	126,524	39 68
Skimmilk shipped out-of-State	64,642	——	——	——
Cream into butter	30,196	25 00	7,549	2 37
Dairy products to Maine dealers	667,913	——	120,530	37.81
Dairy products unaccounted for	676,635	——	627	20
Total sales	2,237,170	14.25	318.817	100.00

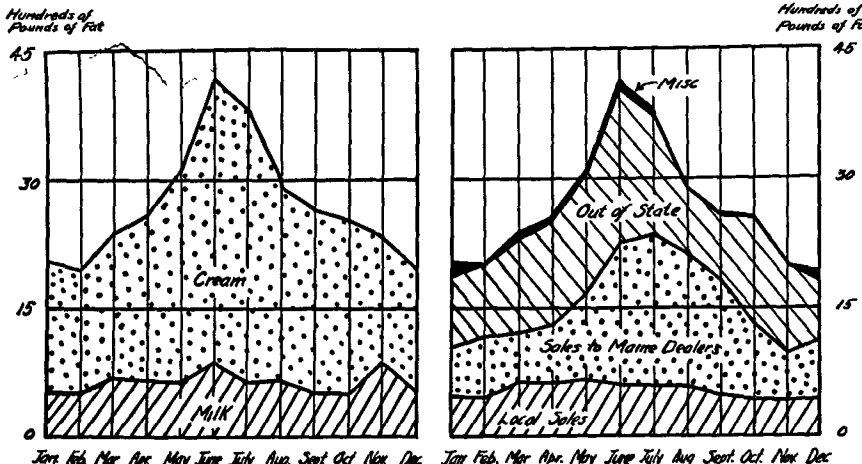

FIG. 123. PLANT UTILIZATION OF BUTTERFAT RECEIVED AT FIVE CREAM PLANTS WITH LOCAL TRADE IN MAINE IN 1928

ICE CREAM PLANTS

At ice cream plants, milk represented about one-fifth of the total butterfat purchased; and cream, approximately four-fifths The utilization of dairy products at these plants included 21.48 per cent of the butterfat sold locally, 28.25 per cent shipped out of the State, 37.63 per cent used in making ice cream mix, and 12.60 per cent converted into manufactured products or sold to other Maine dealers (Table 46). Some milk and cream were manufactured into butter and some milk and skimmilk were condensed; but these manufactured products were usually kept on hand and later used as ingredients in ice cream mix, when the demand for ice cream was relatively high. Milk, cream, and skimmilk were sometimes purchased of, and sometimes sold to, other Maine dealers. The net sales to other Maine dealers amounted to 6.10 per cent of the total butterfat utilized.

TABLE 46

Plant Utilization of Milk and Cream Received at Twelve Ice Cream Plants in 1928

Type of dairy product	Total pounds	Average butterfat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products				
Milk from dairymen	4,545,613	4 34	197,303	19 82
Cream from dairymen	3,514,763	21 73	763,877	76 72
Dairy products from out-of-State	590,750	5 84	34,473	3 46
Total receipts	8,651,126	11 51	995,653	100.00
Total sales of dairy products				
Milk sold locally	924,656	3 94	36,435	3 66
Cream sold locally	474,878	37 36	177,395	17 82
Skimmilk sold locally	95,228	——	——	——
Milk shipped out-of-State	1,547,751	3 90	60,362	6 06
Cream shipped out-of-State	671,222	32 91	220,911	22 19
Dairy products in ice cream	3,536,361	10 59	374,627	37 63
Cream into butter	186,116	27 18	50,589	5 08
Milk into condensed milk	314,012	4 50	14,131	1 42
Skimmilk into condensed skimmilk	326,992	——	——	——
Dairy products to Maine dealers	41,599	——	60,776	6 10
Dairy products unaccounted for	532,311	——	427	04
Total sales	8,651,126	11 51	995,653	100.00

At ice cream plants, local sales of cream and small quantities of milk and skimmilk were much larger in July and August than during the rest of the year (Figure 124). Out-of-State ship-

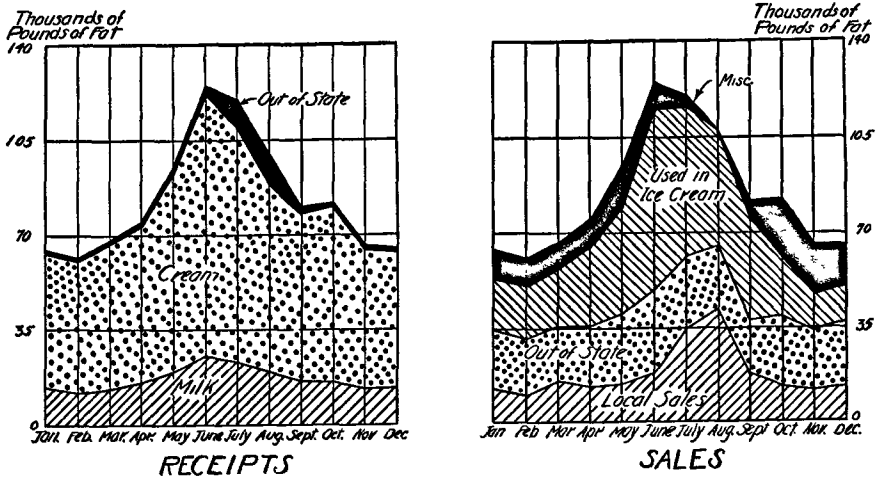

FIG 124. PLANT UTILIZATION OF BUTTERFAT RECEIVED AT 12 ICE CREAM PLANTS IN MAINE IN 1928

ments of milk and cream were, in contrast, relatively uniform in volume throughout the year. The amounts of milk and cream used in manufacturing ice cream were at their height during the hot months of June, July, and August.

BUTTER, AND CHEESE PLANTS

Nearly all the milk and cream received at butter, and cheese plants was manufactured into butter and cheese (Table 47). Of the total butterfat handled, 40.56 per cent was converted into cheese and 56.79 per cent into butter. The seasonal variation of purchases is not shown, because milk used in making cheese closely represents milk purchased from dairymen, and cream converted into butter represents cream purchases.

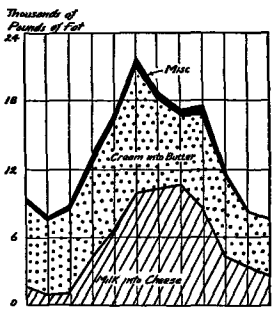

FIG 125. PLANT UTILIZATION OF BUTTERFAT RECEIVED AT 4 BUTTER, AND CHEESE PLANTS IN MAINE IN 1928

TABLE 47

Plant Utilization of Milk and Cream Received at Four Butter, and Cheese Plants in 1928

Type of dairy product	Total pounds	Average butterfat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products				
Milk from dairymen	1,659,249	4 13	68,560	43 73
Cream from dairymen	448,588	19.67	88,234	56 27
Total receipts	2,107,837	7 44	156,794	100.00
Utilization of dairy products				
Milk into cheese	1,628,845	3 90	63,601	40 56
Cream into butter	451,948	19 70	89,047	56 79
Dairy products to Maine dealers	7,060	——	3,147	2.01
Dairy products unaccounted for	19,984	——	999	.64
Total sales	2,107,837*	7.44	156,794	100 00

* The total does not include 314,489 pounds of buttermilk manufactured into casein because the original pounds were included under "cream into butter"

ALL PLANTS OF THE LARGER DEALERS

Of the total butterfat received at all dealers' plants, receipts of milk from dairymen represented 57 39 per cent, receipts of cream from dairymen were 37.15 per cent, and dairy products shipped into Maine, 5 46 per cent (Table 48) The butterfat content of all dairy products received averaged 6 09 per cent.

TABLE 48

Plant Utilization of the Total Milk and Cream Received at All the Larger Dealers' Plants in 1928

Type of dairy product	Number of plants	Total pounds	Average butterfat test	Pounds of butterfat	Per cent of total butterfat
Receipts of dairy products					
Milk from dairymen	78	109 776 462	4 14	4,540,078	57 39
Cream from dairymen	67	17,626,324	16 68	2,939 758	37 15
Dairy products from out-of-State	5	2,483,803	17 41	432,328	5 46
Total receipts	92	129,886,589	6 09	7,912,164	100 00
Utilization of dairy products					
Milk sold locally	54	32,225,540	3 89	1,254,487	15 86
Cream sold locally	49	3,307,085	33.61	1,111,561	14 05
Skimmilk sold locally	34	7,698,711	——	——	——
Buttermilk sold locally	1	920,167	——	——	——
Milk shipped out-of-State	20	27,721,047	4 18	1,157,908	14 63
Cream shipped out-of-State	40	10 899,207	31.84	3,469,948	43 86
Skimmilk shipped out-of-State	27	15,997,006	——	——	——
Dairy products into ice cream	12	5,494,950	9 52	523,064	6 61
Milk into cheese	2	1,628,845	2 90	63,601	80
Cream into butter	12	1,230,627	25 24	310 636	3 93
Milk into condensed milk	2	432,792	4.25	18,388	.23
Skimmilk into condensed skimmilk	4	4,512,186	——	——	——
Skimmilk into powdered skimmilk	1	514 301	——	——	——
Skimmilk into casein	4	13,530 705*	——	——	——
Dairy products unaccounted for	——	3,873,420	——	2,571	.03
Total sales	92	129,886,589	6.09	7,912,164	100.00

* This does not include 314,489 pounds of buttermilk made into casein.

Although milk was the most important product received, cream was the most important dairy product sold at these plants Of the total butterfat utilized, 57.91 per cent was sold as cream as compared with 30 49 per cent sold as milk. The large quantities of cream sold, which tested an average of slightly over 30 per cent, were obtained from standardizing cream that was received with an average test of 16.68 per cent, and from separating large amounts of milk that tested an average of 4 14 per cent.

Of the total butterfat purchased by Maine plants, 29.91 per cent was sold locally, 58.49 per cent was shipped out of the State,

11.57 per cent was used in manufactured dairy products, and .03 per cent was unaccounted for. The relative utilization of all milk and cream received each month in 1928 is shown in Figure 126, which is based on Table 2 of the Appendix. Milk sold locally was approximately equal in amount to milk shipped out of the State. Milk sold locally had an average butterfat content of 3.89 per cent as compared with 4.18 per cent for milk shipped out of the State.

The total butterfat in cream sold locally by the larger dealers was about equal to that in local sales of milk. Cream shipped out of the State accounted for nearly one-half of the total butterfat utilized at plants. The increase in sales of out-of-State cream during May, June, and July also indicates that cream includes a majority of the seasonal increase in receipts during these three months.

The remainder of the butterfat in milk and in cream which was not sold locally or shipped out of the State represented 11.57 per cent of the total, and included dairy products used in the manufacture of ice cream, cheese, butter, and condensed milk. Of this percentage, over one-half was for milk and cream used in making ice cream. The average butterfat test for all milk, cream, and skimmilk used in ice cream mix was 9.52 per cent. Milk made into cheese tested 3.9 per cent and included less than one per cent of the total butterfat handled at all plants. Cream manufactured into butter included about four per cent of the total butterfat utilized. Only three-hundredths of one per cent of the total butterfat was lost in handling due to such factors as spillage, adherence to dairy equipment, and errors in computing the amount of receipts and sales. The seasonal variation in the utilization of dairy products for manufacturing purposes shows an increase in June to about three to four times the amount used for manufacture each month from November to March inclusive.

Large quantities of skimmilk, amounting to about 46 million pounds, were also available at dealers' plants due to converting large amounts of milk and low-test cream into heavy cream. This skimmilk was utilized as follows. 34.74 per cent shipped out of the State, 29.37 per cent made into casein, 16.72 per cent sold locally, 9.80 per cent made into condensed skimmilk, 1.12 per cent converted into powdered skimmilk, and about 8.25 per cent thrown away.

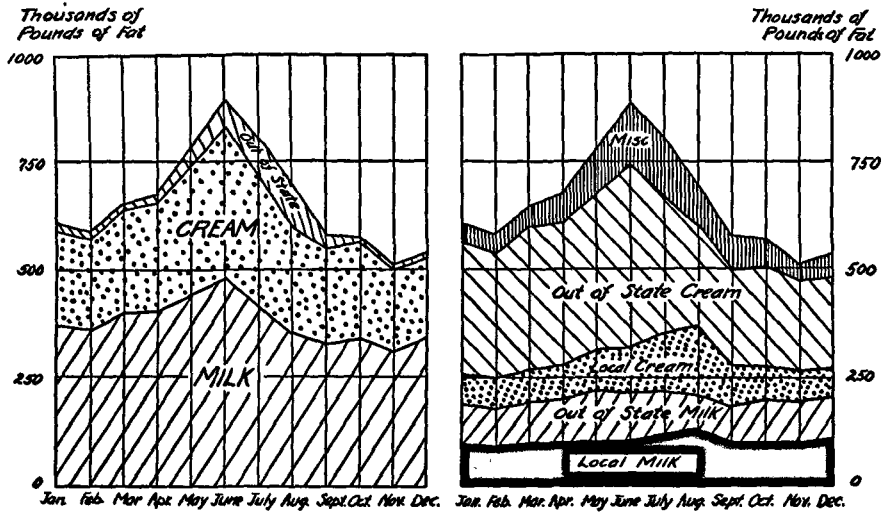

FIG 126 PLANT UTILIZATION OF BUTTERFAT RECEIVED AT ALL THE LARGER DEALERS' PLANTS IN MAINE IN 1928

AMOUNT AND SEASONAL VARIATION OF DAIRY PRODUCTS SOLD OR MANUFACTURED IN MAINE AND SHIPPED OUT OF THE STATE BY THE LARGER DEALERS IN 1928

FLUID MILK AND CREAM SOLD FOR CONSUMPTION IN MAINE

The total amount of milk and cream sold each month by the larger dealers for consumption in Maine is given in Table 2 of the Appendix. The relative amounts of average daily sales of milk and cream each month are presented in Table 49 and are illustrated in Figure 127 Milk consumption in Maine was relatively uniform throughout the year, with the exception of July and August. During these two months, sales increased rapidly to a peak in August which was 22 per cent above the yearly average.

