PROBLEMS INVOLVED IN MARKETING MILK PRODUCED IN CENTRAL OREGON

by

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PART I

BACKGROUND AND DEVELOPMENT OF PROJECT

Background of Project

The preliminary impetus for the formation of a cooperative dairy marketing organization in Central Oregon was provided by many persons in this region who were interested in the cooperative movement. The actual organization of the Central Oregon Cooperative Creamery was carried out in 1930 with the aid of Mr. J. H. Tull, marketing specialist of the Oregon State College Extension Service.

The organization engaged Mr. G. A. Brown as field man in January, 1931, with the duty of securing the necessary members in order that sufficient volume to insure success might be assured when actual operation was started.

In order to acquire facilities for actual operation, an option to purchase Brown's Independent Creamery in Redmond was taken. Commitment on a Federal Farm Board loan to enable the association to purchase this plant was made on May 4, 1931. On May 25, 1931, the purchase of Brown's Independent Creamery was consummated, and the new organization under the name of the Central Oregon Cooperative Creamery opened for business on June 1 of that year. In the interim between the approval of their loan and the purchase of the Brown creamery, the Board of Directors had hired Mr. D. B. McKenzie to assume the

duties of manager of the association.

Since its origin in 1931, the facilities of the association have been expanded to enable it to manufacture ice cream, cheese, and cottage cheese in addition to butter. The addition of a retail sales counter and a frozen foods locker system prior to World War II increased the services rendered to patrons.

In recent years, the further development of irrigated land, developments in methods of marketing milk, and market conditions of competitive products has created problems for this association and producers in Central Oregon. It is around the Central Oregon Co-operative Creamery that this study has been developed.

Development of Project

On a field trip in Jefferson and Crook counties in Central Oregon on September 12 and 13, 1946, Professor P. M. Brandt, head of department of dairy husbandry, Oregon State College, conferred with members of the board of directors and the manager of the Central Oregon Cooperative Creamery Association and county agents, Gene Lear and R. A. Hunt, on the development of the dairy industry in that region.

It was recognized at that time that, with the completion of the North Unit Project, the dairy industry would be expanded beyond the capacities of the present marketing association and that a constructive program should be developed to meet this development. It was agreed that Oregon State College would assist in the development

of this program and that an advanced student would be assigned to the project. Upon Professor Brandt's return, the writer was assigned to the project, and future plans to carry out the project were discussed. Dr. D. B. DeLoach and Dr. G. H. Wilster were to cooperate in the supervision of the project.

On February 4, 1947, a meeting was held in Redmond, Oregon, to determine the specific problems to be studied in the project. The meeting was attended by R. H. Spellman, R. H. Freisen, W. W. King, B. C. Allen, and C. C. Vice, all members of the board of directors of the Central Oregon Cooperative Creamery; D. B. McKenzie and Clarence Killengbeck, manager and plant superintendent of the association respectively; county agents Gene Lear and R. H. Hunt; Dr. G. H. Wilster, Dr. D. B. DeLoach, and the writer. At this meeting, the various problems to be studied were determined. It was planned that the writer was to gather the information and background necessary to carry on the project during the remainder of the school year and that the following summer would be utilized for field investigations in Central Oregon to complete the assembling of material necessary for the preparation of this thesis.

Statement of Problems

The problems involved in marketing milk produced in Central Oregon have arisen due to changes in land utilization, further development of irrigated land, and changes necessary for the more efficient marketing of milk.

A balanced, diversified type of agriculture is necessary in this region to minimize the losses of any one agricultural product, to maintain soil fertility, and for the efficient utilization of land, labor, and capital throughout the year.

Proper use of irrigated lands will necessitate the utilization of approximately fifty per cent of the land for the production of leguminous crops. Livestock products should be produced from these crops and it is recognized that the production of milk is one of the most efficient methods of utilizing leguminous crops. Recent developments in the methods of marketing milk, the change from marketing cream to marketing whole milk, will require adjustments by producers. These numerous problems, as presented by those instigating the project, have been consolidated into six main problems.

Future Production of Milk. This problem is related to the development of the dairy industry and the volume of milk to be produced in Central Oregon. The major agricultural districts in this region are the irrigated districts. This type of land lends itself well to diversified farming; however, due to market conditions and processing facilities available, many agricultural producers deviated from this type of farming when they reduced their livestock enterprises of which dairying constituted an important part. One part of this problem is to determine whether or not the producers will return to their pre-war practice of including dairying as one of the major enterprises in a diversified type of farming. Of major

importance, in estimating future milk production in Central Oregon, is the North Unit Project. The irrigated land in this reclamation project should lend itself well to the development of dairying and the production of milk in this project will influence materially the dairy industry in this region.

Processing Facilities. This problem arises from the expected development of dairying in Central Oregon and the necessity for more efficient processing of milk produced. Originally, the major part of the cream produced was marketed through small private manufacturers in Bend, Redmond, and Prineville. With the development of transportation, there has been a tendency to concentrate this production into a smaller number of plants. At the present time, there are only three plants manufacturing butter. One of these plants, a cooperative that has replaced a private manufacturer, is also processing whole milk for cheese. With the change to marketing whole milk and the development of the North Unit Project, processing facilities must be provided to meet these changes. The present processing facilities available could undoubtedly process the milk to be produced, but none are located or equipped to process this whole milk efficiently.

Dairy plants in Central Oregon equipped to manufacture dairy products for distribution in outside markets are located at Prineville, Redmond, and Bend. Marketing surplus milk through these plants would burden producers of some districts with excessive collection costs. The cooperative plant at Redmond is the only plant equipped to process milk for the manufacture of cheese for outside

markets. All other plants are equipped to manufacture butter only. None are equipped to process by-products. Therefore, additional processing facilities must be made available to producers in Central Oregon if they are to market whole milk.

Quality. A prerequisite to the satisfactory marketing of milk is milk of high quality to enable the marketing organization to manufacture high-quality dairy products to meet competitive products in outside markets. Past receipts of the association show that the quality of a large amount of the milk and cream produced in Central Oregon in the past cannot be judged as being of high quality. Producers in this region have problems to be controlled in producing high-quality milk that are not prevalent in other dairy regions in Oregon. It is only through the concerted effort of producers in following a constructive program under the supervision of the marketing organization that these problems can be eliminated. The importance of quality in dairy products cannot be overemphasized, and the success of a dairy marketing organization will depend largely upon the quality of the raw product it receives for processing.

Products to Manufacture. In the past, surplus cream produced in Central Oregon has been manufactured into butter for distribution in outside markets. No facilities had been available until 1947 for the manufacture of whole milk. Since 1941, this factor had placed producers in an undesirable position because efficient utilization of milk produced could not be achieved. The feeding of skimmilk

to livestock cannot be recognized as efficient marketing.

Producers do not realize the full value of milk produced when cream alone is marketed for human consumption. In feeding skimmilk to hogs, we recover only eight to twelve per cent of the protein of skimmilk and the quality of the protein is appreciably lowered. From a nutritional standpoint, it is anomalous to think that we can produce a product of high quality like milk, utilize approximately one half its food value for human consumption, and waste the remainder as feed for livestock.

Milk and Cream Collection. Methods of collecting milk and cream in Central Oregon have varied. Many inefficiencies and inequalities appear to have existed in the collection of cream. Because the collection of milk is one of the more costly steps in marketing milk - equal to the cost of processing, in some instances - it will be necessary to organize efficiently operated routes to keep these costs at a minimum and enable the producer to receive the largest returns available for his product. In other dairy regions, costs of collecting milk have been excessive due to uneconomic locations of routes and dairy plants. The future organization of milk collection routes in Central Oregon will have to follow a program based on economic factors affecting costs.

