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LARGE-SCALE ORGANIZATION IN
THE DAIRY INDUSTRY

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INTRODUCTION

One of the most important post-war developments in the dairy industry has been the tendency toward large-scale organization in the manufacturing and distribution of dairy products. This tendency is exemplified by the big dairy corporations, the meat packers, the grocery chains, and a number of dairy marketing cooperatives. More than any other factor, the rapid growth of such organizations during recent years has altered the entire marketing structure for dairy products and has affected the methods of their handling at all points in the distributive process.

It goes without saying that this development is of direct consequence to dairy producers. Price-making and competitive conditions are of course affected by the transition from an industry of small-scale enterprise to one in which national organizations play a large part. No less important are the effects of mass distribution upon marketing efficiency—the changes made in the actual mechanics of marketing cannot fail to be of considerable significance. Still another aspect of large-scale organization is its relation to the producers' cooperative movement. There is reason to think that some reorientation in the methods and objectives of cooperative marketing is necessary if producers are to deal effectively with the mass distributors.

This study shows that concentration of control varies considerably for the different dairy products. The three largest handlers of each product distribute approximately 21 percent of the total supply of butter, 63 percent of the cheese, and 44 percent of the condensed and evaporated milk. No single firm has any very large percentage of the total volume of milk that is consumed in fluid form, but it is not uncommon for two or three handlers to distribute from one-half to two-thirds or even more of the supply in a given city market.

As dairy marketing organizations have increased in size, they have almost invariably integrated more of the manufacturing and distributive functions. Thus the large grocery chains have tended to buy more of their butter and cheese direct from local creameries and cheese factories and have set up their own manufacturing plants for condensed and evaporated milk. The meat packers and the large dairy corporations usually have their own distributive systems for carrying the product through to the retailers and, in the case of dairy corporations handling fluid milk, to the consumers. Beginning at the producer end, the larger dairy marketing cooperatives have shown the same tendency toward vertical integration as the corporate handlers. Obviously this has meant some change in marketing structure, with the specialized middleman (that is, the wholesale assembler, the commission merchant, and the independent jobber) playing a less important part than formerly in the distribution of dairy products.

Although the corporate handlers are to be thought of primarily as distributors, they have also entered increasingly into the manufacture of dairy products. The study on which this circular is based shows that in Wisconsin plants operated by national companies handle approximately 23 percent of the total milk receipts from farmers in the State.

It is impossible to obtain a direct measurement of the effects of large-scale organization on the marketing costs and margins of dairy products. But it is significant that the marketing spreads for condensed and evaporated milk (to which mass methods have been most completely applied) have narrowed steadily in relation to those of other dairy products.

In addition to these major topics, the writers have sought to bring together what information is available relative to other phases of the problem. Among these are the financial tendencies shown by the dairy companies, their sources of supply and sales outlets, the importance of patent control in the dairy industry, and the relationship of mass distribution to the producer-cooperative movement. On these, as well as other points, the factual information on which to base analysis and judgment is by no means as complete as might be wished. The writers have ventured to draw conclusions wherever the evidence seemed reasonably clear, but the study has raised more questions than can be conclusively answered.

GROWTH OF LARGE-SCALE ORGANIZATION IN THE DAIRY INDUSTRY

The decade of the 1920's witnessed the organization and rapid growth of large-scale corporations ¹ in all branches of dairy marketing

¹ As used herein, the term "corporation" will refer only to private companies, and not to those incorporated as cooperatives.

and manufacture. The most outstanding examples of this development are the large private dairy companies; the national chain-store systems, several of which have gone into the manufacturing as well as the retailing of dairy products; and the large meat packers who continue to be important in the distribution of butter and cheese. In addition to these national corporations there has been an increase in the number and size of smaller ones doing business on a regional or sectional basis.

The organization and growth of several producer cooperatives that market dairy products on a large scale is another example of the general trend in this direction, although large-scale developments under the cooperative form of business enterprise have not kept pace with those under the corporate form.

GROWTH OF THE LARGE DAIRY CORPORATIONS

There are at present a number of private corporations that handle dairy products on a regional or national basis. Some confine their business almost exclusively to dairy products, but for others this is only one of several lines. The two largest handlers of dairy products are the National Dairy Products Corporation and The Borden Co. Both of these organizations have extensive facilities for manufacturing dairy products and for distributing them in most parts of the country. Next in size are the Beatrice Creamery Co. and the Fairmont Creamery Co., which do a business similar in character to that of the first two, but on a smaller scale. There are also the Carnation Co. and the Pet Milk Co., both engaged primarily in the manufacture and distribution of condensed and evaporated milk. Several of the large meat packers and chain grocery-store systems handle a larger volume of dairy products than some of the specialized dairy corporations listed above, but for the moment the discussion will be confined to the dairy companies.

Dollar sales of the four leading dairy corporations for the period 1919-37 are shown in figure 1 and table 1. All of these companies, and particularly the two largest, showed a tremendous growth during the decade of the 1920's. In the interval from 1925 to 1930, sales of the National Dairy Products Corporation increased from about \$105,000,000 to \$375,000,000; sales of The Borden Co. from about \$123,000,000 to \$345,000,000; and of the four reporting companies combined, from about \$299,455,000 to \$854,378,000. During this period the estimated total sales value of all dairy products increased from about \$1,965,000,000 to around \$2,200,000,000. Dollar sales of the four leading dairy companies thus nearly trebled during a period in which the total sales value of all dairy products increased only about 12 percent.

The period of rapid expansion on the part of these dairy companies ended at least temporarily with the beginning of the depression. Their dollar sales since that time have fluctuated about in accordance with changes in the production and price of dairy products (fig. 1). Whether or not their expansion will be resumed with the return of more prosperous business conditions is conjectural. The fact that they have shown little growth in the last 6 or 7 years does not necessarily mean that the tendency in this direction is permanently arrested, for corporate expansion is usually held in abeyance during periods of business depression.

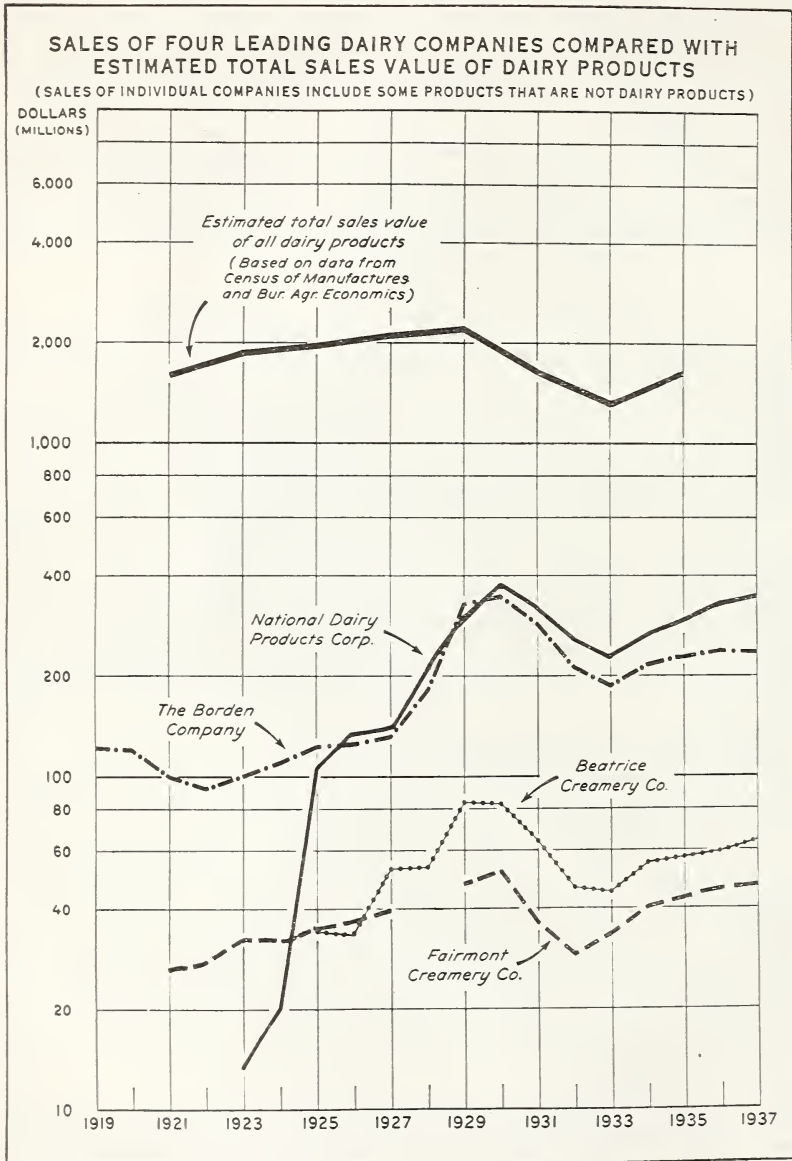


FIGURE 1.—Dollar sales of the four leading dairy companies increased much more rapidly during the 1920's than the total value of all dairy products. Since that time these companies have shown comparatively little growth, their sales having fluctuated about in proportion to changes in prices and supplies of milk and milk products.

TABLE I.—Sales of four leading dairy companies compared with estimated total sales value of dairy products, 1919–37

| Year | Estimated total sales value of all dairy products ¹ | Sales of— ² | | | | Total sales of four companies |
|------|--|-------------------------------------|-----------------------|----------------------|---|-------------------------------|
| | | National Dairy Products Corporation | Beatrice Creamery Co. | The Borden Co. | Fairmont Creamery Co. (Delaware) ³ | |
| | <i>1,000 dollars</i> | <i>1,000 dollars</i> | <i>1,000 dollars</i> | <i>1,000 dollars</i> | <i>1,000 dollars</i> | <i>1,000 dollars</i> |
| 1919 | ----- | ----- | ----- | 122, 284 | ----- | ----- |
| 1920 | ----- | ----- | ----- | 120, 294 | ----- | ----- |
| 1921 | 1, 605, 345 | ----- | ----- | 99, 880 | 26, 899 | ----- |
| 1922 | ----- | ----- | ----- | 92, 059 | 28, 565 | ----- |
| 1923 | 1, 863, 333 | 13, 569 | ----- | 100, 245 | 33, 521 | ----- |
| 1924 | ----- | 20, 181 | ----- | 109, 667 | 33, 027 | ----- |
| 1925 | 1, 963, 988 | 105, 377 | 35, 051 | 123, 353 | 35, 674 | 299, 455 |
| 1926 | ----- | 134, 550 | 33, 974 | 124, 912 | 37, 504 | 330, 940 |
| 1927 | 2, 105, 292 | 145, 330 | 52, 744 | 132, 047 | 39, 823 | 369, 944 |
| 1928 | ----- | 212, 632 | 53, 307 | 180, 850 | (⁴) | ----- |
| 1929 | 2, 198, 575 | 300, 021 | 83, 682 | 328, 467 | 47, 747 | 759, 917 |
| 1930 | ----- | 374, 558 | 82, 811 | 345, 423 | ⁵ 51, 586 | 854, 378 |
| 1931 | 1, 624, 008 | 320, 788 | 64, 059 | 284, 587 | 36, 295 | 705, 729 |
| 1932 | ----- | 252, 654 | 46, 264 | 212, 349 | 29, 031 | 540, 298 |
| 1933 | 1, 311, 995 | 231, 197 | 44, 868 | 186, 301 | 33, 617 | 495, 983 |
| 1934 | ----- | 267, 415 | 54, 883 | 215, 724 | 40, 371 | 578, 393 |
| 1935 | 1, 601, 215 | 290, 441 | 57, 117 | 229, 888 | 42, 995 | 620, 441 |
| 1936 | ----- | 329, 172 | 59, 667 | 238, 845 | 46, 005 | 673, 689 |
| 1937 | ----- | 351, 016 | 64, 224 | 237, 562 | 46, 884 | 699, 686 |

¹ Compiled as follows: Manufactured dairy products—U. S. Census of Manufactures. Fluid milk and cream: 1929, from 1930 Census of Distribution which shows sales by retail and wholesale distributors. Years other than 1929: Sales of these products have been computed on the basis of the United States retail price of fluid milk as compiled by the Bureau of Labor Statistics and the estimated consumption of fluid milk and cream as reported by the Bureau of Agricultural Economics. These estimates of value are intended only to show the trend from year to year.

² Moody's Manual of Investments: Industrials.

³ Before 1929 was known as Fairmont Creamery Co. (Nebraska).

⁴ Not available.

⁵ 14-month period.

NATIONAL DAIRY PRODUCTS CORPORATION

The National Dairy Products Corporation, largest of the dairy companies in volume of sales, was incorporated in 1923, acquiring at that time the Reick-McJunkin Dairy Co. of Pennsylvania and the Hydrox Corporation of Chicago. The corporation immediately began a program of expansion, usually by acquiring the stock or the assets of established dairy companies. Among its first acquisitions was Sheffield Farms Co., Inc., which is the largest fluid-milk distributor in the New York metropolitan area. In rapid succession, National Dairy Products Corporation acquired fluid-milk and ice-cream facilities in most of the large cities of central and eastern United States. Its largest single acquisition was the property and other assets of the Kraft-Phenix Cheese Corporation. This latter corporation itself had previously acquired control of more than 50 separate dairy companies, including Southern Dairies, Inc., which had extensive facilities throughout the Southern and Southeastern States.

By the end of 1930 the National Dairy Products Corporation was doing business in most parts of the country east of the Mississippi and in several foreign countries. During the 10-year period, 1924–33, it acquired control of 331 separate dairy companies, 194 of them directly and the remainder as subsidiaries of acquired companies (9, p. 237).² The corporation made its most rapid expansion in the years 1928, 1929, and 1930, and since that time has grown comparatively little.

² Italic numbers in parentheses refer to Literature Cited, p. 63.

The National Dairy Products Corporation handled 7,177,041,000 pounds of fluid milk and milk equivalent in 1934, which was 9.4 percent of the total volume of milk moving into commercial channels in the United States that year (10, p. 81). For certain products and in some market areas, however, the corporation is much more important than this percentage would indicate. It is estimated that for the United States as a whole, this corporation is handling more than 21 percent of the total volume of ice cream consumed, this percentage in some States running as high as 40 to 50 percent (10, p. 89). Through the Kraft-Phenix Cheese Corporation, it handles approximately one-third of the total supply of cheese in the United States. In the case of fluid milk only, the corporation is estimated to be distributing about 10 percent of the total volume for the country as a whole, with the percentage running up to 30 to 50 percent in most cities in which it has distributive facilities (10, pp. 87-88). Most of the corporation's business is in fluid milk and cream, ice cream, and cheese. It is comparatively unimportant in the handling of butter and evaporated milk.

THE BORDEN CO.

The Borden Co. is similar in size and general character of its operations to the National Dairy Products Corporation. It was incorporated in 1899, succeeding a business originally established in 1857 to manufacture condensed milk but subsequently developing an extensive fluid milk business.

Prior to the 1920's The Borden Co. had a steady but comparatively slow rate of growth. Its early expansion represented mainly the growth of its own business rather than the acquisition of other dairy companies. In this respect it differed from the National Dairy Products Corporation, which was organized to consolidate the operations of numerous going concerns and whose growth was due almost entirely to the purchase of additional dairy companies.

In the latter part of the 1920's The Borden Co. also began the acquisition of other companies. From 1928 to 1932 it acquired 207 separate dairy enterprises located in 18 different States (10, App. table 3). Among the largest of its earlier purchases were the Reid Ice Cream Corporation, the J. M. Horton Ice Cream Co. Inc., the Gridley Dairy Co., and the Weiland Dairy Co. In 1929 it added the Dairy Dale Co., the Casein Co. of America, and Central Distributors, Inc.

As of 1934, the milk and milk products handled by The Borden Co. were equivalent to about 6.8 percent of the total production of milk for commercial use. It will be recalled that the comparable percentage for the National Dairy Products Corporation was 9.4 percent. The Borden Co. handles all dairy products, although the major part of its business is in fluid-milk distribution. It ranks above the National Dairy Products Corporation in volume of condensed milk manufactured, but below it in volume of cheese, ice cream, and butter.

BEATRICE CREAMERY CO.³

Third in volume of business among the dairy corporations is the Beatrice Creamery Co., successor to a produce enterprise started in

³ The Beatrice Creamery Co. purchased the plants and other assets of the Blue Valley Creamery Co., the transaction becoming effective on Mar. 1, 1939. The operations of both concerns were of a similar nature. The Blue Valley Creamery Co. operated 14 plants with estimated annual sales of from \$10,000,000 to \$15,000,000.

Nebraska in 1891. The company had a slow but steady growth until 1925, at which time it began a program of expansion that more than doubled its sales within the short span of a few years. The main emphasis of the Beatrice Creamery Co. has always been on butter. In 1934 the company handled approximately 195,000,000 pounds (5.6 percent of the total factory production), this volume being exceeded only by that of the two largest meat packers. In addition, the company manufactures and distributes substantial quantities of ice cream and cheese, and has a fluid-milk business in a number of midwestern cities. It is not a factor in the manufacture and distribution of condensed and evaporated milk. At present, the company operates dairy-manufacturing and storage facilities in 17 States.

Like the other large dairy companies, the Beatrice Creamery Co. has integrated the distributive functions up to the retailer. It has branch houses in many of the larger cities for making sales of dairy products direct to grocers, hotels, and in the case of fluid milk, to consumers. One of the reasons back of its expansion program has been the need for developing a "family" of dairy and poultry products to help carry the overhead costs of a vertically integrated marketing system.

FAIRMONT CREAMERY CO.

Dollar sales of the Fairmont Creamery Co. rank fourth among those of the dairy corporations (fig. 1). It conducts a business similar in character to that of the Beatrice Creamery Co., but on a somewhat smaller scale. Although this company doubled its sales during the decade of the 1920's by the acquisition of many smaller companies, its growth did not keep pace with that of the other large dairy corporations.

CARNATION CO. AND THE PET MILK CO.

The Carnation Co. and the Pet Milk Co. are the leading factors in the manufacture and distribution of condensed and evaporated milk. The two of them together handle about one-third of the total volume of these products produced, practically all of which they manufacture in their own plants.

The Carnation Co. was organized shortly after the World War for the manufacture and sale of canned milk. Most of the company's business is still with this product, although it subsequently acquired facilities for distributing fluid milk in a number of western cities. The Pet Milk Co. is also interested mainly in condensed and evaporated milk, for the manufacture of which it operates about 30 plants in various parts of the country.

MEAT PACKERS AND GROCERY CHAINS IN RELATION TO THE DAIRY INDUSTRY

In addition to the specialized dairy companies just described, the two other types of large-scale corporate handlers of dairy products are the meat packers and the grocery chains. The meat packers have been important factors in the distribution of butter and cheese for many years, but the entrance of the grocery chains into the dairy field is comparatively recent.

Some idea of the relative size and rate of growth of the leading grocery chains, dairy companies, and meat packers may be obtained

from figure 2. Meat packing is an industry that has been characterized by large-scale organization for years, but this development in grocery retailing has come chiefly since the World War. It should be noted that the dollar sales of the corporations shown in figure 2 relate to sales of all goods, and may not accurately represent the changes in the volume of dairy products handled.

The meat packers distribute dairy products to their route customers (retailers and institutions) along with meats. In point of volume handled, they outrank even some of the large dairy companies for butter and cheese. To a lesser extent they have gone into the manufacture and distribution of condensed and evaporated milk, but they do not distribute fluid milk.

The significance of the grocery chains for dairy marketing extends far beyond the function of retailing. To an increasing extent the

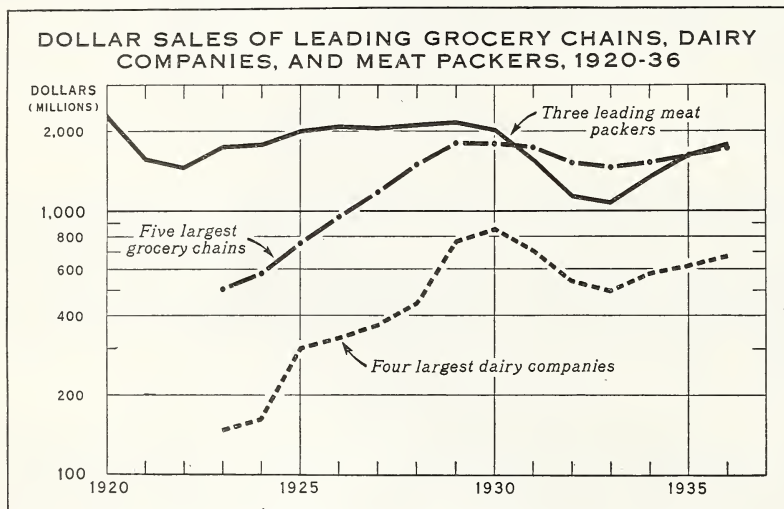


FIGURE 2.—The leading meat packers have been sizable corporations for many years, but large-scale dairy companies and grocery chains are for the most part post-war developments.

larger chains are buying their butter and cheese direct from creameries and cheese factories, or from marketing cooperatives that serve as an intermediary between the two. The chains have not yet gone much into the manufacture of butter and cheese, although some of them have facilities for assembling butter and for the warehousing of cheese. The dairy-manufacturing activities of the chains are confined mainly to condensed and evaporated milk, in which field some of them are very important factors.

GROWTH OF LARGE-SCALE PRODUCER COOPERATIVES

The producers' cooperative movement in the dairy industry began over a half century ago but not until recent years did it develop what might be termed large-scale marketing organizations. Cooperative marketing in this industry first took the form of producer-owned creameries and cheese factories and their handling of the product seldom extended beyond the point of local manufacturing and sale to the private wholesale assembler. But this development furnished the basis for the

subsequent organization of cooperative sales agencies, several of which now distribute dairy products on a regional and even a national basis.

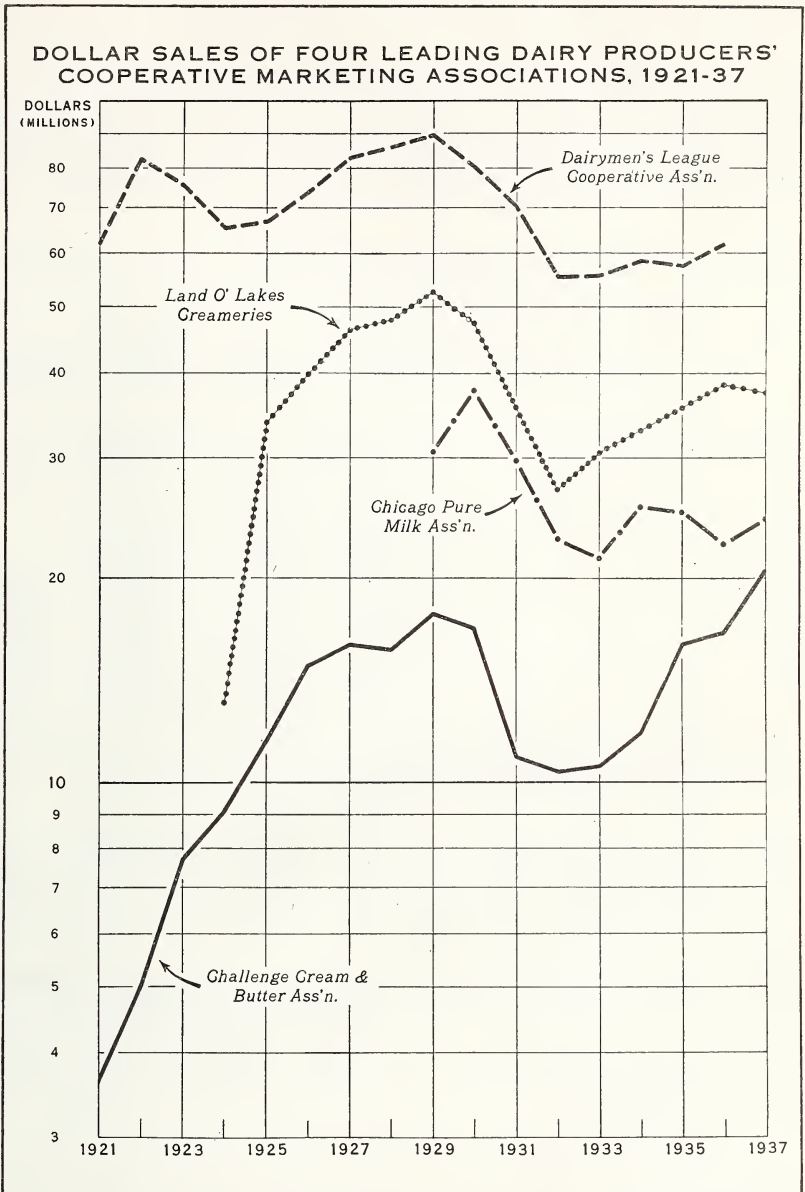


FIGURE 3.—Several dairy producers' cooperatives do business on a large scale, but the growth of these cooperatives has not kept pace with that of private corporations in this field.