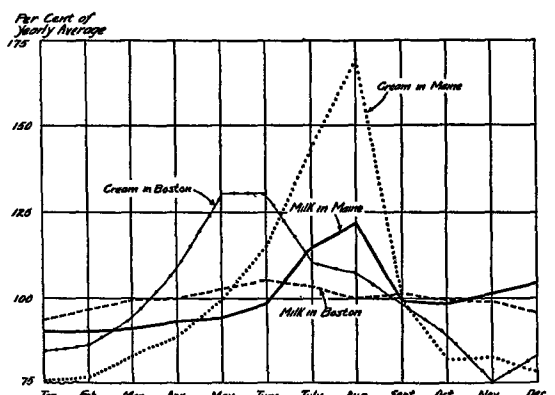

FIG. 127 SEASONAL VARIATION IN THE AMOUNT OF MILK AND CREAM SOLD DAILY BY THE LARGER DEALERS FOR CONSUMPTION IN MAINE DURING 1928 AND IN METROPOLITAN BOSTON DURING 1930 AND 1931

Milk and cream sales in Maine are relatively high during July and August, due primarily to the influx into Maine of summer vacationists from other states Milk consumption per person, however, is relatively constant throughout the year Cream sales per person increase considerably during the summer months

Milk sales in large out-of-State markets, however, usually do not show an increase during July and August. In the large Metropolitan Boston market, the consumption of milk, as indicated by dealers' receipts from all states, actually decreased during July and August. The primary reason for this decrease in sales at Boston during these months in contrast to an increase of milk sales in Maine was due largely to numerous people taking trips and spending their vacations outside the city, while a large number of people come to Maine during the summer months. Milk sales to regular Maine residents held practically constant throughout the year, with a tendency for sales to increase slightly during warm weather and to decrease slightly during the winter months.

Cream sales, both in Maine and Boston, had a much greater variation from month to month than did milk sales. The average daily cream consumption in Maine during August increased 70 per cent above the yearly average, as compared with an increase

TABLE 49

Seasonal Variation in the Amount of Milk and Cream Sold Daily by the Larger Dealers for Consumption in Maine During 1928 and in Metropolitan Boston[41] *During 1930 and 1931*

(Expressed as per cent of yearly average)

Month	Milk sold in		Cream sold in		Skimmilk sold in Maine
	Maine	Boston*	Maine	Boston*	
January	90 11	93 90	76 06	83 98	75 72
February	90 17	96 56	76 72	86 16	82.64
March	91 48	99 50	83 14	93 52	91 64
April	93 00	100 11	88 57	108 92	120 42
May	94 19	102 85	99 93	130 30	134 48
June	98 95	105 63	115 74	130 30	158 14
July	115 46	103 63	144 19	110 91	131 97
August	122 11	100 16	170 27	107 29	108 65
September	99 42	101 71	100 86	98 82	87 84
October	98 22	99 91	82 02	89 84	92 24
November	101 23	99 18	82 01	75 50	61 57
December	104 61	96 72	78 04	83 10	54.51
Yearly average	100 00	100 00	100.00	100 00	100 00

* Consumption in Boston is based on the amount of milk and cream received at Metropolitan Boston from all states.

[41] Receipts of Milk and Cream at Boston and Metropolitan Area by States. Market News Service, Bur. Agr. Econ., U. S Dept. Agr. Mimeographed summaries for 1930 and 1931, by months.

of 22 per cent for milk. Cream consumption in Metropolitan Boston reached its peak in June; and then decreased in July and August, the months when Maine consumption was being stimulated by vacation trade.

Skimmilk sold locally was purchased by dairymen and others as a livestock feed, and by such concerns as bakeries for cooking purposes. The total sales of skimmilk per day in Maine reached a peak in June which was 58 per cent above the yearly average, and dropped to a low point in December which was 45 per cent below the average.

OUT-OF-STATE SHIPMENTS OF MILK, CREAM, AND SKIMMILK

The total amount of dairy products shipped from Maine to other states in 1928 included 27,721,047 pounds of milk, 10,899,207 pounds of cream, and 15,997,006 pounds of skimmilk (Table 50). Massachusetts markets, primarily at Metropolitan Boston, accounted for 88.08 per cent of the milk, 91.99 per cent of the cream, and 97 01 per cent of the skimmilk shipped out of Maine The remainder of the milk sold was about evenly divided between New Hampshire and Rhode Island, while the remainder of the cream and skimmilk was practically all received at Rhode Island.

TABLE 50

Total Amount and Destination of Out-of-State Shipments of Milk, Cream, and Skimmilk from the Larger Maine Dealers in 1928

Destination	Milk		Cream		Skimmilk	
	Total pounds	Per cent of total	Total pounds	Per cent of total	Total pounds	Per cent of total
New Hampshire	1,547,751	5 53	76,272	70	12,126	08
Massachusetts	24,414,930	88.08	10,026,650	91 99	15,518,366	97 01
Rhode Island	1,758,366	6 34	796,285	7 31	466,514	2 91
Total out-of-State	27,721,047	100 00	10,899,207	100 00	15,997,006	100 00

The seasonal variation in milk, cream, and skimmilk shipped daily out of Maine in 1928 is indicated in Figure 128. Both milk and cream shipments reached their highest peak in June, with cream having the greater seasonal variation. The average daily

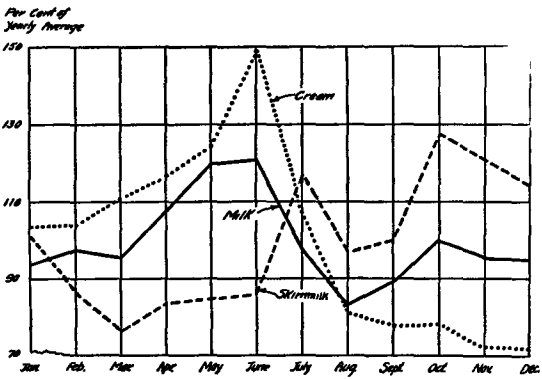

FIG 128 SEASONAL VARIATION IN THE AMOUNT OF MILK, CREAM, AND SKIMMILK SHIPPED DAILY BY THE LARGER MAINE DEALERS TO OUT-OF-STATE MARKETS IN 1928

cream shipments in June were 50 per cent above the yearly average as compared with 21 per cent above for milk. The amount of milk sent to out-of-State markets decreased rapidly after June, reaching a low point in August which was 17 per cent below the

TABLE 51

Seasonal Variation in the Amount of Milk, Cream, and Skimmilk Shipped Daily by the Larger Maine Dealers to Out-of-State Markets in 1928
(Expressed as per cent of yearly average)

Month	Milk	Cream	Skimmilk
January	94 22	103 80	101 21
February	97 98	104 58	86 65
March	95 76	111 32	76 88
April	105 28	116 83	83 97
May	120 01	124 88	85 36
June	121 18	149 60	86 38
July	98.45	107 36	117 58
August	83 47	81 11	97 06
September	89 57	77 57	100 40
October	100 41	78 97	128 15
November	95 64	72 53	121 15
December	95.29	72.23	114.08
Yearly average	100.00	100.00	100.00

yearly average. Cream shipments also decreased from June to August, but at a more rapid rate than did those of milk. This decline for cream did not stop in August but continued slowly in the following months to a low point in December which was 28 per cent below the yearly average (Table 51).

The quantities of skimmilk going from Maine to out-of-State markets varied considerably throughout the year. The average of daily shipments was lowest in March, at 23 per cent below the yearly average, and highest in October, at 28 per cent above the average.

The trend of shipments of milk and cream from Maine to Boston is indicated in Table 52. The trend of total milk equiva-

TABLE 52

Origin of All Milk and Cream Received at Boston and Metropolitan Area[42] *in 1931 and the Trend of Shipments by Rail from Maine to Boston 1925-1931*[43]

(Hundred thousands of pounds, i.e., 00,000 omitted)

State	Milk		Cream		Total milk equivalent	
	Total pounds	Per cent of total	Total pounds	Per cent of total	Total pounds	Per cent of total
Maine	562	10.18	63	12.75	*1,192	*11 40
New Hampshire	669	12.12	19	3.85	859	8.21
Vermont	3,298	59 77	224	45.34	5,538	52.95
Massachusetts	540	9 79	1	.20	550	5.26
Connecticut	5	.09	—	—	5	05
New York	444	8.05	49	9 92	934	8 93
West of Buffalo	—	—	138	27 94	1,380	13.20
Total received in 1931	5,518	100.00	494	100.00	10,458	100.00
Maine, 1925	315	8.23	80	18 95	1,115	15 82
Maine, 1926	307	7 72	86	17.28	1,167	14 67
Maine, 1927	287	7 06	83	16 47	1,117	12.27
Maine, 1928	266	6.50	72	14 06	986	10 70
Maine, 1929	258	6.12	73	13 63	988	10.33
Maine, 1930	224	5 03	76	14 71	984	10 23
Maine, 1931*	370	8.08	57	11.50	940	9 86

* These figures for 1931 are less than those for Maine as shown in the first line of this table primarily because they do not include shipments to the Metropolitan Area. The more complete data for all shipments have been available only since 1930.

[42] Same as footnote 41. Mimeographed summary for 1931.

[43] Computed from unpublished data of New Eng. Milk Prod. Assn., Boston; and Receipts of Milk and Cream in Quarts at Boston by Rail. Commonwealth of Mass., Dept. of Public Utilities. Monthly mimeographed reports.

lent shipped from Maine was downward from 1926 to 1931 inclusive. Total shipments from Maine in 1931 were 94,000,000 pounds of milk equivalent as compared to 116,700,000 pounds in 1926, or a decrease of 19.45 per cent There was a definite trend, however, from cream to milk shipments from October, 1930 through the year 1931. During 1931, milk shipments increased 14,600,000 pounds, or 65 per cent over those of 1930; while cream shipments decreased 1,900,000 pounds, or 25 per cent. Milk shipments from Maine in 1931 were 17 46 per cent more than in 1925, but cream shipments were nearly 29 per cent less than in 1925.

Of the total milk and cream received at Boston and Metropolitan Area from all states in 1931, Maine supplied 10.18 per cent of the milk and 12.75 per cent of the cream, or 11 40 per cent of the total milk equivalent. Vermont supplied over one-half of the total milk equivalent for this market. New Hampshire accounted for only 8.21 per cent of the total as compared with 11.40 per cent from Maine.

ICE CREAM, CHEESE, AND BUTTER MANUFACTURED IN MAINE

The amount of ice cream manufactured in Maine by the larger dealers in 1928 amounted to 1,183,434 gallons (Table 53). The seasonal variation in ice cream manufactured is shown in Figure 129 Ice cream consumption increased rapidly as temperature increased during May, June, and July The daily consumption in August was approximately equal to that of July. The peak of ice cream sales, which occurred during the two months of July and August, was about 2 4 times the yearly average and 6 6 times the sales in January, when consumption was at its lowest. Daily ice cream sales in September decreased rapidly to less than one-half of the large amount sold in July and August.

Ice cream dealers used per gallon of ice cream an average of 4.64 pounds of milk, cream, and skimmilk. These dairy products had an average test of 9.52 per cent of butterfat. No attempt was made in this study to secure the amounts of such dairy products as butter and skimmilk powder that were used in making the ice cream mix. The use of some additional butterfat from manufactured dairy products was required to increase the test from 9.52 to 14.0 per cent for plain ice cream, or to 12.0 per cent

for nut and fruit ice cream (the standards required by law in Maine).