Grade "A" Pool. Many producers supplying milk for the market milk industry in Central Oregon have indicated their desire to organize a Grade "A" pool. There have been variations as to the

specific form and extent of organization. The problem, then, is this: will economic factors and orders of the Milk Control Board permit the organization of fluid milk producers in Central Oregon and can this organization be carried into the Central Oregon Cooperative Creamery?

Definitions of Terms Used

Marketing, as used in this thesis, includes all the phases of the production, processing, and distribution of milk from the time it is drawn from the dairy cow until it reaches the consumer.

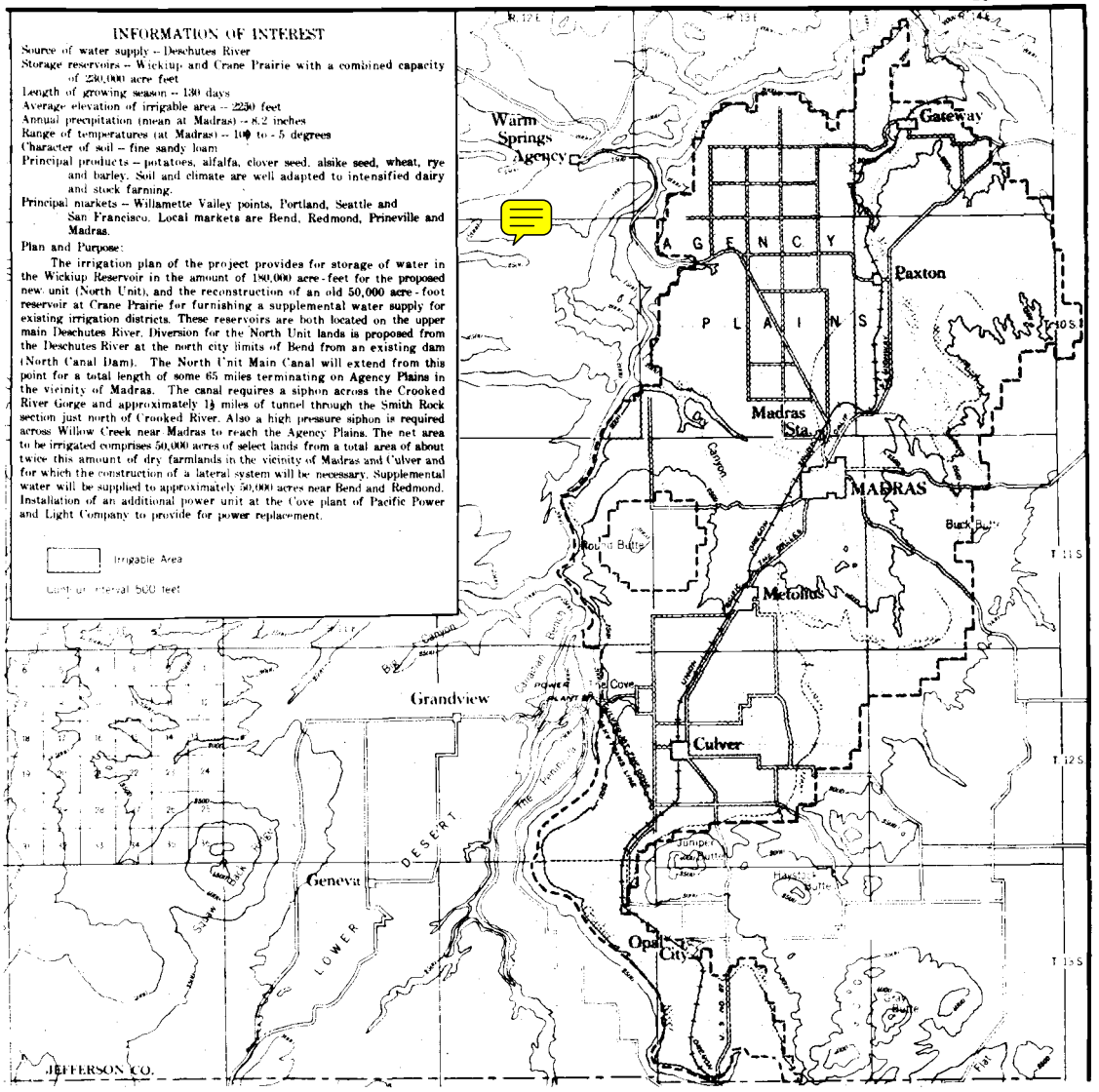
Surplus means that part of the milk supply produced in Central Oregon that cannot be marketed in this region and must be marketed in outside markets.

Central Oregon, as used, includes Jefferson, Crook, and Deschutes counties only.

North Unit Project is the reclamation project being built in Jefferson County by the United States Bureau of Reclamation.

A Grade "A" Pool is a pool in which the milk, expenses, and receipts are pooled.

Association is used synonymously with Central Oregon Cooperative Creamery.



Map 2. NORTH UNIT PROJECT

PART II

STUDY OF THE PROBLEMS

Future Production of Milk

Milk Shed

The milk shed includes all the major dairy production districts within Jefferson, Crook, and Deschutes counties. This would be the North Unit Project in Jefferson County; the Prineville, O'Neil, and Powell Butte districts in Crook County; and the Alfalfa, Tumalo, Sisters, Redmond, Bend, and Terrabonne districts in Deschutes County. The boundaries of this milk shed are, in the main, governed by geographical limitations. The distance from the proposed plant site to the farthest district is only 40 miles. In comparison with milk sheds of other plants in this state, this area would be comparatively small. Economically, the area to be covered by one plant would extend to the point where combined collection and manufacturing costs begin to increase. By increasing the volume of a plant, economies in the scale of operation are effected. The volume of a plant, then, should be increased to a point where the costs of collection of additional volume from greater distances overrides economies effected by increasing the volume.

Other factors may be taken into consideration. In Central Oregon, it would be necessary to determine the costs for two plants since the milk shed could not be contracted without the addition of

another plant. If only one plant were to be established to process a portion of the milk supply, another plant would have to be established to process the remainder since no other efficient marketing organization exists in Central Oregon to handle it, and the distance to dairy plants in other regions would prevent orderly marketing of this milk. This factor is discussed further in the Study of Processing Facilities.

It may not be economically feasible to collect milk from producers located at a considerable distance from an established collection route or producing district, but practical considerations of members' cooperation may sometimes force the management to extend routes into remote sections. However, the factor of membership relations must be taken into consideration. The value of membership relations will have to be determined by the management of the plant in determining collection routes. It is possible, in situations of this type, to have the producer deliver the milk to the established collection route or to some point between the collection route and his farm.

Milking Cows on Farms

The average-size dairy herd in Central Oregon is relatively small. This is because dairying is a part of a diversified type of farming practiced in this region. The size of the herds maintained, as shown in Table 1, has had an influence on the fluctuations in the number of milking cows. The amount of the fixed costs of dairy

production normally prevents rapid entrance and exit of producers in the dairy industry. However, in Central Oregon the fixed costs are principally milk cows since the requirements for buildings for dairy production have been relatively small, and the land can be utilized for the production of other agricultural products. Many producers will market only cream during the summer months and, since few cows are kept on the farm, it has been easy to expand or contract the dairying enterprise. If herds of 15 to 20 cows were maintained on the farms, the variations in milking cow numbers would not be as prevalent as they have been. Table 1 shows the distribution of cows in Central Oregon in 1939.

TABLE 1

DISTRIBUTION OF MILK COWS, TWO YEARS AND OLDER
ON FARMS IN CENTRAL OREGON, JANUARY 1, 1939

Size of Herds	Number of Milk Cows		
	Crook	Deschutes	Jefferson
1 cow	56	232	31
2	144	266	48
3	120	240	60
4	120	276	64
5-9	892	1223	206
10-14	444	713	119*
15-19	366	326	
20-29	106	189	
30-49		447	
50-74			
75-99			
100-196		342	
TOTAL	2248	4254	520

* 10 cows or over

Source: United States Census, 1940, Cows Milked and Dairy Products, pp. 418-419.