Dollar sales of four of the largest dairy cooperatives in the United States are shown in figure 3 and table 2. The Dairymen's League

Cooperative Association, Inc., is not only the largest fluid-milk marketing cooperative, but is also larger than those cooperatives that market primarily manufactured products. During the last 15 years its sales have varied from 55 to 90 million dollars per year, the variation being due in large part to changes in the level of milk prices to farmers. Land O'Lakes Creameries, Inc., is the largest cooperative selling organization that handles primarily manufactured dairy products. It serves mainly cooperative creameries and cheese factories located in Wisconsin, Minnesota, and the Dakotas. Sales of this organization have ranged from about 27 to 47 million dollars per year from 1925, its first full year of operation, to 1937.

TABLE 2.—Dollar sales of four leading dairy producers' cooperative marketing associations, 1921-37

| Year | Dairymen's League Cooperative Association, Inc. ¹ | Land O'Lakes Creameries ² | Challenge Cream and Butter Association ² | Chicago Pure Milk Association ² |
|-----------|--|--------------------------------------|---|--|
| 1921..... | \$61,943,832 | ----- | \$3,658,176 | ----- |
| 1922..... | 82,130,902 | ----- | 5,011,591 | ----- |
| 1923..... | 75,132,468 | ----- | 7,735,719 | ----- |
| 1924..... | 65,048,895 | \$13,125,416 | 9,099,188 | ----- |
| 1925..... | 66,632,884 | 33,889,227 | 11,520,341 | ----- |
| 1926..... | 73,716,900 | 39,851,656 | 14,852,050 | ----- |
| 1927..... | 82,501,310 | 46,315,079 | 15,955,033 | ----- |
| 1928..... | 85,624,190 | 47,834,069 | 15,689,910 | ----- |
| 1929..... | 89,116,833 | 52,631,641 | 17,669,079 | \$30,071,472 |
| 1930..... | 80,165,184 | 47,221,543 | 16,787,974 | 37,696,574 |
| 1931..... | 70,156,911 | 35,734,976 | 10,938,765 | 29,746,739 |
| 1932..... | 55,140,147 | 27,009,308 | 10,408,810 | 22,803,285 |
| 1933..... | 55,454,823 | 30,494,995 | 10,565,576 | 21,387,046 |
| 1934..... | 58,218,112 | 32,841,410 | 11,802,308 | 25,372,744 |
| 1935..... | 57,275,775 | 35,566,291 | 15,874,383 | 24,883,830 |
| 1936..... | ³ 61,708,946 | 38,316,541 | 16,572,694 | 22,318,680 |
| 1937..... | ⁴ 59,300,040 | 37,378,486 | 20,521,543 | 24,320,335 |

¹ From annual report of Dairymen's League Cooperative Association, Inc. (fiscal year ended Mar. 31).

² Courtesy of Farm Credit Administration.

³ Net sales (less deductions for freight and allowances). Other years on a gross sales basis.

⁴ Dairymen's League News, June 21, 1938.

The Pure Milk Association of Chicago is somewhat similar to the Dairymen's League and operates in the Chicago fluid-milk market. The Challenge Cream & Butter Association operates on the Pacific coast and, like the Land O'Lakes Creameries, Inc., handles primarily manufactured products.

The growth of all four of the cooperatives stopped with the beginning of the depression in 1930. Their dollar sales since that time have fluctuated about in line with changes in the price of dairy products. In terms of physical product there has been little further expansion on the part of any of these corporations, and in most cases there has been a decrease.

THE DAIRYMEN'S LEAGUE COOPERATIVE ASSOCIATION, INC.

The Dairymen's League Cooperative Association, Inc., was organized in 1907 by fluid-milk producers located in New York and surrounding States. It was—and still is—primarily a bargaining organization for selling fluid milk to private distributors. At present, its volume of business is larger than that of any other dairy cooperative, its sales amounting in 1936 to more than 60 million dollars. This

exceeded the sales of all the private dairy companies, with the exception of the National Dairy Products Corporation and The Borden Co. During 1936 the league handled 2,562,713,350 pounds of milk for 35,155 dairy farmers (1, p. 7).

The operations of the league, although directed mainly toward the sale of fluid milk to distributors, are very diverse and cover a wide range of manufacturing and marketing activities. In addition to its sales to private distributors, the league itself distributes some milk at wholesale and retail through its own branches and subsidiaries. As of 1936, the volume of milk so distributed amounted to about 15 percent of its total milk receipts.

The league manufactures a considerable part of its milk into products such as cheese, milk powder, and condensed milk. The volume of such products for the last 15-year period is shown in table 3. At one time the organization operated as many as 250 country plants throughout the New York milkshed although at present this number has been reduced through consolidations and disposals.

TABLE 3.—Volume of milk receipts, class I sales and volume of dairy products manufactured by Dairymen's League Cooperative Association, Inc., 1921-37

| Year | Total milk handled | Class I sales (fluid milk) | Volume of manufactured products | | | |
|------|--------------------|----------------------------|---------------------------------|--------------|--------------|-------------------------------|
| | | | Butter | Cheese | Milk powder | Evaporated and condensed milk |
| | 1,000 pounds | 1,000 pounds | 1,000 pounds | 1,000 pounds | 1,000 pounds | 1,000 pounds |
| 1921 | 1,847,100 | | | | | |
| 1922 | 3,391,985 | | | | 1,667 | |
| 1923 | 2,774,632 | 1,269,452 | | | 2,086 | |
| 1924 | 2,447,878 | 1,256,783 | | | 1,620 | |
| 1925 | 2,272,666 | 1,291,460 | | | 1,558 | |
| 1926 | 2,216,328 | 1,351,178 | | | 1,639 | |
| 1927 | 2,345,803 | 1,397,796 | | | 3,078 | |
| 1928 | 2,495,537 | 1,436,396 | | 4,183 | 4,954 | |
| 1929 | 2,578,346 | 1,467,927 | 58 | 1,614 | 8,873 | |
| 1930 | 2,731,103 | 1,508,107 | 875 | 8,433 | 16,743 | 10,301 |
| 1931 | 3,108,776 | 1,509,860 | 1,602 | 9,017 | 33,723 | 23,334 |
| 1932 | 3,323,460 | 1,340,676 | 29 | 3,393 | 36,809 | 15,538 |
| 1933 | 2,732,728 | 1,214,509 | 587 | 2,296 | 34,036 | 16,381 |
| 1934 | 2,559,587 | 1,226,356 | 1,527 | 4,801 | 31,373 | 14,228 |
| 1935 | 2,385,992 | 1,310,688 | 1,332 | 299 | 30,420 | 9,762 |
| 1936 | 2,562,713 | 1,344,703 | | | 23,073 | |
| 1937 | 2,386,156 | 1,360,676 | | | | |

Total milk handled and class I sales from annual reports of the Dairymen's League Cooperative Association, Inc.; volume of manufactured products provided through the courtesy of Farm Credit Administration.

The league was led into these manufacturing activities mainly in order to dispose of the surplus above fluid-milk needs in the New York milkshed. Receiving stations and manufacturing plants were acquired by the league not so much for the purpose of building an integrated distributive system as to hold control over the milk produced in the area (10, pp. 34-35). The objectives and the forces back of the league's growth were therefore somewhat different from those of cooperatives like the Land O'Lakes Creameries, Inc., and the Challenge Cream & Butter Association, the function of which is mainly to serve as a wholesale assembling and distributing agency for local creameries and cheese factories.

LAND O'LAKES CREAMERIES, INC.

Land O'Lakes Creameries, Inc., began operating as the sales agent for a group of cooperative creameries in Minnesota and Wisconsin in 1924. From 1921 to 1924 it had operated as a general service organization under the name Minnesota Cooperative Creameries Association, furnishing member creameries with general field service and improving the quality of butter and creamery operations. Prior to 1924 the creameries in these States sold their products mainly to private wholesale assemblers and commission merchants on an individual creamery basis.

Land O'Lakes Creameries, Inc., originally built its business around butter, but in recent years has handled increasing quantities of other dairy and poultry products (table 4). Its volume of butter declined substantially after 1930, but there has been an increase in several other lines of its business, notably cheese. In 1934 it entered into an arrangement with the National Cheese Producers Federation (a cooperative handling cheese for Wisconsin and Minnesota factories) to sell and distribute part of the cheese assembled by the latter agency. The sharp increase in Land O'Lakes Creameries, Inc. cheese sales during the last few years is due mainly to this arrangement which was continued with the Wisconsin Cheese Producers' Cooperative, successors to the cheese federation.

TABLE 4.—*Volume of dairy and poultry products handled by Land O'Lakes Creameries, Inc., 1924-37*

| Year | Butter | Cheese | Milk powder | Eggs | Poultry | Dressed turkeys |
|------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|
| | <i>1,000 pounds</i> | <i>1,000 pounds</i> | <i>1,000 pounds</i> | <i>1,000 cases</i> | <i>1,000 pounds</i> | <i>1,000 pounds</i> |
| 1924 | 32,842 | | | | | |
| 1925 | 79,107 | | | 10 | | |
| 1926 | 79,567 | | 733 | | | |
| 1927 | 84,257 | | 2,937 | | | |
| 1928 | 86,649 | | 7,865 | 108 | 1,197 | |
| 1929 | 93,115 | | 20,819 | 53 | 3,396 | |
| 1930 | 100,993 | | 19,150 | 106 | 3,272 | |
| 1931 | 98,215 | | 13,193 | 113 | | 2,927 |
| 1932 | 98,138 | 4,539 | 12,625 | 125 | 4,243 | 5,541 |
| 1933 | 98,392 | 7,084 | 5,328 | 107 | 4,818 | 5,959 |
| 1934 | 85,018 | 23,250 | 5,419 | 153 | 4,074 | 4,811 |
| 1935 | 78,816 | 24,074 | 9,063 | 155 | 4,478 | 4,022 |
| 1936 | 74,154 | 21,329 | 5,131 | 216 | 2,902 | 5,810 |
| 1937 | 70,941 | 20,319 | 8,926 | 172 | 3,560 | 4,778 |

Compiled as follows: 1924-34, from Fetrow (3, p. 26); 1935-37, courtesy Farm Credit Administration.

Land O'Lakes Creameries, Inc., operates practically no manufacturing facilities of its own, although some processing, like packaging butter and dressing turkeys, is incidental to its sales service. At present about 400 dairy-manufacturing plants sell their products through this organization. In addition to its assembling, warehousing, and selling service, it employs a staff of field agents to help its members with plant problems and quality improvement, and furnishes them with manufacturing supplies and equipment on a cooperative basis.

Land O'Lakes Creameries, Inc., is a vertically-integrated marketing organization that has sought to carry the product as far toward the consumer as possible. The distributive functions it performs are wholesale assembling, warehousing, grading and branding, and selling

to the trade in wholesale and job lots. Most of the products it handles are shipped to its plant at Minneapolis or to branch warehouse units at Chicago and Duluth where the products are graded and repacked under the trade-mark of the cooperative. Emphasis has been placed on quality and uniformity, and the organization has sought to make its product known to consumers through brand advertising. It operates branch jobbing houses in a number of the larger cities where sales are made direct to retailers, hotels, and local institutions. Sales are also made to corporate and cooperative chains most of which distribute the product under Land O'Lakes brand. Since 1936 the organization has had an arrangement with Armour & Co. to distribute Land O'Lakes products under the cooperative's brand in territories where it has no jobbing facilities of its own.

CHALLENGE CREAM & BUTTER ASSOCIATION

The Challenge Cream & Butter Association is a cooperative that is similar to Land O'Lakes Creameries, Inc., in type and method of operation. Its business (the volume is about half that of Land O'Lakes Creameries, Inc.) is confined mainly to the Pacific coast. Its main product is butter, but it handles a complete line of dairy products.

The association acts as the sales agent for handling the products manufactured by its member creameries. One of its principal functions has been to develop wider market outlets for these products than the creameries could do individually. Like Land O'Lakes Creameries, Inc., it merchandises its product under its own brand and has sought to integrate as far toward the retailers as possible by establishing sales offices and jobbing branches in the large cities of its territory.

PURE MILK ASSOCIATION OF CHICAGO

Following a producers' milk strike in January 1929, and through subsequent arbitration, the Pure Milk Association gained recognition from leading milk distributors in Chicago as the marketing agency for about 14,000 farmers in the Chicago area. The association's approximate sales since that date are shown in table 2 and figure 3.

The Pure Milk Association confines its activities more strictly to bargaining in the sale of milk and cream than does the Dairymen's League. Thus the operations of country plants, either as country receiving stations or as manufacturing plants, are a minor part of its service. Membership of the Pure Milk Association extends into Wisconsin, Indiana, Michigan, and northeastern Illinois.

OTHER PRODUCER ORGANIZATIONS

A considerable number of other dairy cooperatives might be included here. Among the large fluid-milk cooperatives are Twin City Milk Producers' Association operating in the markets of Minneapolis and St. Paul and one of the oldest associations of this type in the country; the Michigan Milk Producers' Association operating in Detroit and several smaller markets in Michigan; the New England Milk Producers' Association operating in the Boston market; the Interstate Milk Producers' Association operating in the Philadelphia market; the Dairymen's Cooperative Sales Association serving Pittsburgh and several nearby towns and cities; and the Sanitary Milk

Producers', Inc., of St. Louis. These associations are interested primarily in the marketing of fluid milk and cream in their respective markets, although they are also engaged in varying degrees in the manufacture and sale of surplus milk (that not sold for fluid consumption).

In the marketing of cheese three other cooperatives might be mentioned. The National Cheese Producers' Federation with headquarters in Plymouth, Wis., was at one time the largest specialized cheese cooperative association in the United States. It handled nearly 37 million pounds of American and foreign types of cheese in 1930, its peak year. Because of financial and operating difficulties many factories left the federation. It was later reorganized and is now known as the Wisconsin Cheese Producers' Cooperative. This new association handled about 13 million pounds of cheese in 1937. The federation, as it is commonly called, has operated mostly as a wholesale assembler of cheese, but through the Land O'Lakes Creameries, Inc., it has been in a position to offer its members an integrated marketing service.

The Tillamook County Creamery Association of Tillamook, Oreg., handles from 7 to 8 million pounds of cheese annually for 18 member factories. The Wisconsin Cooperative Milk Pool operates a cheese warehouse at Green Bay, Wis., and handled approximately 12 million pounds of cheese on a brokerage or check-off basis in 1937.

Several district butter-marketing organizations perform sales service for creameries on a brokerage basis. Among these are the Iowa State Creameries, which sold 16 million pounds of butter for 72 creameries in 1936; the Midwest Producers' Creameries, Inc., of Indianapolis, representing about 20 creameries in Indiana and Michigan and handling approximately 25 million pounds of butter per year; the United Dairymen's Association of Seattle, marketing about 15 million pounds of butter per year; and the Dairy & Poultry Cooperative, Inc., handling butter for about 20 creameries in the Central West. These cooperative selling agencies, together with those previously mentioned, probably sell approximately 20 percent of the creamery butter produced in this country annually (3).

FINANCIAL TENDENCIES OF THE LEADING DAIRY COMPANIES

The scale and character of operations carried on by the leading dairy corporations have now been indicated. The financial tendencies shown by such corporations during the last 12 or 15 years are next considered. By the term "financial tendencies" is meant the changes that have taken place from year to year in capital structure and investment, in earnings, in rates of return on invested capital, and in profit margins.

CAPITAL STRUCTURE

The capitalization of a corporation consists of the par or stated values of its outstanding capital stock, its surplus and surplus reserves, and its long-term debt as measured by bonds outstanding. The sum of these items represents the approximate amount of capital invested directly or indirectly in the business, except insofar as the assets may be carried on the books of the company at a valuation differing from their actual cost. Capitalization as here defined should not be confused with authorized capital stock under articles of incorporation.

A change in capitalization is likely to be due to one or more of the following factors: (1) A change in investment resulting from an increase or decrease in the size of the business; (2) additions to or deductions from surplus arising from operating profits, losses, or dividend payments; and (3) a revaluation of assets, either up or down. Corporations sometimes revalue their assets for a number of reasons. In some instances, fixed assets and goodwill are written up in value when companies are merged or consolidated. Asset values may also be changed in response to changing business conditions. Items like goodwill and capital surplus arising from appreciation of assets have been deducted from the capitalization in order to provide a closer approximation to invested capital. But even so, the figures given here may not represent exactly the amount of invested capital, which is a qualification to be kept in mind throughout the discussion.

Table 5 shows the total capitalization of the three largest dairy corporations, divided into capital stock, surplus and surplus reserves, and bonds. First to be noted is the more than five-fold increase in capitalization from 1924 to 1930. This provides a fairly accurate index of the growth of these companies during this period. Since 1930 there has been a decrease in their capitalization from about 371 million dollars to around 280 million. Most of this decrease, however, reflects a write-down of asset values and a reduction in the earned surplus rather than a decrease in the actual size of their enterprises.

TABLE 5.—Total capitalization of the three leading dairy companies, divided into capital stock outstanding, long-term bonds, and surplus ¹

| Year | Total capitalization ² | Capital stock | Bonded indebtedness | Surplus and surplus reserves |
|------|-----------------------------------|---------------|---------------------|------------------------------|
| | 1,000 dollars | 1,000 dollars | 1,000 dollars | 1,000 dollars |
| 1923 | 60,176 | 42,431 | 416 | 17,329 |
| 1924 | 68,158 | 47,968 | 499 | 19,691 |
| 1925 | 104,166 | 58,385 | 20,158 | 25,623 |
| 1926 | 127,739 | 71,579 | 19,393 | 36,767 |
| 1927 | 141,678 | 78,829 | 16,490 | 46,359 |
| 1928 | 219,015 | 105,249 | 48,838 | 64,928 |
| 1929 | 303,441 | 170,424 | 48,558 | 84,459 |
| 1930 | 371,407 | 194,492 | 80,151 | 96,764 |
| 1931 | 351,495 | 190,069 | 76,917 | 84,509 |
| 1932 | 337,953 | 187,007 | 74,526 | 76,420 |
| 1933 | 315,150 | 174,054 | 69,624 | 71,472 |
| 1934 | 306,276 | 169,835 | 68,215 | 68,226 |
| 1935 | 280,003 | 144,571 | 67,766 | 67,666 |
| 1936 | 282,744 | 144,104 | 66,552 | 72,088 |
| 1937 | 280,523 | 143,858 | 64,039 | 72,626 |

¹ The companies included are the National Dairy Products Corporation, The Borden Co., and the Beatrice Creamery Co.

² Goodwill, reacquired treasury stock, and capital surplus arising from appreciation of asset values have been deducted to obtain a closer approximation to the actual capital invested.

Compiled from the consolidated balance sheets of the companies as published in Moody's Manual of Investments. For the last 4 years these statements have been checked with those filed by the companies with the Securities and Exchange Commission.

Only one of the three companies had any bonded indebtedness.

All of the companies greatly increased their surplus in the years before 1930 (fig. 4). Their total earned surplus was nearly 97 million dollars in 1930, as compared with nearly 20 million in 1924. These figures indicate that earnings have provided roughly 25 percent of the increase in capitalization of these dairy companies from 1923 to 1930.

After 1930 their operating income was sharply curtailed as a result of the depression. In some years, dividends on stock were paid partly out of earned surplus, which accounts for some reduction in this item during recent years.

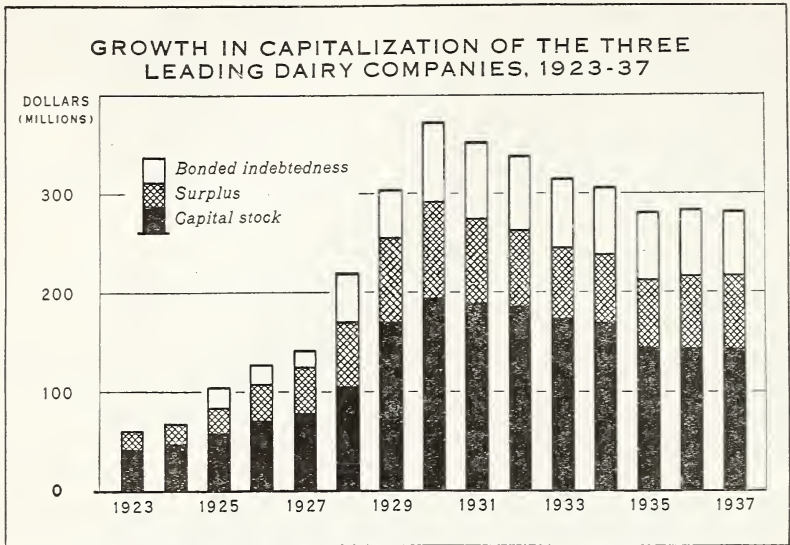


Figure 4.—A considerable part of the capital used by the three leading dairy companies was obtained from earnings.

EARNINGS AND RATES OF RETURN ON CAPITAL

Earnings of capital investment in marketing enterprises represent one of the component parts of the marketing spread for dairy products. For this reason producers and consumers have an interest in the amounts of such earnings and in the trends they show from year to year.

The earnings data given here have been compiled from the regularly published financial statements of the four leading dairy corporations. They represent gross sales minus cost of sales, operating expenses, and depreciation. In other words, they are the amount of money available for dividends on capital stock, interest on bonded debt, additions to net worth, and Federal income taxes. Salaries and bonuses of officers are not included as part of earnings, as these are usually reported as an operating expense.

Table 6 shows the combined earnings of the four leading dairy companies, expressed in terms of actual amounts and as a percentage of capitalization. Their earnings increased from about 16.5 million dollars in 1925 to nearly 57.5 million in 1930. This increase is attributable mainly to the growth of the companies rather than to an increasing rate of profit. The earnings figure fell as low as 16.6 million dollars in 1933, but had increased by 1937 to 23 million.