TABLE 53

Seasonal Variation in the Gallons of Ice Cream, and Pounds of Cheese and Butter Manufactured in Plants of the Larger Maine Dealers in 1928

Month	Total gallons of ice cream	Per cent of daily average for the year	Total pounds of cheese	Per cent of daily average for the year	Total pounds of butter	Per cent of daily average for the year
January	36,665	36 59	4,132	28 06	24,906	81 36
February	38,940	41 54	2,437	17 72	25,675	89 67
March	52,427	52 30	2,634	17 93	27,573	90 07
April	62,085	64 03	12,171	85 65	28,394	95 85
May	100,330	100 09	18,079	127 22	39,358	128 67
June	154,231	159 08	26,836	188 82	37,797	127 66
July	242,094	241 54	28,305	192 62	41,711	136 37
August	237,857	237 33	29,161	198 52	43,633	142 65
September	102,998	106 19	23,750	167 09	37,625	127 05
October	66,435	66 29	10,516	71 52	22,731	74 27
November	46,946	48 41	7,797	54 85	17,321	58 46
December	42,376	42 28	7,129	48 52	14,596	47 72
Total	1,183,434	100 00	173,548	100 00	361,320	100 00

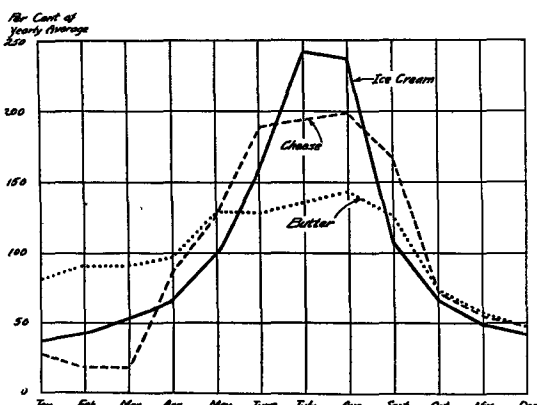

FIG. 129. SEASONAL VARIATION IN THE AMOUNT OF ICE CREAM, CHEESE, AND BUTTER MANUFACTURED DAILY BY THE LARGER DEALERS IN MAINE IN 1928

The manufacture of American cheese at Maine dairy plants during 1928 amounted to 173,548 pounds The seasonal variation in the total cheese manufactured is shown in Figure 129. Average daily cheese production reached a peak during June, July, and August which was nearly twice as high as the yearly average, and about ten times that of February and March. An average of 9 4 pounds of milk, testing 3.9 per cent, was required to produce one pound of American cheese.

Creamery butter manufactured in Maine during 1928 totaled 361,320 pounds. Butter production, as shown in Figure 129, did not have as much seasonal variation as manufactures of cheese and ice cream. The average daily production of butter reached a peak in August which was 43 per cent above the yearly average, as compared with 98 per cent above in August for cheese and 141 per cent above in July for ice cream. An average of .86 pounds of butterfat was required to make one pound of butter. The average test of cream used for butter was 25 24 per cent.

SKIMMILK BY-PRODUCTS MANUFACTURED IN MAINE

Large quantities of skimmilk were converted into condensed skimmilk, powdered skimmilk, and casein. During 1928, of the total skimmilk thus used, 74.15 per cent was condensed, 2 51 per

TABLE 54

Total Pounds of Condensed Skimmilk, Powdered Skimmilk, and Casein Manufactured in Maine During 1928

Month	Pounds of condensed skimmilk	Pounds of powdered skimmilk	Pounds of casein	Per cent of total skimmilk into		
				Condensed	Powdered	Casein
January	214,354	——	36,167	85 56	——	14 44
February	112,807	——	45,867	71 09	——	28 91
March	140,326	——	52,691	72 71	——	27 29
April	110,390	10,153	51,089	64 32	5 92	29 76
May	161,467	9,853	52,691	72 08	4 40	23 52
June	208,306	9,555	58,183	75 46	3 46	21 08
July	53,862	2,692	31,727	61 01	3 05	35 94
August	46,271	404	20,992	68 38	60	31.02
September	29,684	5,407	16,016	58 08	10 58	31 34
October	69,235	1,875	8,700	86 74	2.35	10 91
November	53,688	——	7,364	87 94	——	12 06
December	58,790	2,747	14,768	77.05	3.60	19 35
Total	1,259,180*	42,687	396,246	74.15	2 51	23.34

* Includes 112,330 pounds of condensed whole milk.

cent was powdered, and 23.34 per cent was made into casein (Table 54). Also a slight amount of whole milk was condensed, and some buttermilk was used in manufacturing casein. At Maine plants in 1928, a total of 1,259,180 pounds of condensed milk and skimmilk was manufactured, of which about 85 per cent was sweetened and 15 per cent was unsweetened. An average of 3.93 pounds of skimmilk was used to produce one pound of condensed skimmilk. The manufacture of powdered skimmilk began in April, 1928 and amounted to 42,687 pounds for the year. An average of 12.05 pounds of skimmilk was required per pound of powdered skimmilk. Casein production totaled 396,246 pounds in Maine during 1928, requiring 34.94 pounds of skimmilk per pound of casein.

TREND IN THE MANUFACTURE OF DAIRY PRODUCTS IN MAINE FROM 1925 TO 1930 INCLUSIVE

The trend in the amount of dairy products manufactured in Maine from 1925 to 1930 inclusive is indicated by estimates made by the Bureau of Agricultural Economics of the United States Department of Agriculture from monthly reports sent in by dairy dealers (Table 55). Although these figures are not necessarily complete, because some dealers do not report, they do indicate the

TABLE 55

Trend in the Amount of Dairy Products Manufactured in Maine During 1925-1930 Inclusive as Estimated by the United States Department of Agriculture[44]

(Thousands of gallons or pounds, i.e., 000 omitted)

Manufactured product	1925	1926	1927	1928	1929	1930
Ice cream, gallons	1,331	1,341	1,386	1,504	1,565	1,570
American cheese, pounds	—	128	111*	88	75	85
Creamery butter, pounds	480	547	519	348	256	202
Condensed and evaporated milk, pounds	1,110	1,675	1,744	1,032	1,984	516
Dried casein, pounds	284	344	325	344	2,032	58

* Revised figure resulting from additional information furnished the author at cheese plants

[44] Courtesy of Bur. of Agr. Econ., U. S. Dept. Agr. Dairy products manufactured in Maine, by months, 1925-1930. Unpublished data.

trend in the manufacture of dairy products in Maine. The amount of ice cream manufactured increased steadily from 1925 to 1930 inclusive. This increase amounted to 17.94 per cent for the five-year period American cheese production in Maine was relatively unimportant each year. Production of whole milk American cheese decreased from 1926 to 1929 and then increased slightly in 1930. Creamery butter production was also relatively unimportant between 1925 and 1930. The highest production amounted to 547,000 pounds in 1926. Since that time, the quantity of butter churned at creameries has decreased steadily to only 202,000 pounds in 1930. The amount of condensed milk, evaporated milk, and casein manufactured was relatively high in 1929 and then dropped to an exceedingly low level in 1930.

MILK AND CREAM PRODUCED FOR THE SMALLER RETAILERS IN MAINE

In addition to milk and cream purchased by the 92 larger dealers from 6,580 Maine dairymen, there were also 2,018 small retailers supplied by 2,704 dairymen.[45] Although each of these retailers did a relatively small volume of business (less than 500 quarts of milk equivalent daily), the aggregate for all of these retailers was large. On a milk equivalent basis, production for these small retailers during 1928 totaled 163,216,785 pounds of milk, which represented 71.43 per cent of the total milk and cream sold for consumption in Maine and 46.61 per cent of the total milk and cream sold by all Maine dairymen.

The information for these small retailers was based on data secured[46] from retailers' application cards which they sent to the Dairy Division of the State Department of Agriculture in securing their operating licenses for 1929 Each application card contained a statement of the estimated average amount of milk and

[45] It should not necessarily be inferred that the total number of Maine dairymen who sell milk and cream is equal to the sum of the 2,704 dairymen selling to small retailers plus the 6,580 producers selling to the larger dealers. It is quite probable that some of the former dairymen had some surplus milk (milk in excess of local demands) which they sold to the larger dealers and, therefore, were counted in each group of producers.

[46] Osgood, Clayton F., State Dairy Inspector. Unpublished data. Maine Dept. Agr., Augusta.

cream sold daily, the sources of the milk and cream supply, and the number of cows kept by the retailer.[47] The data used in this study include sales of milk and cream which were produced by the retailer or purchased directly from dairymen. Most of the store and some residence sales were omitted because they were also represented under vehicle sales, and the attempt was made to eliminate any duplications of supply. Since these data were dairymen's estimates, they may be slightly too high or too low due to the difficulty of estimating the average daily retail sales, such as at summer camps where the demand varied widely during the year. Nevertheless, these data are of much value and give the approximate volume of milk and cream produced by Maine dairymen to be sold by the small retailers.

Production of milk and cream for, and by, the 2,018 small retailers was distributed among 213 towns and cities of Maine. Their location and the approximate number of quarts of milk sold daily are shown in Figure 130. In the majority of these towns, the volume retailed was comparatively small. In 129 towns, the sales were less than 500 quarts of milk daily per town (Table 56) In only 19 towns and cities did the small retailers handle a total of 2,000 or more quarts of milk daily. These concentrated areas include Auburn, Augusta, Bangor, Bath, Biddeford, Brewer, Brunswick, Camden, Gardiner, Lewiston, Millinocket, Portland, Rockland, Saco, Sanford, Skowhegan, South Portland, Waterville, and Westbrook. The data on which Figure 130 is based are given in Table 13 of the Appendix.

There was a tendency for each small retailer to handle, on the average, a larger volume of business in the larger towns and cities than in the smaller towns. The average quarts of milk equivalent sold daily per retailer was 143 quarts in the 19 larger towns and cities as compared with 63 quarts per retailer in towns where the total amount retailed was less than 500 quarts daily.

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[47] The following questions were included among those answered in each "Application for Milk and Cream License: I hereby apply to the Commissioner of Agriculture for a license to sell milk and cream from a ——— Name ——— P. O. Address ——— (vehicle, store, or residence) Location, town, rd., or st. ——— Amount sold daily (qts.) Milk ——— Cream ——— Product sold in the town of ——— If milk and cream are purchased, from whom ——— Number of cows in your herd ———"

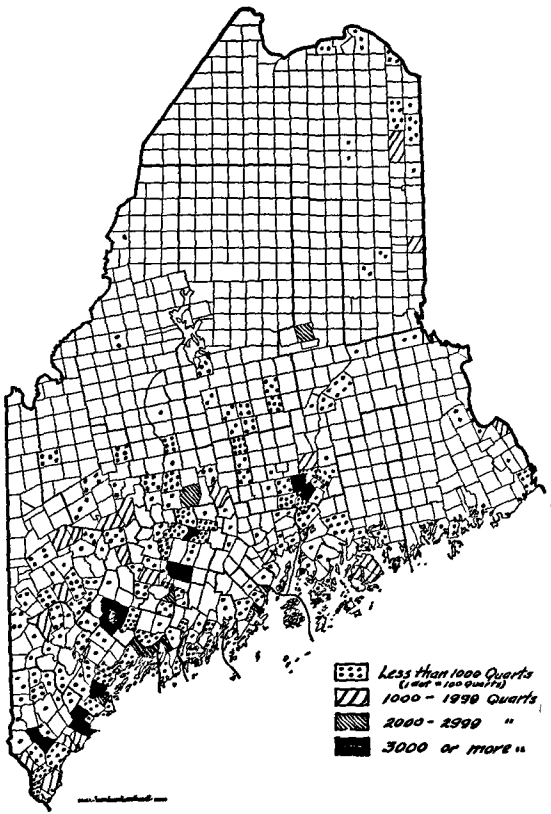

FIG 130. AVERAGE QUARTS OF WHOLE MILK SOLD DAILY TO SMALL RETAILERS WITHIN EACH TOWN IN 1928 (THOSE WHO HANDLED LESS THAN 500 QUARTS OF MILK DAILY)

TABLE 56

Total Quarts of Milk and Cream Sold Daily by Dairymen to the Small Retailers

Quarts of milk sold daily per town	Number of towns	Number of retailers	Quarts sold daily		Quarts milk equivalent per retailer	Number of producers
			Milk	Cream		
Under 500	129	554	25,451	920	63	630
500 — 999	43	446	31,772	1,070	95	590
1,000 — 1,999	22	370	29,541	892	104	481
2,000 and over	19	648	72,666	2,031	143	1,003
Total	213	2,018	159,430	4,913	103	2,704

About four-fifths of all the small retailers produced their own supply of milk and cream. These retail dairymen kept an average of 9.2 cows per herd and sold an average of 78 quarts of milk equivalent daily. An additional 16.70 per cent of the retailers purchased milk from one or more other dairymen in addition to their own production. These retailers sold an average of 210 quarts of milk equivalent daily per retailer, of which 200 quarts were from the combined production of the retailer's own herd and an average of 1.72 supplementary herds. These retailers' herds consisted of an average of 14.3 cows per herd. An average of ten quarts of milk equivalent per day was supplied to these retailers by the larger dealers. Only 51 retailers, or 2.53 per cent of all small retailers, kept no cows, and, therefore, purchased their entire milk supply. This group sold an average of 275 quarts of milk equivalent daily, of which 266 quarts were supplied by an average of 3.11 dairymen. The remaining 9 quarts were purchased from the larger dealers. The average volume of business handled daily by all small retailers was 105 quarts of milk equivalent, of which 103 quarts were purchased directly from dairymen or produced by the retailers. A total of 2,704 producers, or 1.34 dairymen per retailer, regularly supplied the milk and cream to these small retailers.