Since the organization of the Central Oregon Cooperative Creamery, fluctuations have occurred in the number of milking cows maintained on farms in this region. Since the inception of the association in 1931, there has been a decrease in milking cows during the early thirties and during the World War II, as shown in Table 2. The decrease during the depression years of 1931-39 occurred when producers liquidated or reduced the size of their herds to obtain cash to enable them to pay for current living expenses. Many of these cows were purchased by buyers from California seeking milking cows for dairy farms supplying milk for the metropolitan centers in that state. Many of the better cows were sold to these buyers and, consequently, the quality of milking cows in Central Oregon decreased.

After the depression, there occurred a gradual increase in the number of milking cows until 1943 when the total number again began to decline. During 1943, this decrease occurred when producers liquidated or reduced their herds to enable them to produce hay, potatoes, and other agricultural products for which more favorable market conditions existed. If facilities for the processing of surplus whole milk had been available in Central Oregon during this latter period of decline in the number of milking cows, the decrease undoubtedly would not have been as large as it was.

In 1947, there appears to have been a gradual increase in the number of milking cows. It is expected that the number will increase to pre-war levels in Crook and Deschutes counties. The rate of increase will depend upon the markets and prices for row and seed

crops which compete with dairying for the utilization of land in Central Oregon. The number of milk cows, 5,000, estimated to be on farms in the North Unit Project shortly after its completion is based on the recommendations of the Dairy Committee of the Jefferson County Agricultural Program for 1946. The number of milk cows in Central Oregon in recent years is shown in Table 2.

TABLE 2

MILK COWS, TWO YEARS AND OLDER, ON FARMS, BY COUNTIES IN CENTRAL OREGON 1929 - 1947

Year	Number of Milk Cows		
	Crook	Deschutes	Jefferson
1929	2591	4641	841
1934	2331	4688	707
1939	2850	4600	550
1940	2700	4500	550
1941	2750	4600	550
1942	2600	4800	550
1943	2900	4800	600
1944	2600	4400	600
1945	2400	4300	600
1946	2000	4000	590
1947	1500	3800	700

Source: United States Census of Agriculture, 1935, Vol. II, Statistics by Counties, P. 933.
Files of the Department of Dairy Husbandry, Oregon State College.

Milk Production

Expected milk production that may be received by the association is based upon past receipts of the association in Deschutes

and Crook counties and from the recommendations of the Jefferson County Agricultural Program of 1946.

Table 3 shows the butterfat receipts of the association at Redmond. This volume received is estimated to be approximately fifty per cent of the volume of butterfat marketed in Central Oregon. The remainder is marketed for fluid milk or for processing by other manufacturers in this region. The trend in butterfat receipts has followed closely the trends in milking cows on farms in this region.

TABLE 3

BUTTERFAT RECEIPTS BY YEARS OF CENTRAL OREGON COOPERATIVE CREAMERY, 1931-1944

Year	Pounds of Butterfat
1931	222,682*
1932	401,381
1933	399,070
1934	349,030
1935	348,206
1936	363,915
1937	360,403
1938	432,512
1939	464,537
1940	468,470
1941	496,711
1942	516,461
1943	492,034
1944	424,254

* Represents seven months' operation

Source: Records of Central Oregon Cooperative Creamery.

In 1943, a decrease in receipts occurred due to the decrease in the number of milking cows and continued until 1947 when a gradual increase again occurred. It is expected that production will increase to pre-war levels in these counties when more adequate facilities are provided for processing milk.

On the basis of the above information, it is expected that production in Crook and Deschutes counties available for processing in the plant at Culver will be approximately 500,000 pounds of butterfat annually. This amount would be slightly higher than the peak volume achieved by the association; but, with only one plant processing whole milk, this plant could expect to receive a larger percentage of the production of Crook and Deschutes counties. Undoubtedly, some producers will market their milk or cream through other processors but this transfer will be offset by additions of other producers now shipping to private manufacturers.

The volume expected from the North Unit Project is based on the estimate of 5,000 milking cows in this project shortly after its completion. From records available, it has been estimated that the average production of dairy cows in Central Oregon is 230 pounds of butterfat annually. Assuming an annual production of 230 pounds of butterfat per cow, this would mean a production of 1,150,000 pounds of butterfat annually in the North Unit Project. It is expected that approximately 150,000 pounds of butterfat will be consumed on the farms, fed to calves, or marketed through the market milk plant at Madras annually. This would leave a surplus of 1,000,000 pounds of

butterfat available for processing.

The combined volume of Jefferson, Crook, and Deschutes counties that may be marketed through the dairy plant is 1,500,000 pounds of butterfat, or approximately 34,000,000 pounds of milk when it is assumed that the average fat test is 4.4 per cent.

The estimated volume, 1,500,000 pounds of butterfat, need not necessarily be considered to be the actual volume to be received for processing. This figure may be revised upward or downward when completing the plans for another dairy plant. These revisions may be made by producers and the personnel of the association.

Processing Facilities

General Aspects

One of the most important problems of milk producers in Central Oregon is providing or securing additional processing facilities for the efficient marketing of milk and cream. The necessity for obtaining these additional facilities arises primarily from the development of the North Unit Project, from which it is expected that one million pounds of butterfat will be marketed annually, and the lack of adequate facilities for milk now being produced in Crook and Deschutes counties.

At the present time, the only dairy plant processing whole milk into cheese is the cooperative marketing organization at Redmond. This association is probably the most desirable organization now available to producers in Central Oregon. The dairy plant of this

association is limited in the volume of milk it can process. Expansion of the plant is limited, due to location and plant layout, and would be economically inadvisable. Therefore, an additional plant or a new plant to replace the plant at Redmond must be established to process this additional volume.

The most efficient number, size, and location of dairy plants for a given area are determined by the combined costs of operating the plants and the costs of collecting the milk or cream to be processed. Assuming efficient operation of a plant, plant costs will decrease with an increase in volume. Economies in the scale of operation become exhausted, however, when the collection costs increase to a point where they nullify the decrease in costs due to an increase in volume.

The economies of the scale of operation will depend upon the characteristics of the individual plant. The decrease in unit costs become smaller as the volume is increased over a certain volume, depending upon the plant itself, and generally levels off in the large plant capacities. This decrease in unit costs can be correlated with the different manufacturing costs up to the point where the decrease in unit costs begin to level off. After that point, they come through greater efficiency of labor, research, and other factors that cannot be measured accurately.

Trend Toward Large-Scale Plants

The present trend toward large-scale dairy plants is one of the most important developments that has occurred in the history of the dairy industry in the United States. Specifically, the advantages of a large volume of business that has brought about this trend toward large-scale dairy plants are, as follows:

Operating Efficiency. Manufacturing costs per unit of product usually decrease as volume increases. Fixed costs per unit of product manufactured also decrease. This increase in general operating efficiency is perhaps the greatest single advantage of possessing a large volume of business. Most of the dairy cooperatives that have gone out of business during recent years have been marketing organizations which operated with small volumes of business.

More Complete Utilization of Milk Solids. Recent nutritional discoveries and the war-stimulated demand for dairy products will have a lasting effect on the dairy industry. The plants that can economically use all or most of the milk solids by producing by-products will be able to pay more for the milk they receive. By-products such as whey powder cannot be produced efficiently in plants receiving only an average volume of milk. In general, the dairy plants which offer the greatest opportunities for post-war success are those in which all the milk solids may be used profitably.

Competent Manager. The ability of the manager is usually one of the most important factors determining the success or failure of a cooperative dairy marketing organization. An organization operating

a small-scale plant usually cannot compete effectively with an organization operating a large-scale plant for the services of an efficient manager.

Specialized Personnel. The magnitude of operations of a plant with a large volume of business requires the employment of a greater number of workers than may be profitably utilized in a plant with a small volume of business. In a small-scale plant, each man must perform a number of diverse duties; in a large-scale plant, specialists may be employed to perform certain functions.

