January, 1919 Extension Bulletin Series 1, No. 151-A

Colorado Agricultural College
EXTENSION SERVICE
Fort Collins, Colorado

H. T. FRENCH, Director

DAIRY MARKETING SURVEY IN COLORADO

By J. A. RAITT

Collaborator, Bureau of Markets, U. S. Department of Agriculture

CONTENTS

CO-OPERATING AGENCIES
Bureau of Markets, U. S. Department of Agriculture
Extension Service of the Colorado Agricultural College
State Dairy Commissioner of Colorado

CO-OPERATIVE EXTENSION SERVICE IN AGRICULTURE AND HOME ECONOMICS -COLORADO AGRICULTURAL COLLEGE AND U. S. DEPARTMENT OF AGRICULTURE CO-OPERATING

Colorado Agricultural College

FORT COLLINS, COLORADO

THE STATE BOARD OF AGRICULTURE

		Term Expires
HON. CHAS. PEARSON	Durango,	1919
HON. R. W. CORWIN	Pueblo,	1919
HON. A. A. EDWARDS, *President of the Board*	Fort Collins,	1921
HON. J. S. CALKINS	**Westminster,**	1921
HON. H. D. PARKER	Greeley,	1923
MRS. AGNES L. RIDDLE	Denver,	1923
HON. J. C. BELL	Montrose,	1925
HON. E. M. AMMONS	Denver,	1925

PRESIDENT CHAS. A. LORY
GOVERNOR JULIUS C. GUNTER } *Ex-Officio*

L. M. TAYLOR, Secretary — CHAS. H. SHELDON, Treasurer

EXECUTIVE COMMITTEE

A. A. EDWARDS, *Chairman*

E. M. AMMONS — H. D. PARKER

EXTENSION SERVICE

CHAS. A. LORY ..... PRESIDENT
H. T. FRENCH ..... DIRECTOR
A. E. LOVETT, STATE LEADER COUNTY AGRICULTURAL AGENTS
W. E. VAPLON ..... STATE LEADER BOYS' AND GIRLS' CLUBS
MIRIAM M. HAYNES ..... STATE LEADER COUNTY HOME DEMONSTRATION AGENTS
ANNA T. BARNARD ..... EXECUTIVE CLERK

EXTENSION STAFF

RALPH L. CROSMAN ..... EDITOR OF PUBLICATIONS
MAUDE E. SHERIDAN ..... ASSISTANT LEADER BOYS' AND GIRLS' CLUBS
R. W. CLARK ..... ANIMAL HUSBANDRY
STUART L. SWEET ..... MARKETS AND MARKETING
O. S. RAYNER ..... FARM MANAGEMENT DEMONSTRATIONS AND EXTENSION SCHOOLS
WM. G. JAMISON ..... ASSISTANT STATE LEADER COUNTY AGRICULTURAL AGENTS
G. S. RAY ..... **SPECIALIST IN AGRONOMY**
R. H. FELTS ..... ASSISTANT STATE LEADER COUNTY AGRICULTURAL AGENTS

COLLEGE FACULTY CO-OPERATING

COUNTY AGRICULTURAL AGENTS

	County
Jas. E. Morrison, Sterling	Logan
W. H. Lauck, Colorado Springs	El Paso
C. G. McCord, Fort Morgan	Morgan
H. H. Simpson, Longmont	Boulder
E. D. Smith, Durango	La Plata
Geo. R. Smith, Brighton	Adams
Rodney C. Allred, Glenwood Springs	Garfield
Ralph R. Jeffries, Canon City	Fremont
C. D. Hyatt, Monte Vista	Rio Grande
Chas. E. Smith, Trinidad	Las Animas
Mason E. Knapp, Greeley	Weld
Waldo Kidder, Walsenburg	Huerfano
E. H. Divelbiss, Delta	Delta
Mary Collopy, County Home Demonstration Agent, Colorado Springs	El Paso
————	Lamar
Scott Wisner, Hugo	Lincoln
Floyd C. Tripp, Golden	Jefferson
Walter J. Ott, Julesburg	Sedgwick
Walter A. Groom, Littleton	Arapahoe
Harold B. Kobey, Craig	Moffat
Harry C. Nevius, Montrose	Montrose
J. C. Hale, Steamboat Springs	Routt
H. O. Strange, Burlington	Kit Carson
G. P. Newsom, Cortez	Montezuma
D. C. Bascom, Fort Collins	Larimer
W. F. Droge, Rocky Ford	Otero
L. J. Wormington, Castle Rock	Douglas
Wm. O. Sauder, Center	Saguache
O. L. Davis, Pueblo	Pueblo

EMERGENCY WORKERS

Erma Douglass, County Home Demonstration Agent	Walsenburg
Mabel Verne Campbell, Urban Home Demonstration Agent	Denver
Mrs. Rose Cole, Urban Home Demonstration Agent	Pueblo
Fannie E. Virgil, County Home Demonstration Agent	Canon City
Eunice Kennedy, Boys' and Girls' Clubs	Fort Collins
Pearl I. Horn, County Home Demonstration Agent, Glenwood Springs	Garfield
Susanne Thompson, County Home Demonstration Agent, Greeley	Weld
Florence Redifer, Urban Home Demonstration Agent, Colorado Springs	El Paso
Agnes Kreutzer, Trinidad	Las Animas

FOREWORD

In this bulletin are presented the results of a dairy marketing survey made by J. A. Raitt of the Office of the State Dairy Commissioner of Colorado and collaborator of the Bureau of Markets of the United States Department of Agriculture. This bulletin is published by the Extension Division of the Colorado Agricultural College, and is intended to furnish general facts and information in regard to the dairy industry development of Colorado; dairy marketing methods and conditions in the State, and a report of the distribution of market milk in Denver and other Colorado cities. As a knowledge of marketing conditions and methods of marketing are important in undertaking educational work which is aimed to improve existing dairy conditions, the information contained in this report should be of value to those engaged in such work in Colorado, also to producers, buyers, manufacturers and distributors of dairy products in the State.

It is recognized that much energy and considerable money has been spent by Government and State agencies for the purpose of encouraging a larger production of milk and improving methods of manufacturing dairy products. While comparatively little has as yet been done in the way of educational work for the improvement of marketing methods and conditions, in some States provision has been made for the giving of assistance to producers, manufacturers and ditributors of dairy products in improving marketing conditions, and if in the State of Colorado, funds were provided for such work, much helpful market information and assistance of mutual benefit to producers, manufacturers, distributors and consumers of dairy products could be given.

The data and information contained in this report represents a beginning of such work, which may be used as a basis for future dairy marketing work in Colorado.

H. T. FRENCH, Director Extension Service.
G. E. MORTON, State Dairy Commissioner.

AREA OF LAND IN FARMS - 1909

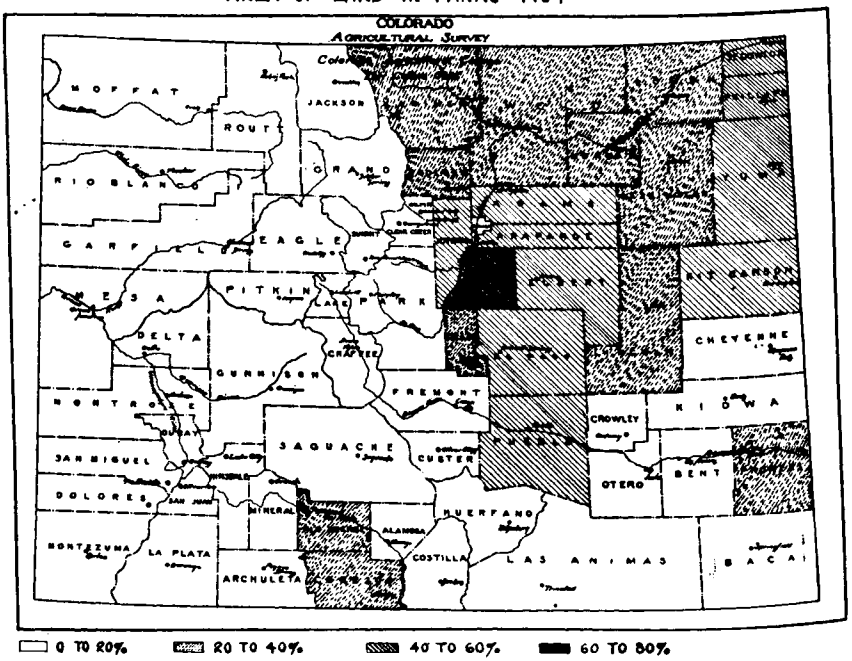

CHART NO. 1—AREA OF LAND IN FARMS, 1909

Much of the land in Colorado is mountainous, but large tracts of grazing land are available for stock. Some counties having low acreage in farms have large numbers of cattle.

DAIRY MARKETING SURVEY IN COLORADO

By J. A. RAITT

Collaborator, Bureau of Markets, U. S. Department of Agriculture

Agricultural development in Colorado is limited by natural conditions, as much of the land is mountainous and unsuited for farming. Of the total area, 62 percent is still owned by the Government and of the deeded land, over 50 percent is suitable only for grazing purposes. Large tracts of coal, timber, and mineral lands have been deeded, so necessarily the tillable land comprises but a small percent of the total area. From the U. S. Census of 1910, the following figures were obtained:

Land area (acres)	66,341,120
Land in farms (acres)	13,532,113 or 20.4%
Improved land in farms (acres)	4,302,101 or 6.7%
Number of farms in state	46,170
Average number of acres per farm	239.1
Average number of acres improved land per farm	93.2

About one-third the area of the State lies east of the mountains, and most of this land, where the rainfall is sufficient to mature a crop or irrigation is practiced, is suitable for agricultural purposes. The rainfall in the eastern section is greatest in the northeastern part, and diminishes towards the south. The central portion of the State is mostly mountainous and contains a very small amount of land suitable for agricultural purposes other than those of grazing.

On the western slope, farming is confined to the valleys as the country is more mountainous and rolling than on the eastern slope. (See Chart Number One).

DIVERSITY OF AGRICULTURAL DEVELOPMENT

Stock raising is the most important agricultural industry in Colorado, natural advantages and economic conditions favoring this branch of agriculture. Large tracts of open range are available for stock raising, especially in the mountainous sections. Little shelter is needed for range animals and conditions on the range are more suitable for marketing live stock than other agricultural products.

Abundant grain and forage crops are produced in the tillable

area and represent an important part of the agricultural production of the state. Recent change from range to farm homestead conditions and the advance in the market prices of farm products have stimulated their production, especially in the prairie section. The growing of sugar beets, particularly in the irrigated sections of the State, is of increasing importance.

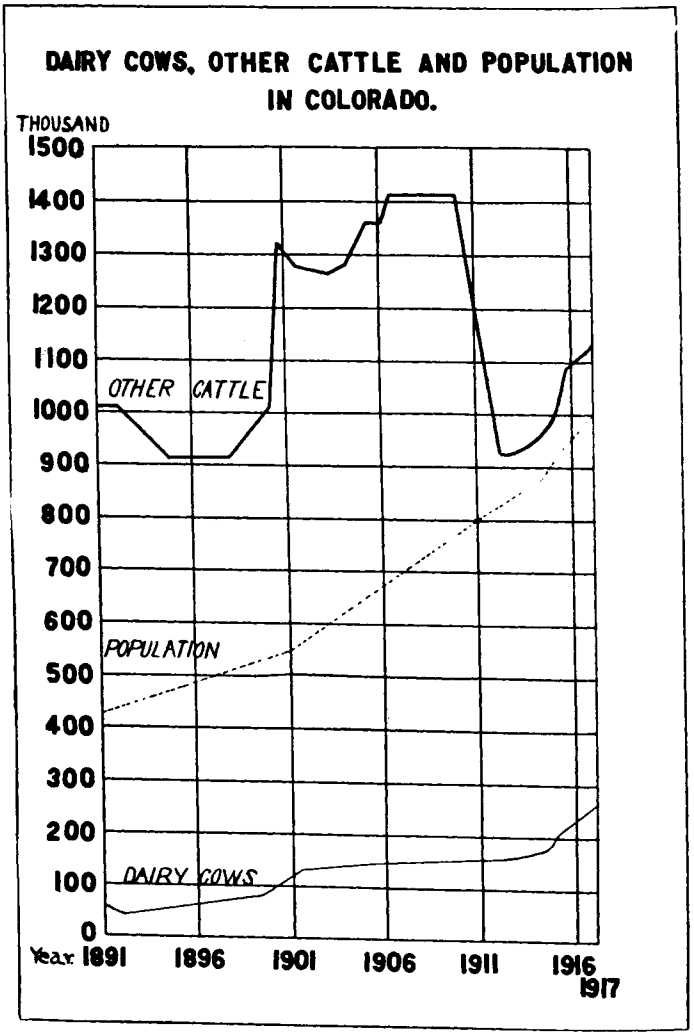

CHART NO. 2--COMPARISON OF NUMBER OF DAIRY COWS AND OTHER CATTLE AND THE POPULATION OF COLORADO.

The population of Colorado has increased in greater proportion than dairy cows. Other cattle vary in numbers from year to year

In the United States Census statistics for 1910 the value of the various agricultural products is given as follows:

Hay	$17,282,176
Cereals	14,787,519
Animals sold	22,456,000
Animals killed on farm	1,754,000
Sugar crops	6,104,672
Dairy products	4,174,270
Wool	1,458,003
Total	$68,014,740

While the State of Colorado does not take high rank in value of dairy products produced, dairying is yearly becoming a more important industry and the demands for milk, butter, and other dairy products which formerly were supplied from outside sources are being supplied by the production of the State.

The increase in number of dairy cows and annual value of dairy products produced are evidence of an increasing interest in dairying, although much smaller in comparison to the value of some other agricultural products. Statistics from the U. S. Census of 1910 showed the dairy production as follows:

Gallons milk produced	33,631,723
Gallons milk sold	10,037,067
Gallons cream sold	440,257
Pounds dairy butter made	5,856.132
Pounds creamery butter made	6,351,691
Pounds dairy cheese made	69,857
Pounds factory cheese made	550,662

The relative number of dairy cows to the number of other cattle and to the population of the State is shown in Chart No. 2, and the number of dairy cows by years since 1890 is given below:*

Year	Number of Dairy Cows	Percent of Cows in U. S.
1890	62,285	.39
1891	60,416	.37
1892	63,437	.39
1893	76,124	.47
1894	77,646	.47
1895	79,975	.49
1896	82,374	.52
1897	91,666	.58
1898	93,499	.59
1899	100,416	.61
1900	110,386	.65
1901	120,569	.72
1902	121,775	.71
1903	125,988	.69
1904	130,202	.70
1905	133,459	.70
1906	136,712	.70
1907	144,000	.70
1908	158,000	.72

* Year Book, U. S. Department of Agriculture.