The number of retailers of varying size is given in Table 58. Nearly 40 per cent of these retailers sold less than an average of 50 quarts of milk daily, and only 6 per cent sold 300 or more quarts of milk per day. In the latter group, nearly two-thirds of the retailers purchased part of their milk and cream from other

TABLE 57

Types of Small Retailers and Relation of Type to Volume of Milk and Cream Purchased Daily from Dairymen

Type of retailer	Number of retailers	Per cent of total number	Quarts milk equiv daily per retailer	Number of producers*	Producers per retailer	Cows kept per retailer
Produced all	1,630	80.77	78	1,630	1 00	9 2
Produced part, buy part	337	16 70	200	915	2 72	14 3
Purchased all	51	2 53	266	159	3 11	
Total	2,018	100.00	103	2,704	1 34	9 8

* These producers include retailers who kept herds and dairymen from whom retailers purchased milk and cream.

dairymen The smaller the dealer's daily sales, the smaller was the proportion of his supplies that he bought from other dairymen. Nearly all of the smaller retailers produced sufficient milk in their own herds to supply their retail trade. Many of these smaller retailers probably did not have regular retail routes but merely supplied milk or cream to some nearby store or to their neighbors, or retailed milk and cream only during the summer months to nearby summer camps.

TABLE 58

The Variation Between Small Retailers in the Volume of Business Handled Per Day

Quarts of milk sold daily per retailer	Number of retailers	Per cent of total number	Total quarts sold daily		Per cent of retailers producing own supply
			Milk	Cream	
Under 50	791	39 20	16,374	136	96 59
50 — 99	472	23 39	26,259	597	86 65
100 — 199	466	23 09	50,559	1 161	69 96
200 — 299	168	8 32	29 961	857	50 00
300 and over	121	6 00	36,277	2,162	38 84
Total	2,018	100 00	159,430	4,913	80 77

TOTAL AMOUNT OF MILK AND CREAM SOLD FOR CONSUMPTION IN MAINE IN 1928

The sale of milk and cream by both the larger dealers and small retailers, for consumption in Maine, has become an important market outlet for milk produced by Maine dairymen. During 1928, the 92 larger dealers and 2,018 small retailers sold a total milk equivalent of 228,513,175 pounds of milk for consumption in Maine. This amount represents 65.25 per cent of the total milk and cream sold by Maine dairymen during that year. Of these local sales, the larger dealers supplied 28.57 per cent and the small retailers supplied 71 43 per cent.

TABLE 59

Importance of Milk and Cream Sold for Consumption in Maine as Compared with the Total of All Milk and Cream Sold by Maine Dairymen

Utilization of milk	Pounds of milk	Pounds of cream	Milk equivalent	
			Total pounds	Per cent of total
Total milk and cream sold for consumption in Maine:				
By larger dealers	32,225,540	3,307,085	65,296,390	28 57
By small retailers	125,455,467	3,776,132	163,216,785	71 43
Total	157,681,007	7,083,217	228,513,175	100 00
Total sales by Maine dairymen:				
To larger dealers	109,776,462	17,626,324	186,995,908	53 39
To small retailers	125,455,467	3,776,132	163,216,785	46 61
Total	235,231,929	21,402,456	350,212,693	100 00
Per cent of total dairymen's sales consumed in Maine				65 25

The average sales retailed per day in Maine included 200,382 quarts of milk and 9,216 quarts of cream. These sales per day are apportioned to towns in the two left hand columns of Table 13 of the Appendix. The amount for each town, however, does not in all instances represent sales within the exact boundaries of each town. A retailer who sold milk and cream in more than one town did not always apportion the amount sold to each town.

This lack of detail has been overcome, in some cases, by combining the towns. For example, the towns of Auburn and Lewiston, Mexico and Rumford, and Bangor and Brewer have been paired together in stating their local retail demand In a few towns, however, it was not possible to apportion the sales to each town or to combine the towns served by the same dealer Auburn was an example of a town in which a large dealer was located, who sold considerable milk and cream within a wide area in the vicinity of Auburn, especially during the summer season In this case, the total sales are listed under Auburn-Lewiston, but actually a part of this total was sold in surrounding towns. A similar situation existed at Portland, Benton, and Rockland.

The most important retail milk market in Maine was at Portland, which required an average of 27,933 quarts of milk and 1,521 quarts of cream daily. In addition to this quantity, the adjacent towns or cities of Westbrook, South Portland, and Cape Elizabeth purchased 7,852 quarts of milk and 100 quarts of cream. The combined retail markets of Auburn and Lewiston were second in size, with 17,009 quarts of milk and 1,121 quarts of cream daily. The retail markets next in order of size, according to number of quarts of milk sold daily, were Bangor-Brewer with 14,615 quarts; Biddeford-Saco, 9,045; Augusta-Hallowell, 7,117; Waterville, 5,944; Sanford, 5,743; and Mexico-Rumford, 5,267.

SUMMARY

The more intensive dairy sections of the State are situated in southwestern and south central Maine. Dairy herds in Maine, based on 1,802 questionnaires received from dairymen in 1931, averaged 8.2 cows per herd. These dairymen could stable and raise roughage for about five additional cows per herd, or an increase of about 60 per cent. Fifteen per cent of the cows were purebred, and five per cent of the herds consisted entirely of purebred cattle.

Herds that contained either more than one breed of cows or crossbreeds included about 43 per cent of all the cows. Of the remaining cows, 53.9 per cent were Jersey, 25.0 per cent were Holstein, 16.6 per cent were Guernsey, 2.5 per cent were Ayrshire, 1.7 per cent were Shorthorn, and .3 per cent were Brown Swiss.

The milk and cream sold by dairymen in 1928 to all the larger dairy dealers (those buying an equivalent of 500 or more quarts of milk daily) amounted to about 187 million pounds of four per cent milk. This was estimated to be nearly one-third of the total milk produced in the State. The milk and cream produced by and sold to the smaller retailers (those handling an equivalent of less than 500 quarts of milk daily) amounted to 163 million pounds of milk, or slightly over one-fourth of the total milk produced in Maine.

Dairymen's sales to the larger dairy dealers were most intensive in the areas north of Portland, northeast of Lewiston, and in the vicinities of Farmington, Unity, Hermon, Newport, and Dexter. Milk tended to be sold in the towns and areas where the sales of dairy products were relatively concentrated; cream sales were more important than milk where the total sales were relatively small and scattered.

A total of 6,580 Maine dairymen sold milk and cream to the larger dealers in 1928. Of this number, 53 per cent sold milk and 47 per cent sold cream. The former sold about one-third more butterfat per dairyman than did those who sold cream.

Dairymen's sales of milk and cream in 1928 reached a peak in June with milk sales 28 per cent above the daily average for the year, and cream sales 49 per cent above. Since 1928, milk sales have tended to become somewhat more uniform. Milk and

cream sales in Maine varied less during the year than dairymen's sales in the states of Vermont and New York.

Milk sales were the most uniform from month to month for dairymen who sold to local retail plants. Second in order of decreasing uniformity were sales to plants shipping out of the State, third, to ice cream plants, and last, to cheese plants.

Some of the seasonal variation in total sales was due to a variation from month to month in the number of producers. For example, total sales of milk and cream were 66 per cent higher in June than in November, but on the basis of average sales per producer, the spread was only 50 per cent. On this latter basis, the seasonal variation for cream was approximately the same as that for milk.

The average butterfat test for milk delivered was 4.14 per cent and for cream delivered was 16 68 per cent. The spread between the lowest and highest month's test was only .13 per cent for milk and 2.63 per cent for cream.

The average price and the seasonal variation in prices paid for milk and cream varied somewhat according to the types of plants Local retail plants paid the highest prices and had the smallest seasonal price variation. The basis of payment influenced the butterfat content of milk and cream delivered. For example, cream delivered to plants that paid only a butterfat price had an average test of 21.6 per cent, whereas cream delivered to plants paying a butterfat and hundredweight price tested 16 3 per cent.

The majority of the dairy dealers would not accept any sour milk or cream At plants where slightly sour products were accepted, the proportion that was sour was influenced by the reduction in price made for sour products.

All except 7 of 92 dairy plants were located on railroad lines in 1928. From 1928 to 1932, the total number of plants was reduced approximately one-fourth, resulting in greater volume per plant operated.

Of the total butterfat purchased by all of the larger dealers in Maine, about 30 per cent was sold locally, 58 per cent was shipped out of the State, and 12 per cent was used in manufactured dairy products. Cream sales included 58 per cent of the total butterfat sold, as compared with 30 per cent for butterfat sold as milk. The former was relatively large because consider-

ble quantities of surplus whole milk were converted into cream. Milk made into cheese included only about one per cent of the otal butterfat; milk and cream used in ice cream mix included .6 per cent; and cream made into butter included 3.9 per cent of he total butterfat. The utilization of milk and cream varied a reat deal between types of dairy plants.

Milk consumption in Maine was highest during July and August, reaching a peak in August that was 22 per cent above he yearly average. Cream consumption in Maine reached a peak n August that was 70 per cent above the yearly average. Milk nd cream consumption during July and August was stimulated omewhat by the large number of summer tourists and vacationsts who came to Maine from other states.

Out-of-State shipments of milk and cream reached a peak n June, with milk 21 per cent above the yearly average and cream 0 per cent above.

Ice cream sales were highest in July and August, when they vere 2.4 times the yearly average and 6.6 times the sales in Janury when ice cream consumption was the lowest.

In addition to the larger dealers in Maine, there was a total f 2,018 smaller retailers who received milk and cream direct rom 2,704 dairymen. These retailers secured from dairymen an verage equivalent of 103 quarts of milk daily per retailer.

Of the total milk and cream sold for consumption in Maine, he larger dealers supplied 29 per cent, and the smaller retailers upplied 71 per cent. The average local sales per day in Maine mounted to 200,382 quarts of milk and 9,216 quarts of cream. Portland was the largest retail market, followed in order of deeasing size by Auburn-Lewiston, Bangor-Brewer, Biddeford-Saco, Augusta-Hallowell, Waterville, Sanford, and Mexico-Rumford.

STATISTICAL APPENDIX

TABLE 1

Concentration of Cows in 1930; and Number of Producers and Butterfat Sales to the Larger Dealers, by Towns, in 1928

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B F. sold in 1928[50]	Pounds B F sold per 100 acres farm land[51]	Per cent of B. F. sold		Average number of producers	Pounds of B F sold per producer
		Crop and pasture	Woodland* and misc			As milk	As cream		
ANDROSCOGGIN COUNTY	4 5	50.01	49 99	637,910	296	76.14	23 86	507.7	1,256
Auburn	5 9	62 52	37 48	83,311	303	85 75	14 25	62 4	1,335
Durham	2 8	48 18	51 82	4,230	24	——	100 00	4 8	881
East Livermore	1 9	42 35	57 65	30,152	188	22 35	77 65	24 4	1,236
Greene	3.1	46 16	53 84	54,278	245	89 18	10.82	44 6	1,217
Leeds	4 9	72 82	27 18	78,929	618	55.31	44 69	66 4	1,189
Lewiston	7 1	68.30	31 70	56,370	589	68 70	31 30	48 4	1,165
Lisbon	2 5	45 63	54 37	22,509	120	84 06	15 94	15 5	1,452
Livermore	10 4	30 03	60 97	88,120	1,138	73 92	26 08	57 9	1,522
Mechanic Falls	5 4	54 83	45 17	20,393	447	86 58	13.42	21.1	967
Minot	3 8	48.67	51 33	31,484	252	98 28	1 72	25 3	1,244
Poland	2 9	35 54	64 46	15,610	75	94 01	5 99	15 5	1,007
Turner	4 3	46 35	53 65	104,909	408	82 56	17 44	80 9	1,297
Wales	4 9	50 74	49 26	41,490	444	90 12	9 88	34 8	1,192
Webster	11 4	48.04	51 96	6,125	59	87.78	12 22	5.7	1,075
AROOSTOOK COUNTY	1 6	56 58	43.42	34,601	4	11.20	88 80	39 0	887
Bancroft	3 7	48 37	51 63	4,548	153	——	100 00	7 6	598
Cary Plantation	1.2	45 38	54 62	1,730	29	——	100 00	1.5	1,154
Haynesville	1 8	61 46	38 54	284	14	——	100 00	5	569
Hodgdon	2 3	59 86	40 14	3,461	18	——	100.00	3 0	1,154