Quality of Products. An increase in the volume of business will usually permit an increase in the quality of the products to be manufactured due to the use of technological advantages, the ability to pay a premium for high-quality milk, and the opportunity to make profitable use of fieldmen.

Standardization of products. Standardization of products presents one of the greatest post-war opportunities for the success of a dairy marketing organization. Greater uniformity of quality and physical appearance of products are usually more easily obtained in a plant with a large volume of business.

Yield of Product. Increased efficiency of operations derived from increased volume may result in a greater yield of the final product for each unit quantity of milk. Some losses of raw product in the plant, such as the loss of butterfat which has adhered to the walls of separators and connecting pipes, do not increase in direct proportion to increases in the volume of product handled. Also,

greater control over the manufacturing process which can be obtained in large dairy plants will increase the yield of the product.

Services to Patrons. Large-scale dairy plants can extend a greater number of services to patrons than can small dairy plants. This is true in regard to the sale of the product manufactured, purchase of supplies which farmers need, and the employment of fieldmen.

Machines. Certain types of plant and office machines that can be operated more efficiently than others require a large volume of business in order to operate efficiently enough to compensate for the additional costs involved. For certain processes, such as the dehydration of milk for use as human food, there are no machines that can be operated efficiently with a small volume of milk. Other plant operations, such as packaging and bookkeeping, are also particularly dependent on a large volume of production if costs are to be held at a reasonable level.

Research. A large volume of business may present an opportunity for extensive research. The post-war importance of research devoted to the many phases of production of milk and dairy products must be recognized by producers as important to the success of a dairy marketing organization.

Operational Flexibility. A large-scale plant is not necessarily flexible, but a flexible plant usually has to be large-scale to be profitable. The importance of utilization of all the milk solids discussed previously can be obtained in a flexible plant. The

ability to shift production is also important. The success or failure of a flexible plant need not hinge on the price of a single dairy product. On the contrary, under certain conditions a plant can manufacture a combination of dairy products that will make the greatest net returns to producers. A reasonably flexible plant may thus be in a particularly strong position with respect to competition from within and without the dairy industry.

Location of Facilities

It may be assumed that the volume of a plant should be as large as possible and that the limiting factor in the size of a dairy plant is the cost of collection. The following tables show the total butterfat-miles necessary to concentrate the expected volume at different locations. It has been assumed that production in Crook and Deschutes counties will be distributed among the different districts in the same proportion as butterfat receipts from these districts in 1939. Expected milk production in Jefferson County is based on data presented previously. Although the points from which mileages were calculated may not be the exact center of production in the districts, for purposes of this paper they may be considered accurate enough for computing butterfat-miles and costs of concentration.

TABLE 4

TOTAL BUTTERFAT MILEAGE TO CONCENTRATE PRODUCTION AT REDMOND, OREGON

Production District	Miles to Redmond	Pounds of Butterfat	Butterfat Miles
Powell Butte	8	128,000	1,024,000
Alfalfa	22	24,500	539,000
Bend	16	32,500	520,000
Sisters	20	33,500	670,000
Tumalo	14	49,000	686,000
Prineville	19	22,500	427,500
Terrabonne	6	71,000	426,000
Metolius	23	300,000	6,900,000
Culver	18	300,000	5,400,000
Madras	27	400,000	10,800,000
O'Neil	8	17,500	140,000
TOTAL			27,532,500

TABLE 5

TOTAL BUTTERFAT MILEAGE TO CONCENTRATE PRODUCTION AT TERRABONNE, OREGON

Production District	Miles to Terrabone	Pounds of Butterfat	Butterfat Miles
Powell Butte	14	128,000	1,792,000
Alfalfa	30	24,500	735,000
Bend	24	32,500	780,000
Sisters	28	33,500	938,000
Tumalo	22	49,000	539,000
Prineville	21	22,500	472,500
Metolius	15	300,000	4,500,000
Culver	10	300,000	3,000,000
Madras	19	400,000	7,600,000
O'Neil	7	17,500	122,500
Redmond	8	119,500	956,000
TOTAL			21,435,000

TABLE 6

TOTAL BUTTERFAT MILEAGE TO CONCENTRATE
PRODUCTION AT CULVER, OREGON

Production District	Miles to Culver	Pounds of Butterfat	Butterfat Miles
Powell Butte	26	128,000	3,328,000
Alfalfa	40	24,500	980,000
Bend	34	32,500	1,105,000
Sisters	38	33,500	1,349,000
Tumalo	32	49,000	1,568,000
O'Neil	19	17,500	332,500
Redmond	18	119,500	2,151,000
Madras	9	400,000	3,600,000
Metolius	5	300,000	1,500,000
Terrabonne	12	71,000	852,000
Prineville	31	22,500	697,500
TOTAL			17,463,000

TABLE 7

TOTAL BUTTERFAT MILEAGE TO CONCENTRATE
PRODUCTION AT METOLIUS, OREGON

Production District	Miles to Metolius	Pounds of Butterfat	Butterfat Miles
Powell Butte	31	128,000	3,968,000
Redmond	23	119,500	2,748,500
Alfalfa	45	24,500	1,002,500
Bend	39	32,500	1,267,500
Tumalo	37	49,000	1,813,000
Sisters	43	33,500	1,440,000
Prineville	39	22,500	652,500
Terrabonne	17	71,000	1,207,000
Culver	5	300,000	1,500,000
Madras	4	400,000	1,600,000
O'Neil	25	17,500	437,500
TOTAL			17,637,000

From the foregoing tables, the most economical location of one dairy plant in Central Oregon would be at Culver. Since the limiting factor is collection costs, the location of a single plant at Culver can be compared with the alternative of establishing two plants. One such plant would be located at Redmond and the other at Metolius, both being the most economical location of two plants in this region.

It has been assumed that the cost of operating milk trucks is 15.7 cents per mile. This cost per mile is the variable cost. Fixed costs would remain the same or be slightly higher if two plants were established. The cost per mile is the total of the following variable costs:

Estimated Variable Operating Costs

	Expenses Per Mile
Gasoline (8 miles per gallon, 24 cents per gallon) . .	$.03
Labor ($1.12 per hour, 15 miles per hour).	.075
Maintenance	.033
Tires and Tubes	.015
Greasing and Oil	.004
Total Variable Costs Per Mile	$.157

Assuming an average load of 200 pounds of butterfat, or 4545 pounds of milk, the costs per pound of butterfat per mile would be .0785 cents. The variable costs of concentrating all the production at Culver would be $13,708.35, as compared to total variable concentration costs of $5,913.01 when establishing two plants, as in Table 8.

TABLE 8

TOTAL BUTTERFAT MILEAGE TO CONCENTRATE PRODUCTION
AT METOLIUS AND REDMOND, OREGON

Production District	Miles to Redmond	Pounds of Butterfat	Butterfat Miles
Powell Butte	8	128,000	1,024,000
Alfalfa	22	24,500	539,000
Bend	16	32,500	520,000
Sisters	20	33,500	670,000
Tumale	14	49,000	686,000
Prineville	19	22,500	427,500
Terrabonne	6	71,000	426,000
O'Neil	8	17,500	140,000
	Miles to Metolius		
Culver	5	300,000	1,500,000
Madras	4	400,000	1,600,000
TOTAL			7,532,500

The difference of $7,795.34 is the additional cost of concentrating the volume into one dairy plant.

It can be assumed that a minimum saving of one cent per pound of cheese manufactured could be obtained if only one plant were established. It may not be possible to calculate these savings actually, but it is reasonable to assume that they can be effected. The estimated savings are based upon a large number of published statements, the experience of most plant operators, and the writer's analysis of cheese manufacturing costs here in Oregon. Assuming the manufacture of 2,500,000 pounds of cheese annually, the savings effected by establishing only one plant would be

approximately $17,000 annually. It would be possible to amortize an investment of $261,331.67 at five per cent interest over a period of thirty years from a saving of $17,000 annually. It is highly possible that greater savings could be effected in this instance although they would be difficult to estimate.