Year	Number of Dairy Cows	Percent of Cows in U. S.
1909	161,000	.73
1910	164,000	.73
1911	167,000	.80
1912	172,000	.84
1913	186,000	.90
1914	205,000	.96
1915	219,000	.99
1916	237,000	1.04
1917	254,000	1.10

DAIRY INDUSTRY DEVELOPMENT

That the Dairy Industry in Colorado is progressing is shown by the increase in the number of dairy cows. In 1917 there were 254,000, which represents an increase of 322 percent from 1890 to 1918, while during the same period the number of dairy cows in the United States increased 44 percent.

The dairy cows in Colorado comprise 1.1-percent of the total number of dairy cows in the United States, which is about the same ratio as the population of Colorado is to the population of the United States.

The increase in population of the State in relation to the number of dairy cows and other cattle presents an interesting comparison. The population of the State has gradually increased as has the number of dairy cows, while the number of other cattle shows considerable variation, which indicates the stability of the dairy industry as affected by unfavorable grazing and crop conditions.

The prevailing type of cows used in Colorado for dairy purposes are those from the range which show desirable milk producing qualities. While many cows of this type are fairly good producers, a large number are unprofitable, as the average production is below 150 pounds of butter fat per year. The use of beef sires in dairy herds and the production of dual purpose cows is a general practice in some sections which has checked the improvement of dairy stock. In stock raising sections such a practice may seem to be desirable, but beef bred cows usually are not profitable milk producers.

Of the improved dairy breeds the Holstein-Fresian is most popular and seems to do very well in the State. The Jersey ranks next in importance and in the past few years large numbers of cows of the improved breeds have been shipped into the State, particularly to sections supplying milk for city consumption and to milk condenseries. The increased prices of milk and dairy products during recent years have stimulated larger milk production and increased investments in improved stock. Through the cow testing

Colorado Dairy Cows—1917

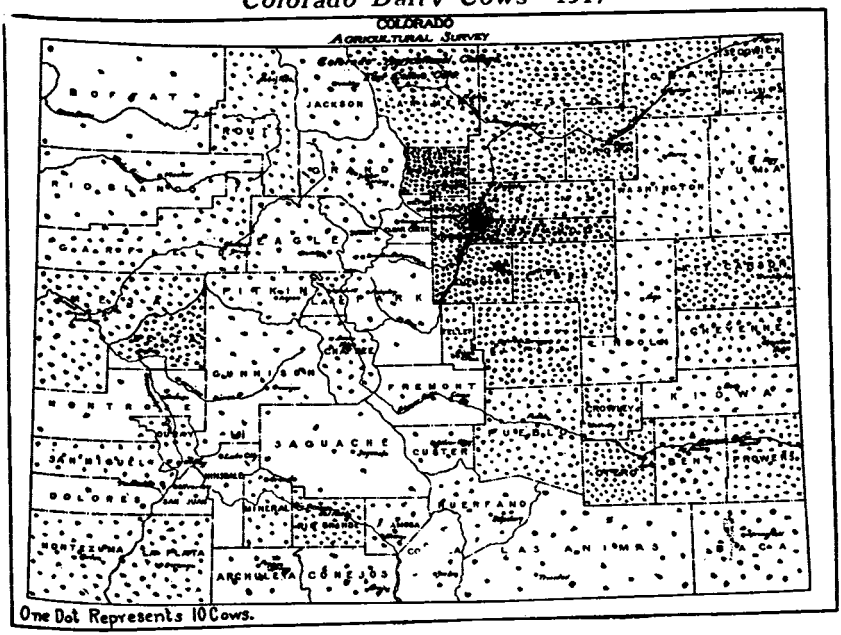

CHART NO. 3—LOCATION OF DAIRY COWS
The location of dairy cows in the various sections indicates the importance of dairy interests

associations which have been organized, improvement has been made by the elimination of cows of low production. During 1917 the herds included in five cow-testing associatioons in the State averaged over 6,000 pounds of milk per cow per annum.

The distribution of dairy cows in Colorado naturally is determined by available markets and natural conditions. (See Chart No. 3), In the sections immediately adjoining Denver, the demands for market milk are greatest and dairy herds are most numerous in these counties. The natural conditions favor dairying in these counties also, and the proximity to markets accounts for this increase in the number of dairy cows.

The annual precipitation also is greater than in many parts of the State, and this with the higher altitude, affords better grazing conditions. The irrigated sections north and northwest of Denver produce forage crops, and these with the sugar-beet by-products have favored the keeping of many dairy cows in these sections of the State. In the southeastern section in the irrigated areas along the Arkansas River there are also relatively large numbers of dairy

Dairy Cows Per Square Mile—1917

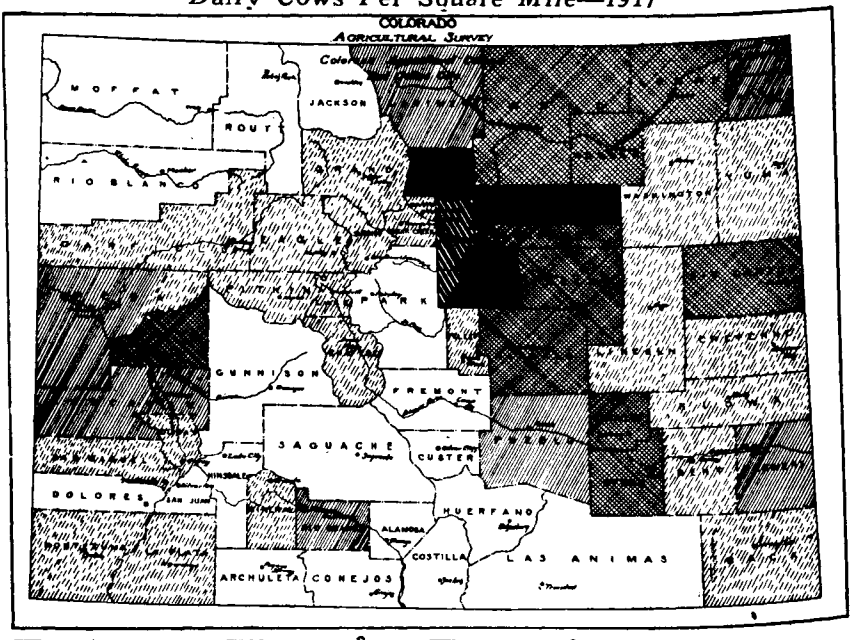

CHART NO. 4—DAIRY COWS PER SQUARE MILE
Few counties have more than 5 cows per square mile

cows. In the western part of the State are between three and five cows per square mile, while in the arid and mountainous sections there are still less.

Sixty-nine percent of the total area of the State has an average of less than one cow per square mile, while 2.3 percent has practically 11 cows per square mile. In 13 counties, comprising 20 percent of the total area, there are more than five cows per square mile. In 1910, in 94 per cent of the total area of the State there was less than one cow per square mile. The number of dairy cows per square mile in various counties is given below, and graphically presented in Chart No. 4:*

Cows per square mile	Number of Counties	Total sq. miles included	Percent of area of State	Av. Number cows per sq. mile
Less than 1	16	35,938	34.6	.5
Between 1 and 3	22	35,451	34.4	1.6
Between 3 and 5	6	11,222	10.8	3.5
Between 5 and 7	9	17,800	17.1	5.8
Between 7 and 9	1	838	.8	7.1
Over 9	3	2,451	2.3	11.1
		103,600	100.0	3.5

* Based on estimates of Yearbook U. S. Department of Agriculture and Colorado Tax Commissioner's Report.

CREAM PRODUCTION

The production of cream for the manufacture of butter is of most importance to the dairy farmer in Colorado, and the amount produced as well as its farm value is daily increasing. Production of milk for sale as market milk in cities is next in importance, and is limited to the local demands of the larger cities. The sale of whole milk to condenseries is increasing, but with few intensely developed dairy sections in the State, the points at which condenseries may operate successfully are limited. There has been but little cheese factory development as the sparsely developed sections have not favored it, and creameries have been able to offer a market for butterfat in sour cream which was apparently satisfactory to milk producers.

With proper care cream may be kept on the farm for three or four days, and then shipped considerable distances to market in small or large quantities, and thereby this method of marketing the product of the dairy is adapted to either the large or small dairyman.

BUTTER PRODUCTION

In 1879 Colorado ranked 39th among the States in amount of farm and creamery butter produced and in 1899 she ranked 37th. In the ten-year period from 1899 to 1909 with increased dairy development her rank increased to 29th. During the same time her rank in population increased from 35th to 32nd. The increase in the total amount of butter manufactured shows continuous and steady growth, and during the past eight years (1909-1917) the amount of creamery butter manufacturer has increased over 100 percent, while farm butter production has increased about 5 per cent. The following table shows a comparison of the annual production of both farm and factory buttor at 10-year intervals since 1879.*

	Total pounds butter made	Pounds farm butter made	Percent of total	Pounds creamery butter made	Percent of total
1879	862,479	862,479	100	.....	..
1889	3,950,086	3,621,086	92	339,000	8
1899	6,499,121	4,932,482	76	1,566,639	24
1909	12.207,823	5,856,132	48	6,351,691	52
1907†	19,100,100	6,165,292	32	13,034,808	68

A further comparison of the production of farm and dairy butter by 10-year periods is presented in Charts Nos. 5 and 6.

* U. S. Census Reports.

†Colorado Dairy Commissioner's Report and further estimated from butter made per cow previously.

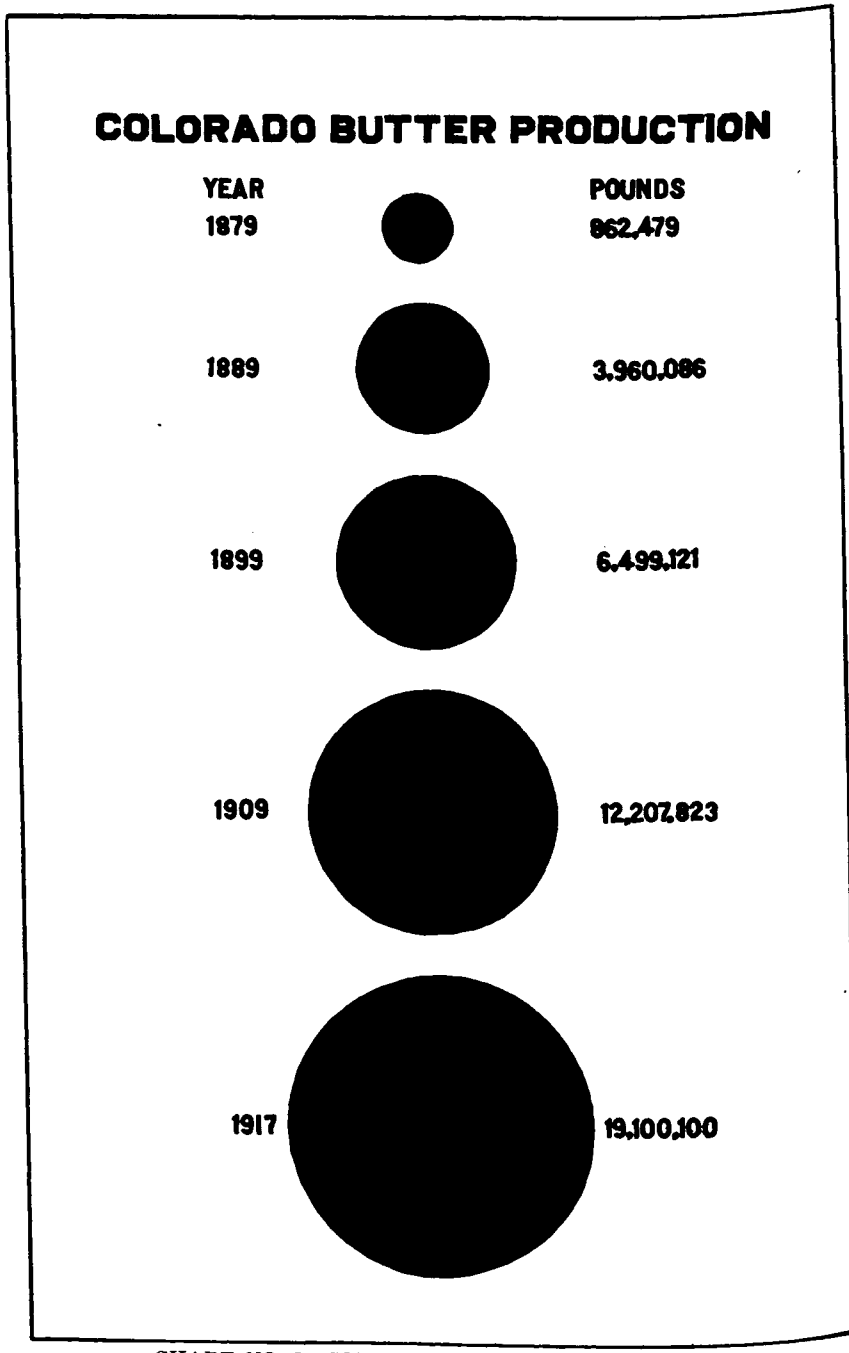

CHART NO. 5—COLORADO BUTTER PRODUCTION
Butter production has increased 10 Percent or more yearly

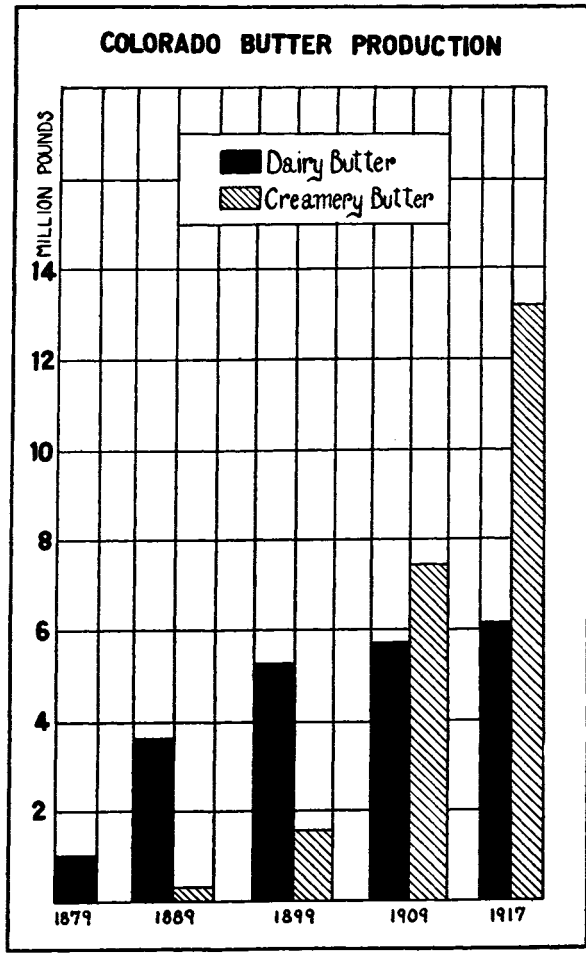

CHART NO 6--AMOUNT OF CREAMERY AND DAIRY BUTTER PRODUCED

Few creameries existed before 1899. Since that time the amount of butter made in creameries has increased rapidly. As methods for marketing cream improve less dairy butter is made