Towns	Number cows per 100 acres farm land[28]	Per cent of all farm land[29]		Pounds of B. F. sold in 1928[30]	Pounds B. F. sold per 100 acres farm land[31]	Per cent of B. F sold		Average number of producers	Pounds of B F. sold per producer
		Crop and pasture	Woodland[32] and misc.			As milk	As cream		
ROOSTOOK COUNTY—Cont.									
Houlton	2.0	65.27	34 73	6,056	32	——	100.00	5.3	1,143
Orient	2 3	44.15	55 85	2,150	70	——	100 00	2.5	860
Reed Plantation	1 7	37.14	62 86	26	1	100.00	——	.3	85
Weston	4.4	47.55	52.45	16,346	237	23.56	76.44	18.3	893
CUMBERLAND COUNTY	4.8	49 85	50.15	711,566	336	98.88	11.12	465.7	1,528
Baldwin	2.0	26.04	73.96	4,304	44	——	100.00	5.8	758
Bridgton	3.7	35 54	64 46	12,943	109	——	100 00	19.2	674
Brunswick	6.2	51.57	48 43	6,104	64	10.18	89 82	13.5	453
Cumberland	5.8	65 72	34 28	20,235	316	95.28	4.72	14.5	1,773
Falmouth	6.6	66.25	33.75	13,440	204	97.92	2.08	7.6	1,768
Freeport	4.9	57 79	42 21	14,586	208	94 35	5.65	8.6	1,696
Gorham	6 4	66 18	33.82	103,479	627	94 66	5 34	49 9	2,206
Gray	5.1	49 70	50 30	89,196	632	100.00	——	34.7	2,570
Harpswell	2 6	40.21	59 79	1,420	17	27.19	72.81	2 5	568
Harrison	3.6	35 16	64 84	30,866	240	14.03	85.97	56.6	536
New Gloucester	4 0	43.40	56.60	62,740	388	98 17	1 83	46.9	1,338
North Yarmouth	6.3	66 02	33 98	86,600	1,061	100.00	——	39.9	1,420
Portland	20 5	77.80	22.20	13,400	708	90 45	9.55	9.5	1,411
Pownal	3.9	62 77	37.23	21,897	284	100.00	——	17.1	1,280
Raymond	3 8	31 98	68.02	20,406	477	100.00	——	11.5	2,557
Scarboro	4.4	49.57	50.43	61,841	506	100.00	——	35.4	1,747
Sebago	1 3	23 46	76 54	9,774	93	——	100.00	13 0	752
South Portland	15 9	72 62	27.38	6,904	470	100.00	——	4.8	1,438
Standish	4 0	31 69	68 31	4,970	110	——	100.00	1.0	4,971
Westbrook	6.7	57.91	42 09	11,299	145	98.74	1.26	8.0	1,383
Windham	6.3	76.29	23 71	76,599	488	94 90	5.10	39.4	1,944
Yarmouth	10.1	73.08	26 92	53,823	2,542	100 00	——	31.0	1,736

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B F sold in 1928[50]	Pounds B F. sold per 100 acres farm land[51]	Per cent of B F sold		Average number of producers	Pounds of B. F sold per producer
		Crop and pasture	Woodland[9] and misc			As milk	As cream		
FRANKLIN COUNTY	3 2	45 61	54 39	562,668	267	46.67	53 33	478 7	1,175
Avon	3 5	35 61	64 39	7,192	136	——	100 00	10 0	719
Chesterville	2 7	42 53	57 45	29,407	215	74 66	25 34	28 7	1,025
Farmington	5 1	60.29	39 71	178,766	571	73 23	26 77	105 4	1,695
Freeman	2 4	37 14	62 86	2,563	36	——	100 00	2 0	1,282
Industry	2 3	36.04	63 96	42,067	385	39 01	60 99	37 3	1,128
Jay	4 1	47 47	52 53	33,873	156	33 91	66 09	38 7	875
New Sharon	3 2	40 70	59 30	69,715	373	4 04	95 96	69 2	1,007
New Vineyard	3 1	45 55	54 45	15,785	171	92 57	7 43	8 3	1,902
Phillips	2 7	44 81	55 19	24,130	182	.21	99 79	25.0	965
Salem	1 2	57 00	43 00	3,320	117	——	100 00	5 5	604
Strong	3 0	36 27	63 73	70,636	533	34 94	65 06	69 1	1,022
Temple	1 2	18 45	81 55	29,193	196	36 79	63 21	22 6	1,292
Weld	2 6	42 74	57 26	7,958	113	——	100 00	12 0	663
Wilton	3 7	63 78	36 22	48,063	235	60 23	39 77	43 9	1,095
HANCOCK COUNTY	2 5	29 81	70 19	190,417	131	4.31	95 69	195 8	972
Amherst	1 7	12 85	87 15	9,738	321	——	100 00	10 3	945
Bluehill	2 3	26 94	73 06	19,341	203	——	100 00	20 4	948
Brooksville	2 7	32 25	67 75	13,390	169	——	100 00	14 1	950
Bucksport	4 2	47 19	52 81	49,084	469	3 06	96 94	54 0	926
Ellsworth	3 0	34 66	65 34	22,227	213	——	100 00	23 4	950
Franklin	2 3	34 05	65.95	10,955	511	——	100 00	11 6	944
Hancock	2 7	23 64	76 36	6,671	145	100 00	——	1 0	6,671
Lamoine	2 3	33 20	66 80	3,843	166	——	100 00	4 0	958
Marlaville	2 2	16 93	83 07	3,652	120	——	100 00	3 9	936
Mount Desert	6 6	31 52	68 48	8,521	1,658	——	100 00	9 0	947
Orland	1.7	27 65	72 35	4,537	29	——	100 00	4 6	986

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B. F. sold in 1928[50]	Pounds B F. sold per 100 acres farm land[51]	Per cent of B. F. sold		Average number of producers	Pounds of B. F. sold per producer
		Crop and pasture	Woodland[52] and misc			As milk	As cream		
HANCOCK COUNTY — Cont.									
Penobscot	3 1	26 10	73 90	25,398	248	——	100 00	26.7	951
Sullivan	2 2	29 47	70 53	1,217	25	——	100 00	1.3	936
Surrey	1 0	25 71	74 29	7,304	67	——	100 00	7.7	948
Waltham	1 8	22 60	77 40	3,652	81	——	100.00	3 8	961
KENNEBEC COUNTY	4 0	54 22	45 78	858,437	235	43.47	56.58	776 7	1,105
Albion	3 9	60 85	39 15	85,828	438	87.66	12 34	70 2	1,223
Augusta	6 7	51 83	48 17	7,812	46	——	100 00	11 1	704
Belgrade	3 5	49 25	50 75	29,700	150	21 90	78.10	33 4	889
Benton	5 2	58 86	41 14	30,007	268	47 90	52 10	22 2	1,211
Chelsea	3 4	60 80	39 20	10,299	130	——	100.00	9 3	1,107
China	3 6	54 59	45 41	40,855	177	48 12	51 88	57 1	715
Clinton	3 7	56 02	43 98	91,022	371	57 89	42 11	71 1	1,289
Farmingdale	3 8	61 06	38 94	2,406	43	——	100.00	2.0	1,248
Fayette	3 3	43 26	56 74	20,218	206	24 59	75 41	25 6	700
Gardiner	5 1	46 41	53 59	22,091	343	64.41	35,59	17 3	1,277
Hallowell	6 4	68 31	31 69	3,534	131	89 42	10.58	3 9	906
Litchfield	2 9	49 60	50 40	11,625	74	79 04	20 96	10 7	1,086
Manchester	4.2	45 91	54 09	32,552	446	——	100 00	36 1	902
Monmouth	5 5	58 91	41 09	85,100	753	56 09	43.91	73 8	1,154
Mount Vernon	2 7	39 39	60 61	42,170	259	52	99.48	45 5	927
Oakland	4 0	53 23	46 77	10,521	90	——	100.00	11 5	915
Pittston	3 6	69 70	30 30	38,012	224	68.81	31.19	31 0	1,226
Readfield	3 7	43 88	56 12	31,607	237	44 38	55.62	28 8	1,097
Rome	2 3	44 63	55 37	4,599	61	16 83	83 17	6 4	719
Sidney	3.5	57.23	42.77	11,424	54	——	100 00	17.2	664
Vassalboro	5 2	62 03	37 97	59,940	380	15 61	84 39	49 8	1,204

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B F sold in 1928[50]	Pounds B F sold per 100 acres farm land[51]	Per cent of B F sold		Average number of producers	Pounds of B F sold per producer
		Crop and pasture	Woodland[a] and misc			As milk	As cream		
KENNEBEC COUNTY—Cont.									
Vienna	3 7	45 04	54 96	21,495	348	——	100 00	16 2	1,327
Waterville	7 7	73 38	26 94	22,432	437	44 23	55 77	13 7	1,637
Wayne	3 6	47 13	52 87	17,089	278	31.83	68 17	13 1	1,304
West Gardiner	3 5	57 84	42 16	2,496	21	——	100 00	2 0	1,248
Windsor	2 7	58 67	41 33	36,763	262	37 76	62 24	25 9	1,419
Winslow	4 8	53 48	46 52	28,289	157	41 59	58 41	17 9	1,580
Winthrop	5 0	49 14	50 86	43,767	352	59 85	40 15	43 9	1,111
KNOX COUNTY	2 9	44 19	55 81	132,917	94	35.66	64 34	130 4	1,019
Appleton	2 8	42 41	57 59	25,093	137	20 34	79 66	27 5	912
Rockland	7 0	53 35	46 65	18,437	498	34 43	65 57	15 1	1,214
Thomaston	5 9	61 49	38 51	11,240	294	11 51	88 49	12 8	878
Union	3 3	65 37	34 63	20,244	112	25 21	74 79	21 8	929
Warren	3 7	46 66	53 34	37,365	189	65 08	34 92	31 0	1,205
Washington	1.5	41 73	58 27	20,638	100	25 48	74 52	22 2	930
LINCOLN COUNTY	2 3	38 90	61.10	238,170	140	45 92	54 08	274 2	869
Alna	1 6	35 34	64 66	15,200	146	90 39	9 61	20 0	760
Bristol	2 7	43 36	56 64	1,132	15	——	100 00	1 2	943
Damariscotta	3.7	42 85	57 15	11,793	329	4 06	95 94	12 4	951
Dresden	2 0	47 14	52 86	27,389	166	65 82	34 18	20 8	1,317
Jefferson	1 8	33 16	66 84	18,151	83	12 92	87 08	21 8	833
									967
Newcastle	2 5	51 98	48.02	37,724	393	21 22	78 78	39 0	824
Nobleboro	3 0	45 55	54 45	19,954	177	27 75	72 25	24 2	943
South Bristol	1 5	43 40	56 60	1,697	53	——	100 00	1 8	790
Waldoboro	2 8	25 30	74 70	39,017	156	41 20	58 80	49 4	819
Whitefield	2 6	50 42	49 58	40,636	191	77 66	22 34	49 6	749
Wiscasset	2 3	33 93	66 07	25,477	185	53 39	46 61	34 0	

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B. F. sold in 1928[50]	Pounds B F. sold per 100 acres farm land[51]	Per cent of B. F. sold		Average number of producers	Pounds of B F. sold per producer
		Crop and pasture	Woodland* and misc.			As milk	As cream		
OXFORD COUNTY	2 5	35 68	64 32	502,860	132	58.60	41 20	535.9	938
Albany	1 5	22 62	77 38	3,955	45	——	100 00	6.5	608
Bethel	1 8	29 60	70 40	4,860	16	52.30	47 70	4 6	1,056
Brownfield	2 2	34 31	65 69	11,403	102	25 15	74.85	13 8	826
Buckfield	3 2	47 81	52 19	71,504	397	74 80	25 20	72 3	989
Canton	2 2	33 66	66 34	48,019	389	34 26	65 74	55.8	861
Denmark	2 8	22 05	77 95	15,098	130	——	100 00	18 8	803
Dixfield	3 2	33 02	66 98	2,179	18	66.66	33 34	2 5	872
Fryeburg	4.9	67 98	32.02	14,061	117	——	100 00	23.0	612
Gilead	1 0	22 27	77 73	1,584	26	83 42	16 58	1 3	1,219
Greenwood	2 5	32.77	67 23	1,402	15	83.42	16 58	1 3	1,125
Hartford	2 8	43 22	56 78	10,142	63	75 43	24 57	10 1	1,004
Hebron	3 1	41 94	58 06	33,831	261	95.33	4.67	29.0	1,167
Hiram	2 2	28 74	71 26	7,540	58	——	100 00	10 6	711
Milton Plantation	3 4	49 97	50 03	9,555	548	90.89	9.11	11 0	870
Norway	3 0	34 44	65 56	15,708	93	22 72	77 28	23 3	674
Oxford	2 1	33 04	66 36	10,383	58	99 13	87	9 3	1,116
Paris	3 9	42 02	57 98	130,418	437	69.84	30 16	113 7	1,200
Peru	2 7	43.85	56 15	12,796	91	91.54	8.46	15 7	815
Porter	1 8	40 48	59 52	3,403	30	——	100.00	5 7	597
Rumford	2.0	27.28	72 72	24,016	83	90.61	9 39	24 7	972
Sumner	2 4	36 20	63 80	28,552	186	66 73	33 27	28.7	995
Sweden	2 2	30 68	69 32	3,164	92	——	100 00	5.2	608
Waterford	2 7	40 11	59 89	27,104	184	3 69	96 31	44 1	615
Woodstock	2 9	38 25	61.75	6,093	64	83 42	16 58	4.9	1,243
PENOBSCOT COUNTY	3.2	49 47	50.53	1,235,658	252	74 29	25.71	1,135 7	1,088
Alton	1.8	35.52	64 48	2,190	38	——	100 00	3 4	644