Ownership of Facilities

The alternative forms of marketing organizations for dairy products in Central Oregon are: (1) the independent private manufacturer, selling through jobbers or other dealers on the outside market; (2) the large corporate manufacturer, generally processing for his own retail outlets; (3) the local cooperative creamery affiliated with the strong regional marketing organization; and (4) the centralized cooperative that may wish to establish a plant in Central Oregon.

The private manufacturer could establish an efficiently operated plant in the North Unit Project and obtain low unit costs and market the products in outside markets. However, with only one plant, a monopoly would exist over the manufacture of dairy products to be marketed in outside markets. The private manufacturer would not be forced to pay maximum prices to meet competition from other processors. It is true that the creamery at Redmond could collect milk in this district but the costs of collection would undoubtedly override or nullify any savings that might be passed on to the producer. If efficiency is very high, the manufacturer may make

unusual profits and still pay producers as much as they could get elsewhere. Under these circumstances, the producers are still failing to get the maximum return for their product but are getting approximately average returns.

A centralized cooperative may establish a plant at Metolius to process the milk produced in the North Unit Project or at Culver and combine the production of the association at Redmond with that to be produced in Jefferson County. A monopoly would still exist. In this monopoly, the producers would have partial representation but would not have complete control over the operation of the plant. In this type of cooperative marketing organization, control and authority are centralized in the headquarter's organization, and the producers in Central Oregon would probably elect only one director to represent their interests in the central organization. The same problem in regard to returns to producers could exist as under the private manufacturer. Furthermore, assuming low unit costs at the plant at Culver or Metolius, these savings may be prorated, or the costs of all plants prorated, to all producers in this centralized marketing organization. If this method of proration of costs and savings were used by the centralized association, the producers in Central Oregon would not receive the maximum return for their product.

The other form of marketing organization would be the Central Oregon Cooperative Creamery that is located at Redmond. If this local cooperative, affiliated with the regional marketing

organization, United Dairymen's Association, were to establish the plant at Culver, the volume of the creamery at Redmond could be easily drawn into this plant and the plant at Redmond could be eliminated. By expanding the association and establishing one plant at Culver, producers in Central Oregon would be able to retain complete control over the marketing organization and would be able to obtain maximum returns for their product.

Products to Manufacture

Markets

In determining the products to be manufactured, it is first necessary to determine the markets available. Under the present contract with United Dairymen's Association, the Central Oregon Cooperative Creamery has rights enabling it to market dairy products in Jefferson, Crook, and Deschutes counties. This market is the association's most advantageous one and should be utilized. The association can make greater returns to producers from dairy products marketed in Central Oregon. The surplus is marketed through the United Dairymen's Association which has well established trade connections.

Some have felt that milk could be shipped to Portland for the market milk trade in that market. There are three principal factors that would prohibit this method of marketing milk produced in Central Oregon. First, Central Oregon is not included in the milk shed of the Portland market in orders issued by the Milk Control Board.

Second, the costs of shipping this milk to Portland would not enable the producers in Central Oregon to compete with producers in the Willamette Valley and the Coast regions. Third, the quality of the milk now produced in Central Oregon may not meet the requirements of the Portland milk code and would prohibit its use in the fluid milk market in Portland.

Products for Outside Markets

The quality of the raw products, comparative value, competition, characteristics of the product, capital investment, and labor requirements are important factors to be considered in determining the dairy products that should be manufactured from surplus milk in Central Oregon.

The present quality of milk produced in Central Oregon would present difficulties if it were to be evaporated or dried. High bacterial activity is accompanied by an increase in the acidity of the raw product which lowers the heat stability of evaporated milk, tends to hasten objectionable age thickening of sweetened condensed milk, and shortens the life of whole milk powder. Although high-quality milk is necessary for the manufacture of all dairy products, butter and cheese may be manufactured from milk of a lower quality than that necessary for evaporating or drying.

Full utilization of the raw product must be obtained in processing whole milk. In the manufacture of a dairy product such as cheese, it is necessary that the cheese whey be processed for

human consumption or for utilization in another industry if the full value of the raw product is to be realized. A marketing organization that does not utilize all the milk solids will not be able to compete advantageously for its milk supply.

Utilization of all the milk solids can be obtained in a multiple-process flexible plant. The term "flexible" denotes an adaptability of productive capacities that cannot be profitably attained in a small plant. The ability to shift production is also important. The success or failure of a flexible plant need not hinge on the price of a single product. A flexible plant can produce a combination of dairy products that will make the greatest returns to producers. A reasonably flexible plant may thus be in a particularly strong position with respect to competition from within and without the dairy industry.

The capital necessary for the manufacture of some dairy products, such as evaporated milk and dried whole milk, may be several times greater than that necessary for the manufacture of butter or cheese. Also, the requirements for technically trained personnel are greater for evaporating or drying operations. These points will be important to an organization that is establishing a new plant and must borrow a large part of the original investment in a new processing plant.

Products for Local Markets

At the present time, the association is marketing cheese, butter, cottage cheese, ice cream, and buttermilk in the local markets. These products should be continued to be manufactured for these markets. The cream received for processing - from the separation of milk for cottage cheese, from the standardization of milk for cheese manufacture, and from the separation of the cheese whey - should provide a sufficient volume of butterfat for the manufacture of butter and ice cream for the local markets. If an excess of butter over the local demand is manufactured, this can be marketed along with the cheese and dried whey on the outside markets.

Packaging

The new development in cheese packaging, the transparent package, should be adopted. This method of packaging cheese will promote the sale of cheese manufactured in both local and outside markets. This, or a similar type of package, will eventually be necessary for the successful marketing of cheese.

Other dairy products manufactured for local markets may be packaged in the present type of packages used. The association may benefit by using the Darigold brand name on its dairy products marketed locally since this brand name is becoming well established in retail outlets.

Milk and Cream Collection

Analysis of Existing Collection Practices

The association is now collecting cream from patrons on established collection routes. Milk received is hauled by producers to the plant. Certain inefficiencies and inequalities were found to exist and apparently have always existed in the collection of cream. Many of these practices are recognized as not following the principles of cooperative marketing. Each route was covered by the writer and the following practices of particular importance were observed in the study of the cream routes:

1. The point of collection varied with each producer and, consequently, the time spent for each stop varied. When the association first established cream routes, it was the policy to pick up the cream at any place the producer had it stored. This practice still prevails and the drivers on many stops had to carry the cream for distances up to 100 feet or drive through one or two gates that were opened and closed going in and coming out of the producer's farm. Table 9 shows the distribution of time spent in collecting cream at each stop. The length of time for each stop was calculated from the time the driver left the county or state road until he returned to the road. The majority of the collections made in the first group represents stops made where the patron had placed the cream can or cans on the road. The cream was placed on the road in many of the stops made in the second group, but the time was

lengthened because of the delivery of dairy products or consumed in leaving the ticket of past receipts for the producer. Time used in collecting cream at patrons' farms in the other groups was longer due to distances the cream was carried and, in some instances, it was necessary to drive up to one-half mile to the patron's farm for the cream. In this practice, when producers pay the same charge for collection costs, many producers are paying more than the actual costs of the service rendered. Others pay less for this service. This has placed many producers in an unequal position.

TABLE 9

TIME, IN MINUTES, USED PER PATRON IN COLLECTING CREAM

Minutes per Patron	Number of Patrons
1 and under 2	56
2 and under 3	53
3 and under 4	17
4 and under 5	14
5 and under 6	7
6 and over	2

2. The association has followed a policy of distributing dairy products to patrons on the cream routes. Generally, no orders are placed for the dairy products and the driver must carry more than necessary to fill the orders on each route. Consequently, dairy products are carried on the route under no refrigeration and returned

to the creamery. During the summer months, the quality of these products is depreciated greatly. Many orders are not placed until the driver reaches the milk house or farm house to collect the cream. Under these conditions, the driver must make two trips.