TABLE 6.—Earnings and rates of return for the leading dairy companies, 1925-37¹

| Year | Four leading dairy companies ² | | Rate of return for 10 dairy companies ³ | Year | Four leading dairy companies ² | | Rate of return for 10 dairy companies ³ |
|------|---|----------------------------------|--|------|---|----------------------------------|--|
| | Total earnings | Rate of return on capitalization | | | Total earnings | Rate of return on capitalization | |
| | <i>1,000 dollars</i> | <i>Percent</i> | <i>Percent</i> | | <i>1,000 dollars</i> | <i>Percent</i> | <i>Percent</i> |
| 1925 | 16,586 | 16.86 | | 1932 | 25,656 | 7.12 | 6.34 |
| 1926 | 21,953 | 17.05 | | 1933 | 16,641 | 4.86 | 4.39 |
| 1927 | 23,319 | 16.10 | | 1934 | 18,582 | 5.70 | 5.14 |
| 1928 | 32,482 | 18.01 | | 1935 | 21,230 | 6.89 | |
| 1929 | 50,551 | 18.35 | 15.66 | 1936 | 29,658 | 10.03 | |
| 1930 | 57,445 | 16.22 | 14.16 | 1937 | 23,066 | 8.22 | |
| 1931 | 48,597 | 12.86 | 12.29 | | | | |

¹ Earnings represent the amount of money available for interest on bonded indebtedness, additions to net worth, Federal income taxes, and dividends to capital stock. Rate of return on invested capital has been computed by dividing these earnings by capitalization of the companies, as shown in table 5.

² Includes National Dairy Products Corporation, The Borden Co., Beatrice Creamery Co., and the Fairmont Creamery Co.

³ Figures in this column were obtained by the Federal Trade Commission (9, table 178, p. 853). Changes from year to year in the Commission's figures (col.3) for 10 companies compare closely with those obtained by taking earnings as a percentage of capitalization for the 4 leading companies (col. 2).

The profitability of a corporate enterprise from the standpoint of the public is usually measured by the rate of return on invested

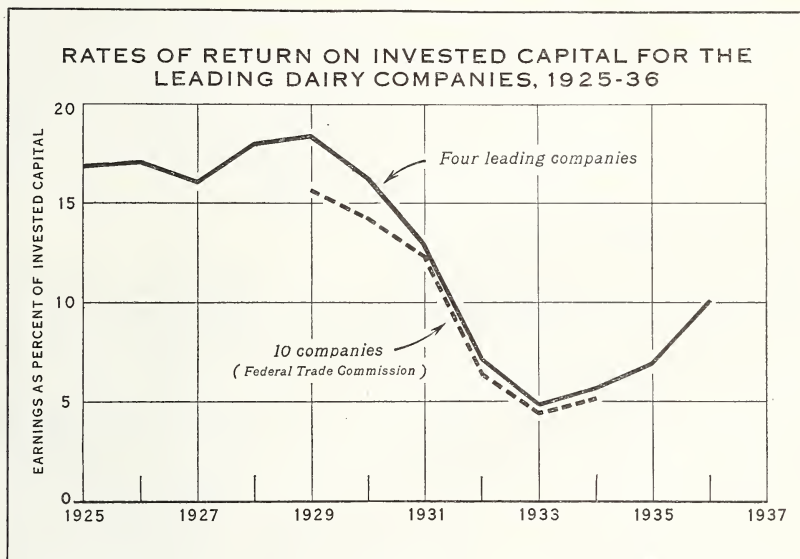


FIGURE 5.—Earnings of the dairy companies fell off sharply as a result of the depression, but have increased substantially during recent years.

capital. Using the adjusted capitalization of the companies as a measure of their total capital, the rates of return for the four largest dairy corporations are shown in column 3 of table 6. The rates thus obtained may be compared with those found by the Federal Trade Commission for 10 companies for a more limited period, as shown in column 4 of the table (fig. 5).

The large dairy companies earned from 16 to 18 percent on their capitalization in the years immediately preceding the depression. The rate fell to less than 5 percent in 1933, rose to 10 percent in 1936,

and was over 8 percent in 1937. The regular corporate financial statements are not complete enough to warrant a conclusion as to whether these rates of return, based as they are on capitalization, are reasonable or unreasonable at any given time. But they can be used to indicate changes in profitability from year to year. The closeness with which they compare with the rates of the return found by the Federal Trade Commission in its more thorough investigation give added evidence of the reliability of the former.

Another ratio that is of interest is the profit margin. The profit margin indicates the proportion of the sales dollar represented by earnings. It is computed by dividing the dollar sales of a company by its earnings. The percentage thus obtained is not to be confused with the rate of return on capitalization. What it represents is the proportion of the sales dollar retained for the payment of interest, Federal taxes, and dividends on stock.

The average profit margins of the four leading dairy companies since 1925 range from 7.27 percent in 1928 to 3.21 percent in 1934 (table 7). Several factors, such as frequency of turnover, prudent investment, and risk, would need to be taken into consideration in determining the reasonableness of these profit margins.

TABLE 7.—*Profit margins of four leading dairy companies, 1925-37*¹

| Year | Average | Year | Average | Year | Average |
|-----------|----------------|-----------|----------------|-----------|----------------|
| | <i>Percent</i> | | <i>Percent</i> | | <i>Percent</i> |
| 1925..... | 5.54 | 1930..... | 6.72 | 1935..... | 3.42 |
| 1926..... | 6.63 | 1931..... | 6.89 | 1936..... | 4.40 |
| 1927..... | 6.30 | 1932..... | 4.75 | 1937..... | 3.30 |
| 1928..... | 7.27 | 1933..... | 3.36 | | |
| 1929..... | 6.65 | 1934..... | 3.21 | | |

¹ Profit margins are earnings as a percentage of dollar sales.

If the profit margins were figured as a percentage of the total marketing spread then the percentages would probably be nearly twice as high. Even so, something more than the profit margin must be attacked, if major reductions are to be made in total marketing spreads. The point is that salary and wage rates, supply costs, plant and equipment costs, and general operating efficiency have more to do with determining the marketing spread for dairy products than do the earnings to capital invested in marketing enterprises.

LARGE-SCALE ORGANIZATION AND PLANT OWNERSHIP IN WISCONSIN⁴

One of the most important aspects of large-scale organization is the entrance of the large companies into the field of dairy manufacturing. This has resulted not only in a change in the ownership of local dairy plants, but also in the size and type of such plants and even in the manufacturing technique itself. The effects of these changes on manufacturing efficiency and the costs of processing milk products are clearly of direct concern to dairy producers.

No less important are the questions of local competition and of proprietary control over plant operations. Through their coopera-

⁴ Many of the data presented in this part of the publication were compiled in cooperation with the crop-reporting service of the Wisconsin Department of Agriculture and Markets and the U. S. Department of Agriculture. W. H. Ebling, senior agricultural statistician, and W. D. Bormuth, assistant agricultural statistician in charge of dairy statistics, assisted in tabulating the material and made helpful suggestions in regard to its analysis.

tive associations, producers control a considerable part of certain types of local manufacturing plants, such as creameries and cheese factories. They have never been prominent in the manufacture of evaporated milk. In recent years large private corporations have extended their proprietary control over primary dairy plants. This has been done through the merging of smaller companies, through purchase, and through construction. They have been particularly active in the operation of plants with sufficient size to handle large quantities of milk and with equipment for diversified manufacturing operations.

Small private and cooperative plants have felt the brunt of this kind of competition. Some cooperatives have attempted to meet it through larger plant units with equipment for manufacturing dry milk and casein and through federation of local units for buying supplies, for selling dairy products, and for the development of plant field service. The preservation of local competition for the producers' milk by modern plants of comparable efficiency is essential if farmers are to share fully in the benefits arising from the newer methods of manufacturing and distributing dairy products.

Centralization of control in the operation of primary dairy plants varies much more than might be expected from the general description of large organizations. For more detailed information as to the changes that are taking place in the type and ownership of dairy-manufacturing plants as a result of large-scale organization, it was necessary to confine the study to a limited area. Wisconsin was chosen because it easily leads in total milk production and because the uses of milk in that State are widely diversified.

TABLE 8.—Number of dairy plants by type and receipts of milk from farms, Wisconsin, 1935

| Type of plant ¹ | Dairy plants | | Receipts of milk from farms ² | | Average volume of milk received per plant |
|---|--------------|--------------------------|--|--------------------------------------|---|
| | Total | Percentage of all plants | Total | Percentage of receipts at all plants | |
| | Number | Percent | 1,000 pounds | Percent | 1,000 pounds |
| Creameries..... | 329 | 11.4 | 2,767,143 | 27.4 | 8,411 |
| American-cheese factories..... | 1,467 | 50.9 | 2,627,235 | 26.0 | 1,791 |
| Condenseries..... | 36 | 1.2 | 1,092,769 | 10.8 | 30,355 |
| Foreign-cheese factories..... | 473 | 16.4 | 787,867 | 7.8 | 1,666 |
| Flexible plants..... | 45 | 1.6 | 761,634 | 7.5 | 16,925 |
| Fluid-milk plants..... | 136 | 4.7 | 503,838 | 5.0 | 3,705 |
| Fluid-milk receiving stations..... | 41 | 1.4 | 485,854 | 4.8 | 11,850 |
| Condensery receiving stations..... | 27 | .9 | 385,535 | 3.8 | 14,279 |
| Combination creameries and cheese factories..... | 66 | 2.3 | 366,015 | 3.6 | 5,546 |
| General receiving stations..... | 23 | .8 | 119,819 | 1.2 | 5,210 |
| Cream-receiving stations..... | 178 | 6.2 | 111,137 | 1.1 | 624 |
| Combination American- and foreign-cheese factories..... | 48 | 1.7 | 95,861 | .9 | 1,997 |
| Ice-cream plants..... | 15 | .5 | 8,458 | .1 | 564 |
| All plants..... | 2,884 | 100.0 | 10,113,165 | 100.0 | 3,507 |

¹ Plants were classified on basis of their utilization of milk. If a large percentage of the milk (75 percent or more) was used for 1 purpose, such as manufacture of butter, the plant was classified on basis of that 1 product. Otherwise, the plant was classed as a combination or flexible plant. By this method, it is seen that a plant may fall into 1 type in a given year, and into another type in another year, depending on the product manufactured.

² Includes milk equivalent of farm-separated cream.

As a background against which to discuss dairy manufacturing in Wisconsin, the approximate numbers and types of dairy plants in the State are shown in table 8. In numbers, the cheese factories greatly exceed all other types of dairy plants as they comprise 69 percent of the

total number. In terms of milk receipts, however, other plants assume relatively greater importance. Of the total milk receipts from farms in Wisconsin in 1935, creameries handled approximately 27 percent; cheese factories (both American and foreign), about 33 percent; condenseries and condensery receiving stations, 15 percent; fluid-milk plants and receiving stations, 10 percent; and all other types of plants, 15 percent. It is believed that these data are reasonably complete for the State as a whole.

OPERATING CONTROL BY TYPE OF PLANT

The number of primary plants in Wisconsin operated by different types of proprietors, and the quantity of milk handled by these plants, is shown in table 9. Particularly significant is the fact that the national companies had only 134 of the 2,884 local dairy plants in the State, or 4.6 percent, and yet they handled approximately 23 percent of the total receipts of milk from farms. Their average size of plant was approximately 3 times as large as the cooperative plants, 7 times as large as the independents, 8 times as large as the local dairy chains, and nearly 11 times as large as the unclassified plants. The latter group operated 29 percent of the plants, but handled only 13 percent of the volume of milk.

TABLE 9.—*Number of dairy plants by type of proprietor and receipts of milk from farms, Wisconsin, 1935*

| Type of proprietor ¹ | Dairy plants ² | | Receipts of milk from farms ³ | | Average volume of milk received per plant |
|---------------------------------|---------------------------|--------------------------|--|--------------------------------------|---|
| | Total | Percentage of all plants | Total | Percentage of receipts at all plants | |
| | Number | Percent | 1,000 pounds | Percent | |
| Cooperative..... | 612 | 21.2 | 3,329,892 | 32.9 | 5,441 |
| Independent..... | 1,126 | 39.0 | 2,787,404 | 27.6 | 2,475 |
| National companies..... | 134 | 4.7 | 2,315,052 | 22.9 | 17,277 |
| Local dairy chains..... | 174 | 6.0 | 357,227 | 3.5 | 2,053 |
| Unclassified..... | 838 | 29.1 | 1,323,590 | 13.1 | 1,579 |
| All plants..... | 2,884 | 100.0 | 10,113,165 | 100.0 | 3,507 |

¹ Types of proprietors were established from annual reports of the concerns, from their articles of incorporation filed with the office of the Wisconsin Secretary of State, by correspondence with some of the larger companies, and from personal knowledge particularly of the cooperatives. The 5 types are as follows: Cooperatives are those associations incorporated as cooperatives or definitely known to be operating on a cooperative basis; independents are those proprietors operating as individuals or as local private companies; national companies are those firms operating as foreign (out-of-State) corporations or are known to be definitely affiliated with such companies. This definition obviously includes more companies than are described in this circular as large private companies; local dairy chains are those local private proprietors operating plants in groups of 2 or more; and unclassified proprietors did not have corporate status and no definite knowledge was available on which to classify them.

² Includes only those plants receiving milk or cream direct from farmers.

³ Includes milk equivalent of farm-separated cream.

The general figures on number and size of plants operated by different types of proprietors are likely to be misleading unless considered with respect to types of plants, such as creameries, cheese factories, and condenseries. Information bearing on this point is presented in tables 10, 11, 12, 13, and 28, and in figure 6. The size of these plants is measured here in receipts of milk from farms. This yardstick gives a uniform and simple measurement for all plants. It obviously does not measure interplant shipments of milk and cream or amounts of different products manufactured.

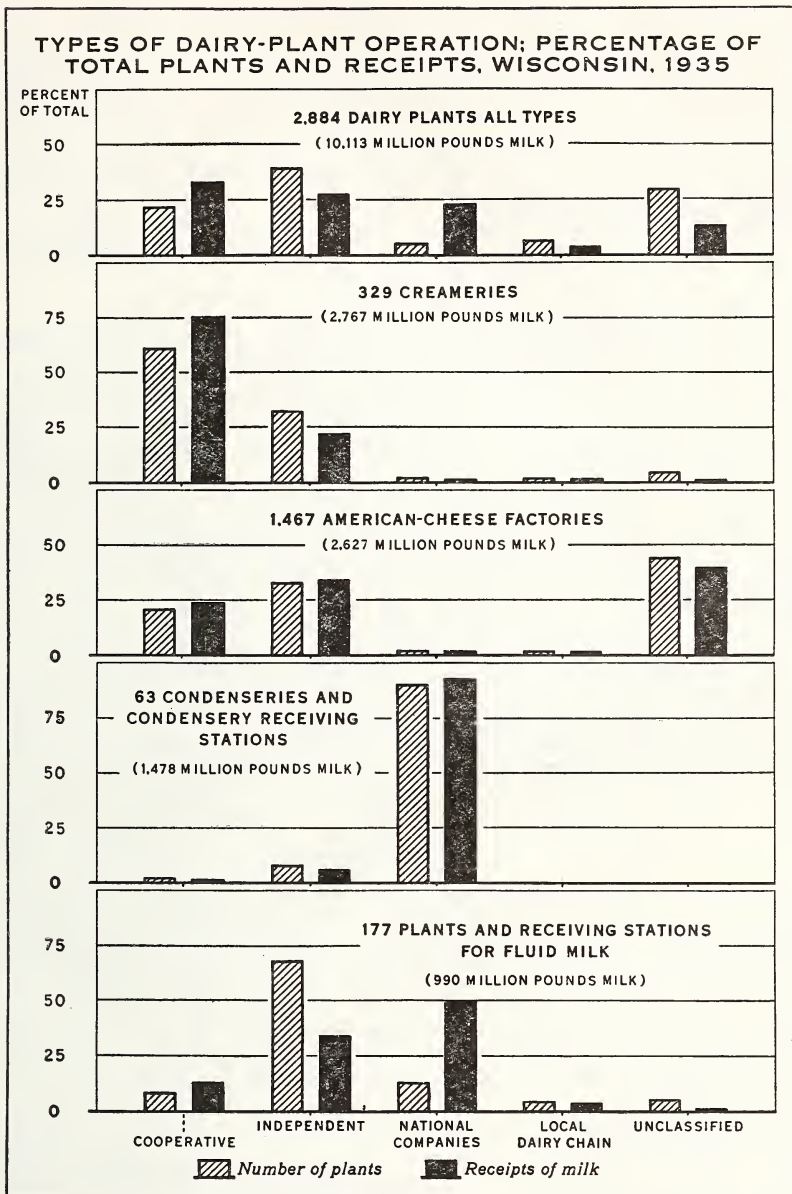


FIGURE 6.—National companies have less than 5 percent of the total number of dairy plants in Wisconsin, but handle 23 percent of the total milk produced in the State. Large companies are comparatively unimportant in the making of butter and cheese, but they manufacture nearly all of the condensed and evaporated milk produced in the State.

TABLE 10.—Number of creameries by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Type of proprietor | Creameries | | Receipts of milk from farms | | Average volume of milk received per plant |
|--|---------------|--------------------------|-----------------------------|--------------------------------------|---|
| | Total | Percentage of all plants | Total | Percentage of receipts at all plants | |
| | <i>Number</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> |
| Cooperative..... | 200 | 60.8 | 2,081,049 | 75.2 | 10,405 |
| Independent..... | 105 | 31.9 | 589,915 | 21.3 | 5,618 |
| National companies and local dairy chains ¹ | 10 | 3.0 | 72,877 | 2.6 | 7,288 |
| Unclassified..... | 14 | 4.3 | 23,302 | .9 | 1,664 |
| All plants..... | 329 | 100.0 | 2,767,143 | 100.0 | 8,411 |

¹ 2 creameries were operated by national companies and 8 by local dairy chains.

TABLE 11.—Number of American-cheese factories by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Type of plant proprietor | American-type cheese factories | | Receipts of milk from farms | | Average volume of milk received per plant |
|--------------------------|--------------------------------|--------------------------|-----------------------------|--------------------------------------|---|
| | Total | Percentage of all plants | Total | Percentage of receipts at all plants | |
| | <i>Number</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> |
| Cooperative..... | 297 | 20.2 | 623,359 | 23.7 | 2,099 |
| Independent..... | 482 | 32.9 | 881,631 | 33.6 | 1,829 |
| National companies..... | 22 | 1.5 | 45,129 | 1.7 | 2,051 |
| Local dairy chains..... | 22 | 1.5 | 45,053 | 1.7 | 2,048 |
| Unclassified..... | 644 | 43.9 | 1,032,063 | 39.3 | 1,603 |
| All plants..... | 1,467 | 100.0 | 2,627,235 | 100.0 | 1,791 |

TABLE 12.—Number of condenseries by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Type of proprietor | Condenseries | | Receipts of milk from farms | | Average volume of milk received per plant |
|-------------------------|---------------|--------------------------|-----------------------------|--------------------------------------|---|
| | Total | Percentage of all plants | Total | Percentage of receipts at all plants | |
| | <i>Number</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> |
| Independent..... | 5 | 13.9 | 95,761 | 8.8 | 19,152 |
| National companies..... | 31 | 86.1 | 997,008 | 91.2 | 32,162 |
| All plants..... | 36 | 100.0 | 1,092,769 | 100.0 | 30,355 |

TABLE 13.—Number of fluid-milk plants by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Type of proprietor | Fluid-milk plants | | Receipts of milk from farms | | Average volume of milk received per plant |
|-------------------------|-------------------|--------------------------|-----------------------------|--------------------------------------|---|
| | Total | Percentage of all plants | Total | Percentage of receipts at all plants | |
| | <i>Number</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> |
| Cooperative..... | 7 | 5.1 | 44,135 | 8.8 | 6,305 |
| Independent..... | 109 | 80.2 | 243,974 | 48.4 | 2,238 |
| National companies..... | 6 | 4.4 | 195,507 | 38.8 | 32,584 |
| Local dairy chains..... | 4 | 2.9 | 10,349 | 2.0 | 2,587 |
| Unclassified..... | 10 | 7.4 | 9,873 | 2.0 | 987 |
| All plants..... | 136 | 100.0 | 503,838 | 100.0 | 3,705 |

CREAMERIES

Fully 60 percent of the creameries in Wisconsin were operated cooperatively and these received 75 percent of the milk and milk equivalent of farm-separated cream that was delivered direct from farms to creameries in 1935 (table 10 and fig. 6). Independents operated about 32 percent of the creameries, but received only about 21 percent of the volume of milk. Other types of proprietors were relatively unimportant in creamery operations in the State. Cooperatives are therefore clearly in the lead with respect to creamery operations as measured by number of plants, total volume of milk and average size of plant.

CHEESE FACTORIES

American-type cheese factories (as shown in table 11 and fig. 6) were small for the most part and were operated mainly by cooperative associations and independents. Comparatively few American-type cheese factories are operated by either local dairy chains or by national companies. Approximately 44 percent of the American-cheese factories were not classified as to type of proprietorship, except to ascertain that they were operated by either individuals or unincorporated companies. Probably a substantial number of these unclassified plants had some degree of cooperative control over operations.

The total number of foreign-cheese factories was about one-third as large as the total number of American-cheese factories. In general, the ownership of foreign-cheese factories is similar to that of the American-cheese factories, except that a larger percentage of them are operated by local dairy chains. The small percentage of foreign-cheese plants operated cooperatively is perhaps not a fair indication of the actual degree of farmer control, for patrons of many of these plants are known to have committees that bargain with the cheese makers with respect to charges and general sales arrangements.

CONDENSERIES

Thirty-six plants were classed as condenseries, 31 of which were operated by national companies and 5 by independents (table 12). A few other plants, including 1 cooperative association, manufacture some evaporated milk. No local dairy chains or unclassified companies were operating condenseries in the State.

The typical condensery was many times larger than the average cheese factory, and over three times as large as the average creamery. Condenseries require, for efficient operation, a much larger plant and more investment in equipment and facilities than do either cheese factories or creameries. Condenseries operated by national companies averaged nearly 68 percent larger in milk receipts from farms than did those operated by independents.

Many of the larger condensing plants are served by receiving stations where milk is received from surrounding farms. At these stations the milk usually is partly condensed before being shipped to the central plant for further processing and canning. There are 27 such stations in Wisconsin, 26 of which are operated by the national companies.

FLUID-MILK PLANTS

A total of 136 plants distributed whole milk and cream for fluid consumption. Table 13 shows that 109 of these were operated by independents. Although the national companies operated only 6 of the 136 fluid-milk plants they handled nearly 39 percent of the total receipts as compared with about 48 percent by the 109 independent plants. The average size of the fluid-milk plants was, therefore, nearly 15 times as large for the national companies as for the independent plants.

OTHER TYPES OF DAIRY PLANTS

In addition to the important types just described, there are numerous other kinds of dairy plants in Wisconsin such as combination butter and cheese factories, fluid-milk receiving stations, flexible plants, cream-receiving stations, and ice-cream plants. Space does not permit discussion of the proprietorship for each of these different types, but data relative to such plants may be found in tables 28 to 35. Attention is called especially to fluid-milk receiving stations and flexible plants because of their size and the nature of their operations. National companies are the principal operators of these two types of plants in Wisconsin.

SUMMARY OF PLANTS OPERATED BY NATIONAL COMPANIES

The number of plants of different types operated by the national companies can be briefly summarized.

The two leading dairy companies—The Borden Co. and the National Dairy Products Corporation—through subsidiaries, operated 49 plants in Wisconsin in 1935. These included 8 condenseries and condensery receiving stations, 8 flexible plants, 5 fluid-milk distributing plants, 8 fluid-milk receiving stations, 17 cheese factories, and 3 of other types.