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B F sold in 1928[50]	Pounds B F sold per 100 acres farm land[51]	Per cent of B. F sold		Average number of producers	Pounds of B F sold per producer
		Crop and pasture	Woodland and muc			As milk	As cream		
PENOBSCOT COUNTY — Cont									
Bangor	6 6	65 70	34 30	34,184	258	67.15	32 85	17 1	1,999
Bradford	2 9	56 58	43 42	42,207	224	92	99 08	39 9	1,058
Bradley	7 4	42 29	57 71	1,454	78	1 76	98 24	2 4	606
Brewer	7 8	58 17	41 83	12,319	437	82 33	17 67	9 3	1,325
Carmel	4 0	44 95	55 05	82,070	572	99 61	39	76 2	1,077
Carroll	1 8	41 41	58 59	6,115	62	——	100 00	13 8	443
Charleston	2 2	48 82	51 18	35,462	196	58 98	41 02	32 1	1,105
Corinna	3 3	55 88	44 12	94,970	446	97 29	2 71	70 3	1,351
Corinth	2 9	51 65	48 35	48,174	227	29 69	70 31	44 9	1,073
Dexter	3.6	56 62	43 38	113,898	649	89 96	10 04	99 5	1,145
Dixmont	3 2	59 54	40 46	85,281	609	90 32	9 68	90 2	945
Drew	2 2	47 73	52 27	284	9	——	100 00	5	568
Eddington	3 1	27 32	72 68	4,937	57	47 11	52 89	5 9	837
Enfield	2 4	40.15	59 85	663	13	——	100 00	7	946
Etna	2 8	47 94	52 06	42,305	403	100 00	——	37 2	1,137
Exeter	2.0	51 32	48 68	78,512	344	39 99	60 01	81 8	960
Garland	3 1	51 92	48 08	44,706	264	42 94	57 06	41 7	1,072
Greenbush	1 8	39 54	60 46	1,904	63	——	100 00	2 9	657
Hampden	5 4	56 53	43 47	73,843	450	71 45	28 55	72 3	1,021
Harmon	4 8	65 35	34 65	70,396	412	98 03	1 97	64 1	1,098
Holden	3.8	39 11	60 89	8,347	82	79 62	20 38	4 1	2,036
Hudson	2 1	31 13	68 87	5 551	79	——	100 00	5 5	1,009
Kenduskeag	3 1	59 92	40 08	27,903	479	——	100 00	26 1	1,069
Kingman	1 7	43 90	56 10	730	22	——	100 00	1 6	456
Lee	2 0	35.67	64 33	91	1	——	100 00	2	456
Levant	4 0	58 12	41 88	36,833	245	54 42	45 58	48 0	767
Lincoln	2 4	37 88	62 12	1,305	13	——	100 00	2 0	652

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[42]	Per cent of all farm land[43]		Pounds of B F sold in 1928[40]	Pounds B F. sold per 100 acres farm land[41]	Per cent of B. F. sold		Average number of producers	Pounds of B F. sold per producer
		Crop and pasture	Woodland[a] and misc			As milk	As cream		
PENOBSCOT COUNTY — Cont.									
Milford	3 0	26 89	73 11	476	25	——	100.00	.7	680
Newburg	4 2	62 04	37 96	69,254	466	89.98	10 02	62 1	1,115
Newport	3 1	38.64	61 36	103,456	629	97 75	2 25	87 3	1,185
Old Town	4.2	37 20	62.80	3,522	62	——	100 00	5.3	665
Orrington	4 3	59 12	40 88	35,409	297	77.22	22.78	25 3	1,400
Plymouth	2 9	51 46	48 54	16,666	110	85 77	14 23	15 6	1,062
Springfield	1 5	41 62	58.38	274	5	——	100 00	.6	456
Stetson	2 3	51 32	48 68	48,666	349	96.35	3 65	42 0	1,159
Winn	1.6	37.14	62.86	1,309	27	——	100.00	3.1	442
PISCATAQUIS COUNTY	2 4	39 86	60.14	173,010	116	70.04	29.96	133.8	1,293
Atkinson	1 8	35 48	64 52	8,031	54	51 18	48.82	6 0	1,338
Barnard Plantation†	2 6	34 15	65.85	1,530	150	——	100.00	1.0	1,530
Bowerbank Plantation†	6	31 68	68 32	2,604	106	——	100 00	1.8	1,496
Dover-Foxcroft	3 8	47 51	52.49	99,298	511	94.69	5 31	67.2	1,478
Guilford	2 1	42 58	57 42	2,155	19	46.43	53 57	1 5	1,436
Parkman	2 2	40 72	59 28	16,004	88	10 86	89 14	19 0	847
Sangerville	3.2	52 27	47 73	11,277	83	79 53	20 47	8.7	1,296
Sebec	2 1	37.32	62.68	6,080	50	49.37	50.63	4 1	1,483
Wellington	2 0	35 52	64.48	25,842	169	32.20	67 80	24 5	1,055
SAGADAHOC COUNTY	2 8	43.19	56 81	59,602	66	92 16	7 84	56.0	1,064
Bath	7 7	66 93	33 07	2,274	85	——	100 00	3 3	689
Bowdoinham	2 7	47 22	52 78	45,101	266	99 21	.79	39 5	1,142
Richmond	3 2	49.80	50 20	10,660	77	95.08	4 92	10 5	1,016
Woolwich	2 5	33 21	66 79	1,558	16	2.67	97 33	2.7	577

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B F. sold in 1928[50]	Pounds B F sold per 100 acres farm land[51]	Per cent of B F. sold		Average number of producers	Pounds of B F sold per producer
		Crop and pasture	Woodland[52] and misc.			As milk	As cream		
SOMERSET COUNTY	3 0	50 60	49 40	1,022,960	260	34.75	65 25	936 4	1,092
Anson	2 9	48 54	51 46	26,569	133	——	100 00	22 2	1,197
Athens	2 6	49 86	50 14	43,374	187	——	100 00	43 7	992
Bingham	3 0	41 11	58 89	8,770	217	——	100 00	12 0	731
Brighton	1 7	47 37	52 63	2,906	74	——	100 00	2 3	1,263
Cambridge	3 3	47 26	52 74	34,729	352	75 96	24 04	31 9	1,089
Canaan	2 8	59 32	40 68	30,875	169	25	99 75	35 8	862
Concord	2 7	42 33	57 67	7,072	132	——	100 00	8 6	822
Cornville	3 2	53 99	46 01	70,736	372	——	100 00	74 7	947
Detroit	3 5	45 62	54 38	50,687	730	90 65	9 35	53 8	942
Embden	2 2	51 90	48.10	6,062	58	——	100 00	8.6	705
Fairfield	2 9	62 28	37 72	73,804	271	36 06	63 94	63 0	1,171
Harmony	2 6	41 02	58 98	63,311	410	52 97	47 03	58 0	1,092
Hartland	2 2	32 55	67 45	6 711	79	35 67	64 33	7 4	907
Lexington	1 1	20 11	79 89	4,796	64	——	100 00	6 1	786
Madison	3 1	54 01	45 99	41,289	169	——	100 00	34.7	1,190
Mercer	3 3	46 19	53 81	37,794	360	——	100 00	3 47	1,089
New Portland	2 1	47 18	52 82	22,991	157	——	100 00	25 0	920
Norridgewock	3 5	52 38	47 62	92,752	342	22 48	77 52	72 0	1,288
Palmyra	3 3	51 26	48.74	46,775	227	86 57	13 43	45 9	1,019
Pittsfield	3.2	46 08	53 92	62,674	313	89 54	10 46	46 7	1,342
Ripley	2 5	53 28	46 72	22,086	183	81 11	18 89	19 3	1,144
St. Albans	3 6	50 68	49 32	74,761	367	86 33	13 67	61 9	1,208
Skowhegan	4 1	60 10	39 90	52 197	200	——	100 00	46 8	1,115
Smithfield	5.0	44 65	55.35	54,678	641	36.48	63 52	40 8	1,340
Solon	2 4	48 28	51 72	37,320	241	——	100 00	39 7	940
Starks	4 1	53 51	46.49	47,241	421	——	100 00	40 8	1,158

TABLE 1—Continued

Towns	Number cows per 100 acres farm land[42]	Per cent of all farm land[43]		Pounds of B F. sold in 1928[44]	Pounds B. F. sold per 100 acres farm land[31]	Per cent of B. F sold		Average number of producers	Pounds of B F. sold per producer
		Crop and pasture	Woodland[45] and misc.			As milk	As cream		
WALDO COUNTY	3 0	43.68	56.32	896,799	306	77.07	22.93	730.2	1,228
Belfast	6 6	55 63	44 37	27,279	282	94 43	35.57	22.4	1,218
Belmont	3 5	39 58	60 42	11,520	340	91 11	8.89	8 0	1,440
Brooks	2 8	50 23	49.77	43,256	393	37 83	62 17	36 5	1,185
Burnham	2.2	32 35	67 65	62,540	453	96.00	4.00	45 2	1,384
Frankfort	2 4	32.09	67.91	12,542	103	66.81	33 19	16.8	746
Freedom	1 4	34 84	65 16	14,055	124	87 95	12.05	9.5	1,479
Jackson	2 9	46.62	53 38	44,115	485	74.41	25 59	41.3	1,068
Knox	4 2	57 61	42 39	77,409	537	87 94	12 06	52 2	1,483
Liberty	2 2	42 08	57 92	21,339	161	12.63	87.37	24 2	874
Lincolnville	3.1	35.05	64.95	3,945	42	——	100 00	4.6	858
Monroe	3 7	50 27	49 73	61,593	350	61.25	38.75	67 8	908
Montville	2 4	43 13	56 87	52,150	245	70 77	29 23	35.7	1,461
Morrill	2 5	33 33	66 67	13,659	153	36.46	63.54	13 2	1,035
Palermo	2 5	30 80	69 20	32,302	170	87 45	12 55	31.1	1,039
Prospect	3 5	34 34	65 66	11,860	248	——	100.00	13.2	898
Searsmont	2.3	41 27	58.73	7,891	54	——	100.00	9 2	858
Searsport	2 4	42 62	57 38	19,088	182	53 31	46 69	17.6	1,119
Stockton Springs	4 6	42 44	57.56	13,132	348	63 95	36 05	11 1	1,183
Swanville	2 6	29 04	70 96	7,890	114	——	100.00	9 2	858
Thorndike	4 2	49 34	50.66	141,091	1,096	100 00	——	88.2	1,600
Troy	2 6	53 77	46.23	74,625	358	100 00	——	61 2	1,219
Unity	3 7	49 85	50 17	96,579	449	100.00	——	69.9	1,511
Waldo	2 9	33 01	66 99	11,838	117	27 24	72.76	11 4	1,038
Winterport	2,9	55 06	44 94	34,803	159	58.14	41.86	36.6	945
WASHINGTON COUNTY	1.7	28.75	71.25	25,327	14	15 20	84 80	38.9	651
Cherryfield	2.4	42.17	57.83	19,043	498	——	100 00	31.8	599

TABLE 1—Concluded

Towns	Number cows per 100 acres farm land[48]	Per cent of all farm land[49]		Pounds of B F sold in 1928[49]	Pounds B F sold per 100 acres farm land[51]	Per cent of B F. sold		Average number of producers	Pounds of B. F sold per producer
		Crop and pasture	Woodland[a] and misc			As milk	As cream		
WASHINGTON COUNTY—Cont.									
Danforth	3 1	56 91	43 09	3,850	65	100 00	——	4 5	856
Jonesport	9	23 99	76 01	2,434	39	——	100 00	2 6	936
YORK COUNTY	3 7	44 83	55 17	196,934	90	89 93	10 07	144 4	1,364
Acton	2 7	35 04	64 96	7,642	88	88 34	11 66	3 4	2,248
Alfred	4 3	37 66	62 34	8,938	146	100 00	——	4 4	2,031
Biddeford	0 6	56 36	43 64	1,227	21	100 00	——	6	2,045
Buxton	2 8	48 50	51 50	51,655	237	89 56	10 44	29 9	1,728
Cornish	2 1	38 62	61 38	7,284	67	——	100 00	9 7	751
Dayton	7 5	55 48	44 52	18,705	344	100 00	——	8 5	2,201
Eliot	6 5	53 45	46 55	30,181	586	100 00	——	32 5	929
Hollis	5 5	50 56	49 44	19,481	352	88 92	11 08	10 6	1,838
Kittery	3 9	48 38	41 62	6,036	140	100 00	——	6 5	929
North Kennebunkport	4 3	51 05	48.95	5,113	83	100 00	——	2 5	2,045
Parsonsfield	2 7	43 23	56 77	1,439	12	——	100 00	1 8	799
Saco	6 9	65 24	34 76	493	4	100 00	——	3	1,644
Sanford	6 3	53 49	46 51	11,502	288	76 76	23 24	5 8	1,983
Shapleigh	2 5	49 17	50 83	2 355	28	100 00	——	9	2,617
South Berwick	3 5	56 05	43 95	6,036	68	100 00	——	6 5	929
Wells	3 6	42 55	57 45	738	10	100 00	——	1 0	738
York	4 6	44 88	55 12	18,109	189	100 00	——	19 5	929
STATE TOTAL	2 9	46 86	53 14	7,479,836	166	60 70	39 30	6,579 5	1,137

[a]Woodland pastured has been included under "Woodland"
†Figures for 1924 were used

[48] For this computation, the total number of cows was furnished by Charles M. White, Maine Dept. Agr., as unpublished data from Fifteenth Census of U. S, 1930; and the total acres of all land in farms was printed by Bureau of Census, U. S.