3. The present method of identifying producer's cream cans is to place a shipping tag on the can. On many stops, the driver must write the producer's name on the tag and place it on the can.

4. Producers receive a cream receipt for each shipment of cream made to the association stating the date, weight, butterfat test, butterfat content, and grade of the shipment. These tickets are made out in the office and are left at the producer's farm the following trip. It was observed that considerable time was consumed in leaving the ticket, since it was necessary to remove the lid from the can to place the ticket inside to prevent it from being lost. There appears to be no justification for this practice other than that it has always been the practice of the association to provide this additional service.

5. Collection charges of one cent per pound of butterfat collected have been made since the association's inception. Actually, the average costs, based on total operating costs of twenty cents per mile, were approximately two times more than the amount charged. The cost of this service has not been distributed equitably. The difference between the actual cost and the amount charged has been distributed to all the members of the association.

Milk Collection

One of the most important problems of producers will be the necessity of organizing and developing routes for the collection of whole milk. This phase of the marketing process is costly and susceptible to serious inefficiencies that appear to have existed in the past. It is possible, with the location of the plant at the most economical location, to reduce collection costs to a minimum if the routes are organized and operated efficiently.

An organization should retain ownership of the milk trucks. There are several advantages in this type of ownership. If the trucks are under the control of the association, the collection routes may be organized and operated as efficiently as possible. This would not necessarily be true if they were owned by private individuals who may feel justified in hauling other products or collecting milk at hours that are not advantageous to the operation of the dairy plant or the producer.

The larger the volume hauled by each truck, the lower the collection costs will be. It is doubtful if privately owned trucks would haul the volume necessary to effect lower costs since their routes could not be rearranged as easily to maintain maximum loads. The association could very easily rearrange routes to maintain maximum loads if they owned the milk trucks.

It has been recommended in the study of milk quality that the "van" type body be used on milk trucks to control the contamination of milk from dust and provide the milk protection from the sun in

transportation. Private haulers may object to using this type of body and little control could be exercised in having them use the "van" body.

Another important advantage of association ownership of milk trucks is that it facilitates the establishment of desirable membership relations. The driver, as an employee of the association, can be trained to assist in quality improvement work and render other kinds of services. He would become, in effect, a contact man representing the mutual interests of the patrons and the association.

Collection Costs

In the past, collection costs for this service rendered have not been distributed equally. All members of the association have been bearing part of the collection cost. Collection costs charged patrons for this service should be as close as possible to the actual cost of hauling the milk. It is impossible to ascertain the exact cost of this service, but it is imperative that the management charge an amount large enough to cover all costs and avoid the mistake of charging some members with costs of services not received.

It is impossible to set forth in this thesis a schedule of costs to be charged for collecting milk. These costs must be determined from historical and pre-determined or estimated costs. Essentially, these are variable and fixed costs.

Fixed costs that may be pre-determined are depreciation,

insurance, taxes, and registration costs. The total of the fixed costs for the year may be reduced to fixed costs per day and allocated to the different routes or zones.

Variable costs that will have to be determined from historical costs or records of the association include the costs of gasoline, maintenance, tires and tubes, greasing, and labor. It is only by the use of past costs that these variable costs may be determined accurately.

Depreciation rates on trucks should be 25 per cent of the original cost. This will allow for the full depreciation of the cost over a four-year period, the average length of use of milk trucks. The "van" bodies would be depreciated at the same rate. Although the life of these bodies may be considered to be slightly longer than four years, no data is available to show the actual life, and it has been the practice of many marketing organizations to depreciate this type of body at the same rate as the chassis. Future cost analyses may show that these bodies should be depreciated over a five-year period if this is their actual length of usage.

Variable costs are more difficult to determine. As previously stated, the only method of determining these costs accurately is from the records kept by the association. Separate accounts for fuel, oil, greasing, maintenance, tires and tubes, and labor will have to be established.

Quality

Problem of Quality

One of the major problems of producers in Central Oregon is the quality of the milk and cream produced. Although other problems exist, it will be necessary to take immediate steps to improve the quality of milk and cream produced to enable the association to market the products manufactured more efficiently and make the highest returns possible to producers. It is realized that it is impossible to achieve the quality necessary in one year, but during a period of several years the additional improvements and changes should be made. Unless these improvements are made, the association cannot operate as an efficient marketing organization. The association would not be able to manufacture dairy products of such a quality that the United Dairymen's Association could maintain satisfactory trade connections. It is difficult to manufacture by-products to take full advantage of market outlets from buttermilk and cheese whey derived from the manufacture of butter and cheese when the raw product is of low quality. The establishment of a field service should be important in improving quality.

Present Quality

It has been necessary to determine the present quality and establish the factors contributing to the low quality of the milk and cream produced. Although the present quality has been determined

during the summer months, predominating factors contributing to low quality could be ascertained.

The present quality has been determined by inspection of milking facilities and equipment on the farm and by conducting platform tests. Platform tests conducted were the sediment, methylene blue, fermentation, and curd tests. These methods of determining quality have been used because they are practical tests and ones to be used in the quality control program.

Of the farms inspected, few could be classified as satisfactory for the production of milk that would insure the manufacture of high-quality dairy products. Many producers were milking cows in a common shed that had no windows or doors, while others had relatively modern milking facilities that could be considered satisfactory. The majority of the farms had no milk houses at all. The milk on these farms was normally strained in the barn and the utensils were washed, sterilized, and stored at the farm house.

The surroundings of many dairy barns were in a highly unsatisfactory condition. Manure piles were close to or adjacent to the milking barn. No protection against contamination from these manure piles was observed. Other domestic animals on many farms were housed in the same barn. All the above conditions have caused contamination of milk and cream and the poor sediment discs obtained. The lack of cooling milk and cream is a predominating factor contributing to the low quality of the milk and cream produced. No satisfactory method was found to be employed on farms to cool milk and cream.

Many cream producers are cooling cream in household refrigerators, but objectionable flavors were found in the cream cooled by this method. To determine the effect of improper cooling, samples of evening and morning milk were obtained. Composite samples were also obtained. Table 10 shows the effect of improper cooling.

TABLE 10

HOURS TO DECOLORIZE SAMPLES OF MILK
TAKEN JULY 1, 1947

Sample Number	Hours to Decolorize		
	Evening Milk	Morning Milk	Composite Sample
1	20 min.	5 hours	20 min.
2	20 min.	5 hours	20 min.
3	1 hour	5 hours	1 hour
4	1 hour	8 hours	2 hours
5	1 hour	5 hours	1 hour
6	1 hour	6 hours	1 hour
7	1 hour	4 hours	1 hour
8	1 hour	5 hours	3 hours
9	1 hour	4 hours	1 hour
10	1 hour	7 hours	2 hours
11	2 hours	7 hours	1 hour
12	2 hours	6 hours	3 hours
13	3 hours	8 hours	3 hours
14	3 hours	5 hours	2 hours
15	3 hours	8 hours	2 hours
16	3 hours	5 hours	3 hours
17	4 hours	6 hours	4 hours
18	4 hours	8 hours	4 hours
19	4 hours	4 hours	3 hours
20	5 hours	6 hours	4 hours
21	5 hours	8 hours	5 hours
22	5 hours	8 hours	6 hours

The approximate number of bacteria present in the milk with different periods of decolorisation is, as follows:

20 minutes or less - over 20,000,000 bacteria per cc.
20 min. to 2 hours - 4,000,000 to 20,000,000 bacteria per cc.
2 hours to 5½ hours- 500,000 to 4,000,000 bacteria per cc.
5½ hours to 8 hours- 100,000 to 500,000 bacteria per cc.
Over 8 hours - Less than 100,000 bacteria per cc.