Twenty-five plants were operated by two meat-packing companies—Armour & Co. and Swift & Co. Included in this group are the plants operated by Pauly & Pauly Cheese Co., an affiliate of Swift & Co. and plants operated by Libby, McNeill & Libby in which Swift & Co. has an interest. Of these 25 plants operated by the two meat-packing companies 9 were cheese factories, 7 were condenseries and condensery receiving stations, 7 were cream-receiving stations, and 2 were creameries.

Two chain stores—The Great Atlantic & Pacific Tea Co., through its subsidiary the Whitehouse Milk Co., Inc., and the American Stores Co., through its subsidiary American Stores Dairy Co.—operated 10 plants in Wisconsin. Three of these were condenseries in which large quantities of evaporated milk were manufactured and 7 were receiving stations delivering milk to the three condenseries.

The Bowman Milk Co. of Chicago operated 7 fluid-milk receiving stations in Wisconsin. Thirteen other interstate or national companies operated 43 plants in Wisconsin; 29 of these were condenseries and condensery receiving stations, 9 were flexible plants, and 5 were of other types. Included in this group of companies were Carnation Co. with 7 plants; Pet Milk Co. with 9 plants; Nestles Milk Products, Inc., with 7 plants; United Milk Products Co. with 7 plants; and 9 other companies with a total of 13 plants.

VARIATIONS AND TRENDS IN SIZE OF PLANTS

A comparison of the average size of plants under different types of control was given in the preceding section. However, these averages alone do not show the range and trend in the size of plants of different types or the relative number of small, medium, and large plants. This is important, for volume per plant is generally recognized as one of the leading factors in efficient operation. It is also a necessary requirement for flexibility in operation and for efficient utilization of byproducts, and is even a factor in the method of sales. The shipment of milk and cream, for example, is relatively easier and cheaper from large plants than from small ones.

In general, dairy plants in Wisconsin are small. The 2,884 dairy plants in the State are classified in table 14 and figure 7 according to size and type of plant. Eighty-five percent of the plants each received less than 5 million pounds of milk from farms per year, but these plants handled only about 40 percent of the total milk receipts. On the other hand, 212 plants, or 7.4 percent, each received 10 million or more pounds of milk per year, and these handled 46 percent of the total milk receipts in the State. Except for the unclassified plants, the operators of each type had a considerable range in size of plants. The plants of national companies were in general larger than those under other types of control. Cooperative plants were next in size although a relatively larger number of them were small.

TABLE 14.—Number of dairy plants of all types by size groups, and by type of proprietor, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received | | Plants by type of proprietor | | | | | | |
|---|---------------------|-------|------------------------------|----------|--------------|--------------|--------------------|--------------------|--------------|
| | | | Total | | Coop-erative | Inde-pendent | National companies | Local dairy chains | Unclassified |
| | | | Num-ber | Per-cent | Num-ber | Num-ber | Num-ber | Num-ber | Num-ber |
| Under 5.0..... | 4,070,447 | 40.2 | 2,467 | 85.5 | 431 | 1,004 | 36 | 162 | 834 |
| 5 to 9.9..... | 1,428,803 | 14.2 | 205 | 7.1 | 89 | 85 | 19 | 8 | 4 |
| 10 to 14.9..... | 872,858 | 8.6 | 72 | 2.5 | 41 | 19 | 10 | 2 | |
| 15 to 19.9..... | 817,941 | 8.1 | 48 | 1.7 | 19 | 8 | 21 | | |
| 20 to 29.9..... | 1,381,563 | 13.7 | 57 | 2.0 | 22 | 9 | 24 | 2 | |
| 30 and over..... | 1,541,557 | 15.2 | 35 | 1.2 | 10 | 1 | 24 | | |
| Total..... | 10,113,169 | 100.0 | 2,884 | 100.0 | 612 | 1,126 | 134 | 174 | 838 |

The general trend is toward larger and fewer dairy plants in the State. The evidence on this point is reasonably clear, although the data may not be wholly comparable for different periods. In January 1924 there were 3,939 primary dairy plants in the State (6, p. 61) compared with 2,884 in 1935. During this period total milk production increased from about 9 billion to 11 billion pounds indicating that the average dairy plant increased about 70 percent in volume. It seems reasonable to expect that the average size of plant will continue to increase for some years through consolidation or absorption of many of the very small plants. Better service, utilization of by-products, and increased economies in larger plants, together with modern transportation facilities point clearly in this direction.

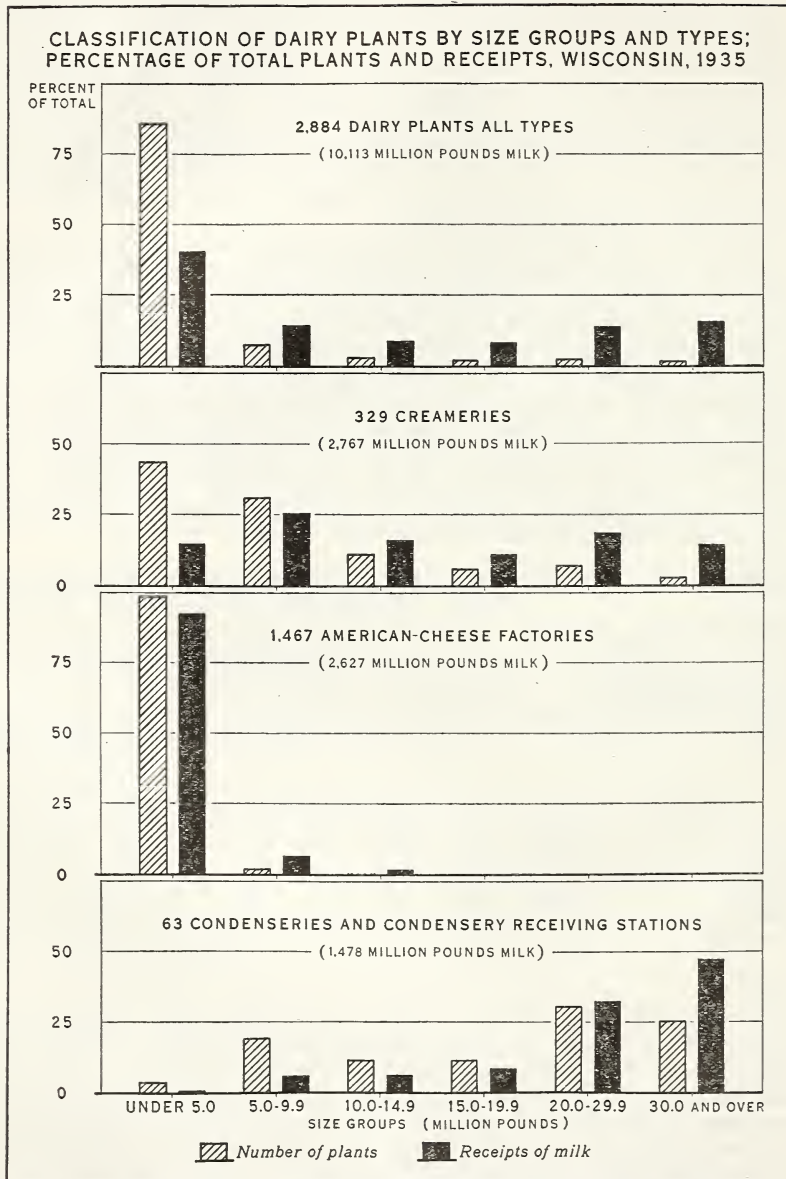


FIGURE 7.—More than three-fourths of all dairy plants in Wisconsin have a volume of less than 5 million pounds of milk per year. Nearly all of the cheese and much of the butter is made in small plants. In contrast, evaporated milk is manufactured in large plants.

A consideration of plants by type of function such as creameries, cheese factories, and fluid-milk plants gives further information on relative size. Such a classification for the important types of plants is given in figure 7.

Creameries in the State averaged about 8.4 million pounds of milk equivalent from whole milk and farm-separated cream as shown in figure 7 and table 15. Of the 329 creameries in the State, 185 plants, or 56 percent, received 5 million or more pounds of milk per plant per year; 85 plants, or 26 percent, received 10 million or more pounds; and 31 plants, or 9 percent, each handled 20 million pounds or more. The creameries with 20 million pounds of milk or more per year handled 33 percent of total milk receipts, those with 10 million pounds of milk or more per plant handled 60 percent of total receipts, and those with 5 million pounds or more per plant handled 85 percent of total milk receipts.

TABLE 15.—*Number of creameries by size groups and by type of proprietor and total receipts of milk from farms, Wisconsin, 1935*

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received ¹ | | Creameries by type of proprietor | | | | | |
|---|----------------------------------|-----------------|----------------------------------|-----------------|--------------|--------------|--|---------------|
| | | | Total | | Coop-erative | Inde-pendent | Local and national com-panies ² | Unclas-sified |
| | | | Number | Percent | Number | Number | Number | Number |
| Under 5.0..... | 1000 pounds 408,191 | Percent 14.7 | Number 144 | Percent 43.8 | Number 64 | Number 61 | Number 5 | Number 14 |
| 5 to 9.9..... | 700,162 | 25.3 | 100 | 30.4 | 64 | 32 | 4 | ----- |
| 10 to 14.9..... | 442,846 | 16.0 | 36 | 10.9 | 32 | 4 | ----- | ----- |
| 15 to 19.9..... | 301,430 | 10.9 | 18 | 5.5 | 15 | 3 | ----- | ----- |
| 20 to 29.9..... | 519,102 | 18.8 | 22 | 6.7 | 16 | 5 | 1 | ----- |
| 30 and over..... | 395,412 | 14.3 | 9 | 2.7 | 9 | ----- | ----- | ----- |
| Total..... | 2,767,143 | 100.0 | 329 | 100.0 | 200 | 105 | 10 | 14 |

¹ Includes milk equivalent of farm-separated cream.
² 2 national company plants and 8 local chain plants.

Two hundred of the three hundred and twenty-nine plants were operated by cooperatives and these were usually much larger than creameries under other types of control. Independently operated creameries were next in number with 105 plants but these were much smaller than the cooperative plants. National and local companies and unclassified creameries were relatively unimportant from the standpoint of both number and size of plants.

Considering as creameries all plants that were licensed to manufacture butter in the State, the average size increased about 40 percent from 1923 to 1935. The same general trend in size of creamery is also indicated in number of licensed creameries and total butter production in Minnesota and Iowa which, along with Wisconsin, produce 40 percent of the creamery butter of the United States.

Cheese factories by size groups and total receipts of milk from farmers, are shown in figure 7 and table 16. Cheese factories were the smallest scale dairy plants in the State. Approximately 70 percent of the 1,467 American-cheese factories in the State received less than 2 million pounds of milk per plant, and 98 percent of the factories received less than 5 million pounds of milk per plant per year. The 1,310 factories under 3 million pounds received 74 percent of total milk receipts and those factories under 5 million pounds handled about 92 percent of total milk receipts.

TABLE 16.—Number of American-cheese factories by size groups and by type of proprietor and total receipts of milk from farms, Wisconsin, 1935

| Size of plants (in terms of milk receipts from farms) (million pounds) | Total milk received | | Factories by type of proprietor | | | | | | |
|--|---------------------|---------|---------------------------------|---------|-------------|-------------|--------------------|--------------------|--------------|
| | | | Total | | Cooperative | Independent | National companies | Local dairy chains | Unclassified |
| | | | Number | Percent | Number | Number | Number | Number | Number |
| Under 5.0..... | 1,000 pounds | Percent | 1,439 | 98.1 | 287 | 468 | 21 | 22 | 641 |
| 5 to 9.9..... | 2,428,690 | 92.4 | 25 | 1.7 | 9 | 13 | ----- | ----- | 3 |
| 10 and over..... | 161,467 | 6.2 | 3 | .2 | 1 | 1 | 1 | ----- | ----- |
| | 37,078 | 1.4 | | | | | | | |
| Total..... | 2,627,235 | 100.0 | 1,467 | 100.0 | 297 | 482 | 22 | 22 | 644 |

Foreign-type cheese factories average slightly smaller than American cheese factories, but had nearly as much range in size. Distribution in size of plants of this type was about the same among the cooperatives, independents, and local chains. The two national-company plants were among the largest.

Cheese factories in the State are generally small, but there has been some increase in average size. The number of licensed cheese factories of all types decreased from approximately 2,500 in 1923 to about 2,000 in 1935 while total production of cheese was increasing in the State from 276 million to 332 million pounds. This would indicate an average increase in size of about 50 percent over a 12-year period. The change is probably due to the development of several large factories rather than a general increase in all of them.

The largest type milk plants in the State were the condenseries (fig. 7 and table 17). Of the 36 condenseries in the State none received less than 5 million pounds of milk per year direct from farms, and 27 plants received 20 million or more pounds per plant. Four condenseries had 50 million or more pounds of milk per plant, and handled 24 percent of the total receipts of milk going direct to this type of plant. Several condenseries are larger than the receipts of milk direct from farms alone would indicate. This is because of receipts of milk from feeder plants or condensery receiving stations. Fully a third as much milk is received in this way as direct from farms. The condensery receiving stations were naturally somewhat smaller than condenseries, as is shown in table 17. Less than one-third of these 27 receiving stations handled 20 million pounds or more of milk per plant.

TABLE 17.—Number of condenseries and condensery receiving stations by size groups and receipts of milk from farms, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Condensery and condensery receiving stations | | | | Condenseries ¹ | | Condensery receiving stations ² | |
|---|--|---------|---------------|---------|---------------------------|---------------|--|---------------|
| | Plants | | Milk received | | Plants | Milk received | Plants | Milk received |
| | Number | Percent | 1,000 pounds | Percent | Number | 1,000 pounds | Number | 1,000 pounds |
| Under 5.0..... | 2 | 3.2 | 6,526 | .4 | ----- | ----- | 2 | 6,526 |
| 5 to 9.9..... | 12 | 19.0 | 80,854 | 5.5 | 2 | 11,997 | 10 | 68,857 |
| 10 to 14.9..... | 7 | 11.1 | 87,306 | 5.9 | ----- | ----- | 7 | 87,306 |
| 15 to 19.9..... | 7 | 11.1 | 121,345 | 8.2 | 7 | 121,345 | ----- | ----- |
| 20 to 29.9..... | 19 | 30.2 | 479,159 | 32.4 | 14 | 353,753 | 5 | 125,406 |
| 30 and over..... | 16 | 25.4 | 703,114 | 47.6 | 13 | 605,674 | 3 | 97,440 |
| Total..... | 63 | 100.0 | 1,478,304 | 100.0 | 36 | 1,092,769 | 27 | 385,535 |

¹ 31 operated by national companies and 5 by independents.² 26 operated by national companies and 1 by cooperative.

The trend in size of these condenseries and condensery receiving stations has been definitely upward, although data for different years cannot be too closely interpreted, because many plants are licensed as condenseries that do not manufacture evaporated milk in hermetically sealed cans.

LOCAL COMPETITION FOR MILK IN WISCONSIN

A question that naturally arises when large dairy plants in Wisconsin are discussed is the geographic location of these plants within the State. This is an important indication of their competitive relationship. For this part of the analysis an arbitrary dividing line was made in size of plants. Cheese factories that receive 5 million or more pounds of milk each year and all other plants receiving 10 million or more pounds of milk were classified as large plants.

Of 2,884 primary dairy plants in the State, 246 were classified as large plants on this basis. These 246 plants represented only 8.5 percent of the total number of plants, but they handled 47.8 percent of all the milk received from farms in the State in 1935.

The location of these large plants is shown in figure 8. Included among them are 95 large creameries, located mainly in the western part of the State, 40 large cheese factories, 49 condenseries and condensery receiving stations, 32 flexible plants (those manufacturing several dairy products), and 21 fluid-milk plants.

In the western part of the State, where creameries predominate, there are more cooperative plants than large private plants. It is somewhat reversed in the southeastern and eastern parts, where milk is used more generally for evaporated milk and for sale as fluid milk and cream. Practically no large plants are operated in the extreme northern counties, where the milk production is light. A similar situation holds true for an area including parts of several counties in the south-central part of the State.

In general these larger plants, whether private or cooperative, are widely distributed in the principal dairy sections of Wisconsin. There is usually genuine competition for volume of business, and most farmers in these areas have several alternative markets frequently including differences in service, quality requirements, and price. Some exception might be noted in the purchase of milk from farmers for distribution as inspected fluid milk and cream. Even so it can hardly be said that there exists any appreciable degree of monopoly in the operation of primary dairy plants in Wisconsin.

Not only are these primary plants located in the same general territory, but in several cases they are located in the same communities. Several large fluid-milk plants, both private and cooperative, are located in Milwaukee. At least a dozen instances can be cited where two or more large dairy plants are located in the same town. Considering the fact that milk is frequently assembled at a single plant from an area nearly the size of an average county, the competitive location of the plants in figure 8 is readily apparent.

MASS DISTRIBUTION OF DAIRY PRODUCTS

Large-scale organization in the distribution of dairy products presents a somewhat different picture than the operation of primary manufacturing plants described in the preceding part of this circular.

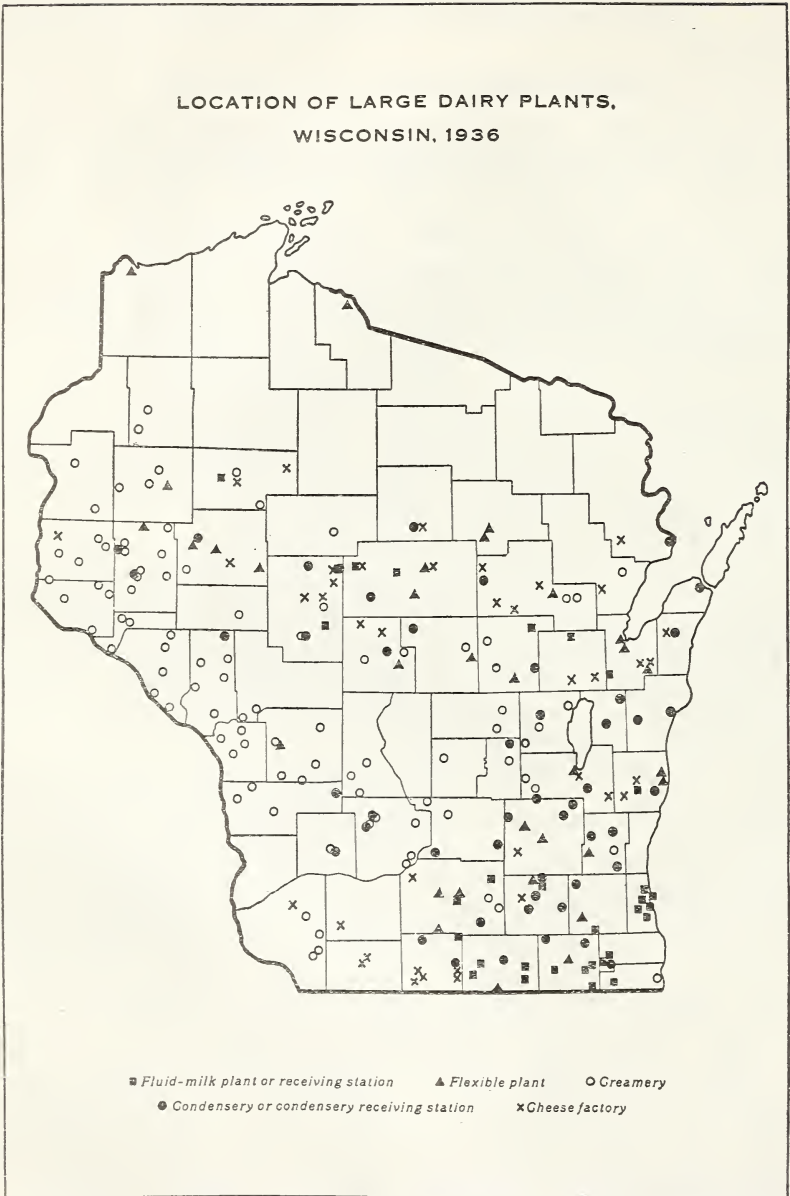


FIGURE 8.—The location and interspersed of large dairy plants in Wisconsin is such that most farmers have ready access to several of them. In addition to the large plants shown in the above figure, there are more than 2,000 small plants.

Although the large companies operate plants for manufacturing some of the products they market, they are to be thought of primarily as distributors rather than manufacturers.

Their growth has changed the entire marketing structure for dairy products. In contrast to the older distributive system comprised of handlers who perform a single function (like manufacturing, assembling, jobbing, or retailing), large-scale organizations commonly integrate several—and in some cases all—of these operations. For instance, the larger grocery chains buy part of their dairy products direct from creameries and cheese factories and, in the case of condensed milk, some of them even do their own manufacturing. The large dairy companies and meat packers do not conduct a retail business (except for fluid milk) but they have facilities for handling the product through all the distributive steps up to this point. Similarly, the larger cooperatives have begun integration from the producer end, and in some instances also carry the product as far as the retailer.

The purpose here is to describe in a general way the channels of distribution for dairy products and to show the place that the various types of large-scale handlers have in the marketing system. Among the topics to be covered are (1) the proportion of specified dairy products handled by the leading companies at each stage in the marketing process, (2) their sources of supply and sales outlets, and (3) some of the economic factors involved in the changes in marketing organization that have taken place.

PROPORTION OF SPECIFIED DAIRY PRODUCTS HANDLED BY LEADING CORPORATIONS

A general idea of the concentration of control that exists in the handling of dairy products may be obtained from table 18. (See also fig. 9.) This table gives the percentages of the total supply of the four major dairy products handled by 11 dairy companies and 10 meat packers, with the percentages of the three largest sellers of each product shown separately.

TABLE 18.—Percentage of total United States factory production of dairy products sold by principal manufacturing and distributing companies, 1934

| Commodity | Total United States production | Sales as percentages of total production | | |
|------------------------------------|--------------------------------|--|-----------------|-------------------|
| | | 11 dairy companies | 10 meat packers | 3 largest sellers |
| | <i>1,000 pounds</i> | <i>Percent</i> | <i>Percent</i> | <i>Percent</i> |
| Fluid milk..... | 30,499,000 | 17.9 | 0.01 | 15.6 |
| Butter..... | 1,696,256 | 25.4 | 18.7 | 20.8 |
| Cheese..... | 579,122 | 43.9 | 45.8 | 62.9 |
| Condensed and evaporated milk..... | 1,773,918 | 60.5 | 7.2 | 44.3 |

¹ The Borden Co., National Dairy Products Corporation, and Beatrice Creamery Co.

² Swift & Co., Armour & Co., and Beatrice Creamery Co.

³ National Dairy Products Corporation, Armour & Co., and Swift & Co.

⁴ Carnation Co., Pet Milk Co., and Whitehouse Milk Co. (subsidiary of the Great Atlantic & Pacific Tea Co.).

Federal Trade Commission (9, compiled from tables 62, 66, 67, and 68).

In the case of fluid milk and cream, 11 dairy companies distributed about 18 percent of the estimated volume of these products consumed

in all cities and villages in the United States. The three largest companies handled nearly 16 percent. These percentages would undoubtedly run much higher in the principal metropolitan markets in the country. On the other hand, no milk is handled by these companies in most of the villages and in many of the smaller cities. It frequently happens that the largest single distributor handles from 30 to 50 percent of the fluid milk in a market and the three largest distributors often handle from 60 to 90 percent.