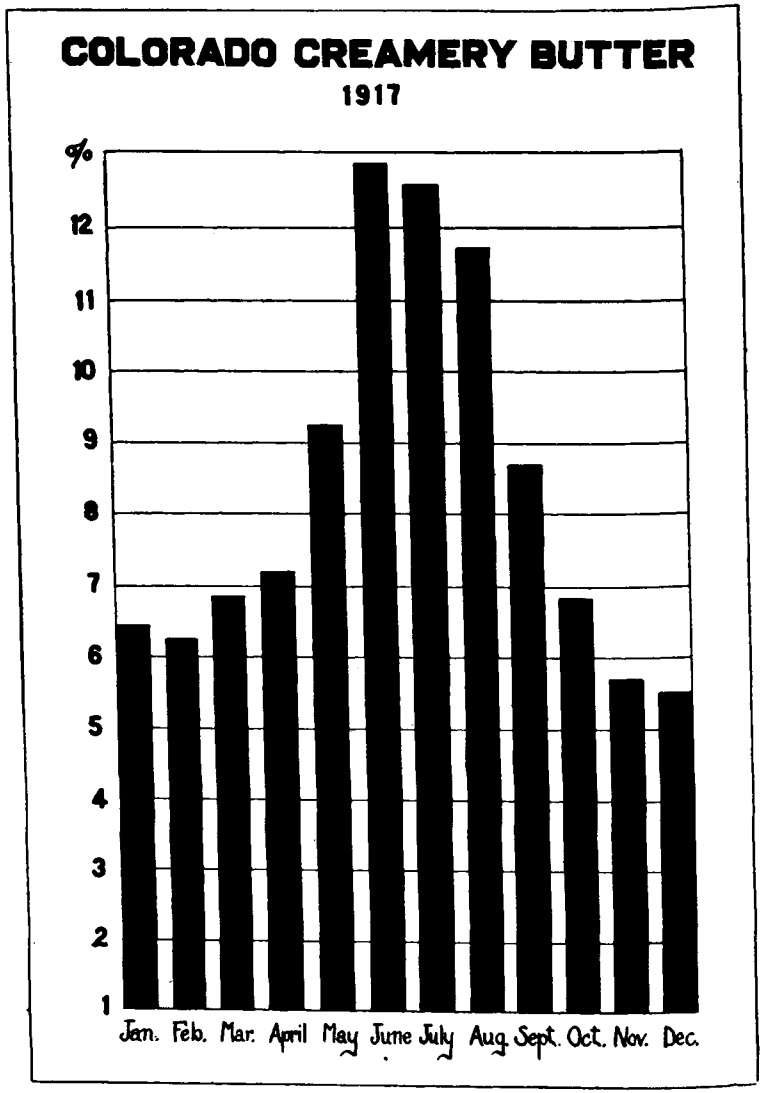

CHART NO. 7—VARIATION IN AMOUNT OF BUTTER PRODUCED
Nearly half the butter produced in Colorado is made in May, June, July and August

A graphic comparison of the monthly production of creamery butter in Wisconsin, Kansas and Colorado, is presented in Chart No. 8.

The months of greatest production of creamery butter in Colorado are May, June, July, and August, during which 46.4 percent of the total annual production is made. (See Chart No. 7). In Kansas 51.3 percent of the annual production is made during the same months, and in Wisconsin 44.8 percent. The months of lowest production in Colorado are November and December, and these also are the months of lowest production in Kansas, while the months of January and February are the lowest in Wisconsin.

During the six winter months (October-March) Colorado manufactured 37 6 percent of the total amount made during the year, while Kansas manufactured 33.4 percent and Wisconsin 38.5 percent. The following table shows the percent of butter manufactured monthly in the States of Wisconsin, Kansas and Colorado, and it will be noted that the butter production of Kansas occurs largely during the summer, while that of Wisconsin and Colorado is distributed more uniformly throughout the year.

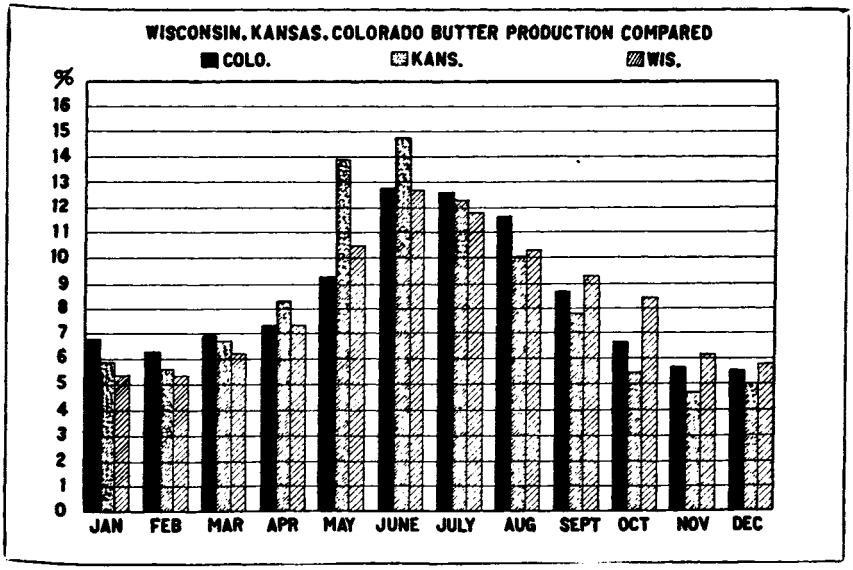

CHART NO. 8—VARIATION OF BUTTER PRODUCTION IN WISCONSIN KANSAS AND COLORADO

Less variation occurs in amount of butter produced in Wisconsin and Colorado than in Kansas

Month	Percent produced monthly Wisconsin*	Percent produced monthly Kansas†	Percent produced monthly Colorado‡
January	5.40	5.94	6.48
February	5.30	5.66	6.23
March	6.30	6.72	6.94
April	7.20	8.22	7.23
May	10.20	13.93	9 14
June	12.70	14.88	12.93
July	11.70	12.47	12 65
August	10.20	9.97	11.70
September	9.30	7.09	8.68
October	8.50	5.48	6.82
December	5.90	5.06	5.55

Dairy Butter Produced Per Cow—1909

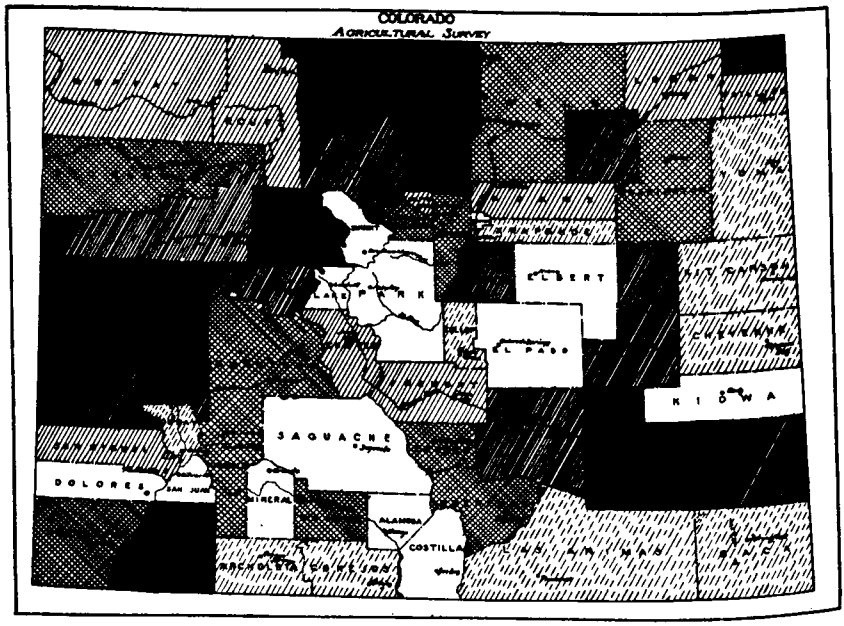

CHART NO. 9—DAIRY BUTTER PRODUCED PER COW

Counties farthest from central markets produce more farm butter per cow

*Wisconsin Experiment Station Bulletin 270
†Kansas Experiment Station Bulletin 216
‡Report State Dairy Commissioner's Report

Dairy Butter Produced Per Capita—1909

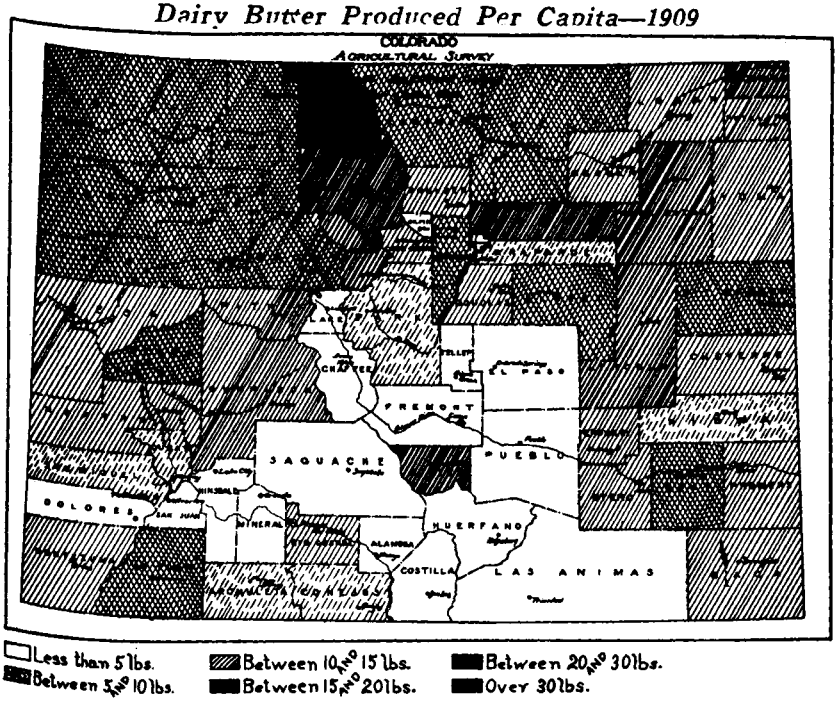

CHART NO. 10—DAIRY BUTTER PRODUCED PER CAPITA
Counties making most dairy butter per capita are located in outlying districts. Some sections, however, maintain a special market for dairy butter

CHEESE PRODUCTION IN COLORADO

The cheese industry in Colorado since 1900 has been on the decline. Before the introduction of the hand separator it was necessary for dairy farmers to make daily delivery of their milk to the skimming station, creamery or cheese factory.

As the skimming of milk on the farm enables time to be saved and labor reduced, in comparison with the daily delivery methods, and the value of butterfat in sour cream sold for butter making and that of whole milk for cheese making purposes has not been sufficient to warrant the extra labor and expenses in making daily deliveries, also the extra care necessary to market whole milk, the sale of sour cream to creameries has steadily gained favor. Poor market conditions have also tended towards lowering the production of cheese, and many cheese factories have been discontinued because of price competition with milk condeseries. The laws of Colorado require that cheese made in the state be branded to show the quality of milk from which it was made, but no provision is made for the branding of cheese shipped into the State. This

competitive condition has been a factor which has handicapped the cheese industry of Colorado to some extent.

During the year July 1, 1917, 13 cheese factories were in operation in the State. Many of these plants were quite small, some handling the product of but two or three herds. The average price paid for butterfat in milk by the cheese factories during the past three years has been 6 cents more than that paid for butterfat in sour cream by creameries.

The quantity and value of cheese made in factories in Colorado for a number of years is given below:

Year	Pounds produced	Value
1889	44,500	
1899	1,465,257	
1904	871,673	
1909	550,622	
1914	106,355	$49,183.00
1917	345,338	99,717.00

CONDENSED MILK PRODUCTION IN COLORADO

The first condensed milk factory was established in Colorado in 1902, and at the present time there are five factories in operation, two of which are in the Arkansas Valley and three in the irrigated section northeast of Denver, the last one being established in January, 1918. The condensery organizations have been successful, and stimulated the dairy industry in the sections where they are located.

The amount of condensed and evaporated milk made by the four condenseries operating in 1917 was 15,501,512 pounds. The Colorado product is marketed in the markets of Colorado and the adjoining states. As the supply of milk required to operate a condensery should not fall below 15,000 pounds daily, and the sections which could supply this amount are limited it is not expected that this industry will develop very rapidly in this state.

ICE CREAM MANUFACTURED IN COLORADO

During 1917, 40 factories were engaged in the manufacture of ice cream. Many of these were operated in connection with creameries and confectionery stores. Statistics are available for the past four years, and the following represents the amount made and value:*

Year	Gallons	Value
1914	560,082	$430,559.00
1915	641,637	585,494.00
1916	656,745	590,016.00
1917	878,391	878,391.00

Many local creameries are finding an increasing demand for ice cream in the smaller towns, and find the manufacture of this product to be profitable.

*Colorado State Dairy Commissioner's Reports.

DAIRY MARKET METHODS AND CONDITIONS

During the pioneer development of an agricultural industry, the availability of markets bears an important relation to production. This has been especially true in establishing dairy markets, and development of the dairy industry. Demands for dairy products has been the important factor in stimulating dairy production in Colorado, rather than favorable natural conditions. The average number of cows in dairy herds is small, which limits the production of individual farms to small quantities; the average distance of delivery to markets, and methods of transportation are unfavorable to frequent deliveries; the availability of nearby local markets is limited. These conditions have been the governing factors in determining present marketing conditions, and in establishing existing marketing methods, and business organizations have been established to market dairy products under these conditions.