Applying the above data to Table 10, the lack of proper cooling had caused the development of millions of bacteria in milk that originally was of fairy quality. Assuming the morning and evening milk to be of the same quality after milking, cooling the evening milk to 50° F. would mean the production of milk of the same quality as morning milk. These results are substantiated by experiments carried on by many research workers. Bacteria multiply by fission and, when held at temperatures that are optimum for their growth, overnight increases of over 100 per cent in the number of bacteria have been observed. The composite samples had bacteria counts that were approximately the same as the evening milk. Milk from a mixture of two different qualities of milk will tend to be of the same quality of the lower quality milk.

Several producers have attempted to cool milk by placing the full cans in tubs of water or irrigation ditches. Neither of these methods has proved successful because of the high temperatures of the cooling medium. Water available in the winter months in cisterns and ditches would be cold enough but there is a period of approximately six months when the temperatures of the water would be too high to be effective.

The cooling of the evening's milk will be of utmost importance since this milk will be stored on the farm for twelve hours or longer before it is collected for delivery to the plant. Water available for cooling milk on many farms is obtained from irrigation ditches and, since this water is carried for miles in these open ditches, the temperature of the water will increase during the day and be relatively close to the average mean maximum temperatures shown in Table 11. The temperatures of domestic water from Opal Springs in Jefferson County increase materially during the summer months because of the shallow covering of the pipe lines from these springs.

TABLE 11

AVERAGE MONTHLY MEAN MAXIMUM TEMPERATURES
1936-1945

Month	Degrees Fah.
January	39.6
February	43.3
March	52.3
April	60.0
May	66.7
June	72.3
July	83.8
August	81.2
September	74.5
October	65.3
November	49.7
December	42.7

Source: Records of the Bend Station of the United States Department of Commerce Weather Bureau

Cream produced is also of low quality since few farmers cool the cream effectively. On many farms, the cream is stored on the back porch, in the cellar, or in the milk house. The temperatures of these storage places during the summer months prohibit the production of premium cream during the summer months. The effect of high temperatures during the summer months on cream quality is shown in Table 12, giving cream receipts by months and grades in 1940.

TABLE 12

PROPORTION OF CREAM RECEIPTS BY MONTH AND GRADE, 1940

Month	Mean Maximum Temperature	Proportion of Cream Receipts by Grade		
		Premium	First	Second
		%	%	%
January	38.3 F.	60.9	39.0	0.1
February	45.6	60.8	39.0	0.2
March	56.4	65.0	34.5	0.5
April	60.5	60.7	39.1	0.2
May	73.0	52.6	46.8	0.6
June	79.0	47.0	52.1	0.9
July	81.3	32.0	65.0	3.0
August	83.4	38.7	59.0	2.3
September	70.7	43.8	54.1	1.1
October	63.5	57.0	42.5	0.5
November	46.6	71.3	28.5	0.2
December	42.9	60.3	39.5	0.2

Source: Records of Central Oregon Cooperative Creamery and Bend Station of the United States Department of Commerce Weather Bureau.

Many producers follow the practice of mixing the cream separated from one milking to that obtained from previous milkings. When this separated cream is added to previously cooled cream, the temperature of the total cream in the can is raised and the rate of the growth of bacteria is increased.

Milk from the evening's milk on many farms has been placed in irrigation ditches for cooling. It has already been stated that this is an unsatisfactory method of cooling, and the milk is depreciated further in quality because of contamination while in the ditches. Sediment tests have shown that the extraneous matter of several producers appeared only in the evening's milk, and the dirt was of the same type as on the ditch bank. Many can lids were found to fit loosely, permitting all deposits of extraneous matter on the pouring lip to fall into the can when the lid was removed. Earwigs found in producer's milk could be traced back to the farm and were found to have fallen into the can during storage under trees or when the can was covered with wet sacks covered with earwigs.

Many cream cans placed on the road for collection were left completely uncovered in the sun. These cans were left in this position for several hours and the temperature increased, favoring the growth of bacteria. One satisfactory method observed for storing the cream on the road was to cover the cream can with wet sacks or blankets. This method protected the cream from the sun and prevented further contamination from wind-blown dust.

A definite contrast in the cleanliness of utensils on the

farms was observed. On many farms, the utensils were clean. This was largely due to the fact that it was the housewife's duty to clean the milking utensils and they were cleaned at the farm house where hot water was available. On other farms where the milking machines and pails were very unclean because of gross negligence in cleaning or the lack of proper facilities to clean these utensils. The lack of hot water for cleaning utensils was a contributing factor that prevented proper cleaning of utensils.

Dust was present in all milk and cream produced. This dust is always present in the air during the summer months and was found on all utensils and milk and cream cans. Little protection was given to the milk during storage and milking periods to prevent this dust from falling into the milk and cream.

Quality Control

Only the major factors contributing to the low quality of the milk and cream produced are covered in this thesis. Methods of controlling other factors that depreciate the quality of the milk and cream may be obtained from bulletins and textbooks. County agents have bulletins available to producers which they may use. New developments in equipment and further research in milk quality will necessitate changes in production methods. The new type milk can that has no pouring lip is now being advocated for use in controlling dust contamination. This type of can should be tried on an experimental basis and adopted if successful. Experiments, such as the

one given, may be carried on by the fieldmen. New developments in testing milk for its quality will undoubtedly be developed and should be adopted if practical.

As indicated previously, the lack of cooling is a major factor contributing to the low quality. Of the different methods of cooling milk, two methods are recommended. The first method, which may be used by those producers that have well water of low temperature, consists of placing the milk cans in a concrete tank and circulating the water in the tank by allowing a continuous flow of water. The only wells permitting this method of cooling are those shallow wells in the Alfalfa and Prineville districts. The temperature of the water supplies of other producers is not low enough to affect proper cooling of the milk. Circulation of the water should be for at least one hour after the last can has been placed in the tank. The water level should be one-half inch above the level of the milk in the can.

The other method of cooling milk is by mechanical refrigeration. This method should be used eventually by the majority of the producers. The "tank" type refrigerator is recommended. Surface type coolers using a refrigerant require a dry storage box and also afford another piece of equipment which may lead to further contamination of the milk. The use of surface coolers is a more expensive method of cooling.

Contamination by dust may be controlled by providing storage space for utensils and protecting the milk in storage and transportation from wind-blown dust. Tightly constructed cabinets will prevent

the contamination of utensils from dust during storage. Milk should be strained in the milk house and drafts in the milking barn should be prevented during milking. Milk placed on the road for collection should be placed in tightly constructed roadside stands. The openings of these stands may be regular doors, or a wet sack may be placed over the opening. "Van" type bodies should be used on milk trucks. Hot water should be made available in the milk house to permit proper cleaning of utensils. An adequate supply of hot water for washing utensils will be necessary on all farms.

Grading Program

A strict grading program should be used by the association to control quality. This program should be used to improve the quality of milk and provide a basis for the payment of milk. Payment of milk must be based on the quality of the milk, and differentials in the price paid for first and second grade milk should be large enough to induce producers to produce milk of high quality.

Receiving room tests should be used in determining grades. The methylene blue and sediment tests are considered practical for establishing grades. Sediment discs should be graded according to the standards of the American Cheese Institute. A "Number two" sediment disc would be necessary for first-grade milk. In using the methylene blue test, the period of decolorization may be gradually increased with the improvement in quality until a period of five

and one-half hours for first-grade milk is achieved.

Other tests to determine the quality of the milk may be adopted when necessary. With the completion of a laboratory in the new plant, the direct microscopic or the plate-count methods of counting bacteria may be used.

Aspects of Marketing Fluid Milk

Requirements for Organization

One of the problems involved in marketing milk produced in Central Oregon is the organization of the fluid milk producers. Many producers in the fluid milk industry have indicated their desire to organize. They are also desirous of having the organization carried into the present cooperative marketing organization. Producers have indicated that they would like to have the Central Oregon Cooperative Creamery perform a particular part, or all, of the functions of marketing fluid milk.