The distribution of butter is less concentrated than that of any other dairy product. Despite the importance of the big packers and dairy companies in the handling of this commodity, none of them

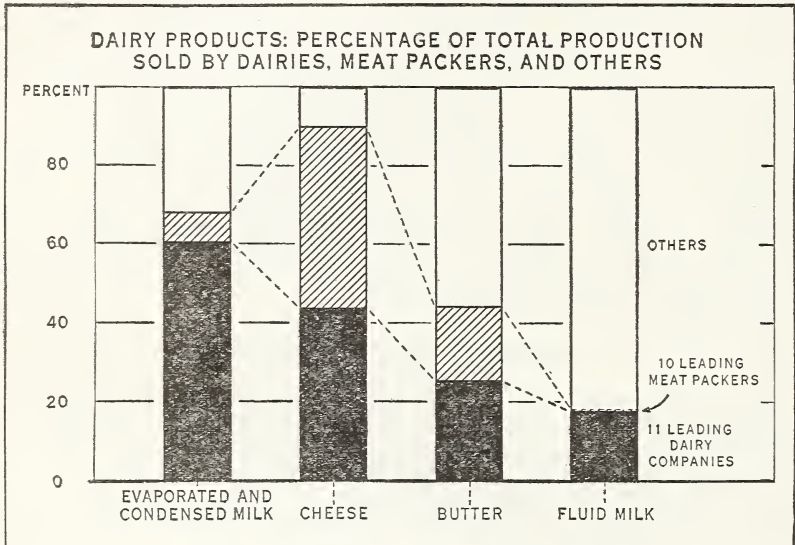


Figure 9.—Large national companies are the main factors in the distribution of cheese, and in the manufacturing of condensed and evaporated milk. They handle a comparatively small percentage of the total milk consumed in fluid form, but are much more important in most large city markets than the figures for the country as a whole would indicate.

controls any very large part of the total supply. Eleven dairy companies and ten meat packers are handling about 25 percent and 19 percent, respectively, of this total (table 18). The three largest distributors are Swift & Co., Armour & Co., and the Beatrice Creamery Co. Together they distribute around 20 percent of all butter produced. The largest single company has about 8 percent of this total supply.

Cheese is manufactured mainly in small factories operated either as producer cooperatives or by independent operators. Its distribution is largely in the hands of a half dozen firms. Cheese sales of 11 dairy companies amounted in 1934 to about 44 percent of all cheese produced, and sales of 10 meat packers to another 46 percent (table 18). Three of these companies (National Dairy Products Corporation, Armour & Co., and Swift & Co.) handled about 63 percent of the total supply and one company alone had nearly one-third of it. There

is some duplication in these figures because of intercompany sales, but this error is not large enough to affect the percentages materially.

Considerable centralization also exists in the manufacture and distribution of condensed and evaporated milk. The leading firms in this branch of the industry are a somewhat different group from those that lead in the handling of other dairy products. The three largest manufacturers of condensed milk are the Carnation Co., The Pet Milk Co., and the Whitehouse Milk Co. (subsidiary of the Great Atlantic & Pacific Tea Co.). These three companies manufacture nearly half of the total output (table 18). Next in importance are The Borden Co. and the National Dairy Products Corporation. As a group the meat packers are a less important factor in the canned milk industry than in the butter and cheese industry.

The above figures relate to the total sales of dairy products by the various companies. Some of the products they sell are manufactured in their own plants and some are purchased from independent or cooperative plants or from wholesale assemblers, produce jobbers, etc. In this respect there are important differences not only between the different dairy products, but also between different types of large-scale handlers. These will now be described for the major dairy products.

DISTRIBUTION OF FLUID MILK AND CREAM

About 30 percent of the milk produced in the United States is consumed as fluid milk and cream in cities and villages. Another 15 percent is used in this form on the farms where it is produced. For the most part, milk sold for fluid consumption is produced near where it is consumed. Fluid cream is often shipped greater distances than fluid milk, but even the main supply of fluid cream is produced near where it is consumed. This general situation is in striking contrast with milk used for manufactured products (like butter, cheese, and evaporated milk) for which the main producing centers are great distances from the principal consuming centers.

THE PLACE OF PRODUCER COOPERATIVES IN FLUID MILK DISTRIBUTION

The distribution of fluid milk and cream is carried on largely by private companies. The important exception to this is the producer-distributor—that is, an individual farmer who sells and delivers his milk direct to the consumers. Of the total milk consumed in fluid form in all cities and villages, it is estimated that 23 percent is handled by such producer-distributors.⁵ This type of distribution is relatively more important in villages and small towns where milk is not pasteurized than it is in large cities, although it is found to some extent in every fluid milk market in the country.

One phase of large-scale marketing in the dairy industry has been the organization of fluid milk producers into bargaining cooperatives for the purposes of selling their milk. Several organizations of this type (the Dairymen's League Cooperative Association, Inc., of New York and the Pure Milk Association of Chicago) were described earlier in this circular. Approximately 40 percent of the fluid milk sold in the United States is channeled through producers' cooperative associations of this kind. At least 185 producer associations represent their members in nearly as many fluid milk markets.

⁵ UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. MILK PRODUCTION UTILIZATION IN THE UNITED STATES, 1934-36. February 1938. See p. 2. [Mimeographed.]

For the most part, these associations of producers are engaged in selling their members' milk to private distributors. More than three-fourths of the milk sales of five of the larger producer cooperatives are made to such distributors (table 19). Other functions of the producer cooperatives are to check the weights and tests of milk sold to the distributors, and to bargain with the latter on the prices to be paid for milk going into the processing of milk not sold for fluid consumption. A few engage in wholesale and retail distribution of milk and cream (table 19). On the whole, however, the producer-cooperative movement is not at the present time an important factor in the actual distribution of fluid milk, its operations being confined mainly to country assembling and selling to private distributing companies (3, pp. 29-33, 5).

TABLE 19.—Sales outlets for fluid milk used by 5 producer cooperatives and 12 leading dairy corporations, 1935

| Sales outlets | 5 producer cooperatives ¹ | | 12 dairy corporations ² | |
|---|--------------------------------------|---------------------------|------------------------------------|---------------------------|
| | Quantity of milk sold | Percentage of total sales | Quantity of milk sold | Percentage of total sales |
| | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> |
| Milk and milk-products wholesalers..... | 248, 796 | 9. 28 | 56, 706 | 1. 43 |
| Milk and milk-products companies..... | 2, 207, 374 | 82. 29 | 109, 267 | 2. 75 |
| Chain grocery stores..... | 380 | . 01 | 170, 098 | 4. 29 |
| Route customers (includes sales to homes, restaurants, institutions, and stores other than chain stores)..... | 219, 272 | 8. 17 | 3, 497, 557 | 88. 18 |
| Other outlets..... | 6, 736 | . 25 | 132, 623 | 3. 35 |
| Total..... | 2, 682, 558 | 100. 00 | 3, 966, 251 | 100. 00 |

¹ New York Dairymen's League Association, Inc.; New England Dairies, Inc.; Twin City Milk Producers Association; Consolidated Dairy Products Co.; and Challenge Cream & Butter Association.

² National Dairy Products Corporation; The Borden Co.; Beatrice Creamery Co.; Fairmont Creamery Co.; Carnation Co.; Pet Milk Co.; Golden State Co.; Western Dairies, Inc.; Creameries of America, Inc.; American Dairies, Inc.; North American Creameries, Inc.; and the Great Atlantic & Pacific Tea Co. (Sales of latter company include only fluid milk sales by its manufacturing plants.)

United States Federal Trade Commission (9, compiled from tables 308, 316).

LARGE-SCALE DISTRIBUTION OF FLUID MILK BY PRIVATE COMPANIES

Because the production and use of fluid milk and cream is so localized, it would seem at first thought that the distribution of these products would not show much tendency toward large-scale organization, but it has. A major part of the business of the two largest dairy corporations is represented by sales of fluid milk and cream, and their operations in the handling of these commodities are on a national scale.

It was stated that 18 percent of the total fluid-milk sales were made by 11 dairy companies of which 3 companies had the larger part. But the distribution of fluid milk in most cities is much more centralized than these figures for the country as a whole would indicate. The percentage of total fluid-milk sales (that sold for consumption as whole milk) by the main distributors in each of five of the largest cities of Wisconsin were obtained for 1937 through the courtesy of the Wisconsin Department of Agriculture and Markets. The three largest distributors in Milwaukee handle 62 percent of the fluid-milk sales; in Racine, 72 percent; in Kenosha, 76 percent; in Madison, 91

percent; and in Sheboygan, 48 percent. In three of these five markets the largest single distributor handled about 30 percent of the total, in another, 42 percent, and in the fifth market, 48 percent. The three largest handlers in each of four cities outside Wisconsin, for which similar data were available, are as follows: Boston, 63 percent; St. Louis, 69 percent; Phoenix, Ariz., 84 percent; and San Diego, Calif., 90 percent (4, p. 14, table 14). These percentages are believed to be typical of those in most other large cities.

The distribution of fluid milk is carried on by companies that are highly integrated as to marketing functions. Most of the milk sold for fluid consumption is assembled from individual farms, and is pasteurized, bottled, and delivered to consumers by the same companies. The main exceptions to this complete integration are (1) the assembling of milk at country points by a number of the larger fluid-milk cooperatives and (2) the selling of milk through retail grocery stores. Table 19 indicates that nearly 90 percent of the fluid milk handled by 12 leading dairy corporations is sold direct to route customers (that is, consumers, restaurants, retail grocery stores, etc.). Because of the high degree of vertical integration found in fluid-milk distribution, the functionally specialized middleman is not an important element in the distributive system for this product. This was true even before the entrance of big corporations into this field.

One of the chief characteristics of the fluid-milk business is its local character. Each market usually has its independent source of supply and its municipal health ordinances, as well as other local factors. The product is produced, processed, and consumed within a single market area. The influence of market organization over prices and margins for fluid milk is therefore likely to be more local than regional or national in character.

In view of this situation it is somewhat paradoxical that national companies, distributing milk in more than a score of widely separated cities, should have developed so rapidly. No doubt some operating advantages result from large-scale purchase of equipment and supplies, from standardization of plant technique and distributive methods, and from centralized research and management. However, in the case of fluid milk these operating factors do not appear to explain the growth of national companies.

The organization of local fluid milk companies into national corporations whose capital stock is traded in on the leading stock exchanges, no doubt increased tremendously, at least for a time, the total market value of these local companies. This appears to have been a relatively more important factor in fluid milk than in the case of manufactured dairy products where a national integrated system of distribution has more importance from an operating standpoint.

LARGE-SCALE ORGANIZATION AND DISTRIBUTIVE EFFICIENCY

It is probably correct to say that the costs of distributing fluid milk could be reduced more than the costs of marketing any other dairy product, given certain changes in the distributive system. For the purpose of efficient use of plant, equipment, and personnel, it is clearly desirable that there be fewer and larger local units in fluid milk distribution in most city markets. A few studies that have been

made suggest that even further economies could be made under a unified, noncompetitive system that would eliminate much of the duplication of plant facilities and distributive services now existing in most markets (8, *pt. 4, pp. 85-113*).

Efficiency in the distribution of fluid milk is to be thought of mainly in terms of the local unit of distribution. The merging of these local units into large national companies appears to be relatively unimportant from the standpoint of distributive efficiency.

Likewise, for efficient distribution the marketing services in fluid milk distribution need not be completely integrated. In fact, several producer associations have demonstrated that they can assemble milk for the whole market and handle the surplus more effectively than where this is left to individual distributors, some of which are not well equipped to perform this service. Moreover, the handling of milk through retail stores offers the possibility of reducing marketing costs to those consumers who do not require the extra service involved in route delivery.

LARGE-SCALE HANDLING OF BUTTER

MANUFACTURE

Butter is manufactured for the most part in a large number of plants, scattered widely geographically. Many of these butter-making plants are owned cooperatively by the producers themselves and a considerable proportion of the remainder by independent plant operators.

Of the creamery butter produced in 1935 in Wisconsin, 64 percent was made in cooperative creameries, 26 percent in independent plants, and 10 percent in other types of plants. In Minnesota, 69 percent was made by cooperative creameries, 15 percent by independents, and 16 percent by centralizers (creameries that receive cream from a number of feeder stations scattered over a wide territory). Similar figures for butter in Iowa were 56, 17, and 27 percent, respectively. The classification of proprietors is not altogether comparable for these three States, but the data indicate that cooperatives manufacture approximately two-thirds of the butter manufactured in this tri-State area. This percentage is obviously higher than for the country as a whole, for it is in these States that cooperative creameries are most numerous. The Cooperative Division of the Farm Credit Administration says that cooperatives reporting to them produced 36 percent of the creamery butter manufactured in 1934 (2, *p. 35*).

Some of the national companies, such as the Beatrice Creamery Co., Swift & Co., Armour & Co., and the Fairmont Creamery Co., operate creameries in various parts of the country. The creameries they operate are usually of the centralizer type. Many are located in districts of relatively light milk production rather than in specialized milk-producing areas.

The large companies are more important as distributors of butter than as manufacturers. It is estimated that the large meat packers manufacture about half of the total volume of butter they distribute (9, *p. 248*). The dairy companies also make some of the butter they handle, much of it being manufactured from surplus milk handled in connection with their fluid-milk business. In contrast to the meat

packers and dairy companies, the grocery chains manufacture practically no butter.

For the country as a whole, butter is produced by so many types of plants and under such a variety of conditions that it is unlikely that there will be any appreciable centralization of control over its manufacture in the near future. In the principal butter-producing States, where cooperative creameries are the leading manufacturers, it is to be remembered that these plants are almost universally operated by separate plant organizations. Individual plants, whether private or cooperative, may have competitive advantages because of location, type of service, efficiency of operation, or other items.

VERTICAL INTEGRATION IN BUTTER DISTRIBUTION

The most significant aspect of mass distribution of butter is the tendency of large handlers to displace the specialized middleman by means of vertical integration. In effect, two different types of distributive systems for butter are growing up side by side—the older comprised of functionally specialized handlers and the other of vertically integrated mass distributors.

The movement of butter from points of manufacture to points of consumption is not easily outlined because of its many marketing channels. The farm-made butter as well as the butter produced in plants as an incidental part of operations is usually consumed in the localities where it is produced. A considerable quantity of creamery butter, probably 10 to 15 percent in the main producing sections, is distributed locally where manufactured. Shipments of butter from local creameries are usually made direct to large central markets like Chicago and New York, although some of it is assembled at concentration points nearer the source of production.

The assembling of butter nearer to production sources rather than in the large central markets is a comparatively new development. It is due partly to the motortruck which makes it possible to assemble butter from short distances for carlot shipment; but mainly it has come about through the efforts of large-scale handlers to deal directly with local creameries. For example, Armour & Co. operates concentration points for butter at St. Paul and Mankato, Minn., and Dubuque, Iowa. Several of the grocery chains also have interior concentration points at which butter is received from the surrounding creameries, and at which it is graded and printed for shipment direct to their wholesale warehouses. The same principle is illustrated for a large-scale producer's cooperative by Land O'Lakes Creameries, Inc., which concentrates butter either at its main warehouse in Minneapolis or at its branches in Duluth and Chicago.

Sources of supply for butter used by the larger dairy companies and meat packers are shown in table 20. Of that part of their supply which they buy rather than manufacture in their own plants, 11 dairy companies buy about 20 percent direct from creameries, 33 percent from marketing cooperatives, and 26 percent from brokers and commission houses. Most of the remainder is bought from wholesale assemblers and merchants. The meat packers obtain even a larger percentage of their purchased supplies direct from creameries and marketing coopera-

tives. Table 20 shows that 87 percent of their total purchases were made from these sources in 1935.

TABLE 20.—*Butter purchases of 11 dairy companies and 10 meat-packing companies, by sources of supply, 1935*

| Source of supply | Dairy companies | | Meat packers | |
|--|---------------------|-------------------------------|---------------------|-------------------------------|
| | Quantity purchased | Percentage of total purchases | Quantity purchased | Percentage of total purchases |
| | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> |
| Creameries and manufacturing plants..... | 26,069 | 20.4 | 101,480 | 71.3 |
| Marketing cooperatives..... | 41,846 | 32.7 | 22,293 | 15.7 |
| Brokers and commission houses..... | 33,306 | 26.1 | 16,627 | 11.7 |
| Wholesale assemblers and merchants..... | 24,429 | 19.1 | 1,823 | 1.3 |
| All other..... | 2,215 | 1.7 | ----- | ----- |
| Total..... | 127,865 | 100.0 | 142,223 | 100.0 |

Federal Trade Commission (9, compiled from table 312).

Data as to the sources of supply for butter used by the chain grocery companies are not available, but it is known that the larger systems buy most of their butter either direct from individual creameries or from producer marketing cooperatives that act as assembling intermediaries between the chains and the creameries. As a general rule, the smaller chains buy more of their butter from brokers and commission men than do the larger ones because their volume is not such as to warrant going direct to local creameries.

Large-scale handlers of butter have integrated not only toward the producers but toward the retailers as well. The sales outlets used by the leading meat packers, dairy companies, and producer cooperatives are shown in table 21.

TABLE 21.—*Sales outlets for butter used by 10 meat-packing companies, 12 leading dairy companies, and 8 producer cooperatives, 1934*

| Sales outlets | Meat packers | | Dairy companies | | Producer cooperatives | |
|------------------------------------|---------------------|---------------------------|---------------------|---------------------------|-----------------------|---------------------------|
| | Quantity sold | Percentage of total sales | Quantity sold | Percentage of total sales | Quantity sold | Percentage of total sales |
| | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> |
| Route customers ¹ | 247,674 | 78.1 | 166,810 | 38.7 | 47,181 | 31.1 |
| Chain grocery companies..... | 25,285 | 8.0 | 94,844 | 22.0 | 50,493 | 33.3 |
| Voluntary chains..... | 6,157 | 1.9 | 6,011 | 1.4 | 20,231 | 13.3 |
| Brokers and commission houses..... | 8,878 | 2.8 | 44,285 | 10.3 | 5,628 | 3.7 |
| Milk-products wholesalers..... | ----- | ----- | 71,834 | 16.6 | ----- | ----- |
| All other outlets..... | 29,115 | 9.2 | 47,687 | 11.0 | 28,212 | 18.6 |
| Total..... | 317,109 | 100.0 | 431,471 | 100.0 | 151,745 | 100.0 |

¹ Includes sales to homes, restaurants, institutions, bakeries, and retail stores other than chains.

Federal Trade Commission (9, compiled from table 317).

The meat packers sell more than three-fourths of their butter to independent grocers, restaurants, local institutions, etc. Sales of the meat packers to grocery chains are relatively unimportant. The reason is that the functional set-ups of the grocery chains and the meat packers are not such as to complement each other. The chains have their own district warehouses for servicing their retail units with dairy products

and therefore do not have need for the type of store service that the packers provide for the independent retailers.

The dairy companies sell a smaller proportion of their butter to local retailers and a larger proportion to the chains than do the packers. About 39 percent of the sales of the 12 leading companies are made to route customers and 22 percent to chains. Neither the packers nor the dairy companies sell much butter to the voluntary chains because such chains do not as yet handle this product extensively for their member stores.

The tendency toward vertical integration for large private handlers of butter is also to be found among the large producer cooperatives. On the whole, it has not proceeded as far and the functions integrated have been mainly those near the producer, but the trend nevertheless has been to carry the product further toward the consumer as the cooperatives have grown in size.

Cooperative sales associations probably handle upwards of 200 million pounds of butter, or between 10 and 12 percent of the total factory production. Eight cooperatives, four of which were primarily fluid-milk organizations, handled 152 million pounds of butter, or about 9 percent of the total. Nearly one-third of the butter sales of these cooperatives were made to route customers, including consumers, retail stores, and restaurants (table 21). It is probable that the bulk of this business was with stores and restaurants rather than direct to consumers, for cooperatives are engaged in retail distribution of fluid milk in only a few markets. The chain grocery companies also furnished the cooperatives with important outlets for butter.

In the distribution of butter by all types of large-scale handlers the fact is important that none of them buys much butter or sells much through commission merchants, brokers, wholesalers, or other specialized middlemen. As a general thing, the mass distributor tends to go around the traditional marketing system and to handle the product through to the retailers. Private commission merchants, produce jobbers, and other types of functionally specialized handlers are still prominent in the handling of butter in central markets, but the growth of mass distribution has clearly meant a decrease in their relative importance in the trade.

LARGE-SCALE HANDLING OF CHEESE

It has been shown (p. 22) that the manufacture of cheese is carried on mainly in small factories, and that the national companies make only a comparatively small percentage of the total production of natural cheese in Wisconsin. By way of recapitulation the following figures are given: Cooperative factories received about 24 percent of the milk used for the production of American cheese in that State; independent factories, about 34 percent; local chain dairy companies, 1.7 percent; and national companies, 1.7 percent. (See table 11.) The same general situation exists for foreign-type cheese, except that the local dairy chains have a somewhat larger percentage of the production than in the case of American cheese.

These data for Wisconsin obviously show no appreciable centralization of control over the operation of cheese factories. It is probable that the national companies exercise more control over cheese-factory

operations in other States. However, the wide geographic distribution of these factories and the prominence of Wisconsin in the industry strongly suggest that no dominant central control over the operation of cheese factories exists in the industry.

CHEESE WAREHOUSING

The next step in the marketing of cheese is assembling from factories to warehouses. American-type cheese is assembled from factories when it is a few days old and sent to cheese warehouses where it is paraffined, stored, and aged (cured), until it is finally shipped for distribution as natural cheese or shipped to processors for manufacture into process cheese and cheese spreads. In a few cases the manufacturing and warehousing of cheese is done in the same plant, and to a somewhat greater extent the general warehousing and processing of cheese is combined in the same building. Foreign types of cheese are handled in about the same general way, although Swiss cheese is stored longer at local factories.

The warehousing of American-type cheese is of interest here because it shows to a very considerable degree, more centralization of control than is found in the manufacture of cheese. As shown in table 22, 93 warehouses handled American-type cheese in Wisconsin in 1935—10 of these were cooperatives, 20 were independents, and 63 were operated by national companies. The 10 cooperatives handled approximately 7 percent of the cheese received directly from factories, the 20 independents handled 19 percent, and the 63 warehouses operated by national companies handled 74 percent. The actual centralization of control is somewhat greater than these figures alone would indicate, for a number of the independents acted exclusively as assemblers for one or more of the national companies.

TABLE 22.—*Number of American-cheese warehouses by size groups and by type of operation and receipts of cheese from factories, Wisconsin, 1935*

| Size of warehouses (in terms of cheese receipts) (million pounds) | Type of operation | | | | | | | |
|---|-------------------|------------------|-------------|-----------------|--|-----------------|--------------------|-----------------|
| | All types | | Cooperative | | Independent and local dairy chain ¹ | | National companies | |
| | Warehouses | Cheese received | Warehouses | Cheese received | Warehouses | Cheese received | Warehouses | Cheese received |
| | Number | 1,000 pounds | Number | 1,000 pounds | Number | 1,000 pounds | Number | 1,000 pounds |
| Under 1..... | 16 | 7,755 | 4 | 1,932 | 4 | 1,787 | 8 | 4,036 |
| 1 to 1.9..... | 33 | 49,023 | 3 | 4,185 | 8 | 12,076 | 22 | 32,762 |
| 2 to 2.9..... | 15 | 36,113 | 1 | 2,101 | 4 | 9,436 | 10 | 24,576 |
| 3 to 3.9..... | 13 | 45,867 | 1 | 3,503 | 1 | 3,920 | 11 | 38,444 |
| 4 to 4.9..... | 7 | 29,414 | 1 | 4,049 | 1 | 4,105 | 5 | 21,260 |
| 5 to 7.4..... | 4 | 23,800 | ----- | ----- | 1 | 5,409 | 3 | 18,391 |
| 7.5 and over..... | 5 | 46,045 | ----- | ----- | 1 | 8,322 | 4 | 37,723 |
| Total..... | 93 | 238,017 | 10 | 15,770 | 20 | 45,055 | 63 | 177,192 |
| Percentage of all types..... | ----- | Percent 100.0 | ----- | Percent 6.6 | ----- | Percent 18.9 | ----- | Percent 74.5 |

¹ The 20 cheese warehouses were operated by 11 companies.