TABLE 2

Seasonal Variation in the Plant Utilization of Butterfat Received at the Ninety-Two Plants of the Larger Maine Dealers in 1928

Month	Receipts of butterfat, in pounds, from			Utilization of butterfat, in pounds				
	Dairymen		Out-of-State	Local sales of		Out-of-State		All other uses
	Milk	Cream		Milk	Cream	Milk	Cream	
January	371,777	220,653	14,762	95,769	71,607	92,426	305,078	42,312
February	359,652	205,900	15,787	89,629	67,576	89,900	287,545	46,689
March	397,362	229,978	16,640	97,231	78,265	93,915	327,180	47,389
April	405,884	251,523	21,194	95,046	80,690	102,794	332,312	67,159
May	440,171	296,758	47,003	100,088	94,091	117,716	367,032	105,005
June	477,887	358,107	59,330	101,760	105,456	115,020	425,523	147,765
July	411,976	310,835	57,556	122,708	135,735	96,557	315,565	139,802
August	356,729	242,610	106,339	129,751	160,290	81,856	238,387	95,394
September	328,759	219,089	29,863	102,231	91,899	85,021	220,627	77,918
October	338,171	226,801	12,948	104,388	77,220	98,481	232,086	65,746
November	311,042	191,008	10,400	104,111	75,389	90,766	205,216	35,088
December	340,668	186,616	10,306	111,175	73,463	93,456	212,207	47,099
Total	4,540,078	2,939,758	432,328	1,254,487	1,111,561	1,157,908	3,469,948	918,260

Dept. Commerce. Fifteenth Census of the U. S., 1930. Agriculture, Vol. I, Farm Acreage and Farm Value, by Minor Civil Divisions, pp 254-259.

[49] Computed from data with same reference as the last half of footnote 48.

[50] These figures of butterfat sold to the larger dealers in each town are based on estimates made by plant managers and others who had an intimate knowledge of the location of their producers The procedure followed was: First, to obtain from the records kept by dealers the total pounds of butterfat purchased from dairymen as milk and as cream. In many cases, these figures included numerous subtotals for separate areas around each plant, such as for each collection route and for local patrons who delivered their own milk and cream. Second, each plant manager listed the town or towns in which the producers lived that were represented in each group of figures. Third, each plant manager estimated the percentage of the butterfat that was produced in each town listed. There may be slight errors of estimate in the apportionment of butterfat to adjoining towns, but it is believed that the estimates, on the whole, are approximately accurate.

[51] Total acres of all land in farms, as used in this computation, were from data with same reference as the last half of footnote 48.

TABLE 3

Seasonal Variation in the Plant Utilization of Butterfat Received at Thirty Local Retail Plants in Maine in 1928

Month	Receipts of butterfat, in pounds, from			Utilization of butterfat, in pounds		
	Dairymen		Dealers and out-of-State	Local sales of		All other uses
	Milk	Cream		Milk	Cream	
January	88,674	6,848	26,762	84,674	40,133	— 2,523*
February	83,513	6,938	23,363	78,997	37,841	— 3,024*
March	91,145	7,792	27,537	84,919	41,498	57
April	94,498	8,030	23,736	84,287	38,792	3,084
May	101,140	9,216	25,492	88 203	43,304	4,341
June	105,656	11,410	25,123	87 659	43,931	10,599
July	98,146	8,749	49,433	99,304	53,318	3,706
August	96,305	7,605	70,723	104,709	68,608	1,316
September	95,036	7,469	32,925	88,801	42,935	3 685
October	99,284	7,755	30,600	91,207	40,136	6,296
November	90,412	7,127	34,767	89,572	40,354	2,380
December	97,861	7,084	33,290	93,973	40,316	3,946
Total	1,141,670	96,014	403,751	1,076,405	531,167	33,863

* Sales were in excess of receipts due to slight errors in estimating the amount of butterfat content of dairy products sold at some plants.

TABLE 4

Seasonal Variation in the Plant Utilization of Butterfat Received at Five Cream Plants with Local Trade in Maine in 1928

Month	Receipts of butterfat in pounds, from		Utilization of butterfat, in pounds				
	Dairymen		Local Sales	Out-of-state cream	Sales to dealers	All other uses
	Milk	Cream				
January	5,194	15 112	4 953	8,056	5,766	1,531
February	5,246	14,235	4,423	8 239	7,216	−397*
March	6,978	16,901	6 214	10 685	5,982	998
April	6,570	19,200	6,125	11 947	6 641	1,057
May	6,332	24,665	6 509	13,442	10 012	974
June	8 674	33,309	6 016	17,376	16 861	1,730
July	6,466	31 568	5 763	13 552	17,834	885
August	6 574	22 220	5 857	6,829	15 835	293
September	5,051	21,043	4,704	7 291	13,575	544
October	4,856	20,309	4 437	11 982	8,724	22
November	4,777	14 437	4 197	9,980	5 600	−623*
December	5,144	13,936	4,349	7,145	6,424	1,162
Total	71,862	246,955	63,587	126,524	120,530	8,176

* Sales were in excess of receipts due to slight errors in estimating the amount or butterfat content of dairy products sold at some plants.

TABLE 5.

Seasonal Variation in the Plant Utilization of Butterfat Received at Thirty-Seven Milk and Cream Plants Shipping Out-of-State in 1928

Month	Receipts of butterfat, in pounds, from			Utilization of butterfat, in pounds			
	Dairymen		Out-of-State	Local Sales	Out-of-State		All other Uses
	Milk	Cream			Milk	Cream	
January	262,590	142,013	11,409	25,414	88,112	270,302	23,184
February	258,304	129,036	12,921	25,511	85,915	261,514	28,221
March	285,570	145,232	12,964	28,093	89,617	299,038	27,018
April	283,087	157,082	17,298	33,632	98,589	300,837	25,009
May	305,166	178,502	42,581	42,219	112,570	327,402	44,418
June	325,945	205,046	52,711	50,594	108,952	377,557	46,599
July	271,354	173,945	72,263	63 424	90,522	278,977	84,639
August	221,661	134,815	84,020	67,205	75,956	212,613	84,722
September	201,333	117,844	25,029	38,023	79,170	196,984	30,029
October	212,027	125,558	10,003	31,100	92,821	193,984	29,743
November	194,894	111,906	7,298	29,511	86,203	175,804	22,580
December	213,589	108,684	7,492	27,018	89,119	181,129	32,489
Total	3,035,520	1,731,523	356,049	461,744	1,097,546	3,085,151	478,051

TABLE 6

Seasonal Variation in the Plant Utilization of Butterfat Received at Twelve Ice Cream Plants in Maine in 1928

Month	Receipts of butterfat, in pounds, from			Utilization of butterfat, in pounds			
	Dairymen		Out-of-State	Local Sales	Out-of-State	Used in Ice Cream	All other Uses
	Milk	Cream					
January	13,608	49,122	975	12,202	21,535	18,856	11,112
February	11,592	48,236	912	10,433	21,115	19,134	10,058
March	12,573	52,698	975	14,772	20,033	21,216	10,225
April	15,120	58,194	1,026	13,255	21,736	28,693	10,656
May	18,740	74,485	1,149	13,735	26,299	38,502	15,838
June	25,215	97,269	3,402	18,402	30,641	66,486	10,357
July	23,047	86,705	10,414	34,168	26,057	55,093	4,248
August	18,894	69,714	10,414	41,693	23,192	41,945	−7,808*
September	16,429	62,115	2,228	17,856	18,811	36 618	7,287
October	15,583	64,327	1,060	12,820	25,877	21,664	20,609
November	13,017	50,930	943	11,906	21,587	12,912	18,485
December	13,485	50,082	975	12,588	23,790	13,308	14,856
Total	197,303	763,877	34,473	213,830	281,273	374,627	125,923

* Sales were in excess of receipts due to slight errors in estimating the amount or butterfat content of dairy products sold at some plants.

TABLE 7

Seasonal Variation in the Plant Utilization of Butterfat Received at Four Butter, and Cheese Plants in Maine in 1928

Month	Receipts of butterfat, in pounds, from		Utilization of butterfat, in pounds		
	Dairymen		Milk into cheese	Cream into butter	All other uses
	Milk	Cream			
January	1,711	7,557	1,632	7,557	79
February	998	6,554	925	6,573	54
March	1,097	7,355	1,014	7,356	82
April	4,769	8,311	4,199	8,332	549
May	7,330	9,328	6,723	9,380	546
June	10,716	10,889	9,922	10,950	733
July	11,111	7,474	10,194	7,778	623
August	11,453	5,715	10,584	6,024	560
September	9,292	8,196	8,541	8,195	752
October	4,171	7,024	4,091	7,062	42
November	3,381	4,811	3,312	4,811	69
December	2,531	5,020	2,474	5,020	57
Total	68,560	88,234	63,601	89,047	4,146

TABLE 8

Gallons of Ice Cream Manufactured in Maine, by Months, 1925-1930, as Reported by Dealers to the United States Department of Agriculture[62]

Month	1925	1926	1927	1928	1929	1930
January	34,331	35,495	40,706	45,389	49,587	52,880
February	45,231	37,502	40,598	45,630	52,072	56,120
March	57 482	55,336	64,368	61,655	66,303	71,743
April	90,248	71,302	90,866	82,982	84,220	89,159
May	131,916	133,378	117,921	133,268	155,244	159,394
June	208,788	204,781	194,220	206,553	251,397	258,635
July	242,870	272,554	272,059	302,359	281,163	275,812
August	257,602	244,353	227,993	303,936	270,615	250,520
September	126,058	129,910	141,072	131,727	146,370	160,381
October	56,026	70,974	95,485	81,747	87,030	92,127
November	44,992	49,141	56,440	58,088	64,496	58,277
December	35,975	38,557	44,410	51,020	55,897	47,161
Total	1,331,519	1,341,283	1,386,138	1,504,254	1,564,994	1,570,409

[62] Courtesy of Bur. of Agr. Econ., U. S Dept Agr. Unpublished data.

TABLE 9

Pounds of American Cheese Manufactured in Maine, by Months, 1925-1930, as Reported by Dealers to the United States Department of Agriculture[52]

Month	1926	1927*	1928	1929	1930
January	6,216	6,128	4,131	4,510	3,726
February	5 040	4 898	2 437	2,448	2,310
March	6,036	5,376	2,633	1,920	2,352
April	9,457	7,156	3,250	3,055	3,147
May	12,587	10,853	5,941	6,735	5,327
June	17 298	14,965	11,183	9,154	10,321
July	17,648	13,651	13,018	10,412	9,582
August	15 115	12,708	12,448	9,100	11,131
September	12,306	11,250	11,040	8 685	9,963
October	11,066	10,824	10,128	7,528	9,868
November	8 751	6,716	6,864	7,027	10,197
December	6,888	6,024	5,346	4,334	7,125
Total	128,408	110,549	88,419	74,908	85,029

* Revised figures, resulting from additional information furnished the author at cheese plants

TABLE 10

Pounds of Creamery Butter Manufactured in Maine, by Months, 1925-1930, as Reported by Dealers to the United States Department of Agriculture[53]

Month	1925	1926	1927	1928	1929	1930
January	81,487	44,129	27,531	24 516	19 027	19,983
February	40 961	21,064	24 906	26,835	16,392	11,179
March	37,221	21,651	32,776	27 007	17,912	18 349
April	35,325	51,879	26,710	25 646	18 475	13,941
May	37,516	31,254	70 068	36,681	21,955	21,843
June	63,621	105,563	141,513	33 256	28,845	24,528
July	50 373	55,159	40,895	36 990	27,398	19,612
August	25,107	47,150	30 086	41,093	26,479	17,193
September	25,239	90,005	44,275	35 112	24,072	18,394
October	38 855	36,149	31,550	22,191	19,889	15,049
November	18,900	19,841	27,534	20,246	16 410	12 096
December	25,204	23,116	20,893	18 639	19,145	9,693
Total	479,809	546,960	518,737	348,212	255,999	201,850

[53] Same as footnote 52.