FARM BUTTERMAKING

The amount of Dairy butter made in Colorado in 1910 was approximately 50 percent of the total production of butter made in the State. Farm conditions and demands, local markets, and available transportation facilities are factors which influence the amount of butter made on farms. Chart No. 9 shows the average amount of farm butter made per cow, and Chart No. 10 shows the dairy butter produced per capita in Colorado in 1909. In some of

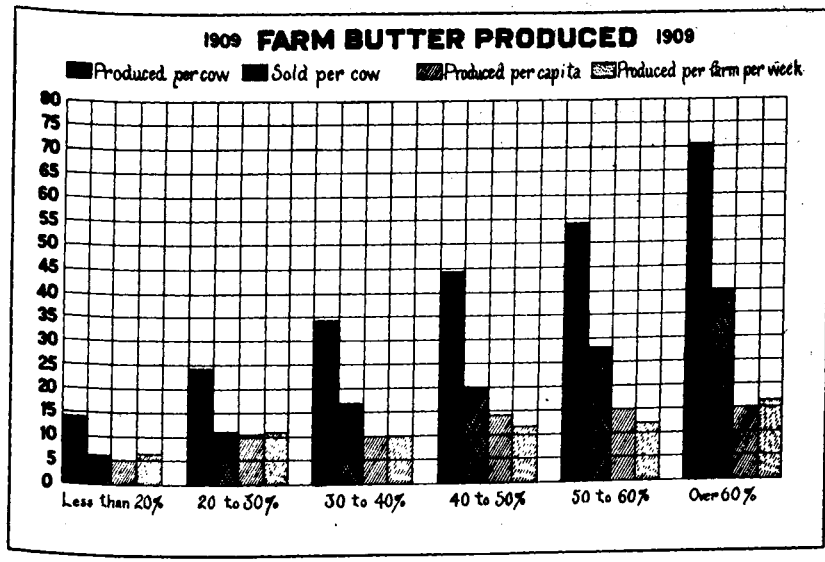

CHART NO. 11
Dairy butter produced per cow, produced per capita and per farms compared

the mountainous counties, where there are comparatively few cows, the product is used as market milk and less than five pounds of butter per capita is made. On the western slope, due to the large local demands and unfavorable conditions for cream marketing the average production per capita is larger than in the eastern part of the State. In the southern part of the State the production of farm butter per cow and also per capita is low and this is also true in some other areas. The average number of pounds of farm butter made per capita is quite evenly distributed throughout the State, with the exception of the south central portion, in which a relatively small amount of the total area is in farms and the rainfall is light, and irrigation has not been developed extensively. The counties in the northern part of the State produce the largest amount of butter per capita, as there are areas of grazing land in the northwestern counties, and the farms are most numerous in the northeastern. In the western section the distance to market, together with a limited demand for milk and cream, tends to increase the production of farm-made butter, while in the northeastern section butter markets are available for the raw product.

Approximately one-half of the butter made on the farms is used for home consumption, indicating that the primary cause for farm butter-making is to supply home demand. The number of pounds produced per cow increased with the per capita consumption and the population of the areas considered. The number of pounds of farm butter made per farm averaged 143.6 per year, or 2.3 pounds per week, fifty percent of which was sold, and the remainder consumed on the farm.

The following table and Chart No. 11, presents conditions in 1910, as more recent statistics are not available. The amount of farm butter made in 1917 was very nearly that made in 1910, and the increase in number of cows and population bear relations similar to those existing in 1910:*

Production per cow—	Av. produced per cow lbs.	Sold lbs.	Sold Percent	Produced Per capita	Produced per farm lbs.
Less than 20 pounds	14.3	6.3	45.0	5.2	83.5
Between 20 and 30	24.0	10.3	41.2	9.0	133.0
Between 30 and 40	34.1	17.0	50.0	10.7	126.0
Between 40 and 50	44.2	20.4	45.4	14.1	149.0
Between 50 and 60	53.8	27.4	50.9	15.3	155.1
Over 60	70.0	55.0	52.2	14.5	205.0

Further statistics of the production of farm-made butter in 1909 are given in the following table:

* U. S. Census 1910.

Number dairy cows	158,000*
Number farms	46,170
Average number dairy cows per farm	3.5
Farm butter made	5,836,132
Farm butter sold	2,914,243
Percent consumed on farm	50

While the amount of farm butter made in 1917 increased slightly over the amount made in 1909, the proportion of farm butter to creamery butter decreased. Several reasons may be given for this variation. An average of 3.5 dairy cows were kept on the farms in Colorado in 1910 and on many farms they were kept primarily to supply home demands. The production of farm butter during the winter months is stimulated by the small amount of butterfat produced as farmers often prefer to make butter rather than market cream, especially if a nearby market is not available. The demand for farm-made butter is also larger at this season, due to the fact that the prices of creamery butter increase in winter and the difference in prices between creamery and farm butter is less.

A comparison of the price of butterfat and farm made butter during 1916 is given below:

	Average price Farm butter	Average price Butterfat
Winter	31. †	32. ‡
Spring	28.3	33.3
Summer	27	29
Fall	30.7	32.7
Average for year	29.2	31.7

The average price paid for butterfat during the year 1916 was 31.7 cents while the average price received for farm-made butter was 29.2 cents. It would seem that farm buttermaking would be less desirable than marketing cream unless conditions other than the financial returns were considered.

The low returns obtained for farm-made butter in comparison to those for butterfat in cream is undoubtedly the principal factor in this relative decrease in production. Farm butter varies greatly in quality, and few buyers make a difference in the price paid for good or poor quality. Most of the butter is sold to country stores, and is paid for either in cash or in trade. A large portion is resold to local consumers, while the remainder is usually shipped to butter renovating factories. Very few stores attempt to maintain a special market for farm butter although a few grade the butter and pay and receive a higher price for the better grades. The desire of merchants to prevent dissatisfaction among customers is a

*U. S. Census, 1910
†U. S. Department of Agriculture Yearbook
‡Reports of Creameries, Colorado Dairy Commissioner's Office

factor which causes merchants to purchase all grades of butter at a price which must be sufficiently low to prevent loss. The consumption of farm-made butter is reduced because of the lack of uniformity in the quality of the product and the production of a better grade is discouraged somewhat by the methods of marketing employed. It is fair to assume that less butterfat would be churned on farms were it not for the fact that home demands, distance to markets, and prices for the product favor the production of butter on farms under certain conditions.

CREAM MARKETING METHODS

The history of the creamery industry in Colorado is one of progressive growth and development, and while creameries have been established in some localities before conditions warranted, the number is small in comparison with some other states. In the early history of the industry, the irrigated sections were practically the only localities where factories or skimming stations were operated, but with the introduction of the hand separator in Colorado about 1900, conditions for shipping of cream greater distances became favorable, and with improved buttermaking methods, it was possible to ship cream considerable distances and manufacture it into butter of marketable quality. This led to the development of dairying in sections of the State where it would have been difficult to have developed it under previous conditions.

The three markets for cream in Colorado may be classified as the cream station, local creamery and centralizer creamery. The cream station is the outgrowth of the skimming station but its operation is quite different. Since the farm separators have come into use skimming stations have become obsolete, as the milk is now separated on the farm and the cream may be marketed to a cream station, or creamery where it is weighed and tested and operator shall pass an examination showing his fitness to sample and test cream, and he is required to maintain sanitary conditions, both in the matter of providing quarters and equipment for the work and in handling cream. The Dairy Commissioner is charged with the enforcement of the dairy laws, and inspection of these stations, also in passing on the qualifications of station operators. The regulations for the equipment of the station provide for a steam boiler, tester and suitable glassware, accurate scales, wash-sink, can rack, weigh-scales, cream sampler and other equipment. The building used must have suitable surroundings and good drainage. A separate room must be maintained for handling cream, which shall be provided with sufficient light and ventilation and shall be screened. A cement floor is recommended but if the floor is of wood, it must be of clean, smooth, well-matched boards. The

Location of Cream Stations

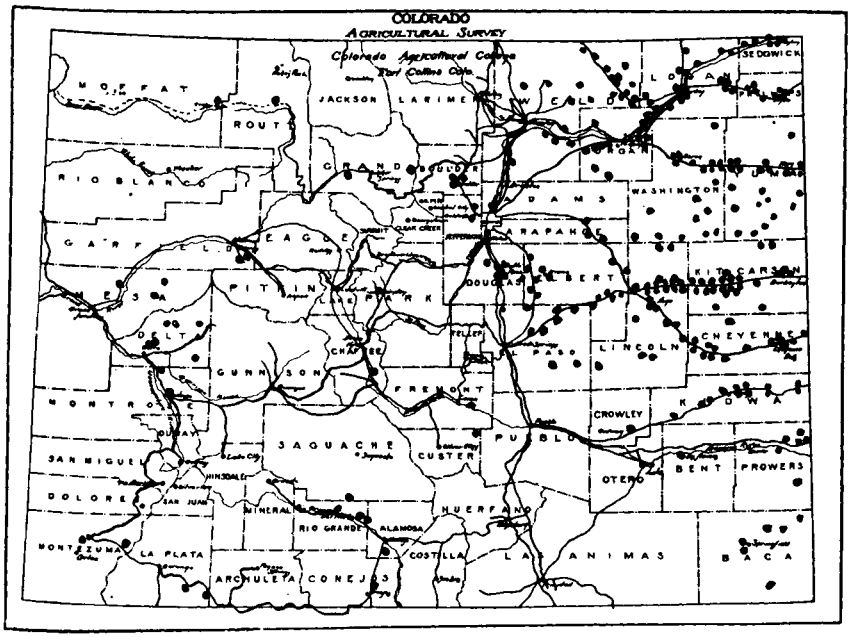

CHART NO. 12—LOCATION OF CREAM STATIONS
Most of the cream shipping stations are located in Eastern Colorado.

boiler and wash-sink should be in a separate room. Where the station receives but a small amount of cream it is not required that a boiler be provided, but provision must be made for heating sufficient water for testing and cleaning purposes.

Most of the stations are operated by the creameries, and there the product is procured by the creamery. Some stations are operated by an independent buyer, while a few are maintained by associations of cream producers and the cream is sold to the highest bidder. It is customary for some of the centralizers to quote prices for two grades of cream, but it seldom happens that any cream is paid for at the second grade price. Although station operators generally refuse to accept cream of very poor quality, financial inducement is not offered dairymen to produce cream of a higher quality. The cream received at the factory is graded so that the poorer grades of cream may be eliminated from the cream used in manufacturing the better grades of butter.

Three hundred cream stations are operated in Colorado and by referring to Chart No. 12 it will be noted that most of these are located in the dry-farming area in the eastern section of the State.

The cream station has a useful place in the dairy industry in

Colorado. It provides marketing facilities for much of the cream that would otherwise be made into butter on the farm and it tends to stimulate the industry by offering a convenient local market. While the expense of marketing cream in this way is rather expensive, the cost of producing cream in these sections is usually less than in other localities. The cream station serves a useful purpose in localities where the cream supply is limited, and is not sufficient to support a local creamery.

One objection to the cream station is that it costs as much to receive, test, and make payment for cream as it does to manufacture the cream into butter. This is due primarily to the small volume of business. Competition for securing the raw product often results in two or more stations operating in the same town, when one station could handle the business more economically. Statistics are not available in regard to the amount of cream handled by stations, but reports indicate that it would not exceed 4,000,000 pounds of butterfat annually. The average station therefor would handle 13,000 pounds butterfat yearly or 250 pounds weekly. It would seem that arrangements among cream producers whereby they might pool their product and eliminate unnecessary stations would be desirable.

LOCAL CREAMERIES

The local creamery usually procures most of its cream from producers within hauling distance, very little being shipped from outside territory. They are either proprietary or co-operative in form of organization; in the co-operative, the buttermaker usually serves as manager, bookkeeper and marketing agent. The success in marketing often depends upon his experience and ability, and frequently because of lack of good business methods in operating and marketing rather than because of poor quality of butter produced or lack a supply of raw products, the creamery fails.

The feasibility and practicability of establishing a local creamery depends upon several factors, the most important of which are a sufficient number of cows to supply the required amount of raw product, a proper co-operative spirit among farmers; appreciation of better marketing facilities for cream offered by a local creamery and an outlet for the sale of the butter produced which will return a higher average price for the product. When any one of these factors is lacking the success of the enterprise can not be assured. A thorough survey of conditions should be made whenever a local creamery is proposed and the essential facts determined and used as the basis for future action. Too often creameries are promoted either by industrial companies or boards of trade, in localities which are not able to properly support them. Such

efforts are of little value to the industry, for the enterprise usually is unsuccessful as the patrons become discouraged when conditions prevent the payment of competitive prices.

The following creameries are inactive and represent the effort of professional creamery promoters:

Mancos Creamery Company, Mancos, Colo.
Niwot Creamery Company, Niwot, Colo.
Poudre Valley Company, Windsor, Colo.
Sunflower Valley Creamery Co., Hoehne, Colo.
Yuma Creamery Company, Yuma, Colo.
Berthoud Creamery Company, Berthoud, Colo.
Genoa Creamery Company, Genoa, Colo.
Yampa Creamery Company, Yampa, Colo.
Bayfield Creamery Company, Bayfield, Colo.
Rifle Creamery Company, Rifle, Colo.
Wiley Creamery Company, Wiley, Colo.

A successful local creamery is a valuable asset to the dairy industry of a community as it not only stimulates local development, but provides local manufacturing facilities for converting raw dairy products produced in the community into finished manufactured products and not only used for home demands but may be shipped to supply the demands of the other sections. Furthermore the payment of express on cream to distant creameries and on shipment of butter to the local market is eliminated. At some of the local creameries, ice cream is manufactured, with little additional machinery, and expense. Where a market can be obtained, the manufacture of ice cream aids in defraying the overhead operating expense of the plant. There are sometimes opportunities for local creameries to handle the milk supply of the town in which they are located, and the surplus milk, which often represents a loss to the distributor, could be handled to advantage with very little additional equipment.

The important factors operating against the success of local creameries are the inefficient marketing systems employed, and insufficient supply of raw product obtainable. It is almost a universal practice for creameries to market butter direct to the retail merchant when possible and to dispose of the surplus to larger dealers. Therefore the location of the creamery in respect to the market has an influence on the price received for butter. Many creameries are able to dispose of most of their goods locally at the prevailing market price, while some market most of their output through wholesale and jobbing distributors. Most creameries sell their butter under their own brand. Competition is keen between the large and small creameries, and as quality requirements

are not always high in the smaller markets, the local creameries often have to meet the competitive price of storage goods with fresh butter.

It is often a difficult problem for the local creameries of Colorado to find a market for their surplus butter. The supply of butter produced in Denver exceeds the demand, and this market offers very little opening for butter manufactured outside the city, and the surplus butter marketed there is done so at a sacrifice. Shipments of butter made to Chicago in less than carlots have proven unsatisfactory and carlot shipments from small creameries are not possible under the existing conditions. It would seem that a co-operative effort among the local creameries to have their shipments of butter pooled might result in mutual benefit, since local refrigerator car service for less than carload shipments is not furnished.

THE CENTRALIZED CREAMERY

A centralized creamery procures its supply of cream from outlying territory and practically all of it is shipped to the factory either from cream stations or by producers direct. The centralizing creamery serves a useful purpose, in sections where the dairy cows are widely scattered, and the number is limited. In eastern Colorado such conditions exist and centralizing creameries have been established to serve these conditions and now occupy an important place in the development of Colorado dairying. It has distinct departments devoted to the securing of supplies of cream, also to the manufacturing, and marketing the butter produced. Field men are employed whose duties are not only those of buying and collecting cream but also to develop new territory. Time and money is spent in new territory rather than in competitive efforts with established creameries in older dairy sections. The manufacturing department is usually in charge of experts, and low manufacturing costs as well as uniform and standard quality products are obtained. The selling is usually efficiently done and extensive advertising campaigns conducted, and local salesmen employed to increase the business.