Of the 63 warehouses operated by national companies or their subsidiaries, 31 were operated by the two largest dairy companies—The Borden Co. and National Dairy Products Corporation; 30 warehouses were operated by 5 meat packers—Swift, Armour, Cudahy, Kingan, and Hoffman; and one was operated by a grocery chain—The Great

Atlantic and Pacific Tea Co. The cooperative warehouses were operated by the Wisconsin Cheese Producers Cooperative and by the Milk Pool Products Cooperative, now operated under the name of the parent organization, the Wisconsin Cooperative Milk Pool.

Sixteen of the 93 warehouses received less than 1 million pounds of cheese a year from factories. Sixty-one received from 1 to 4 million pounds, 7 from 4 to 5 million pounds, and 9 received more than 5 million pounds a year. Considering the modern highways and transportation facilities available for the assembling from large districts it is obvious that there are many more cheese warehouses in Wisconsin than are necessary for the most economical assembling and warehousing of cheese. Apparently many are maintained because of the community interest in their continuance and the opportunity they give for close business contact with the factories. Nevertheless, there is some tendency for these warehouses to become larger and for the business to concentrate in a few of them. The largest cheese warehouses were operated by the national companies, although some of these companies also operated a considerable number of small cheese warehouses.

MARKETING CHANNELS FOR LARGE-SCALE HANDLERS OF CHEESE

On the whole, the channels of distribution for cheese are similar to those for butter, except that substantial quantities of cheese are handled by specialized cheese jobbers who service retail stores, restaurants, etc. regularly every few days. This is particularly true for processed cheese and special types of natural cheese, for which the larger dairy companies operate branch distributing agencies in most of the larger cities of the country.

As in the case of butter, all types of large-scale handlers of cheese have integrated most of the marketing functions up to the retailer. The meat packers sell approximately three-fourths of their cheese to independent retailers and local institutions (table 23). The larger dairy companies dispose of nearly half of their cheese through such outlets, and sell substantial quantities to the grocery chains. All types of large-scale handlers sell some cheese to the wholesale distributor who in turn sells to the retailer, but for the most part the large companies themselves handle the wholesale distribution of their cheese products.

TABLE 23.—Sales outlets for cheese sold by 10 leading dairy companies, 10 meat packers, and 6 large producer cooperatives, 1934

| Sales outlets | Meat packers | | Dairy companies | | Producer cooperatives | |
|---|---------------|---------------------|-----------------|---------------------|-----------------------|---------------------|
| | Quantity sold | Percentage of total | Quantity sold | Percentage of total | Quantity sold | Percentage of total |
| | 1,000 lb. | Percent | 1,000 lb. | Percent | 1,000 lb. | Percent |
| Route customers (independent grocers, restaurants, institutions, etc.)..... | 198,084 | 74.7 | 117,254 | 46.1 | 14,328 | 47.3 |
| Chain grocery companies..... | 14,950 | 5.6 | 46,863 | 18.4 | 2,438 | 8.1 |
| Voluntary chains..... | 3,800 | 1.3 | 4,047 | 1.6 | 4,377 | 14.4 |
| Dairy-manufacturing companies..... | 14,527 | 5.5 | 37,396 | 14.7 | 496 | 1.6 |
| Dairy wholesalers..... | 1,631 | .6 | 26,284 | 10.3 | ----- | ----- |
| Wholesale grocers..... | 24,215 | 9.1 | 10,712 | 4.2 | 5,820 | 19.2 |
| Other outlets..... | 8,345 | 3.2 | 12,034 | 4.7 | 2,844 | 9.4 |
| Total..... | 265,061 | 100.0 | 254,590 | 100.0 | 30,303 | 100.0 |

The smaller grocery chains buy most of their cheese from cheese wholesalers and assemblers, but the larger systems go direct to the local manufacturing plants as they do for butter. The Great Atlantic & Pacific Tea Co. assembles and cures the cheese for its retail stores, for which purpose it operates one of the largest cheese warehouses in Wisconsin.

Large-scale producer cooperatives are not at present quite so important a factor in cheese distribution as they are with butter. Cooperative sales associations are handling less than 10 percent of the total production. The largest cooperative handler of cheese is Land O'Lakes Creameries, Inc., which now serves as distributor for most of the cheese assembled by the Wisconsin Cheese Producers' Cooperative.

PROCESSED CHEESE

Approximately 40 percent of the American and foreign types of cheese produced in this country is marketed as processed or blended cheese and as cheese spread. Processed cheese is made by special methods of heating and pasteurizing natural cheese, to which is usually added an emulsifying salt. Most kinds of processed cheese are put up in special packages and sold under brand names. This method of merchandising cheese has increased rapidly during the last 15 years.⁶

The processing of cheese in Wisconsin has been limited largely to the Kraft-Phenix Cheese Corporation (a subsidiary of the National Dairy Products Corporation), to the Lakeshire Cheese Co. (a subsidiary of The Borden Co.), and to the Shefford Cheese Co. (a subsidiary of the Kingan Packing Co.). These three subsidiary companies also process and package cheese for other companies to be sold under the brand name of the latter. The patents governing the processing of cheese, of which more will be said later, have largely been under control of the National Dairy Products Corporation. In fact, it is this phase of the cheese industry that appears to show the greatest degree of centralized control.

EVAPORATED AND CONDENSED MILK

The manufacture of evaporated or canned milk is considerably more centralized as to control than is the manufacture of any other principal dairy product. Ninety-one percent of the evaporated milk produced in Wisconsin, as indicated in table 12, is manufactured by interstate and national companies. These include such companies or their subsidiaries as the Carnation Co. and Pet Milk Co., which are engaged primarily in the manufacture and distribution of evaporated milk; Great Atlantic & Pacific Tea Co., and the American Stores Co., both large chain-store companies; Armour & Co. and Swift & Co., both large meat packers, and The Borden Co., one of the two largest dairy companies.

Wisconsin produced 714 million pounds of evaporated milk in 1935, or about 39 percent of the total produced in the United States. No other State produced more than about 10 percent. It is believed that the data for Wisconsin as to type of operating control and integration are reasonably representative of the industry as a whole, although condensery plants average somewhat larger in Wisconsin than in other States.

⁶ The production of processed or blended cheese and cheese spreads totaled 51,376,823 pounds in 1929, 151,708,086 pounds in 1931, 198,737,584 pounds in 1935, and 256,402,584 in 1937. U. S. Bureau of the Census, Census of Manufactures.

Not only is the manufacture of evaporated milk centralized in a few companies, but it is confined to relatively few plants and for the most part to large plants. The entire output of evaporated milk in Wisconsin in 1935 was manufactured in 36 condenseries and 6 flexible plants. The three largest plants manufactured 240 million pounds of finished product, or 34 percent of the total in the State. The size of condenseries when measured in terms of output of evaporated milk is relatively larger than when measured in receipts direct from farms. This is because about one-fourth of the total milk handled by these plants comes from condensery receiving stations where it is usually partially processed before it is transferred to the larger plants for further processing and canning.

Probably the most important reasons why the manufacturing of evaporated milk is largely confined to large companies are the following: (1) The entire processing, including packaging and labeling, is done at the primary plants and is relatively expensive compared with that of most other dairy products; (2) large amounts of capital are required for the construction of plants of sufficient size for efficient operation; and (3) evaporated milk is sold mainly under a few nationally known brands and the market for evaporated milk not under these brands is relatively limited except at lower prices.

MARKETING CHANNELS FOR EVAPORATED MILK

The channels of distribution for condensed and evaporated milk are very different from those described for butter and cheese. The canned-milk industry was developed from the first under conditions of integrated, large-scale organization. The small operators and the specialized middleman have never been important factors in the handling of condensed and evaporated milk, except of course in retailing and to a lesser extent in wholesaling.

Some idea of the channels of distribution for condensed and evaporated milk may be had from table 24. The larger dairy companies (particularly the Carnation Co. and the Pet Milk Co.) manufacture and distribute the bulk of these commodities. Some of the meat packers handle considerable quantities of evaporated milk. Cooperatives are comparatively unimportant in this line.

TABLE 24.—Sales outlets for condensed and evaporated milk used by 4 meat packers, 8 leading dairy companies, and 3 producer cooperatives, 1934

| Sales outlets | Dairy companies | | Meat packers | | Producer cooperatives | |
|--|---------------------|---------------------------|---------------------|---------------------------|-----------------------|---------------------------|
| | Quantity sold | Percentage of total sales | Quantity sold | Percentage of total sales | Quantity sold | Percentage of total sales |
| | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> | <i>1,000 pounds</i> | <i>Percent</i> |
| Route customers (independent grocers, hotels, institutions, etc.)..... | 14, 605 | 1. 4 | 108, 935 | 85. 1 | 14, 081 | 28. 0 |
| Chain grocery companies..... | 424, 178 | 39. 5 | 7, 234 | 5. 7 | 5, 537 | 11. 0 |
| Voluntary chains..... | 71, 417 | 6. 7 | 4, 651 | 3. 6 | 2, 038 | 4. 1 |
| Wholesale grocers..... | 496, 675 | 46. 3 | ----- | ----- | 22, 623 | 45. 0 |
| All other outlets..... | 65, 651 | 6. 1 | 7, 233 | 5. 6 | 5, 964 | 11. 9 |
| Total..... | 1, 072, 526 | 100. 0 | 128, 053 | 100. 0 | 50, 243 | 100. 0 |

Federal Trade Commission (9, compiled from tables 309, 319).

One of the items to be noted in connection with the distribution of canned milk is the importance of the wholesale grocer. As evaporated milk does not require special storage or refrigeration facilities, it can be handled by the regular wholesaler along with other dry groceries. Nearly half of the sales of condensed and evaporated milk made by the leading manufacturers are to wholesale grocers who in turn sell to independent retailers (table 24).

NARROWER MARKETING SPREADS FOR CANNED MILK

The canned-milk industry appears to offer an illustration of the fact that large-scale organization and vertical integration sometimes make for greater marketing efficiency and reduced marketing spreads. The manufacturing and distributive margins for evaporated milk have narrowed steadily since 1920 and at present the spread between producer and consumer is less than two-thirds as large as it was 15 years ago. The total marketing spread for a 14½-ounce can of evaporated milk was 8.8 cents per can in 1921, 6.4 cents per can in 1925, 5.9 cents in 1929, and 4.5 cents in 1937 (table 25). Part of this reduction came between the price paid the producer for raw milk and the wholesale price received by the manufacturer for the canned product. There was an even greater reduction, however, in the retail margin for the product.

TABLE 25.—*Prices and margins of evaporated milk, 1919-37*

| Year | Average retail price of 14½-ounce can ¹ | Average wholesale price of 14½-ounce can ² | Average price paid condensery producers for milk—14½-ounce can ² | Spread between wholesale and retail price | Spread between producer price and wholesale price | Total spread between consumer and producer |
|-------------------------|--|---|---|---|---|--|
| | Cents | Cents | Cents | Cents | Cents | Cents |
| 1919..... | 14.5 | | | | | |
| 1920 ¹ | 14.0 | 10.9 | | 3.1 | | |
| 1921..... | 12.6 | 9.5 | 3.8 | 3.1 | 5.7 | 8.8 |
| 1922..... | 11.1 | 7.7 | 3.4 | 3.4 | 4.3 | 7.7 |
| 1923..... | 11.1 | 8.6 | 4.4 | 2.5 | 4.2 | 6.7 |
| 1924..... | 10.4 | 7.7 | 3.6 | 2.7 | 4.1 | 6.8 |
| 1925..... | 10.3 | 8.0 | 3.9 | 2.3 | 4.1 | 6.4 |
| 1926..... | 10.4 | 8.1 | 3.9 | 2.3 | 4.2 | 6.5 |
| 1927..... | 10.4 | 8.4 | 4.2 | 2.0 | 4.2 | 6.2 |
| 1928..... | 10.2 | 8.2 | 4.2 | 2.0 | 4.0 | 6.0 |
| 1929..... | 9.9 | 7.7 | 4.0 | 2.2 | 3.7 | 5.9 |
| 1930..... | 9.2 | 7.0 | 3.3 | 2.2 | 3.7 | 5.9 |
| 1931..... | 8.2 | 6.1 | 2.4 | 2.1 | 3.7 | 5.8 |
| 1932..... | 6.9 | 4.9 | 1.8 | 2.0 | 3.1 | 5.1 |
| 1933..... | 6.6 | 5.1 | 2.0 | 1.5 | 3.1 | 4.6 |
| 1934..... | 6.8 | 5.3 | 2.3 | 1.5 | 3.0 | 4.5 |
| 1935..... | 7.1 | 5.7 | 2.7 | 1.4 | 3.0 | 4.4 |
| 1936..... | 7.6 | 6.4 | 3.1 | 1.2 | 3.3 | 4.5 |
| 1937..... | 7.6 | 6.3 | 3.1 | 1.3 | 3.2 | 4.5 |

¹ Bureau of Labor Statistics, Retail Price Series.

² Compiled from reports of the Bureau of Agricultural Economics.

The marketing margins for canned milk have shown a greater reduction during the last 15 or 20 years than have those of the other leading dairy products. This is indicated by table 26, which shows the number of cans of evaporated milk that could be bought at retail for the price of specified units of butter, cheese, and fluid milk.

TABLE 26.—Number of cans (14½ ounces) of evaporated milk that could be bought at retail for the price of 1 pound of butter, 1 pound of cheese, or 1 quart of whole milk, 1919–37¹

| Year | Cans of evaporated milk for— | | | Year | Cans of evaporated milk for— | | |
|-----------|------------------------------|-------------------|-----------------------|-----------|------------------------------|-------------------|-----------------------|
| | 1 pound of butter | 1 pound of cheese | 1 quart of whole milk | | 1 pound of butter | 1 pound of cheese | 1 quart of whole milk |
| | <i>Number</i> | <i>Number</i> | <i>Number</i> | | <i>Number</i> | <i>Number</i> | <i>Number</i> |
| 1919..... | 4.68 | 2.94 | 1.07 | 1929..... | 5.57 | 3.84 | 1.44 |
| 1920..... | 5.01 | 2.97 | 1.19 | 1930..... | 5.01 | 3.82 | 1.52 |
| 1921..... | 4.10 | 2.70 | 1.16 | 1931..... | 4.32 | 3.43 | 1.50 |
| 1922..... | 4.32 | 2.96 | 1.18 | 1932..... | 3.97 | 3.33 | 1.58 |
| 1923..... | 4.99 | 3.32 | 1.24 | 1933..... | 4.12 | 3.41 | 1.61 |
| 1924..... | 4.97 | 3.39 | 1.33 | 1934..... | 4.59 | 3.47 | 1.68 |
| 1925..... | 5.32 | 3.56 | 1.36 | 1935..... | 5.03 | 3.65 | 1.65 |
| 1926..... | 5.11 | 3.52 | 1.35 | 1936..... | 5.21 | 3.70 | 1.58 |
| 1927..... | 5.35 | 3.62 | 1.36 | 1937..... | 5.36 | 3.83 | 1.64 |
| 1928..... | 5.54 | 3.77 | 1.39 | | | | |

¹ Computations based on average annual retail prices of the several products as given by the Bureau of Labor Statistics.

The amount of money required to buy a pound of butter at retail would have bought 4.1 cans of evaporated milk in 1921, about 5.3 cans in 1925, 5.6 in 1929, and 5.4 cans in 1937 (table 26). Substantially the same situation exists for cheese. The reduction in prices of canned milk is even more striking when compared with prices of bottled milk. About 1⅓ cans of evaporated milk can be bought for the price of 1 quart of fluid milk at the present time as compared with less than 1¼ cans in the early 1920's.

A number of factors account for the reduction made in the costs and margins of manufacturing and distributing evaporated milk. One has been the introduction of improved and more efficient manufacturing equipment. Probably even more important was the fact that the grocery chains began the manufacture and distribution of this product on an extensive scale, often using it as a price leader in their retail stores.

OTHER ASPECTS OF LARGE-SCALE ORGANIZATION IN THE DAIRY INDUSTRY

Large-scale organization in the dairy industry has several aspects in addition to those already discussed. Among these are (1) large-scale dairy farming, (2) the growth of labor organization in the industry, (3) the control of patent rights for dairy products, and (4) mass distribution and cooperative marketing. It has not been possible to go thoroughly into any of these topics. But their importance with respect to the general problem of large-scale organization is such that they cannot be passed over without brief discussion.

LARGE-SCALE DAIRY FARMING

The large private dairy companies that have been described do not own or operate dairy farms to any significant extent. An exception of wide interest is the Walker-Gordon farm, located in New Jersey, which is a subsidiary of The Borden Co. The leading dairy-marketing cooperatives in the country do not operate any farms.

The size of the farm dairy enterprise may be measured in several ways.⁷ But the classification of farms by number of cows milked seems to be the best single measurement of the dairy enterprise and has the further advantage of being easily understood. This measurement obviously excludes other farm activities and it gives no information on farm income or operating efficiency. A classification of farms by number of cows milked is shown for the United States and for 10 selected States in table 27.

TABLE 27.—*Farms classified by number of cows milked per farm, United States and 10 selected States, 1929*

| Item and State | Total farms | Farms on which the number of cows milked was— | | | | | |
|---|---------------|---|---------------|---------------|---------------|---------------|---------------|
| | | Less than 3 | 3-9 | 10-19 | 20-49 | 50-99 | 100 and over |
| Farms reporting in 10 selected States: | <i>Number</i> | <i>Number</i> | <i>Number</i> | <i>Number</i> | <i>Number</i> | <i>Number</i> | <i>Number</i> |
| Texas..... | 339,635 | 219,075 | 108,665 | 8,538 | 2,823 | 429 | 105 |
| Alabama..... | 179,623 | 161,966 | 15,869 | 979 | 596 | 173 | 40 |
| Minnesota..... | 170,317 | 17,358 | 89,798 | 56,928 | 6,162 | 67 | 4 |
| Wisconsin..... | 168,890 | 12,886 | 60,962 | 79,019 | 15,852 | 154 | 17 |
| New York..... | 130,142 | 33,045 | 46,757 | 33,209 | 16,430 | 634 | 67 |
| Virginia..... | 128,453 | 94,488 | 29,935 | 2,700 | 1,155 | 143 | 32 |
| California..... | 52,805 | 26,259 | 11,183 | 6,139 | 6,701 | 1,997 | 526 |
| Florida..... | 22,613 | 17,111 | 4,524 | 440 | 357 | 137 | 44 |
| Massachusetts..... | 17,271 | 6,619 | 5,975 | 3,200 | 1,331 | 122 | 24 |
| New Jersey..... | 14,158 | 6,597 | 3,603 | 2,531 | 1,296 | 95 | 36 |
| Total farms reporting, United States..... | 4,615,529 | 2,274,862 | 1,781,581 | 454,096 | 97,570 | 6,211 | 1,209 |
| Total cows milked, United States..... | 21,124,221 | 3,177,427 | 9,051,228 | 5,803,277 | 2,521,167 | 388,946 | 182,176 |
| Percentage of total farms reporting..... | 100.0 | 49.29 | 38.60 | 9.84 | 2.11 | 0.13 | 0.03 |
| Percentage of total cows milked..... | 100.0 | 15.04 | 42.85 | 27.47 | 11.94 | 1.84 | .86 |

Compiled from Fifteenth Census of the United States, Census Agriculture, vol. IV, p. 647, table 10.

The farm dairy enterprise is usually small. The farms maintaining less than 10 cows per farm represented about 88 percent of the farms, but they had only 57.89 percent of the cows. Even more striking is the fact that the farms having less than 3 cows per farm represented over 49 percent of all farms, but only 15 percent of all cows milked. On the other hand, the farms milking 10 or more cows per farm comprised slightly over 12 percent of all farms, but had over 42 percent of all cows. Of 4,615,529 farms on which cows were milked, only 1,209 farms had 100 cows or more per farm. California had 526 of these farms, Texas was second with 105, and New York third with 67. Wisconsin, the leading dairy State in the production of milk, had 17 of these farms, and Minnesota, second in volume of production, had only 4.

The data on size of dairy farms have certain limitations. They are measurements of size of individual dairy units. They give no information on the extent to which these farms are operated or controlled in groups of two or more. Data on chain farming as applied to the dairy industry are not available. Corporate farming is not

⁷ If large-scale dairy farms are considered as those whose products aggregate in value \$30,000 or more a year, then there were 882 such dairy farms in the United States in 1929. This measurement of size of the dairy enterprise obviously is affected by prices, type of sales as fluid milk or butter, and production of other than dairy products on these farms. This condition is evidenced by the fact that of these 882 farms, 54 farms had fewer than 60 cows per farm; 246 farms had 60 to 99 cows per farm; 443 farms had 100 to 199 cows per farm; 75 farms had 200 to 299 cows per farm; 48 farms had 300 to 499 cows per farm; 12 farms had 500 to 999 cows per farm; and 4 farms had more than 1,000 cows per farm. (See FIFTEENTH CENSUS OF THE UNITED STATES, CENSUS OF AGRICULTURE, Large-Scale Farming in the United States, 1929, p. 68.)

believed to be extensive in the dairy industry, although no complete data are available on this point. But individual cases can be found in many communities.

No satisfactory information is available on the degree of operating control that is exercised by farm creditors over dairy farms that are heavily mortgaged or by landlords over tenants operating dairy farms. Nevertheless, insurance companies, private banks, and banks affiliated with the Farm Credit Administration are known to be large holders of mortgages on dairy farms, as well as on other types of farms, throughout the country. But these credit agencies do not appear to influence materially the processing and marketing of dairy products. Where dairy farms have been foreclosed and are operated or leased by these credit agencies their marketing influence is substantially the same as individual proprietors, for the farms are usually widely scattered.

UNIONIZATION OF LABOR IN THE DAIRY INDUSTRY

The unionization of labor employed in the processing and distribution of dairy products has been greatly extended of late. Labor unions have existed for some time among employees of companies that distribute fluid milk in some of the larger cities, but only recently has it been extended on any considerable scale to workers in country manufacturing plants.

The principal objectives of labor, as set forth in their proposed contracts but not all of which are obtained in each case, can be summarized briefly as follows:

- (1) Union recognition.
- (2) Closed shop, which provides that all employees shall be members of the union in good standing and that new employees shall have union permits.
- (3) Seniority rights in employment, lay-offs, and reemployment.
- (4) Negotiation and arbitration in the settlement of all disputes.
- (5) Higher wages, including fixed minimum weekly rates, bonuses, and overtime.
- (6) Division and classification of work among employees.
- (7) More attractive working conditions, including daylight deliveries in fluid-milk markets, minimum work periods when called to work, maximum workweek, and vacations with pay.
- (8) Organization privileges within employers' plants, including union stewards among employees, entrance of authorized union officers, and posting of union notices.