It must be recognized that there must first be justification for organizing. Bakken and Schaars (1) have stated that there must first be an economic need for organization. This need may be determined by answering the following questions: (1) is there a lack of adequate facilities; (2) is there an absence of competition and is the local operating margin too wide; (3) is the service honest and

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(1) Bakken, H. H. and Schaars, M. A. The Economics of Cooperative Marketing. New York, N. Y. McGraw-Hill Book Company, 1937. Page 187.

dependent —— are excessive profits being made by established concerns; (4) Are the producers' best interests adequately served; (5) what concrete improvements or savings can the cooperative effect; (6) will the improvement sought be commensurate with the risk, financial investment, and farmers' time and effort involved; and (7) is the local association needed to such an extent that it will enlist the support of the best farmers of the community? Second, is there sufficient volume for efficient operation? Third, can producers finance the association or facilities necessary? Fourth, are there sufficient producers interested in organizing? Also, state regulations governing the marketing of fluid milk must be taken into consideration.

Analysis of the Marketing Problem

It was first deemed necessary to determine if an economic need existed for the organization of fluid milk producers. From the information gathered through interviews with producers, many felt that they were being subjected to malpractices by the present processors. Under normal conditions, if this situation existed, it would be considered justification for organizing. However, laws of the state of Oregon, under the supervision of the Division of Foods and Dairies of the State Department of Agriculture, specify the procedures and methods of weighing, testing, and sampling milk and cream, the malpractices which many producers feel they are being subjected to. Under these circumstances, it would be considered a poor move to

organize for reasons governed by the laws of the state of Oregon.

Several producers have indicated they would like to process cooperatively the fluid milk marketed in Central Oregon. This would include the milk supply of five separate markets as established by the Milk Control Section. In order to do this, it would be necessary to obtain a license. Licenses may be obtained in two ways: either by having the administrator of the Oregon Milk Control Act grant a license; or by purchasing the business of an established processor who has a license. There is, at the present time, no justification for the Milk Control Administrator to grant an additional license in any of the markets in Central Oregon. The costs of purchasing the businesses of already established processors would prevent the organization of a single cooperative distributor.

One method of marketing fluid milk that warrants consideration by both producers and distributors in Central Oregon is the establishment of a market pool that would cover the entire region under consideration. In this method, it is possible to have the existing cooperative marketing association act as a bargaining association and it could also assemble and distribute the fluid milk to the present processors. This type of pool already exists in several areas in Oregon. The main advantage of this type of pool is that milk from one locality can be shifted to another locality to balance surplus and deficit areas. Also, more efficient utilization of milk not used in the market milk industry may be obtained when the processing facilities of existing distributors will not warrant efficient

utilization of that portion of the milk not bottled.

No attempt is made in this study to give a definite answer to the problem of organization of the fluid milk producers. Many of the economic implications of this problem have been presented and may be used for further analysis. A more complete study than was possible in this project would be necessary to determine the need for organization and the most efficient method of marketing fluid milk in Central Oregon.

PART III

SUMMARY AND RECOMMENDATIONS

The milk shed of the marketing organization recommended to process the major part of the milk produced in Central Oregon should include all the major production districts in Jefferson, Crook, and Deschutes counties. The number of milking cows in the production districts in Deschutes and Crook counties is expected to increase to pre-war levels and 5,000 milking cows are expected to be maintained on farms in Jefferson County shortly after the completion of the North Unit Project.

The production of milk in the irrigated areas in Deschutes and Crook counties and in the North Unit Project is expected to provide 1,500,000 pounds of butterfat for manufacturing purposes through a single plant at Culver. Changes from the estimated volume may be taken into consideration before completion of the new plant. Variations in the volume to be received may be determined easily by producers and personnel of the association.

The number, size, and location of dairy plants in Central Oregon are determined by the combined costs of operation and collection of milk to be processed, the optimum being reached when these combined costs are the lowest. The economic advantages of a large-volume operation have caused a trend toward large-scale plants that have operational flexibility and economies in the scale of operation. Economically, one plant should be established in Central

Oregon at Culver to process the major part of the milk to be produced in this region.

Under existing conditions, the Central Oregon Cooperative Creamery is undoubtedly the most advantageous form of marketing organization available to producers in Central Oregon. This association should be re-located at Culver to serve the majority of producers in this region. Assuming normal operating procedures, this will permit the association to: (1) make such changes in plant facilities and marketing methods as are desirable; (2) accumulate adequate capital for all purposes; (3) offer more services to patrons; (4) make a reasonable rate of return to producers on money invested in the association; and (5) increase the money payments to producers for milk they market through the association.

It is expected that opposition to the re-location of the plant will develop and the following points should be recognized:

1. The directors and other members of the association may be unaware of the existence of the trend toward large-scale plants.

2. The directors and members of the association may not realize the economic benefits which may accrue to them from the operation of a large-scale plant.

3. Individual and community loyalty to the established plant may prevent consideration of the economic advantages of re-location. Local business interests also may wish to maintain the plant at Redmond.

4. Personal convenience may cause some producers to oppose the change. The hauling costs of some producers will be increased, but net returns may also be increased through a more efficient marketing organization. However, many producers are inclined to be more concerned with sure increases in cost than possible increases in net returns.

5. Some producers will fear the creation of monopoly with the establishment of a single plant; however, the trend toward large-scale plants has developed and it may be merely a question of whether the local association or another marketing organization is to be dominant in Central Oregon.

The markets of the Central Oregon Cooperative Creamery include local markets in Jefferson, Crook, and Deschutes counties, and the outside markets of the United Dairymen's Association. Cheese should be manufactured from milk not used for manufacturing dairy products for local markets. Cheese whey, the by-products, should be dried or condensed. The reasons for recommending these products are below:

1. Cheese is already being manufactured by the association and equipment already available may be utilized.

2. Some of the present personnel are trained in the manufacture of cheese, and it would not be necessary to re-staff the association with technicians for manufacturing another product. Additional employees will be necessary.

3. Less equipment is necessary and the initial cost of expanding the association would be less for the manufacture of cheese than other products.

4. The producers in Central Oregon are becoming acquainted with the methods of manufacturing cheese and the sanitary requirements for milk to manufacture this product. This is highly important from the standpoint of membership relations.

5. Complete utilization of milk solids will be obtained when the cheese whey is dried or condensed.

6. The United Dairymen's Association has established markets for the distribution of a high-quality cheese.

Inefficiencies and inequalities that appear to have existed in collection practices in the past should be eliminated. The ownership of milk trucks should be retained by the association and the "van" type body should be used. All milk collected should be placed at the roadside in a shelter for collection. This practice is not followed universally in the area at this time. Accurate records of fixed and variable costs must be maintained for the proper distribution of the cost of milk collection.

It would be desirable if the association were to establish a separate department for cost accounting. This department would establish the costs of the different operations and services rendered to enable management to equitably allocate these costs. This

department would make periodic cost analyses for the use of management in keeping costs to a minimum. It is highly improbable that costs could be reduced to a minimum if no procedures were established to control costs. Serious inefficiencies may exist in the collection and processing of milk and cannot be eliminated unless a system of cost control is established.

An improvement in the quality of milk produced will be necessary for efficient marketing of dairy products. Methods of cooling will have to be adopted to prevent the growth of bacteria. Storage facilities for milk and utensils must be provided and an adequate amount of hot water must be made available for the proper cleaning of utensils. A field service should be employed to improve quality. Receiving room tests should be used to grade milk and cream and improve their quality.

Further studies should be carried on to determine the necessity and feasibility of organizing fluid milk producers and carrying this organization into the Central Oregon Cooperative Creamery. Under existing conditions, it would appear inadvisable for the association to carry on any of the phases of marketing fluid milk.