PRICES PAID FOR BUTTERFAT BY CREAMERIES

The price which the local creameries are able to pay for butterfat varies widely. Many pay approximately the price paid by shipping stations in the State, while some pay more. The wide difference in prices paid is due to lack of sufficient raw product, disadvantageous location for marketing, and lack of efficient busi-

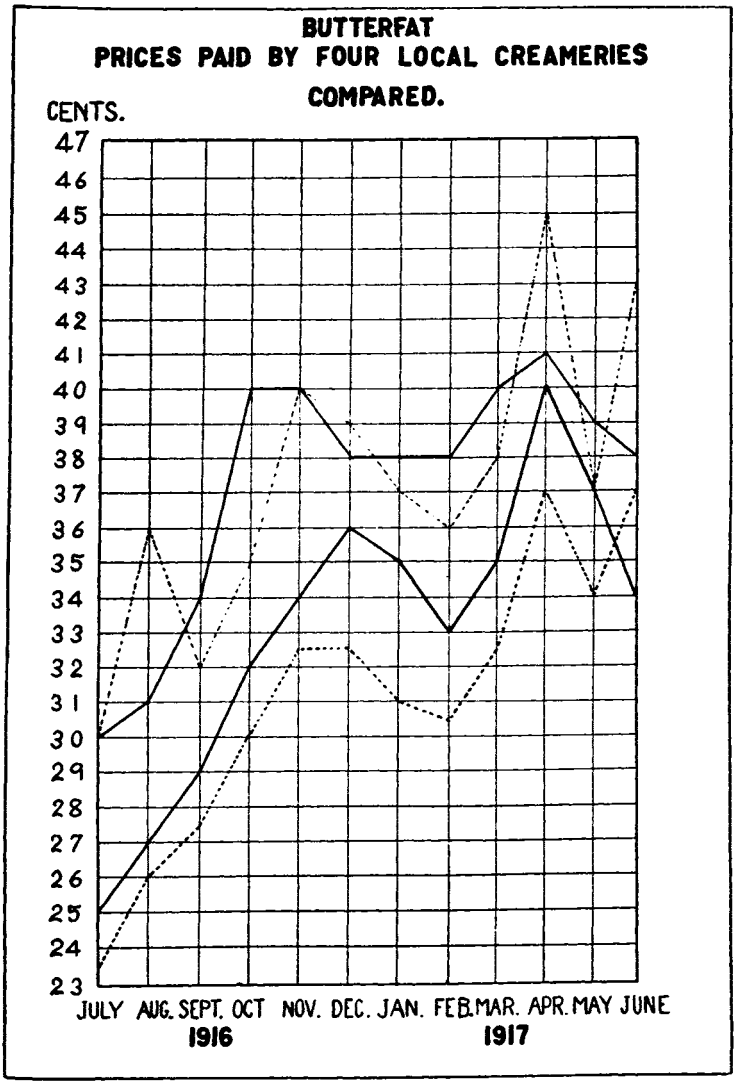

CHART NO. 13—COMPARING PRICES PAID BY FOUR LOCAL CREAMERIES

Prices paid by local creamies vary widely
Prices paid by four local creameries for butterfat in 1916-1917*:

ness methods in operating and marketing. The following table and Chart No. 13 show the monthly prices paid for butterfat by four creameries, each making approximately the same amount of butter.

*PRICES PAID BY FOUR LOCAL CREAMERIES FOR BUTTERFAT IN 1916-1917**

July, 1916	23.5	25.0	30.0	30.0
August	26.0	27.0	31.0	34.0
September	27.5	29.0	34.0	32.0
October	30.0	32.0	40.0	45.0
November	32.5	34.0	40.0	40.0
December	32.5	36.0	38.0	39.0
January, 1917	31.0	35.0	38.0	37.0
February	30.0	33.0	38.0	36.0
March	32.5	35.0	40.0	38.0
April	37.0	35.0	41.0	35.0
May	34.0	37.0	39.0	37.0
June	37.0	34.0	38.0	43.0
Average	31.1	33.0	37.3	38.0

The creamery for which prices are given in the first column is located in a mountain valley on the western slope, and at a distance from the railroad, the second is located in a small town near a large city which is supplied with butter by creameries located in it. Poor marketing facilities seem to be the reason for the lower prices paid by these creameries. The third manufactures ice cream and is located in a city which requires much of its product to supply local demands. The last creamery also manufactures ice cream. and markets most of its butter locally. This table shows that widely different prices are paid, and indicates that under Colorado conditions, the location of a creamery in respect to markets is a factor to be considered in determining the amount a creamery may pay for butterfat. Payment for cream is made by local creameries either once or twice a month, the 1st and 15th or 5th and 20th being payment days. The patrons thus furnish the working capital for operating the creamery.

In the price tables showing comparison of the prices paid for butterfat by centralizers, local creameries, and cream stations, prices quoted are based upon the delivery of butterfat in cream to the cream stations, local creameries or railroad station. One and three-tenths cents is deducted for transportation charges from the quoted prices to direct shippers.

The following table shows a comparison of the average price paid by all creameries in the state and the average price paid by local creameries:

*Creamery Reports, Colorado Dairy Commissioner's Office.

COMPARISON OF THE AVERAGE PRICE PAID BY ALL CREAMERIES FOR BUTTERFAT AND THE AVERAGE PAID BY LOCAL CREAMERIES

	Local Creamery Prices	Average Prices All Creameries
July, 1916	25.9	26.1
August	28.3	29.2
September	30.7	31.5
October	32.6	33.5
November	35.5	37.0
December	35.7	36.8
January, 1917	33.9	34.7
February	34.5	35.8
March	37.9	38.1
April	40.5	41.4
May	36.0	36.9
June	36.0	36.4
Average	34.0	34.8

While the variation in prices paid for butterfat between local creameries is wide, as shown in previous table, the average paid by them is eight-tenths of a cent below the average of all creameries in the State. During the winter months, production is low and the average price paid by the local creameries is one cent less than the average State price. The number of local creameries paying an excessively low price is small, and unimportant.

Very little difference in the prices paid by the various centralizers is noted. While there appears to be keen competition for the raw product, the prices paid by the various factories follow very closely. The following table shows a comparison between the average net price paid direct shippers by centralizers, and the average price paid by all creameries in the State.

COMPARISON OF AVERAGE NET PRICE PAID DIRECT SHIPPERS BY CENTRALIZER AND PRICE PAID FOR BUTTERFAT BY ALL CREAMERIES*

	Centralizer net price†	Average price all creameries
July, 1916	26.3	26.1
August	29.6	29.2
September	32.2	31.5
October	34.4	33.5
November	38.6	37.0
December	37.9	36.8
January, 1917	35.5	34.7
February	36.2	35.8
March	38.3	38.1
April	42.2	41.1
May	37.8	36.9
June	36.8	36.4
Average	35.6	34.8

*Reports of Creameries, Colorado Dairy Commissioner's Office
†Net prices determined by deducting 1.3 cents for transportation charges from the quoted price to direct shipper

The average net price paid by centralizers to direct shippers is eight-tenths of one cent more than the average paid by all creameries in the State. It was shown in the previous table that the average price paid by local creameries for butterfat was eight-tenths cent less than the net price paid by all creameries. The price paid at cream stations which offer a market for cream to farmers who either do not live near a local creamery or who have too small a supply to make direct shipment, or who would prefer patronizing a local cream buyer, offers another comparison of prices. Because of the unfavorable conditions for transporting and marketing small quantities of cream when the distance to market prevents direct delivery, many farmers are willing to accept a lower price for butterfat when sold at cream stations. The cream station renders a distinct service, which is paid for by the producer in a lower price received for his cream.

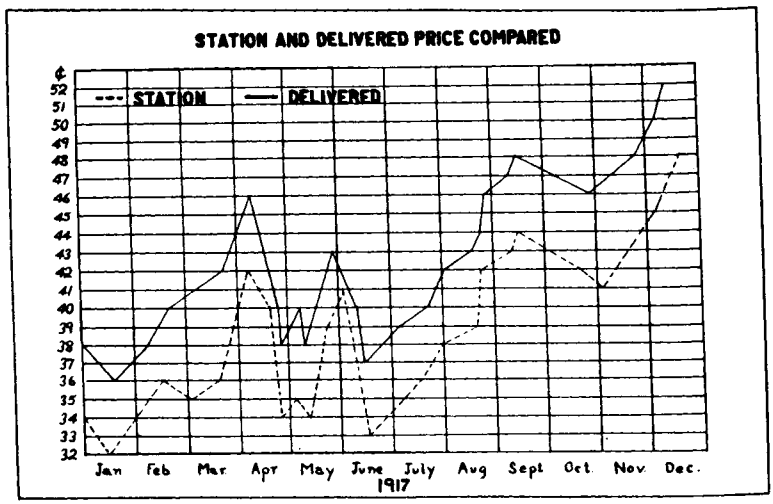

CHART NO. 14—STATION AND DELIVERED PRICES FOR BUTTERFAT COMPARED

Station prices follow delivered prices very closely

A comparison of the average net prices paid for butterfat shipped direct to the centralizer and delivered to cream stations is shown in the following table and in Chart No. 14 for the year 1917:

	Gross prices paid direct shippers by centralizers		Prices paid at stations by centralizers	
	1916	1917	1916	1917
January	31.6	36.9	27.8	33.0
February	31.6	37.5	28.5	34.2
March	36.0	39.6	33.0	36.6
April	34.7	43.5	31.6	40.1
May	29.9	39.1	26.8	34.9
June	28.2	38.1	25.2	35.7
July	27.6	39.4	26.0	35.4
August	30.9	43.0	26.9	39.1
September	33.5	47.0	30.0	43.4
October	35.7	47.7	36.0	36.0
November	39.9	46.6	35.3	41.8
December	39.2	50.7	35.2	46.0
Average	33.3	42.5	29.3	38.6

Net price is determined by deducting 1.3 cents for transportation charges from the quoted gross price to direct shippers

In 1917 the average difference between the delivered gross price paid direct shippers by centralizers and those paid at stations was 3.9 cents, while in 1916 the difference was 4.0 cents.

Cream stations ordinarily do not pay a higher price for butterfat than is paid by an independent cream-buying organization unless that price is below the quoted station price.

The prices paid at stations in different parts of the state do not vary greatly at any time, and the prices paid by stations located in the same town are usually identical, and while competition for raw product is keen, overbidding is not practiced, and uniform prices usually prevail. It sometimes does occur that slightly different prices are quoted by the same company in different parts of the State, but this usually occurs when competiting creameries in Kansas and Nebraska quote higher or lower prices. Kansas and Nebraska prices are usually identical, and differences that occur seldom exceed two cents. Another variation that sometimes occurs is due to another creamery or an independent buyer or association advancing the price above the quoted station price and this the station operator is authorized to meet.

The prices paid in Colorado for cream at cream stations are determined largely by Kansas and Nebraska prices as creameries in those states are competitive buyers of the Colorado product. The quotations offered for direct cream shipments are somewhat

regulated by the station price. The following table shows a comparison of the average station price paid in Kansas and Colorado, also the Elgin butter quotation for the period given:

	Colorado*	Kansas†	Elgin butter
July, 1915	20.8	21.0	25.5
August	20.1	20.7	24.5
September	20.3	21.1	25.2
October	24.4	24.2	27.6
November	26.7	27.1	30.7
December	32.2	31.8	33.3
January, 1916	27.8	28.6	30.7
February	28.5	28.7	32.2
March	33.0	32.7	35.5
April	31.6	32.1	34.2
May	26.8	26.8	29.2
June	25.2	26.0	29.3
Average	26.4	26.8	29.3

The average station prices in Colorado and Kansas are approximately the same and are less than the Elgin quotation for butter.

MARKETS FOR COLORADO BUTTER

The greatest portion of butter manufactured in Colorado is consumed within the State and until recently it was necessary to import butter, but for two years butter has been sold in quantities outside the State. Denver contains a population equal to one-fourth that of the entire State, and is the principal butter market. It is also the leading manufacturing point, as over 50 percent of the butter produced is made in that city.

The wholesale market distribution of butter in Colorado differs somewhat from the methods in many cities in that commission merchants and receivers handle very little of the product, and most of it is distributed direct to the retailer by the creamery. Practically all the butter sold in the State is put up under private brands and is either marketed locally or shipped by express to various parts of the State. The larger creameries maintain quite extensive selling organizations, and employ salesmen to solicit local trade. Weekly quotations are mailed to the outside trade. Local creameries depend largely on local demands for their markets, or the success of marketing their products depends somewhat upon the location of the creamery, and the ability of the manager or buttermaker to obtain markets. Centralizers store butter during the season of greatest production, but local

*Creamery Reports, Colorado Dairy Commissioner's Office.
†Kansas Experiment Station Bulletin No. 216

creameries dispose of their products at the time it is manufactured. As the small creamery is largely dependent upon local demands, price cutting often results.

As market distribution in Colorado is conducted mostly by butter manufacturers there is little need for market grades, such as have been established at large markets by the commercial organizations of dealers, as a measure of quality, but each creamery rather established its own grades under different brands. When a brand becomes established it serves somewhat as a measure of quality, but it often happens that butter of different grades is put under one brand. This is especially true for the trade outside of Denver, as often second grade butter is put out under a brand which in Denver is used for first-grade goods. Storage and re-worked butter is often put up as first-class goods.

STORAGE OF BUTTER

Without modern cold storage facilities the prices of butterfat, and butter would vary greatly as they did in former years when butter was sold directly as it was manufactured. The practice of storing the surplus made during flush season of production in summer until the lower season of production in winter works alike to the advantage of the producer and the consumer. The farmer received a higher and more uniform seasonal price for his butterfat, even through the surplus season of production. The consumer is insured of supply of needed butter during the winter months when there is not enough butter produced to meet the demand.