Labor unions in the dairy industry, as in others, are essentially bargaining associations. They do not attempt to operate processing plants nor to engage in the distribution of dairy products.

No data are available relative to the extent of union organization among workers in the dairy industry. It is a matter of general knowledge, however, that such organization is on the increase. Particularly noteworthy is the fact that unionization has been extended to many country manufacturing plants like creameries and condenseries. As a general thing, the larger plant units have been the first to organize. Unionization has not been confined to private plants, but is also to be found among some of the cooperative ones.

Numerous reasons lay back of this increase in unionization. Probably the major reason is the impetus received from the broad trend toward unionization in nearly all parts of the economy. A contributing factor has undoubtedly been the growth of large-scale organization in the dairy industry itself. An industry made up of small units

in which the employee is in more or less intimate contact with his employer is not usually so conducive to labor organization as one carried on under conditions of large-scale enterprise.

So far as the subject of large-scale organization in the dairy industry is concerned, the most salient feature of organized labor is that it has come first and farthest in the larger plant units and among employees of the larger dairy companies. To the extent that this tendency continues and that organized labor is successful in its program, the proprietors of large-scale enterprises may expect to pay to labor, in the form of high wage rates, some of the advantages that they may have in operating efficiency. This may be a retarding factor to further consolidation and integration in the dairy industry.

PATENT CONTROL

For probably no other agricultural product has scientific discovery, particularly in the field of chemistry, played so important a part as it has with milk. Innumerable innovations have been made in recent years in the various techniques of processing milk and milk products. Better types of machinery have been invented, new processes have been developed, and new uses have been found for milk products. Many of these innovations have been of considerable economic importance in the industry. They have influenced manufacturing costs, types of dairy plants, byproduct uses, and market outlets for milk.

Nearly all of the important discoveries in milk processing of the last 50 years have been patented.⁸ This means that for a limited number of years (usually 17) the commercial application of newly discovered processes is limited to the individual or company that holds the patent or to those other firms to whom the patentee may choose to sell or lease the process.

The patent right has unquestionably also been a factor affecting the size of business units in the dairy industry. The outstanding example is process cheese, the basic patents for which were controlled by the Kraft-Phenix Cheese Corporation. The growth of this company has been due in no small part to the fact that these early patents gave it primary access to the rapidly expanding market for packaged and processed cheese products. An earlier example was condensed and evaporated milk, the main patents for which have now run out but which at one time gave their holders a paramount position in this branch of the industry. At present, patents relating to the casein are important economically because of the many new uses being found for this product.

There are literally hundreds of patents for dairy products; some have great commercial importance and many have practically none. To go through all these patents and classify them with respect to their holders and their present or probable commercial significance would be a near-impossible task and certainly beyond the facilities of the present study. The writers have sought, however, to summarize the patent situation for the more important dairy products and to indicate its relationship to the whole question of large-scale organization in the dairy industry.

No patents have been granted in this country on the principle of pasteurizing milk and cream. Machinery and equipment used in

⁸ An important exception has been the Babcock test for determining the butterfat content of milk and cream as developed by the late Stephen M. Babcock of the University of Wisconsin.

the process of pasteurizing and bottling milk, however, have been patented, although most of the important patents of this type have expired. At present considerable interest is being shown in the development and use of paper containers and in the patents relating thereto. These containers seem well adapted for use in the distribution of milk and cream through retail stores.

No patents relating to butter have any great commercial significance at the present time. The mechanics and the basic chemical processes involved in making butter have been known for centuries and hence are not patentable. Among the patents relating to butter are several for deodorizing cream and for making plastic cream (which might make possible the more economic shipment of butterfat from which butter could be made). At present, however, the processes to which these patents relate are not widely used.

The making of cheese is an old and universally used process. No important patents relate to it. But the methods by which this natural cheese is made into the various kinds of process cheese are controlled by patents of great commercial value.

As already stated, the main patents for the making of process cheese from natural cheese were controlled by the Kraft-Phenix Cheese Corporation. One of the most important is a patent covering a process for the heating and pasteurizing of cheese in such a way as to prevent the separation of the fat globules from the other milk solids. The terms of the patent grant were broad and gave the Kraft-Phenix Cheese Corporation control of the basic methods for making process cheese. The corporation leased rights for the use of its methods to several other large dairy concerns, but it has always been, and continues to be, the leading factor in the process-cheese industry.

The main patents for process cheese have expired in the course of the last few years. A number of more recent patents relating to methods for making it have been granted, not only to the Kraft-Phenix Cheese Corporation but to a number of other firms and individuals. It remains to be seen whether any of these newer patents will give their holders a degree of control over the making of this cheese similar to that heretofore exercised by the Kraft-Phenix Cheese Corporation, but from present indications they will not.

Valuable patents have played an important part, at one time or another, in the processing of condensed and evaporated milk. These include the basic patent for condensing milk as developed by Gail Borden in 1856 and the method of preserving unsweetened condensed milk (evaporated milk) by heat sterilization as developed by J. B. Meyenberg in 1884. There have been many improvements in the machinery and equipment used in the industry and most of these improvements have been patented. The more important of these patents for machinery have expired. At present patents relating to methods of processing and canning evaporated milk so as to improve its taste and make it more acceptable as a table food hold considerable promise of commercial importance.

Patents covering the various methods of making and using casein are perhaps the most important of any now in effect for dairy products. Casein is a product for which new uses are being constantly found. The large dairy companies in particular are devoting a great deal of research to casein products.

One of the more important uses of casein is in the making of glue and adhesive cements. Patents have greatly aided one of the large dairy corporations in attaining a primary place in the casein-glue industry. Recently what is claimed to be an improved method has been found for using casein in the manufacture of paint. The patents for this process also are owned by one of the large dairy corporations. This company also has patented machinery for making casein much more efficiently than could be done by the old vat and press methods.

A technique has recently been developed for making textiles from casein. How important this may become commercially it is impossible to foresee. Other uses for casein might be listed, but these seem among the most important at present.

The manufacture of whey powder (whey being a byproduct of cheese manufacture) is also being improved by new discoveries and innovations. One of the chief obstacles to the use of whey powder heretofore has been its tendency to take up water when exposed to the air. A new method of dry-whey manufacture has recently been discovered which overcomes this difficulty. Thus far the process is not widely used, but is likely to be.

Through a process of irradiation with ultraviolet light it is possible to increase greatly the content of vitamin D in many food and medicinal products. This process is used extensively in the dairy industry in the marketing of fluid or whole milk and in the manufacture of evaporated milk. Both products are used widely in infant and adult foods. Vitamin D is the antirachitic vitamin or the nutritional factor that prevents rickets.

The basic patent covering this irradiation process was developed by Harry Steenbock of the University of Wisconsin and was assigned to the Wisconsin Alumni Research Foundation. The patent rights are leased on a royalty basis under the supervision and direction of the foundation which uses its income to promote and encourage investigations and research.

Although the leading dairy companies and their subsidiaries by no means hold all of the important patents for milk products, they have many of the most important. This is to be expected in view of the greater facilities for research that such companies have. Not only do they conduct research in their own laboratories, but their financial resources enable them to buy or lease patent rights and methods developed by scientists and research workers outside their own organizations.

The question of patent rights for new methods of processing milk products brings up the even broader question of the effect of technology on the size of the business unit in the dairy industry.

The manufacturing of dairy products becomes increasingly complicated as new types of equipment and new product uses are developed. Dairy byproducts, once comparatively unimportant in an economic sense, now represent a growing part of the total value of dairy products. Plants not equipped to obtain some of these byproducts are therefore likely to be at some disadvantage as compared with those that are. One of the advantages the large dairy firms appear to have lies in the fact that most of their manufacturing plants are equipped for byproduct manufacture.

Moreover, much of the modern equipment for milk processing is expensive. Small business units often cannot obtain the capital necessary for the purchase or the rental of such machinery. A few of the producer cooperatives are organizing on a scale that permits them to use the most modern plant and equipment facilities, but on the whole the large dairy companies have most of such facilities as now exist.

AUTHORS' SUGGESTIONS REGARDING PATENT CONTROL

It is evident from what has been said that patent control has been, and will probably continue to be, of considerable economic importance in the dairy industry. Our present patent laws were not designed with adequate consideration given to large corporate organizations which have developed in recent years in manufacturing and distribution. There is undoubtedly need for reconsideration of privileges granted under patent laws to the end that these privileges will serve public purpose more definitely than they now do.

The authors of this study, therefore, suggest the following with respect to patent laws and patent granting procedure: (1) That the usual 17-year exclusive period for patents be substantially shortened and that steps be taken to prevent patents from being "salted away" or purposely kept out of use by those controlling them; (2) that equality of access to all technical improvements be provided on the basis of uniform royalty payments and under conditions approved by the Government; (3) that the issuance of patents be limited to discoveries and inventions which are distinctly new and basic in principle; and (4) that revision and improvement be made in the general administration of patent laws along the lines suggested by the Science Advisory Board of the National Research Council (7, pp. 321-340).

MASS DISTRIBUTION AND COOPERATIVE MARKETING

The growth of large-scale food corporations is an important factor which should be taken into account by leaders in the cooperative movement if producers are to meet and to have effective organized participation in a system of mass distribution. As shown earlier, some marketing cooperatives in the dairy industry are in a position to deal with and to complement the handling operations of the mass distributor, but it is probably true that thus far the producers' cooperative associations that sell manufactured dairy products have designed their objectives and set up their marketing programs mainly in terms of the older channels of distribution. These associations have tried to take dairy products around rather than send them through the mass distributors, although there are exceptions to this general statement.

It is highly significant for the cooperative marketing of dairy products that large-scale private handlers have not only integrated distribution services, but have extended this integration into the assembling and manufacturing of these products. It raises the important question as to what extent producers' cooperatives should bargain or deal with the mass distributor, such as the large private dairy company, the meat packer, and the national grocery store companies; and to what extent farmers should attempt to compete with them.

FLUID-MILK COOPERATIVES

Producers' cooperatives have probably gone further in adjusting their marketing objectives and functions to the mass distributor in large fluid-milk markets than in the handling of any other dairy products. In keeping with the local characteristics of these fluid-milk markets, producers have organized their associations on an individual-market basis. With few exceptions these associations have bargained with distributors, primarily the large and medium-sized ones, and have sold their products through these distributors rather than setting up competing distribution organizations.

The producers' cooperatives have further attempted to serve their members by taking care of such factors as market relations with individual producers, check testing and weighing of milk, and in general representing their individual members in the market. Several marketing plans and devices peculiar to fluid-milk markets have been developed through this process of bargaining. These include classification of sales and price differentials according to the use made of milk by distributors, market or distributor price pools, base-rating plans in paying producers, etc. Where producers' associations have entered into the distribution of fluid milk it has usually been because of failure of such associations and distributors to agree upon prices to producers and upon general marketing practices.

Some of the characteristics and practices of fluid-milk markets may of course be altered if health ordinances should become standardized and inspection service made more general, and if the large national distributing companies further consolidate their various subsidiary fluid-milk distributing companies. This is a point in market organization which producers' fluid-milk cooperatives may well bear in mind.

DAIRY MANUFACTURING BY PRODUCERS' COOPERATIVES

Integration of large private companies toward the producers has resulted in a larger proportion of the total milk supply being manufactured in plants owned by such companies and a smaller percentage by others, particularly by private independent companies. Producers still own and operate many of the dairy-manufacturing facilities on a cooperative basis, but cooperative control of such plants is to be found mainly among creameries and cheese factories rather than among condenseries and flexible plants. Some of the largest and best-equipped dairy plants in Wisconsin, as well as elsewhere, are cooperatively owned. But the private concerns, for the most part, have taken the initiative in building and equipping plants that are fitted to the present-day transportation and technological conditions.

If producers are to benefit fully through cooperative control and operation of local dairy plants at least two general conditions will have to be met. (1) The cooperative plants will have to be as modern, efficient, and well equipped as those of their chief competitors. This can be done, but it will require organization, capital, and management in keeping with the size of the undertaking. When producers have undertaken to organize local dairy-manufacturing enterprises they have often failed to realize fully the advantages of having a volume of business and capital resources sufficient to operate plants that are equipped for large-scale operation, for the manufacture of byproducts, and in general for flexible operations. But the success of a growing number of

cooperatives with plants of modern type promises to give new impetus to this type of cooperative organization.

(2) The successful operation of dairy-manufacturing plants under cooperative ownership requires that such plants should have as good market outlets as those of large private concerns. There was a time when efficient operation of the plant itself was about all that was needed to insure its success. As all plants sent their products through the same channels of distribution none had any particular competitive advantage so far as market outlets were concerned. But today, the dairy products manufactured by grocery chains, for example, reach the consumers through a different type of marketing system than those manufactured by dairy plants whose products move through the old channels. Unless these older channels handle the products as cheaply and as efficiently as the large-scale distributors, the local plants selling through the former system will be handicapped in meeting the competition of plants that are operated by a mass distributor.

This observation seems particularly relevant in the manufacture of evaporated milk. Given sufficient volume, capital, and good management, a producers' cooperative should be able to manufacture canned milk as cheaply as any private company. Yet producers have not built many cooperative condenseries, no doubt partly because they have no sales outlets for canned milk comparable to those possessed by the large private companies. This is true despite the fact that a higher percentage of the canned milk went through the wholesale grocery outlets than was true of any other dairy product. It seems that, in the sale of evaporated milk, brand names from the start have been much more important than in the sale of butter and cheese.

COOPERATIVE DISTRIBUTION OF MANUFACTURED DAIRY PRODUCTS

It has generally been assumed that the best type of cooperative sales organization was one that merchandised its product—that is, developed distinctive quality, carried its product as far toward the consumer as possible, and perhaps used advertising and other methods of sales promotion. Such a program has been followed with considerable success by a few of the larger dairy cooperatives. In dealing with some kinds of buyers, a program of this kind is undoubtedly the soundest that can be developed.

In some respects, however, it does not appear to be fitted from a functional standpoint to the operations of the mass distributor, unless the cooperative itself becomes one. The large-scale handler of dairy products—whether a grocery chain, meat packer, or dairy company—has usually integrated some of the functions that a marketing cooperative of the sort described is seeking to perform. The tendency of large-scale handlers to assemble butter and cheese direct from creameries and cheese factories has already been described. So long as they have facilities for making such direct contacts these large handlers are not so likely to need or to utilize the marketing services which a vertically integrated producers' cooperative is in position to perform.

Another long-sought objective of cooperative marketing has been the development of brand names for dairy products. Here again is something that is more feasible when the product is distributed through the old channels than when it is intended for sale to the mass distributor. Most of the large private handlers have their own brands

for dairy products. This is true of the dairy companies, the meat packers, and a number of the larger grocery chains. When this is the case, they may not wish to handle a cooperative's brand, particularly if the grade of the latter competes directly with their own. If they do handle a competing cooperative brand it is almost certain to receive less promotional effort.

One of the difficulties of most cooperative marketing associations in developing a merchandising program is that they have a single product, or at best a small group of products. Some of the costs of distribution—and this is particularly true for those functions at the consumer end of the system—are in the nature of fixed costs. A single product like butter will, therefore, have difficulty in carrying the cost of distribution, certainly as far as the retailers. Other things being equal, the greater the number of closely related products that are handled, the lower will be the per-unit costs of distribution. In this respect, all types of private large-scale handlers have an advantage over the specialized dairy cooperative in an integrated system of distribution.

A number of the dairy cooperatives have sought to reduce the per-unit costs of distribution by adding to the number of products they handle. Such a program of product expansion appears to be necessary if a cooperative proposes to engage extensively in the wholesale distribution of its line.

It probably will be generally agreed that a system of mass distribution permits—perhaps even requires—some sort of cooperative marketing at the producer end for the proper protection of the latter's interest. The manufacturing and local assembling of certain dairy products for sale to the mass distributor can perhaps in many cases be done more satisfactorily by producers' cooperatives than in any other way. In other cases, as in some fluid milk markets, producers may feel that they have adequate representation through bargaining organizations. Some of the grocery chains and other types of large-scale handlers prefer to obtain dairy products from cooperatives inasmuch as it relieves them of the need for dealing with individual plant units with respect to quality, deliveries, and price arrangements. But individual local cooperatives are not in a good position to service the large-scale distributors, because volume and standardization are prime requisites of a product for mass distribution.

How far farmers' dairy cooperatives need to go in the direction of horizontal and vertical organization for effective marketing is, of course, conjectural. Other factors than those covered in this study will need to be taken into account. Cooperatives can hardly expect to develop in the immediate future marketing organizations comparable in size or volume of business with those of the large meat packers, chain-grocery companies, or large private dairy companies. Nor is it necessarily desirable that they do so. For the present, at least, the marketing problem of producers who sell to fluid-milk markets seems to be somewhat different and more localized than the marketing problem of producers who sell milk for butter, cheese, and evaporated milk.

The suggestion that all milk producers need to join a single dairy cooperative for effective marketing does not seem to be borne out by this study. On the other hand, the size of the private organizations with which producers must deal or compete certainly suggests that

they consolidate their efforts in as few organizations as possible, giving due consideration to the nature of the products and the particular marketing problem.

The extent to which producers' cooperatives should engage in distribution is even more difficult to say. It would seem that, for the present at least, such efforts should be confined to those markets in which the advantages are reasonably clear. The ability of a producers' cooperative to enter into distribution is probably one of its most effective bargaining weapons in dealing with the large private distributor. But this weapon needs to be used with care or it will defeat its own purpose, for it is not probable that producers can expect to replace the large private organizations already in the field. In general it would seem desirable that the functional operations of the large private distributors and the cooperatives should complement and not duplicate each other. Otherwise, the two types of organizations will constitute more or less separate and competitive channels of distribution.

SUMMARY

The two decades since the close of the World War have witnessed the organization and growth of large-scale corporations in all branches of dairy marketing and manufacture. The outstanding examples of this development are the large dairy companies, the meat packers, and the grocery chains. Several producer marketing cooperatives are today operating on a regional and even a national scale, but in general large-scale developments under the cooperative form of business enterprise have not been so rapid as those under the corporate form.

The combined dollar sales of the four leading dairy corporations increased from about \$300,000,000 in 1925 to more than \$850,000,000 in 1930. During this period, the estimated total sales value of all dairy products increased from \$1,965,000,000 to around \$2,200,000,000—an increase of only 12 percent as compared with a near trebling of sales by the four big dairy companies. Since 1930, the dollar sales of these four companies have fluctuated about in line with changes in the supplies and prices of dairy products, which indicates that their expansion program was brought at least temporarily to a stop by the depression.

The growth of these large companies was achieved mainly by the purchase and consolidation of hundreds of dairy companies in all parts of the country. Within the course of a few years, one concern acquired, either directly or through its subsidiaries, more than 300 separate companies; another acquired more than 200. As of 1934, the largest dairy corporation handled milk products equivalent to 9.4 percent of the total volume of milk moving into commercial channels.

Other types of corporate handlers of dairy products are the meat packers and the grocery chains. For years the packers have handled dairy products along with meats. Several of them outrank even some of the large dairy companies in volume of butter and cheese handled.

Grocery chains are important in the retailing of dairy products, but their operations extend much further than this. The larger systems have their own facilities for assembling butter and cheese direct from local plants, and have gone extensively into the manufacture of evaporated milk.

The cooperative marketing of dairy products began more than 50 years ago, but only within the last two decades have large-scale marketing organizations been developed under this form of ownership. The largest cooperative from the standpoint of dollar sales is the New York Dairymen's League Cooperative Association, an association of producers supplying fluid milk for the New York metropolitan area. Next largest is Land O'Lakes Creameries, Inc., which markets the products of about 400 dairy manufacturing plants, mostly creameries, in the Great Lakes dairy region. Neither of these cooperatives has a volume of business anywhere near so large as the leading corporate handlers. Generally, the cooperatives have shown little or no expansion in their scale of operations since 1930, and in some cases they have shown a decrease.

The amount of money invested by the three largest private dairy corporations as measured by their capitalization increased nearly fourfold from 1925 to 1930. A considerable part (perhaps as much as 25 percent) came from their earnings during these years.

The earnings of capital invested in marketing enterprises represents one of the component parts of the marketing spread for dairy products, and hence is of interest to producers. The total earnings (that is, the amount of money available for dividends on stock, interest on borrowed capital, and Federal income taxes) of the four leading dairy companies have varied from as high as \$57,400,000 in 1930 to as low as \$16,600,000 in 1933. Their earnings in 1937 were about \$23,100,000. Capital invested in these four companies earned from 16 to 18 percent in the 6-year period 1925-30, 4.9 percent in 1933, and 8.2 in 1937.

The average profit margins of the four largest dairy companies (the ratios of earnings to dollar sales) have ranged from as high as 7.3 percent in 1928 to as low as 3.2 percent in 1934. Salary and wage rates, plant and supply costs, and general operating efficiency have more to do with determining marketing margins for dairy products than earnings to capital invested in marketing enterprises.

All three types of large-scale private handlers of dairy products (the dairy companies, meat packers, and grocery chains) operate some manufacturing plants in producing areas. The entrance of such concerns into the field of dairy manufacturing has resulted not only in a change in ownership but also in the size and type of dairy plants.

In Wisconsin (the area selected for special study of local plant operations), plants operated by national companies received 23 percent of all milk moving into commercial uses; cooperative plants received 33 percent; independent plants, 28 percent; local dairy chains, 3 percent; and plants (all small ones) unclassified as to ownership received the remainder.

The national companies are much more important in manufacturing evaporated milk than in making butter and cheese. Of 329 creameries in Wisconsin, national companies had but 10, and these 10 received less than 3 percent of the milk manufactured by creameries in the State. Factories operated by the national companies received less than 2 percent of the total milk receipts of American-cheese factories. In the case of condenseries, however, the national companies had 31 out of a total of 36 plants, and these 31 plants manufactured more than 90 percent of the evaporated milk produced in the State.

Control of fluid milk facilities in Wisconsin may not be typical for other parts of the country, but in that State the national companies had plants that received one-half of the milk destined for consumption in fluid form.

The trend in the manufacture of dairy products is toward fewer and larger plants. The use of the motortruck in assembling milk from farms, utilization of byproducts, and increased efficiency in larger plants point clearly in this direction. Large-scale handlers of dairy products have taken the initiative in building and equipping plants fitted to these modern transportational and technological conditions.

In general, the location of dairy plants in Wisconsin is such that farmers have several alternative outlets for their milk. It appears that there is genuine local competition among plants for milk, and that no appreciable degree of monopoly exists in the operation of primary dairy plants in Wisconsin.

Although large-scale handlers are important in the manufacturing of dairy products, they are to be thought of primarily as distributors rather than as manufacturers. Concentration of control in distribution is much greater than in the field of manufacture.

Eleven dairy companies distribute about 18 percent of the total volume of fluid milk consumed in villages and cities in the United States. Three companies alone distribute 16 percent. In many of the larger metropolitan areas, however, a single distributor may have 30 to 50 percent of the total supply, and the three largest together often have as much as 60 to 90 percent.

The distribution of butter shows less centralization than that of any other dairy product. Eleven of the larger private dairy companies are handling 25 percent of the total supply, and 10 meat packers, 19 percent. The largest single handler has about 8 percent of the total, and the three largest handlers together have about 20 percent.

Cheese is manufactured in hundreds of cooperative and independently-owned factories, but its distribution is largely centralized in the hands of six or eight firms. The three largest handlers of cheese (the National Dairy Products Corporation, Armour & Co., and Swift & Co.) distribute nearly two-thirds of the total supply, of which amount the largest single firm has about half.