TABLE 11

Pounds of Condensed and Evaporated Milk Manufactured in Maine, by Months, 1925-1930, as Reported by Dealers to the United States Department of Agriculture[54]

Month	1925	1926	1927	1928	1929	1930
January	79,128	267,459	257,485	235,162	263,258	31,290
February	74,318	186,955	203,913	117,625	85,982	——
March	79,874	175,087	114,443	141,975	20,516	52,185
April	100,736	170,561	221,885	84,564	526,426	11,451
May	123,054	182,443	324,126	136,408	109,048	16,240
June	152,680	239,468	296,784	191,723	142,140	13,910
July	120,739	137,473	74,324	35,469	354,178	81,000
August	86,512	43,241	7,560	——	252,048	127,260
September	29,430	20,474	10,920	24,255	147,710	92,700
October	83,370	8,505	64,785	27,904	26,088	35,190
November	24,969	——	14,700	5,336	33,480	31,140
December	153,944	237,283	153,276	31,444	21,018	23,760
Total	1,108,724	1,674,949	1,744,201	1,031,865	1,983,890	516,126

TABLE 12

Pounds of Casein Production in Maine, by Months, 1925-1930, as Reported by Dealers to the United States Department of Agriculture[54]

Month	1925	1926	1927	1928	1929	1930
January	21,125	53,360	21,348	31,005	25,285	——
February	38,283	43,813	25,220	51,879	112,063	——
March	38,488	54,941	38,996	59,901	27,385	——
April	34,227	33,177	37,245	54,209	281,818	9,559
May	39,723	33,521	47,793	52,185	824,475	9,769
June	34,717	45,534	45,364	59,015	728,247	17,262
July	25,907	17,091	26,735	2,051	25,498	5,104
August	7,505	11,960	20,510	——	5,215	2,148
September	7,770	9,450	20,935	676	1,981	3,922
October	16,691	9,350	14,885	12,507	——	4,398
November	——	8,500	5,200	910	——	2,770
December	19,968	22,943	20,605	19,890	——	3,556
Total	284,402	343,640	324,506	344,228	2,032,467	57,588

[54] Same as footnote 52.

TABLE 13

Total Amount of Milk and Cream Sold Daily for Consumption in Maine and Production for Small Retailers, by Towns, During 1928

Towns	Total quarts retailed daily[44]		Total number retailers	Production for small retailers[44]		
	Milk	Cream		Quarts milk daily	Quarts cream daily	Number of producers
ANDROSCOGGIN COUNTY	20,899	1,195	120	13,111	153	186
Auburn-Lewiston	17,009	1,121	67	9,305	79	110
East Livermore	1,382	18	13	1,382	18	22
Lisbon	922	19	12	922	19	16
Mechanic Falls	929	24	14	845	24	20
Poland	320	7	7	320	7	8
Turner	85	—	2	85	—	2
Webster	252	6	5	252	6	8
AROOSTOOK COUNTY	6,030	277	87	6,030	277	102
Ashland	50	4	1	50	4	1
Caribou	705	37	12	705	37	21
Fort Fairfield	505	34	12	505	34	13
Fort Kent	248	1	4	248	1	4
Houlton	1,915	129	27	1,915	129	30
Island Falls	205	2	4	205	2	4
Limestone	55	5	3	55	5	3
Madawaska	290	2	2	290	2	2
Mars Hill	110	6	4	110	6	4
Oakfield	157	5	3	157	5	3
Presque Isle	1,525	51	12	1,525	51	13
Van Buren	265	1	3	265	1	4
CUMBERLAND COUNTY	44,433	1,850	244	21,555	432	295
Bridgton	1,154	21	19	1,324	21	26
Brunswick	2,330	60	21	2,430	86	40
Cumberland	100	15	1	550	15	3
Falmouth	504	9	4	504	9	4
Freeport	487	7	10	487	7	11
Gorham	324	2	7	324	2	7
Gray	115	—	2	115	—	2
Harpswell	287	2	13	287	2	14
Harrison	447	20	6	607	20	7
Naples	322	13	9	232	13	8
New Gloucester	—	—	—	200	—	1
Otisfield	145	4	2	85	—	2
Portland	27,933	1,521	49	5,102	75	45
Raymond	398	7	7	398	7	7
Scarboro	440	44	7	440	44	10
Sebago	204	5	5	124	5	7
South Portland-Cape Elizabeth	4,292	32	31	2,580	18	33
Standish	344	15	8	344	15	9
Westbrook	3,560	68	35	4,375	88	48
Windham	342	4	4	342	4	4
Yarmouth	705	1	6	705	1	7
FRANKLIN COUNTY	4,750	264	68	4,791	225	93
Farmington	1,306	60	21	1,347	28	28
Jay	475	—	5	475	—	8

TABLE 13—Continued

Towns	Total quarts retailed daily[a]		Total number retailers	Production for small retailers[a]		
	Milk	Cream		Quarts milk daily	Quarts cream daily	Number of producers
FRANKLIN COUNTY—Cont.						
Kingfield	647	5	9	647	5	14
Phillips	360	27	4	360	27	4
Rangeley	485	32	6	485	32	7
Strong	162	13	4	162	6	3
Weld	307	47	6	307	47	6
Wilton	1,008	80	13	1,008	80	23
HANCOCK COUNTY	6,854	431	94	6,642	249	122
Bar Harbor	1,850	47	16	1,841	47	26
Bluehill	127	7	5	127	7	5
Brooklin	70	6	4	70	6	4
Brooksville	200	10	6	200	10	6
Bucksport	500	24	7	500	13	11
Castine	495	12	9	495	12	13
Deer Isle	132	11	7	132	11	7
Ellsworth	1,135	200	12	923	29	13
Hancock	115	10	3	115	10	5
Lamoine	—	—	—	9	—	1
Mount Desert	1,390	68	12	1,390	68	17
Penobscot	45	3	2	45	3	2
Stonington	270	5	4	270	5	5
Sullivan	175	8	2	175	8	2
Winter Harbor	350	20	5	350	20	5
KENNEBEC COUNTY	21,151	749	261	20,223	551	341
Augusta-Hallowell	7,117	310	82	6,410	199	91
Belgrade	986	53	16	881	57	20
Benton	882	28	12	802	21	11
Clinton	125	3	1	125	3	1
Gardiner-Farmingdale	3,219	74	40	2,905	81	68
Manchester	50	3	2	115	4	6
Monmouth	747	—	13	522	—	13
Mount Vernon	50	3	2	50	3	2
Oakland	723	16	14	828	14	16
Pittston	40	8	1	40	8	1
Randolph	—	—	3	305	—	5
Readfield	180	3	5	180	3	5
Rome	169	5	6	169	5	6
Vassalboro	185	1	4	285	3	5
Waterville	5,944	221	31	4,365	103	53
Wayne	165	8	3	165	8	4
Winslow	—	—	12	682	6	16
Winthrop	569	13	14	1,394	33	18
KNOX COUNTY	9,268	413	125	8,499	328	172
Camden-Rockport	2,838	96	38	2,838	96	57
Friendship	60	—	1	60	—	1
Hope	75	—	2	75	—	2
North Haven	410	27	11	410	27	11
Rockland	3,660	217	41	2,891	132	55
St. George	577	2	9	177	—	8
Thomaston	756	35	10	931	33	17
Vinalhaven	687	5	10	687	5	10

TABLE 13—Continued

Towns	Total quarts retailed daily[15]		Total number retailers	Production for small retailers[16]		
	Milk	Cream		Quarts milk daily	Quarts cream daily	Number of producers
KNOX COUNTY — Cont						
Warren	205	31	3	430	35	11
LINCOLN COUNTY	3,411	158	71	3,053	86	93
Boothbay-Booth Harbor	1,349	6	21	1,149	6	27
Bristol	515	22	25	515	22	28
Damariscotta-Newcastle	494	40	11	494	40	17
Edgecomb	46	4	2	46	4	2
Waldoboro	300	9	3	300	9	4
Whitefield	—	—	—	—	5	1
Wiscasset	707	77	9	549	—	14
OXFORD COUNTY	10,611	421	140	8,503	229	161
Bethel	420	15	8	420	15	9
Buckfield	120	1	3	150	1	4
Canton	95	1	3	95	1	3
Denmark	8	14	2	8	14	2
Dixfield	267	10	5	267	10	6
Fryeburg	396	14	11	396	14	14
Greenwood	85	4	3	85	4	3
Hartford	30	—	1	—	—	—
Hebron	217	2	4	217	2	6
Hiram	144	1	4	144	1	4
Lovell	345	63	14	345	63	14
Mexico-Rumford	5,267	188	31	3,276	17	35
Norway	1,044	19	14	1,044	19	19
Oxford	322	4	7	402	8	9
Paris	824	73	17	807	48	18
Peru	125	—	3	125	—	3
Waterford	827	9	9	647	9	11
Woodstock	75	3	1	75	3	1
PENOBSCOT COUNTY	23,403	1,471	202	20,573	869	286
Bangor-Brewer	14,615	1,138	91	10,089	542	117
Bradley-Milford-Old Town	1,930	44	24	1,918	32	29
Carmel	28	3	2	28	3	2
Charleston	—	1	1	—	—	—
Corinna	195	25	4	187	—	4
Dexter	987	64	10	968	33	13
Eddington	182	10	4	182	10	4
Enfield-Howland	566	8	11	566	8	14
Etna	2	—	1	—	—	—
Hampden	338	8	3	788	20	8
Hermon	2	—	1	580	48	12
Holden	100	4	1	100	4	4
Levant	—	—	—	50	—	1
Lincoln	592	18	8	592	18	8
Mattawamkeag	70	8	1	70	8	1
Millinocket	2,025	56	12	2,025	56	34
Newport	524	13	9	515	4	9
Orono	979	11	12	979	11	12
Orrington	268	60	7	936	72	14

TABLE 13—Continued

Towns	Total quarts retailed daily[25]		Total number retailers	Production for small retailers[25]		
	Milk	Cream		Quarts milk daily	Quarts cream daily	Number of producers
PISCATAQUIS COUNTY	3,181	158	61	3,181	143	68
Brownville	455	17	7	455	17	8
Dover-Foxcroft	817	48	14	817	33	15
Greenville	374	36	11	374	36	11
Guilford	341	1	10	341	1	12
Milo	735	42	11	735	42	12
Monson	239	9	6	239	9	6
Sangerville	220	5	2	220	5	4
SAGADAHOC COUNTY	4,739	275	81	4,639	169	92
Bath	2,906	120	40	2,706	14	42
Bowdoinham	65	12	2	65	12	2
Georgetown	195	4	7	195	4	7
Phippsburg	231	7	11	231	7	11
Richmond	532	62	12	532	62	14
Topsham	750	70	8	750	70	13
Woolwich	60	—	2	160	—	3
SOMERSET COUNTY	7,767	449	111	7,434	187	129
Anson-Madison	1,712	92	32	1,477	74	34
Bingham	563	17	8	563	17	11
Carratunk Plantation	80	4	4	80	4	4
Fairfield	1,270	189	15	997	50	17
Hartland	285	9	4	285	9	4
Jackman	200	5	4	200	5	5
Norridgewock	150	—	5	250	5	8
Pittsfield	1,082	2	13	1,082	2	14
Skowhegan	2,300	125	25	2,300	15	29
Solon	125	6	2	125	6	2
Starks	—	—	—	75	—	1
WALDO COUNTY	2,734	113	48	2,726	77	50
Belfast	1 826	85	24	1,806	49	25
Brooks	120	12	3	120	12	3
Burnham	80	1	1	80	1	1
Freedom	50	—	2	50	—	2
Islesboro	42	—	2	42	—	2
Jackson	3	—	1	—	—	—
Lincolnville	40	1	2	40	1	2
Northport	40	2	1	40	2	1
Searsport	160	4	4	180	4	6
Stockton Springs	138	4	3	138	4	3
Thorndike	5	—	1	—	—	—
Unity	80	—	2	80	—	2
Winterport	150	4	2	150	4	3
WASHINGTON COUNTY	4,901	190	87	4,901	190	101
Addison	29	4	2	29	4	2
Baileyville	300	2	4	300	2	4
Calais	1,437	91	28	1,437	91	33
Danforth	245	6	3	245	6	4
Eastport	1,114	11	20	1,114	11	23
Harrington	40	2	1	40	2	1

TABLE 13—Concluded

Towns	Total quarts retailed daily[55]		Total number retailers	Production for small retailers[56]		
	Milk	Cream		Quarts milk daily	Quarts cream daily	Number of producers
WASHINGTON COUNTY — Cont						
Jonesport	160	6	2	160	6	2
Lubec	615	21	7	615	21	9
Machias	560	38	7	560	38	10
Machiasport	105	—	4	105	—	4
Pembroke	56	3	4	56	3	4
Princeton	240	6	5	240	6	5
YORK COUNTY	26,250	802	280	23,569	748	413
Acton	75	—	1	75	—	1
Alfred	184	5	5	184	5	7
Berwick	1,155	6	14	1,155	6	20
Biddeford-Saco	9,045	294	93	10,001	414	157
Buxton	170	10	5	170	10	5
Cornish	177	11	5	177	11	5
Hollis	137	—	3	137	—	3
Kennebunk	903	28	15	1,080	41	28
Kennebunkport	1,238	60	22	1,195	50	30
Kittery	1,251	12	9	832	12	10
Lebanon	90	5	2	90	5	2
Limerick	350	6	6	350	6	6
Limington	75	—	1	75	—	1
Newfield	40	2	2	40	2	2
North Berwick	315	6	7	375	7	9
Old Orchard	1,620	120	4	70	—	2
Parsonsfield	190	4	2	190	4	2
Sanford	5,743	111	48	4,219	74	68
South Berwick	791	9	13	791	9	18
Waterboro	120	1	2	120	1	2
Wells	1,064	13	11	940	8	22
York	1,517	99	15	1,303	83	13
STATE TOTAL	200,382	9,216	2,080	159,430	4,913	2,704

[55] Includes local sales of milk and cream in Maine by both the larger dealers and small retailers.

[56] Based on figures secured from application cards for licenses sent by retailers to the State Dairy Inspector of the Maine Dept of Agr