The effect of modern storage facilities and the storage of butter upon the extreme low and high prices for certain years are shown below:

Year	Low price per lb.	High price per lb.	Percent of Fluctuation
1880	18	38	111
1890	16	27	30
1910	27	36	33
1917	35½	49	38

Elgin quotations used except in 1917 when the Elgin quotation was discontinued and the Denver quotation used

Cold storage has stablized prices and secured a seasonable distribution of the supply which the general farmers have failed to produce through fall and winter dairying. The amount of butter held in storage varies from season to season, or if prices of cream are higher during the flush production season than experience and good judgment show that it is possible to get for butter during the

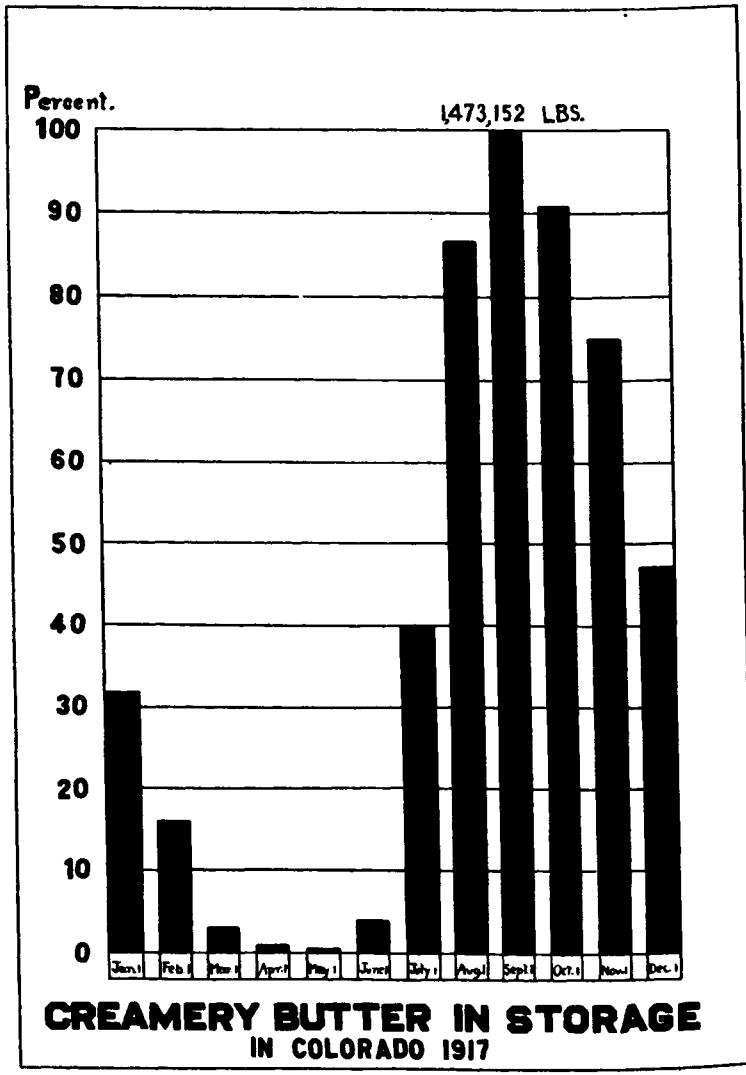

CHART NO. 15—CREAMERY BUTTER IN STORAGE

season of disposal of suplus the general practice is to keep storage stocks low while the demand and high prices usually diverts a great deal of stock from storage. In seasons of low prices, the movement of stocks from storage is slow and supplies have to be held for later months for sale.

The greatest production is in June and consequently it is the month of largest storage in most markets. The storage figures for the last two years would seem to indicate that the months of

greatest storage in Colorado are later than in Kansas and Wisconsin. Owing to the demand for butter due to the clearing of the storage butter early in the year the storage was later during 1917. Relation of Storage intake and output to season of surplus and deficit butter production for the year 1917 in Colorado Storages:

Month	Percentage Production by months	Net pounds of butter placed in storage	Percent of butter stored by months	Net pounds of butter taken from storage monthly	Percent of butter stored taken from storage monthly
January	6.5%			240,430	16%
February	6.2%			182,925	13%
March	6.9%			39,690	3%
April	7.3%			10,386	1%
May	9.2%	52,316	4%		
June	12.9%	542,648	37%		
July	12.6%	677,980	46%		
August	11.8%	176,272	12%		
September	8.5%			141,767	10%
October	6.9%			216,910	14%
November	5.6%			421,187	28%
December	5.6%			217,017	15%
Year	100.0%	*1.449,216	100%	1,470,312	100%

Local creameries in Colorado store but little butter as they are often located a long distance from storage centers, and also need the money from regular sales of butter for operating expenses and immediate payments for butterfat. Long distance shipments to storage from small creameries entails considerable expense on shipping to and from storage. The butter is first shipped as manufactured in small quantities for storage. Then it must be reshipped to the local plant for printing and placing in cartons, if it is to be sold locally or within the State as practically all sales to the consuming trade within the State is made in carton form.

MARKET PRICES OF BUTTER

Since nearly all the butter consumed in Colorado is produced within the State, and very little is imported, the butter market prices are dependent largely upon local market conditions. The large creameries in Denver quote prices weekly, and these prices are generally used as the basis on which butter is bought and sold. Quotations are mailed to retail merchants throughout the state, and to local creameries as well, and thus the prices are standardized in the State. As competition with outside points is not keen, competitive prices do not apply closely.

*Difference of 21,196 pounds represents accumulated surplus from previous year.

In general two quotations for butter exist in Colorado, viz: Denver quotations and State quotations. State quotations apply to butter sold outside of Denver and Colorado Springs, and as a rule are one cent below the Denver quotations. The following table shows a comparison of the Denver quotation with the Chicago and New York market quotations, for the year 1917, also the price paid for butterfat by Denver Creameries to direct shippers. (See Chart No. 16).

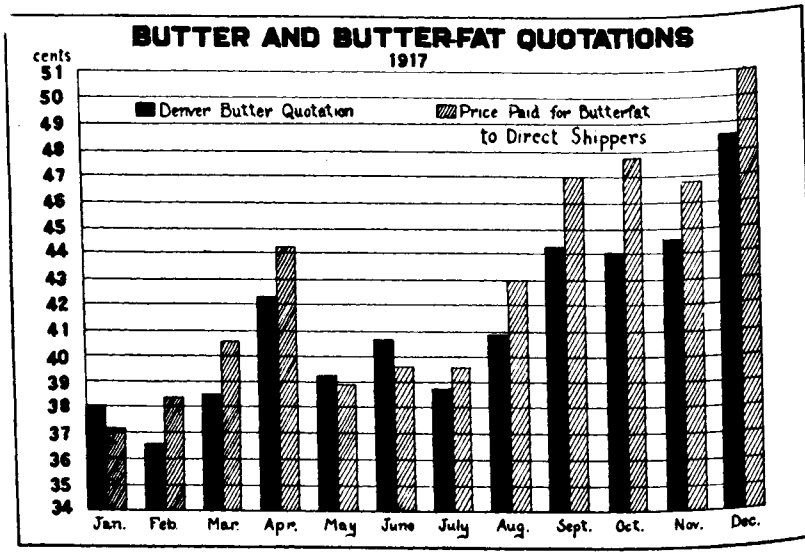

CHART 16—BUTTER AND BUTTERFAT QUOTATIONS

The price paid for butterfat delivered at the centralizer in 1917 exceeded butter quotations except during the months of January, May and June

	Denver	Chicago	New York	Butterfat Price
January	38.1	37.8	39.5	36 9
February	36.5	40.3	43.3	37.5
March	38.6	40.3	41.6	39.6
April	42.2	43.1	44.2	43.5
May	39.1	38.5	40.4	39.1
June	40.8	38.4	39.6	38.1
July	38.7	37.5	39.1	39.4
August	40.8	39.5	40.8	43.0
September	44.2	43.1	44.1	47.0
October	44.0	43.1	44.7	47.7
November	44.4	44.1	45.0	46.6
December	48.5	47.8	49.0	50.7
Average	41.3	41.2	42.6	42.5

The Denver quotations are for butter in cartons while the Chicago and New York quotations apply to butter in tubs. This would make the difference in cost of package about one cent higher

than in the latter markets. As the butter is sold in prints direct to the retail merchant, the Denver quotations represent the prices received by the creamery for butter jobbed to retailers in Denver, while the Chicago and New York quotations represent strictly wholesale transactions.

The average price paid for butterfat in 1917 delivered in Denver was 1.3 cents above the Denver quotations. In May the butter quotations were identical with price paid for butterfat, while in October it was 3.7 cents below the price paid for butterfat. As local conditions of supply and demand govern butter quotations primarily the quotations established in the larger eastern wholesale are not followed. Figure 16 indicates that while there is a close relation between quotations at times they vary widely, and the difference would be increased if Denver quotations were based upon butter in tubs.

COST OF COLLECTING CREAM, MANUFACTURING AND MARKETING BUTTER

The conditions under which much of the cream is collected and handled in Colorado are unfavorable for making an exceedingly high quality butter. The average distance from farms to creamery, cream station or shipping station is great, and trips to town are rather infrequent. The average farmer keeps but few cows, and frequent extra trips are not justified for the sole purpose of delivering cream. Cream deliveries are often delayed and cream of poor quality is accepted by buyers. Some cream is shipped long distances, which has a very detrimental effect on the quality of butter produced, especially in warm weather.

The collection, handling and transportation of cream to the factories present rather complex problems. The cost is relatively small for the farmer living within hauling distance of a local creamery, being a part of his business trip to town, while with cream stations the cost averages about four cents per pound butterfat. The direct shippers pay a transportation charge, proportionate to the distance shipped, while cream station patrons receive a lower price based upon average expense of operating stations and costs of transportation of cream from them to the creamery. Patrons of a cream station located 300 miles from the creamery are paid the same as patrons of a station 50 miles distant, and the quantity handled daily at a station does not affect the price paid.

The average expense of operating a station and transporting cream to the factory is about 4.1 cents per pound butterfat. The operator is usually paid a commission of either 1½ or 2 cents per

pound butterfat and the average cost of transportation and depreciation of cans is 1.5 cents, while incidentals such as coal, rent, supplies, etc., approximate the balance.

The average cost of making a pound of butter in 1917 was 4.35 cents. This included all costs of receiving the cream, the manufacturing and packing the product. The average cost in plants making 400,000 or more per year was 3.5 cents, while the average in local creameries making 40,000 pounds or more per year was 4.8 cents. Practically all butter is cartoned at the creamery, this cost, including the shipping box, amounts to about one cent.

The process of marketing butter in Colorado is much more simplified than in some other states. The ordinary processes through which butter passes from the creamery to consumer in the eastern states involves middlemen expense which do not occur in Colorado, as the creamery usually performs the services of manufacturer, jobber, and wholesale distributor. The following table represents the cost of collecting, manufacturing and marketing a pound of butter made in a centralizing creamery from cream received by the creamery through a cream station and from a direct shipper.

	Station Patron		Direct Shipper	
	Amount	Percent	Amount	Percent
Farmer receives	30.88	68.1	32.8	72.6
Express, cans, etc.	1.20	2.6	1.36	2.7
Station operator	1.40	3.1		
Station expense	.68	1.5		
Solicitation, manufacturing package and marketing	7.14	15 8	7.14	15.4
package and marketing	7.14	15.8	7.14	15.8
Retail merchant	4.00	8.9	4.00	8 9
Total	45.3	100.0	45.3	100.0

The average price for which butter was sold in 1917 was 45.3 and of this the farmer shipping direct received 72.6 percent and the station patron received 68.1 per cent. The direct shipper receives on an average 1.92 cents more than does the station patron for butterfat in one pound of butter.

MARKET MILK DISTRIBUTION IN DENVER AND OTHER CITIES

A survey of the market milk supply of Denver and some other Colorado cities was undertaken as a part of the general dairy marketing survey in Colorado. The problem of supplying a city with an adequate supply of pure milk at a price which is fair to both producer and consumer, is by no means simple. As milk is an essential and necessary article of diet, especially for children, it

is vitally important that infants and the young should be supplied with clean, pure milk in quantities sufficient to promote vigorous growth.

During the past year, the market milk problem in the larger Colorado cities, as in many cities in the United States, has become somewhat critical both to producer and consumer. With retail price advanced approximately 50 percent, the consumer has given complaint to the high prices, while producers have contended that the business of market milk production was unprofitable on account of steadily increasing costs of production. The percentage increase in the retail prices of a number of food products from February 1, 1915, to February 1, 1918, is shown in the following table:

	Unit	Feb. 1, 1915	Feb. 1, 1918	Percent increase in cost
Sirloin steak	Lb.	.224	.321	32.9
Pork loin	Lb.	.171	.322	80.9
Bacon	Lb.	.264	.533	101.8
Eggs	Doz.	.400	.550	37.5
Butter	Lb.	.400	.550	37.5
Cheese	Lb.	.250	.350	40.0
Flour	Lb.	.035	.054	55.0
Beans	Lb.	.080	.170	112.0
Milk	Qt.	.083	.120	44.5

The average increase in price of the above products has been 60.2 percent, while the increase in the price of milk has ben but 44.5 percent.

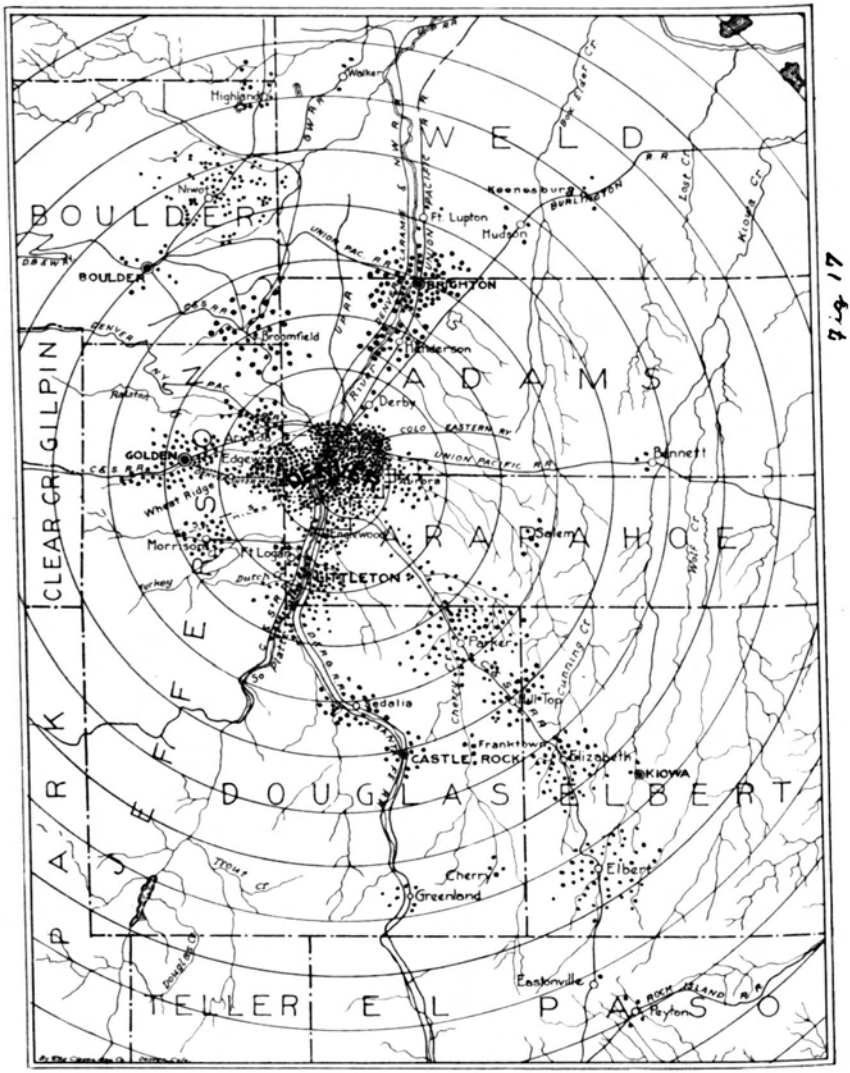

CHART NO. 17—LOCATION OF COWS SUPPLYING DENVER WITH MILK
(One dot for ten cows)
Most of the milk sold as market milk is within hauling distance. Milk stations encourage the industry in their locality

Dairying, unlike some phases of farming, requires a number of years to become well established. It requires several years to improve a herd and a cow does not usually begin to produce until she is past two years. The situation during 1917 may have been somewhat abnormal due to war conditions, and with the increased

price of farm crops, abnormal profits in grain production, and high prices of beef or dairy stock for meat production, the dairy farmer has been tempted to dispose of his herd and engage in other phases of agriculture.

Considering the food value of milk and its cost in relation to other foods, it is one of the cheapest of foods and its production should be encouraged. It is a complete food for the infant and contains carbohydrates and fats to supply the body with energy, protein to replace tissues, inorganic mineral salts for building bone and muscle, and in addition growth promoting elements which are essential to the development of children. A comparison of the energy and protein value of milk with certain other foods is shown in the following table:

One quart of milk is equal on an energy basis, to
- 10 ounces of sirloin steak
- 8 eggs
- 19 ounces fowl

One quart of milk is equal on a protein basis, to
- 6 ounces sirloin steak
- 4 eggs
- 8 ounces fowl

MARKET MILK SUPPLY OF DENVER

The market milk supply is obtained from approximately 600 farms located within a radius of 40 miles of the city. (See Chart No. 17). The size of the herds kept varies, some farmers being engaged primarily in the business of milk production, while others regard it as a side line. There were approximately 80 farmers who delivered direct to consumers, while the others sell all their supplies to city distributors. The size and number of the local dairy herds, some located within the city, selling direct to consumers, is indicated in the following table:

Number of cows	Number of dairies	Percent
Under 10 cows	1	1.2
Between 10 and 15 cows	8	10.0
Between 16 and 20 cows	11	13.7
Between 21 and 25 cows	23	28.8
Between 26 and 30 cows	11	13.7
Between 31 and 35 cows	12	15.0
Between 36 and 40 cows	4	5.0
Between 41 and 45 cows	3	3.6
Between 46 and 50 cows	2	2.5
Over 50 cows	6	6.5

On the 81 farms or dairies there were 2,248 cows kept or an average of 28 cows on each. The average daily production of these cows was 5,620 gallons or 2.5 gallons per cow.

The increased prices of land, limited pasture areas, and increasing cost of labor and feed, have been factors constantly tend-

ing to eliminate the local dairy of the producer-distributor type. Five years ago there were more than 300 such dairies and the city depended upon them for its milk supply. Although certain economies in marketing may be practiced by local dairies, such as rail transportation and the costs of bottling and distributing may be combined with those of production, the margins of profit are necessarily narrow at present labor and feed costs and scarcity of profitable producing cows. However, such dairies are important in the market as they furnish over 25 percent of the milk supply.

The number of cows kept per farm and number of farms supplying milk to city distributors, is given in the following table:

Number of cows	Number of farms	Percent
Under 6 cows	54	10.8
Between 6 and 10 cows	128	24.1
Between 11 and 15 cows	110	20.7
Between 16 and 20 cows	96	18.1
Between 21 and 25 cows	48	9.00
Between 26 and 30 cows	40	7.5
Between 31 and 35 cows	24	4.5
Between 36 and 40 cows	14	2.5
Over 40 cows	16	2.8

The majority of farmers selling to distributors kept less than 16 cows per farm and over one-third kept less than 11. The number of cows kept on the 530 farms was 8,998 or approximately 17 per farm. The dairy production averaged 14,359 gallons of milk or 1.59 gallons per cow. These figures are of interest in comparison with an average of 28 cows per farm which produced 2.5 gallons of milk daily on farms where the supply was delivered direct.

The daily per capita consumption of milk and of cream expressed in milk equivalents is .296 quarts which is about the average of 66 cities in the United States. The number of cows and farms supplying milk to Denver with the quantity supplied daily is given below:

Number of farms supplying milk	611
Number of cows supplying milk	11,246
Average number of cows per farm	18.3
Quarts milk sold	79,916
Average number of pounds per year	5,110
Quarts per capita consumed	.296
Average gallons per cow per day	1.77

The amount of milk consumed as such was estimated to be 53,273 quarts daily. On the basis of the amounts recommended (Sherman and Lusk) for consumption by people of various ages, Denver should consume 91,233 quarts daily. This amount is based on the following per capita rate:

Age	Quarts Recommended	Population	Daily Requirements
Under 1 year	1	6,039	6,039
Between 1 and 2 years	¾	5,905	4,428
Between 2 and 13 years	½	66,572	33,286
Over 13 years	¼	189,922	47,480
		268,439	91,233

The percent of small dealers selling at wholesale indicates that most small dealers do not have any surplus to dispose of in that way. The larger distributors, confronted with the problem of maintaining an adequate supply, buys the entire yearly production of his patrons and with fluctuating seasonal supplies and practically constant trade demands experiences a surplus during certain seasons which he must separate and market as cream and skim milk.

Of the 100 distributors operating three or less wagons per day, 80 produced all or a part of the entire supply delivered and 23 purchased all the milk distributed. The amounts distributed daily by the 100 smaller distributors and 3 larger are given below:

	Daily Sales
100 small distributors (milk)	9,179 gallons
3 large distributors (retail milk)	4,444 gallons
3 large distributors (milk wholesale)	1,428 gallons
3 large distributors (skimmed milk)	2,228 gallons
3 large distributors (sold wholesale as cream)	2,700 gallons

Only one of the small distributors sold milk exclusively at wholesale, and 17 sold a part at wholesale, and 80 per cent sold to stores.

CITY REGULATION OF MILK SUPPLY

For the suprvision of the milk supply of Denver from the sanitary standpoint, a milk inspection department consisting of a chief inspector and two assistants, is maintained. Each producer and distributor is required to obtain a license for which a fee of $5.00 is obtained. The standards of quality require not less than 3 percent butterfat content and a bacteria content of less than 500,000. Samples are obtained from each distributor at least once each month and inspections made for number and kind of bacteria, and percent of butterfat and total solids. Pasteurization is not compulsory. However, as the death rate due to milk communicable diseases is very low, the supply would appear to be reasonably pure and healthy.

COST OF MILK DISTRIBUTION

The costs of distributing milk in Denver were ascertained for distributors producing their own supply and for those purchasing their supply from others. As has been previously stated, there were 100 small distributors and 3 large distributors supply Denver.

The marketing problems of the small distributors are less complex than those which confront the large distributor and it is sometimes possible for the small distributor to retail milk at a lower price than the larger. Usually the small distributor and immediate members of his family perform the actual work, cheaper help is employed, no charge is made for administration and clerical work, and losses are prevented which ordinarily occur when the owner is unable to give personal attention to the business.

The small distributors do not, as a rule, incur the expenses or shrinkage incident to pasterization and the majority are engaged in both production and distribution which permits an interchange of labor and a saving to be expected.

Although under certain conditions milk may be retailed at a lower price by the small distributor, the fact that many are quitting the business indicates that the business is not profitable due to the small volume of business handled and narrow margins which necessarily result in small profits. To enlarge the business would require additional expenses which might make it unprofitable.

The operating costs of a small distributor selling 180 quarts daily at 10c per quart and 6c per pint is given in the following table:

180 quarts milk produced and charged at wholesale price of 6.1c per quart		$10.98
2 hours' labor (cooling and bottling)		.75
100 pounds ice		.50
Bottles, caps and cans		.62
Labor incurred in delivery		2.20
Shrinkage and shortage		.30
Delivery truck depreciation and operating expense		2.20
Coal and sundry supplies		.30
		$17.85
Average cost and expense per quart	$ .099	
Average net price received per quart	.102	
Net difference per quart	$ .003	

It is evident that a dairy of 18 cows producing 2½ gallons or 10 quarts of milk per day would not much profit from the distributing end of the business at the prices given. Although the profits from the production of the milk are not given, it is doubtful if the dairyman could profitably continue the business, were it not for the fact that he has his money invested and it gives him employment. In the foregoing statement, no charge was made for taxes, insurance, depreciation and other items of cost which should properly have been made.

Additional data in regard to the costs of production and distribution and receipts of sales for a small distributor producing his own supply shows a margin of one-half cent per quart.

Receipts from sales:		
210 quarts milk at 12c	$25.20	
80 pints milk at 7c	5.60	
90 half-pints cream at 12c	10.80	
19 gallons milk at 30c	4.50	
	$46.10	
Average net price received per quart		$ .104
Costs and expenses of production and distribution:		
Feed for cows	23.20	
Labor	$ 9.00	
Horse feed and upkeep	4.50	
Wagon and harness upkeep	.40	
Ice	.75	
Bottles and caps	.70	
Shrinkage	.75	
Coal, supplies, etc.	.50	
Water, taxes and insurance	1.50	
Interest on investment	1.75	
	$43.05	
Average net cost and expense of producing and distributing, per quart		$ .099
Net margin cost and selling price per quart		$ .005

The above represents a dairy of 47 cows producing 111 gallons daily. Most of the milk was sold at retail for 12 cents a quart and 7 cents a pint, but enough cream and wholesale milk was sold to decrease the average receipts per quart to 10.4 cents. It will be noted that charges are not made for incidental farm expense and accounting. It cost 23.5 cents a gallon to produce this milk and and the net margin of profit is one-half cent per quart. The largest item of expense is that of delivery. If all the product had been sold as milk at 12 cents per quart, the profits would have been satisfactory to the proprietor.

These two small distributors are representative of that class. Under very favorable conditions a small profit may be made when the proprietor does a large share of the labor. When conditions are at all unfavorable. or he is obliged to sell surplus milk or considerable amounts of cream, or if he sells for less than the standard price, his margin of profits are greatly reduced. With the gradual elimination of the small dairyman, the city must depend more and more in the future for its milk supply, upon the dairies in the outlying districts.

The business of large distributors differs from that of small distributors in that a considerable surplus is purchased in order to meet emergency demands. Of 10,000 gallons of milk handled by

the three large distributors, 2,700 gallons were sold at wholesale in the form of cream. The other 8,100 gallons or 32,000 quarts were marketed as follows:

13,037 quarts retail at	12c	$1,564.44	
5,926 pints retail at	7c	414.82	
1,776 quarts to stores at	10c	177.60	
5,712 quarts at wholesale at	7½c	428.40	
5,242 half pints of cream at	12c	629.03	
1,900 gallons skim milk at	10c	190.00	
Average net price received per quart			$ .1051

The plant cost of handling and expense of delivery by large distributors is shown below:

Plant costs and expenses per quart	$ .0127	
Bottles, cans, etc.	.0025	
Delivery expenses	.0156	
Administration, clerical, taxes, insurance, etc.	.0070	
Total costs handling and delivery	$ .0378	
Net cost of milk per quart	$ .0610	
		$ .0988
Net margin between price received per quart and costs of handling and delivering		$ .0063

While the prevailing price of milk was 12c per quart, the average net price received was 10.51c or approximately 1½c less than the prevailing price. This was due to the sale of a considerable surplus in the form of cream and skimmilk at prices below 12c per quart for the milk skimmed.. Ordinarily 1.7 quarts of milk worth 12c per quart or 20c, would produce one-half pint of cream worth 12c and about 3c worth of skim milk, which represents a return of 15c or a loss of 5c on each half pint of cream sold under the return from the sale of the whole milk. Although it costs less to sell milk at wholesale, the net margin is greatly reduced when milk costing 6.1c per quart is sold at 7½c wholesale. The cost of handling and delivering is shown in the foregoing table to be 3.78c per quart and it is quite possible that the prevailing retail price could be considerably lower, if no surplus milk was purchased.

ECONOMIES IN MILK PRODUCTION AND DISTRIBUTION

Under existing conditions there is a tendency for farmers to quit dairying, particularly on the higher-priced land near the city where much of the feed for the herds must be purchasd. As the nearby production decreases, additional supplies are being obtained from more distant sections where the costs of production are lower. Prior to the advance in prices paid to producers for milk, there was general dissatisfaction among the producers. Although the price to producers for all seasons was the same and the demand

practically constant, the prices paid producers fluctuated somewhat with the seasonal supply. It is evident that distributors purchasing the seasonal surplus production must pay a lower price for the entire supply when the surplus is largest unless a definite agreement is made between producer and dealer whereby a fixed price is paid for all milk sold as fluid milk and a lower price for the surplus. The surplus cream during the winter months is sold to creameries and in summer to ice cream factories, and at certain seasons, surplus milk may be sold to milk condenseries. An effort by producers to regulate and reduce the seasonal surplus would tend to an increase in the price received.

Through improvement in the quality of the dairy herd, such as may be obtained by the elimination of the low and unprofitable producers through cow testing associations, the production of milk may be made more profitable.

Among the items of expense in milk distribution the elimination of duplication of service represents a possible saving. The largest single item in the total cost (3.78c per quart) of handling and delivering milk, was that of drivers' wages. Besides receiving a salary, he was paid a bonus amounting to 8 percent of the collections and one-fourth cent for each empty bottle returned to the plant. For one quart of milk or one-half pint of cream this would amount to 1.21c not including the salary and represents over 10 percent of the cost to the consumer and 32 percent of the total cost of distribution.

Another item is that of factory expense which it should be possible to reduce by the more efficient organization and operation of the business, by greater centralization of the business and elimination of duplication of service on routes and by closer co-operation between distributor and consumer.

The size of the load carried on each distributing wagon affects greatly the cost of distribution. The average load represents 350 quarts of milk and consists of 200 quarts of milk, 80 pints of milk and 60 half pints of cream. While the majority of loads are nearly that of the average, the variation is wide, the largest equalling 690 quarts and the smallest 250 quarts. Although the maximum size load of 690 quarts could not possibly be maintained on all routes, it would seem reasonable to suppose that the size of loads might be increased from 350 to 425 quarts. If it were possible to do this, of the 73 routes now being operated by the three large distributors, 13 could be eliminated. With consolidation of routes of small distributors, a greater saving in delivery costs could be effected. The practice of daylight deliveries instead of evening and early morning deliveries is generally considered to result in lower costs of distribution.

MARKET MILK DISTRIBUTION IN COLORADO SPRINGS

The milk supply of Colorado Springs is derived from farms located within a radius of thirty miles from the city. Of the forty one farms which produce milk for the city, thirty-six are located within 15 miles of the city, and twenty-four, or more than 50 percent, are within 6 miles of the city. Most of the supply is hauled direct to the city by the producer, although six ship by express and seven send their supply by auto truck. The express and trucking charges average 1.7 cents per gallon and are paid by the producer.

The population of Colorado Springs is about 50,000, which is increased by approximately 20,000 during the summer months. The average daily consumption during the month of September, 1917, was 13,000 quarts, or an average of 3.4 quarts per capita.

The following table shows the number of cows kept on farms furnishing milk for the city:

Number of cows	farms	Percent
Under 10 cows	4	10.0
Between 10 and 20 cows	12	29 2
Between 20 and 30 cows	8	19 5
Between 30 and 40 cows	5	12.2
Between 40 and 50 cows	3	7 3
Between 50 and 60 cows	3	7 3
Over 60 cows	6	14.5
	41	100.0

Forty percent of the farmers furnishing milk kept less than 20 cows per farm, while 10 percent kept less than 10 cows. This would indicate that many of the dairies are quite large and that many engaged in dairying regard it more as the chief business enterprise rather than a side line. This has tended towards better care of the milk, and consequently an improved milk supply.

CITY DISTRIBUTION

Eleven distributors operate in Colorado Springs. Of these, one operates five wagons, one has three wagons, three operate two, and five use one wagon or truck. Daylight delivery is the method followed during the winter months and early morning delivery in summer.

All milk sold is required by city regulation to be produced by cows that are free from tuberculosis as shown by the tuberculin test, and must be delivered in the original package. Since the advance in price, this ordinance has been modified, and permission has been given to sell loose milk at milk plants. The fee for a license for producers, also for each wagon used for delivery, and for each store selling milk is $1.00 per year.

The price of milk to the consumer was increased from 10 cents to 11 cents per quart, on August 1, 1917. The wholesale price prior

to August 1st of the same year was 22½ cents per gallon but at that time was advanced to 35 cents per gallon. The advance in price paid the producer in 1917 was as follows:

Prior to April 1, 1917	15-16 cents
April 1 to August 1, 1917	21 cents for 3% milk 24 cents for 4% milk
Since August 1, 1917	25 cents for 3% milk 28 cents for 4% milk

At these prices the milk dealers received a margin of 17 cents for milk delivered to family trade. This is a comparatively narrow margin to cover operating expenses, profits and losses. It should be noted, however, that owing to the presence of a large transient population of summer tourists, the consumption of milk increased coincident with the period of greatest production; and for that reason the dealers did not have as much surplus milk to dispose of as in some other cities. The wholesale price, 35 cents, was considered ample for a profitable disposal of such limited surplus stock as different dealers had on hand from time to time.

MARKET MILK DISTRIBUTION IN PUEBLO

The milk supply of Pueblo is produced by 48 producers who are located within a radius of 25 miles of the city and only 7 live a distance greater than 8 miles from the city and 27 less than 3 miles. Much of the milk is delivered to the distributors by producers, 250 gallons being received as express shipments and 150 by motor truck.

The daily consumption of milk is 9,120 quarts, and with a population of 50,000, the average consumption per capita is .18 quarts. It should be noted that in a city of this type and size, the "town cows", or those kept by residents of the city, are an important factor to be considered in the milk supply and they were not considered in the above figures.

The distribution of the cows kept on farms, which supply the city is shown in the following table:

Number of cows per farm	Number of farms	Percent of total
Under 10 cows	7	14.6
Between 10 and 20 cows	24	50.0
Between 20 and 30 cows	8	16.6
Between 30 and 40 cows	4	8.3
Between 40 and 50 cows	2	4.2
Over 50 cows	3	6.3

Seventy-five percent of the farmers furnishing milk kept less than 20 cows. This would indicate that many of the farmers kept cows as a side line and that but 25 per cent consider dairying as their principal business.

Sixteen distributors operate in Pueblo, the largest operating 10 wagons. One operates 4 wagons, one 2 and the remaining 13 operate one wagon each. During the winter, delivery is begun about 4 o'clock A. M. and in summer one hour earlier.

The prevailing prices paid by the consumer for milk in 1917 in Pueblo were:

Prior to June 1	9 cents per quart
June 1 to September 1	10 cents per quart
After September 1	12 cents per quart

The prices paid by wholesale trade were:

Prior to September 1	30 cents per gallon
After September 1	37½ cents per gallon

The prices paid to producer were:

Prior to June 1	18 cents per gallon
June 1 to September 1	20 cents per gallon
After September 1	30 cents per gallon

CITY HEALTH REGULATIONS

The city regulations require that milk come from cows free from tuberculosis, as shown by the tuberculin test. Herds must be tested at least once in two years, and herds in which reactors have been found,once every year. The maximum count for bacteria is 500,000 and 3 percent fat is the minimum allowed.

The margin between price paid by consumer and price paid to producer is 18 cents. The price of 37½ cents per gallon, at which milk is wholesaled, enables much of the surplus milk to be disposed of without loss.

The price to the producer is based upon milk testing 3.4 per-cent butterfat and a deduction of one cent per gallon is made for each point below that test.

THE MILK SUPPLY OF TRINIDAD

The milk supply of Trinidad is obtained from dairies located near the city. There is no agricultural land in the vicinity, and all feed is shipped in. In the following table is shown the number of dairies, number of cows in each and approximate amount of milk supplied daily by each:

Number of cows milked in each dairy	Gallons sold
85	173
90	150
38	76
22	40
13	28
25	50
285	517

The consumption of .18 quarts per capita is very low. The average number of cows per dairy was 47 and the price of milk

delivered to the consumer prior to June 1, 1917, was 10 cents per quart. On June 1st the price was increased with the following scale of prices, according to the quantity purchased daily: 1 quart, 12½ cents; 2 quarts, 11 cents per quart; 3 quarts, 10 cents per quart. Later in the year the retail price of milk was advanced to 15 cents. The price of milk sold at wholesale was 35 cents per gallon.

THE MILK SUPPLY OF ROCKY FORD

The milk supply of Rocky Ford is distributed by four dealers, three of whom are producers, while the other buys all the milk he distributes. The number of gallons reported sold daily was 200. This would give a very low consumption per capita but the "family" or "city" cow is a large factor in the milk supply of small cities and towns and the amount supplied from this source is difficult to determine. The retail price of milk was 10 and 11 cents per quart, and the wholesale price in bulk was 35 cents per gallon.

THE MILK SUPPLY OF LA JUNTA

As in the case of other cities of this size, the "family" cow provides a large portion of the milk supply. Three distributors handle the milk supply, milking forty cows in all. In addition to the amount furnished by these cows, two milk depots buy milk and retail in bottles. The estimated amount of milk sold is 175 gallons daily.

Previous to June 1st, the price of milk to the consumer was 6 and 8 cents per quart, but later the price was increased to 10 and 11 cents per quart.

THE MILK SUPPLY OF WALSENBURG

The average daily consumption of milk in Walsenburg is 140 gallons. Three dairymen milking a total of 50 cows distribute milk and purchase additional supply. Some milk is shipped from the Denver territory. Milk sells for 11 and 12 cents per quart retail, and for 40 cents per gallon wholesale.

THE MILK SUPPLY OF SALIDA

Most of the dairies delivering milk to Salida are small, six dairies keeping a total of 65 cows. In addition milk is bought by the distributors. It is estimated that the consumption is 300 gallons daily. Milk is sold for 12½ cents per quart retail and 25 to 30 cents per gallon wholesale.

THE MILK SUPPLY OF CANON CITY

Seven distributors supply milk to Canon City, from a total of 116 cows. In addition to the milk produced by these dairies, 50 gallons is bought, making a total consumption of 280 gallons per

day. The price of milk was raised from 10 cents per quart on September 1st, 1917, to 12.5 cents per quart. The wholesale price is 40 cents per gallon.

BOARD OF HEALTH SANITARY REGULATIONS IN COLORADO CITIES

Very few of the smaller cities of the State maintain a regular inspection of the dairies for sanitation and purity of milk supply. The health officer is generally the official who enforces the milk ordinance, but as a rule the regulations are not enforced unless the need becomes imperative. Many of the cities do not have special milk ordinances, the general laws of the State being enforced when necessary.

The following cities have provided local ordinances governing the inspection and regulation of their milk supplies: Denver, Colorado Springs, Pueblo, Trinidad, Boulder, Fort Collins, Durango, Silverton, and Canon City.

SUMMARY

Although agricultural development in Colorado is limited chiefly by the large amount of mountainous lands unsuited for agricultural purposes, where the soil and climatic conditions are suitable and rainfall is sufficient or irrigation is employed rapid progress has been made in establishing the various agricultural industries in the State.

Natural conditions have favored stock raising especially on the large open range tracts in the valleys in the mountainous sections. The areas which are best suited to general farming lie mostly east of the mountains and include the east central and northeastern portion and the counties of Rio Grande and Conejos on the southwest central border. The more intensively developed dairy sections include the east central and the northeast central sections of the State.

It is of interest to note that the value of hay and cereal production in 1910 equaled 32 million, animals and animal products not including dairy products 25½ million, dairy products over 4 million, and sugar crops over 6 million. While the number of dairy cows in 1910 in round numbers was 164,000, and in 1917 was 254,000, the percent increase was near 7½ times that of the whole United States, which indicates that the dairy industry of Colorado is constantly gaining an increasing importance to the dairy industry of the United States.

In the production of dairy products in Colorado, creamery butter ranks first and dairy butter second. Since 1889 the creamery industry has forged to the front from a production of 339,000

pounds that year to over 13,000,000 pounds in 1917. This is an increase of nearly 4,000 percent while the amount of farm dairy butter produced has increased during the same period less than 100 percent.

On account of the limited extent to which dairying has been developed in local communities, comparatively few sections are able to supply sufficient whole milk for the operation of cheese factories or condenseries. In 1917, there were in operation thirteen cheese factories which produced 345,338 pounds of cheese and four milk condensing factories which turned out over 15,000,000 pounds of condensed and evaporated product.

The chief dairy product of the farm is cream which is marketed either to cream buying stations, local creameries or shipped direct to centralizing plants. Over 300 cream stations are operated and the cream purchased at them is shipped to the centralizing plant.

For the year 1917, the direct shipper received a net return of about 2.5c more per pound for butterfat than the producer selling at a cream station. The prices paid by local creameries varied widely, according to local conditions. Some were able to pay an average of 4c above the average price paid by all local creameries and 2.3c above the net price received by direct shippers and 4.8c above the average price received at cream stations.

Considering that the cost per pound of receiving and handling at the 300 cream receiving stations the 4,000,000 pounds of butterfat received amounts annually to approximately $100,000 and that this cost is increased by unnecessary duplication of stations occasioned by operating two or more in the same town, and that such duplication could be eliminated with profit to the producers, it would seem desirable that arrangements be made by them whereby they would pool all cream marketed at one town and thus reduce the costs incurred in marketing through unnecessary stations.

The price of butterfat follows closely the market price of butter and the latter, while somewhat independent, is governed largely by the prices prevailing in the larger wholesale eastern butter markets. On the basis of the retail price of butter, the cream producer selling at a cream station receives 68.1 percent and the direct shipper 72.6 percent of the consumer's dollar.

As the urban and rural population of Colorado represent nearly equal numbers, and twenty-nine cities and towns in the State each have a population of 2,500 or more, the requirements for milk to supply the city demands is considerable. In the smaller cities and towns, and to a considerable extent in the larger, the producers distribute the supplies direct to the consumers and in some of the cities many "family cows" are kept.

Milk distributors who purchased their supplies of milk obtained them mostly from producers living within trucking distance, although some shipments were obtained by express from more distant sections.

The cost of distribution by large distributors was less than 4c per quart and were somewhat less for smaller distributors. Prices to producers and to consumers were increased during 1917, due to increased costs of production and distribution.

A number of cities in Colorado have provided city regulations governing the sanitary conditions and purity of product which must prevail in the distribution of milk in those cities.

The following cities have local ordinances governing their respective milk supplies: Denver, Colorado Springs, Pueblo, Trinidad, Boulder, Fort Collins, Durango, Silverton and Canon City.

In general, the problem of supply milk to cities in Colorado is not different from other cities of the middle west, although local conditions are somewhat different in the various cities.

List of Available Extension Bulletins

These bulletins are free. If you desire a copy of any of them, order by number and title, addressing THE EXTENSION SERVICE, COLORADO AGRICULTURAL COLLEGE, Fort Collins, Colorado.

Bulletin Number

104 **Dry Farming in the Plains Region,** by Alvin Kezer, J. W. Adams, W. E. Vaplon, and R. McCann. 16 pages.

107 **Silos and Silage,** by R. W. Clark and Chas. I. Bray. 12 pages.

108 **Domestic Water Supply.** 11 pages.

117 **Prevention of Smut in Oats,** by Harvey E. Vasey. 8 pages.

118 **Fighting Grasshoppers,** by Chas. R. Jones. 12 pages.

120 **Preservation of Fruits and Vegetables by Drying,** by H. W. Allinger. 16 pages.

121 **Farm Storage of Apples and Potatoes,** by James L. McGinnis. 19 pages.

125 **Wheat Growing in Colorado,** by Alvin Kezer. 7 pages.

126 **The Poultry House,** by W. E. Vaplon. 7 pages.

127 **Management of the Dairy Herd,** by R. W. Clark. 13 pages.

130 **Poultry Management,** by W. E. Vaplon. 8 pages.

135 **Hints on the Conservation of Food,** by Miriam M. Haynes. 4 pages.

136 **Potato Diseases and Methods of Control,** by H. E. Vasey. 4 pages.

139 **Water Hemlock, A Poisonous Plant,** by W. W. Robbins. 4 pages.

140 **Prevention of Blackleg,** by Geo. H. Glover. 4 pages.

142 **Poisoning by Larkspur,** by Geo. H. Glover. 4 pages.

143 **Emmer Flour—A Substitute for Wheat Flour,** by W. P. Headden. 4 pages.

145 **Storing Vegetables for Home Use,** by R. A. McGinty. 4 pages. (Reprint of Bulletin No. 131.)

147 **Eradicate Common Barberry,** by W. W. Robbins and H. E. Vasey. 8 pages.

148 **Co-operative Marketing of Live Stock,** by R. W. Clark. 16 pages.

149 **Preparation and Use of Dried or Dehydrated Vegetable Products,** by E. L. Kirkpatrick and Mrs. E. L. Kirkpatrick. 26 pages.

150-A **Horse Management,** by R. W. Clark. 32 pages.

152-A **Suggestions to the Dry-Land Farmer,** by R. W. Clark. 20 pages.

153-A **Seed Testing in the Home and School,** by W. W. Robbins and G. E. Egginton. 24 pages.

154-A **Hemorrhagic Septicemia in Sheep,** by Dr. I. E. Newsom. 16 pages.