The three leading manufacturers and distributors of condensed and evaporated milk are the Carnation Co., the Pet Milk Co., and the Whitehouse Milk Co. (a subsidiary of the Great Atlantic & Pacific Tea Co.). These three firms manufacture nearly half of the total output.

The horizontal growth of the mass distributor of dairy products has been accompanied by the vertical integration of additional marketing functions. In many cases—notably the manufacture and distribution of canned milk by grocery chains—such distributors bridge the entire gap between producers and consumers.

The distribution of fluid milk is carried on by companies that are highly integrated as to marketing functions. Most of the milk sold for fluid consumption is assembled from the farm, pasteurized, bottled, and delivered to the consumers' doorstep by a single company. The main exception to this complete integration is the assembling of milk at country plants by some of the larger producer cooperatives.

The handling of butter and cheese by the meat packers also shows a high degree of vertical integration. It is estimated that the larger

packers manufacture in their own plants about half of the butter they distribute. Most of the remainder they buy direct from individual creameries. Both butter and cheese are distributed by the packers direct to independent retailers, hotels, institutions, etc. The packers do not sell many dairy products to the grocery chains because the chains have their own district warehouses for servicing their retail units with these products.

Sources of supply for butter and cheese used by the grocery chains vary somewhat, depending on the size of the chain. The smaller chains rely chiefly on the dairy companies or produce wholesalers to assemble the product for them. The larger systems go direct to the local creameries and cheese factories wherever possible, and operate butter and cheese warehouses in producing areas for assembling the product for shipment to their branch distributing houses.

The channels of distribution for canned milk are quite different from those of the perishable dairy products. The grocery chains that manufacture canned milk of course carry it to the retail shelf within their own organization. The manufacturers of canned milk who have no retail outlets sell largely to the wholesale grocer, who in turn sells to the independent retailer.

The growth of mass distribution has clearly meant a decrease in the relative importance of the specialized middleman (the commission merchant, the broker, and the produce jobber) in the distribution of dairy products. As a general thing, the mass distributor tends to go direct to the local plant or marketing cooperative for his supplies, and carries them through to the retailer. Specialized middlemen are still important factors in the trade, but they serve mainly the small buyers rather than the mass distributors.

One of the most important aspects of large-scale organization is its effect on marketing costs and margins. The facilities of the study were not such as to permit an extended analysis of this phase, but certain conclusions of a rather general character seem warranted on the basis of this and other studies.

In the case of fluid milk, it is clearly desirable that there be fewer and larger local distributing companies if the objective is to reduce marketing costs. Several studies that have been made suggest that even further economies could be made under a unified, noncompetitive system that would eliminate much of the duplication of plant facilities and distributive services now existing in most markets. The merging of local distributive units for fluid milk into large national companies appears to be relatively unimportant from the standpoint of distributive efficiency. Moreover, the complete integration of marketing functions within a single firm is probably not necessary for a high degree of efficiency in fluid-milk distribution.

Mass distribution has been carried farther with canned milk than with any other dairy product. This branch of the industry appears to offer an illustration of the fact that mass methods sometimes make for greater marketing efficiency and reduced marketing spreads. The manufacturing and distributive margins for evaporated milk have narrowed steadily since 1920, and at present the gross spread between producers and consumers is less than two-thirds of what it was 15 years ago. Another indication of this reduction is to be found in the fact that retail prices of canned milk have declined steadily in relation to those of other dairy products. Part of this reduction seems attribu-

table to the fact that the grocery chains began to manufacture and distribute canned milk on an extensive scale, often using it as a price leader in their stores.

Large-scale organization has not been extended in any considerable degree to dairy-farming operations. With the exception of a few large dairies conducted on a somewhat experimental basis, the dairy companies do not engage in the production of milk. Corporation dairy farming is not carried on extensively although enterprises of this kind are to be found in many communities. According to the last agricultural census, only about 1,200 out of more than 4,500,000 farms on which milk is produced had more than 100 cows per farm.

The unionization of labor employed in manufacturing and distributing dairy products has proceeded rapidly during recent years. One reason appears to be found in the growth of large-scale enterprise, for an industry comprised of small units is less conducive to such organization on the part of labor than one of larger units. To the extent that organized labor succeeds in its program of obtaining higher wages, large-scale enterprises may have relatively higher costs than otherwise, which would be a factor retarding further consolidation and integration in the industry.

Patent rights constitute important instruments of economic control in the dairy industry. The outstanding example relates to process cheese, the basic patents for which are controlled by one of the large dairy companies. The growth of this company has been partly due to the fact that its patents gave it primary access to the rapidly expanding market for packaged and process cheeses. Patents were at one time also important in the manufacture of condensed and evaporated milk, but the basic patents for these processes have run out. There are no important patents relating to the manufacture of butter and natural cheese, as the methods of making these products are old and widely used. Science has recently discovered new commercial uses for casein, and patents relating to these uses are among the most important now in effect in the dairy industry. The larger dairy companies have most of what now appear to be the most valuable casein patents.

Mass distribution of dairy products seems to have created new problems as well as new opportunities for the producers' cooperative movement. If producers are to benefit fully from cooperative ownership and operation of manufacturing plants these plants will have to match those of the big companies in service to producers, efficiency, and the utilization of byproducts. Moreover, they will need equally good sales outlets. The large companies have taken the initiative in building dairy plants that are adapted to modern transportational and technological conditions, but the success of a growing number of cooperative plants of this kind promises to give new impetus to cooperative control in the field of dairy manufacturing.

It is generally agreed that cooperative marketing can play an important part in a system of mass distribution. There is considerable controversy, however, over what type of marketing program a cooperative ought to adopt when dealing with the corporate mass distributors. Manufacturing and local assembling of the product seem clearly within the province of the cooperative. As a matter of fact, some grocery chains and other types of large distributors often prefer to obtain dairy products from a cooperative, as it relieves them of the

need for dealing with individual plants with respect to supplies, quality, and price arrangements.

How much further the cooperative should go in the direction of vertical integration if it wishes to deal with the mass distributors is conjectural. The large corporate handlers usually have their own brands for dairy products and their own facilities for wholesale distribution in urban centers. Under these circumstances they have no need for many of the marketing services that the vertically integrated cooperative is in position to offer to the smaller buyer. The most satisfactory arrangement between the cooperative and the mass distributor is most assuredly one under which their functional set-ups complement rather than duplicate each other. Otherwise the two will constitute separate and competitive systems of distribution, with the cooperative sending its products around the mass distributor while the latter deals directly with unorganized local plants or even directly with individual producers.

COMMENTS BY THE AUTHORS ON SOME CONSIDERATIONS OF PUBLIC POLICY

This study has been primarily concerned with the character of large-scale developments in the dairy industry, and with the effect of these developments on marketing structure and handling methods. The purpose of the study was not to develop recommendations as to public policy with respect to large-scale organization in the dairy industry. In the course of their work, however, the authors have formulated certain ideas and opinions regarding this broader question which are incorporated in the discussion that follows. This discussion represents solely the opinions and beliefs of the writers, and is not to be regarded as bearing the endorsement either of the Department of Agriculture or of the Wisconsin Agricultural Experiment Station.

Basic to the whole question of large-scale organization in the dairy industry have been technological innovations and improvements not only in the industry itself but throughout the entire economy. New types of plant equipment and new methods of processing and distributing dairy products have been developed during the last several decades, the best application of which requires larger economic units in the industry than those theretofore existing. Less direct but even more important in their combined effect have been all the innovations in transportation and communication which now make it feasible to supervise and conduct business enterprises on a regional and even a national basis. This is not to imply that all large-scale corporate developments can be explained or justified on the basis of these technological factors alone. But to overlook them is to miss an important underlying cause of what is happening in nearly all phases of food processing and distribution.

Larger plants are clearly needed if the most efficient use is to be made of modern techniques of manufacturing milk products. Progress is being made in this direction by the consolidation of dairy plants, but it would be desirable in many instances if the movement could be accelerated. Much of the overlapping of plant territory and of motortruck routes is mainly a reflection of the competition for volume of business in an industry whose plant facilities are not well adjusted to present-day technological and economic conditions.

Large marketing organizations are distinctly necessary if we are to have anything like maximum efficiency in the distribution of manufactured dairy products such as butter, cheese, and evaporated milk. Moreover, there appears to be a distinct advantage in having the various stages of distribution closely correlated or integrated so as to reduce selling costs. This can probably be done more easily within large companies than through intercompany transactions.

In the case of fluid milk and cream there does not appear to have been the same economic justification for national companies, largely because the markets for these products are local in character. Although the merging of fluid milk distributing companies into large national corporations does not appear to have made any major contribution to efficiency, it is not probable that the dissolution of such national companies would significantly affect or improve conditions in local fluid milk markets.

A question might properly be raised as to what extent the growth of large-scale organization can be permitted within a competitive system of distribution without creating a serious monopolistic problem. Here again the problem is distinctly different for manufactured dairy products than for fluid milk and cream.

Monopolistic control of the handling and distribution of manufactured dairy products such as butter, cheese, and evaporated milk appears unlikely, at least in the immediate future. These products are manufactured by large numbers of widely scattered and competitive dairy plants. They are marketed in the regular channels of food distribution along with many other food items so that no single firm or type of handler is likely to be in position to exercise significant control over their distribution. The only important exception may be an instance in which a company gains some special advantages as, for instance, through control of patents and perhaps trade-marks.

Fluid milk markets have more factors that tend toward the development of monopolistic practices than do the markets for manufactured dairy products. Among these factors are the specialized facilities for wholesale and retail distribution of milk and cream; restrictions of supply resulting from municipal health ordinances; local drivers' unions in some markets; dealer organizations and private bottle exchanges; and producer cooperatives with closed-membership policies. It should not be inferred that the above factors are necessarily monopolistic or detrimental to public interest. The opposite may be true, but the fact still remains that fluid milk marketing has several elements of potential monopoly in local markets.

Public concern with respect to monopolistic factors in the dairy industry has not been consistent. While there has been opposition to monopoly practices in fluid milk distribution, governmental agencies themselves have at times sponsored or perpetuated restrictive measures. These are exemplified by health regulations and their administration, and by the fixing of fluid milk prices under State and Federal regulation. Such governmental measures have sometimes curbed rather than encouraged competitive prices, regardless of their value otherwise.

The direction that public policy should take with respect to fluid milk distribution is not easy to determine since there are several conflicting forces. One approach would be to promote a policy that would make the agencies in these markets more competitive. Merely

limiting the size of the distributing agency would not accomplish this. In fact to "freeze" the size of organization at any given percentage of the business may possibly have the opposite effect and take away the initiative of these companies to compete for further business. If a competitive policy is aggressively promoted it would probably mean (1) an open market for all producers who are willing to meet the quality standards of such markets, (2) a standardization of milk ordinances and a broad system of inspection service, (3) abolishment of agreements and practices that tend to limit the number or kind of distributors (this would mean open membership in bottle exchanges and more encouragement of retail sales through stores), and (4) an open shop for labor with wages and hours in line with competitive employment. Such a policy would probably not be acceptable to organized groups within these markets nor is it clear that a purely competitive policy would result in major economies in the market. It might result in more agencies and more duplication of service rather than in narrower distributive margins.

Another approach would be to develop a completely unified system of milk distribution under some form of public operation or control. Obviously this policy would do away with much of the duplication of facilities and services now existing in all fluid-milk markets. It should mean corresponding economies in the use of capital, labor, and operating supplies. On the other hand, it would require a greatly extended participation in economic affairs by State and municipal agencies, many of which are not at present equipped with personnel, finances, or facilities for an undertaking like that of fluid-milk distribution.

These are two general lines of thought with respect to a positive program of public action in relation to fluid-milk marketing. Another policy would be for the public to remain aloof from the problems of this industry and to take no active part in its direction. This would be to accept the situation substantially as it now is.

The authors assume that the objective of public policy with respect to the dairy industry should be to encourage the most economical and efficient marketing system that can be developed, provided that the major advantages are passed along to consumers and producers. The authors believe that it would be against the best interests of the public and of the industry itself blindly to oppose large-scale organization; and that at present, in most phases of the industry, the advantages of mass distribution appear to outweigh the dangers of monopoly.

Although the writers believe that large plant and marketing units are essential in many cases for maximum efficiency, they are not insensible to the danger of uncontrolled private monopoly. When such a situation develops, one of two general courses is open: either to make an attempt to restore and preserve competition by the dissolution of the monopolistic elements, or to develop some form of governmental control—perhaps even operation—of the marketing functions that are monopolized. Which of these two general courses should be followed will depend on the special circumstances surrounding each case. Where large-scale organization contains elements of monopoly but is nevertheless necessary for increased efficiency in the dairy industry, the writers believe that public policy should be in the direction of control rather than the dissolution of large-scale concerns.

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APPENDIX

TABLE 28.—Number of miscellaneous dairy plants in Wisconsin by type of ownership and receipts of milk from farms, 1935

FOREIGN-CHEESE FACTORIES

| Type of proprietor | Foreign-type cheese factories | | Receipts of milk from farms | | Average volume of milk received 1,000 pounds |
|---|-------------------------------|---------|-----------------------------|---------|---|
| | Number | Percent | 1,000 pounds | Percent | |
| Cooperative..... | 54 | 11.4 | 121,294 | 15.4 | 2,246 |
| Independent..... | 207 | 43.8 | 325,878 | 41.4 | 1,574 |
| National and local companies ¹ | 68 | 14.4 | 143,477 | 18.2 | 2,110 |
| Unclassified..... | 144 | 30.4 | 197,218 | 25.0 | 1,370 |
| All plants..... | 473 | 100.0 | 787,867 | 100.0 | 1,666 |

¹ 2 plants were operated by national companies and 66 by local dairy chains.

COMBINATION AMERICAN- AND FOREIGN-CHEESE FACTORIES

| Type of proprietor | Combination factories | | Receipts of milk from farms | | Average volume of milk received 1,000 pounds |
|---|-----------------------|---------|-----------------------------|---------|---|
| | Number | Percent | 1,000 pounds | Percent | |
| Cooperative..... | 5 | 10.4 | 10,624 | 11.1 | 2,125 |
| Independent..... | 21 | 43.8 | 36,824 | 38.4 | 1,754 |
| National and local companies ² | 12 | 25.0 | 31,707 | 33.1 | 2,642 |
| Unclassified..... | 10 | 20.8 | 16,706 | 17.4 | 1,671 |
| All plants..... | 48 | 100.0 | 95,861 | 100.0 | 1,997 |

² 1 factory was operated by a national company and 11 were operated by local chains. The national company plant was much larger than any of those operated by local chains.

TABLE 28.—Number of miscellaneous dairy plants in Wisconsin by type of ownership and receipts of milk from farms, 1935—Continued

CONDENSERY RECEIVING STATIONS

| Type of proprietor | Stations | | Receipts of milk from farms | | Average volume of milk received |
|-------------------------|----------|---------|-----------------------------|---------|---------------------------------|
| | Number | Percent | 1,000 pounds | Percent | 1,000 pounds |
| Cooperative..... | 1 | 3.7 | 14,672 | 3.8 | 14,672 |
| National companies..... | 26 | 96.3 | 370,863 | 96.2 | 14,264 |
| All plants..... | 27 | 100.0 | 385,535 | 100.0 | 14,279 |

FLUID-MILK RECEIVING STATIONS

| Type of proprietor | Number | Percent | 1,000 pounds | Percent | 1,000 pounds |
|-------------------------|--------|---------|--------------|---------|--------------|
| Cooperative..... | 8 | 19.5 | 83,015 | 17.1 | 10,377 |
| Independent..... | 12 | 29.3 | 86,054 | 17.7 | 7,171 |
| National companies..... | 17 | 41.5 | 293,027 | 60.3 | 17,237 |
| Local dairy chains..... | 4 | 9.7 | 23,758 | 4.9 | 5,939 |
| All plants..... | 41 | 100.0 | 485,854 | 100.0 | 11,850 |

FLEXIBLE PLANTS

| Type of proprietor | Flexible-type plants | | Receipts of milk from farms | | Average volume of milk received |
|-------------------------|----------------------|---------|-----------------------------|---------|---------------------------------|
| | Number | Percent | 1,000 pounds | Percent | 1,000 pounds |
| Cooperative..... | 11 | 24.4 | 213,531 | 28.0 | 19,412 |
| Independent..... | 14 | 31.1 | 156,478 | 20.6 | 11,177 |
| National companies..... | 17 | 37.8 | 362,634 | 47.6 | 21,331 |
| Local dairy chains..... | 3 | 6.7 | 28,991 | 3.8 | 9,664 |
| All plants..... | 45 | 100.0 | 761,634 | 100.0 | 16,925 |

COMBINATION BUTTER AND CHEESE FACTORIES

| Type of proprietors | Combination factories | | Receipts of milk from farms | | Average volume of milk received |
|---|-----------------------|---------|-----------------------------|---------|---------------------------------|
| | Number | Percent | 1,000 pounds | Percent | 1,000 pounds |
| Cooperative..... | 18 | 27.3 | 116,430 | 31.8 | 6,468 |
| Independent..... | 34 | 51.5 | 206,476 | 56.4 | 6,073 |
| National and local companies ³ | 3 | 4.5 | 9,871 | 2.7 | 3,290 |
| Unclassified..... | 11 | 16.7 | 33,238 | 9.1 | 3,022 |
| All plants..... | 66 | 100.0 | 366,015 | 100.0 | 5,546 |

³ 1 plant was operated by a national company and 2 by a local dairy chain.

GENERAL RECEIVING STATIONS

| Type of proprietor | Stations | | Receipts of milk from farms | | Average volume of milk received |
|--------------------|----------|---------|-----------------------------|---------|---------------------------------|
| | Number | Percent | 1,000 pounds | Percent | 1,000 pounds |
| Cooperative..... | 3 | 13.0 | 17,800 | 14.8 | 5,933 |
| Independent..... | 16 | 69.6 | 93,301 | 77.9 | 5,831 |
| Unclassified..... | 4 | 17.4 | 8,718 | 7.3 | 2,180 |
| All plants..... | 23 | 100.0 | 119,819 | 100.0 | 5,210 |

TABLE 28.—Number of miscellaneous dairy plants in Wisconsin by type of ownership and receipts of milk from farms, 1935—Continued

CREAM-RECEIVING STATIONS

| Type of proprietor | Stations | | Receipts of milk from farms | | Average volume of milk received |
|--------------------------------|----------|-------|-----------------------------|-------|---------------------------------|
| | | | | | |
| Cooperative..... | 8 | 4.5 | 4 3,983 | 3.6 | 498 |
| Independent ⁵ | 109 | 61.2 | 4 67,116 | 60.4 | 616 |
| National companies..... | 7 | 3.9 | 4 6,488 | 5.8 | 927 |
| Local dairy chains..... | 54 | 30.4 | 4 33,550 | 30.2 | 621 |
| All plants..... | 178 | 100.0 | 4 111,137 | 100.0 | 624 |

⁴ Milk equivalent of farm-separated cream.

⁵ Includes 1 plant for which the proprietorship was not definitely ascertained.

ICE-CREAM PLANTS

| Type of proprietor | Plants | | Receipts of milk from farms | | Average volume of milk received |
|-------------------------|--------|---------|-----------------------------|---------|---------------------------------|
| | Number | Percent | 1,000 | Percent | |
| | | | pounds | pounds | |
| Independent..... | 13 | 86.7 | 6,468 | 76.5 | 498 |
| National companies..... | 2 | 13.3 | 1,990 | 23.5 | 995 |
| All plants..... | 15 | 100.0 | 8,458 | 100.0 | 564 |

TABLE 29.—Number of foreign-type cheese factories by size and by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received | | Factories by type of proprietor | | | | | |
|---|---------------------|---------|---------------------------------|---------|--------------|--------------|--|---------------|
| | | | Total | | Coop-erative | Inde-pendent | National and local chains ¹ | Unclas-sified |
| | 1,000 pounds | Percent | Number | Percent | Number | Number | Number | Number |
| Under 0.5..... | 7,543 | 1.0 | 23 | 4.9 | | 15 | | 8 |
| 0.5 to 0.9..... | 80,105 | 10.2 | 101 | 21.3 | 9 | 41 | 10 | 41 |
| 1.0 to 1.9..... | 334,096 | 42.4 | 234 | 49.5 | 22 | 100 | 41 | 71 |
| 2.0 to 2.9..... | 178,684 | 22.7 | 76 | 16.1 | 12 | 32 | 11 | 21 |
| 3.0 to 3.9..... | 82,112 | 10.4 | 24 | 5.1 | 6 | 16 | 1 | 1 |
| 4.0 to 4.9..... | 16,963 | 2.1 | 4 | .8 | | 1 | 1 | 2 |
| 5.0 to 7.4..... | 46,785 | 5.9 | 8 | 1.7 | 4 | 2 | 2 | |
| 7.5 to 9.9..... | 7,898 | 1.0 | 1 | .2 | 1 | | | |
| 10.0 and over..... | 33,681 | 4.3 | 2 | .4 | | | 2 | |
| Total..... | 787,867 | 100.0 | 473 | 100.0 | 54 | 207 | 68 | 144 |

¹ 2 national company plants and 65 local chain plants.

TABLE 30.—Number of fluid-milk plants by size groups and by type of proprietor and total receipts of milk from farms, Wisconsin, 1935

| Size of plants (in terms of milk receipts from farms) (million pounds) | Total milk received | | Plants by type of proprietor | | | | | | |
|--|---------------------|---------|------------------------------|---------|--------------|--------------|----------------|-------------|---------------|
| | | | Total | | Coop-erative | Inde-pendent | National chain | Local chain | Unclas-sified |
| | 1,000 pounds | Percent | Number | Percent | Number | Number | Number | Number | Number |
| Under 1.0..... | 18,392 | 3.6 | 47 | 34.6 | 2 | 39 | | 1 | 5 |
| 1.0 to 1.9..... | 50,980 | 10.1 | 35 | 25.7 | 1 | 29 | 1 | | 4 |
| 2.0 to 2.9..... | 43,847 | 8.7 | 18 | 13.2 | | 16 | | 1 | 1 |
| 3.0 to 3.9..... | 31,526 | 6.3 | 9 | 6.6 | | 8 | | 1 | |
| 4.0 to 4.9..... | 26,717 | 5.3 | 6 | 4.4 | 1 | 4 | | 1 | |
| 5.0 to 7.4..... | 47,268 | 9.4 | 8 | 5.9 | 2 | 6 | | | |
| 7.5 to 9.9..... | 54,837 | 10.9 | 6 | 4.4 | | 5 | 1 | | |
| 10.0 to 14.9..... | 20,808 | 4.1 | 2 | 1.5 | | 2 | | | |
| 15.0 and over..... | 209,463 | 41.6 | 5 | 3.7 | 1 | | 4 | | |
| Total..... | 503,838 | 100.0 | 136 | 100.0 | 7 | 109 | 6 | 4 | 10 |

TABLE 31.—Number of fluid-milk receiving stations by size groups and by type of proprietor and total receipts of milk from farms, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received | | Plants by type of proprietor | | | | |
|---|------------------------|----------------|------------------------------|-------------|-------------|-----------------|--------------|
| | | | Total | Cooperative | Independent | National chains | Local chains |
| | | | Number | Number | Number | Number | Number |
| Under 5.0..... | 1,000 pounds 28,451 | Percent 5.9 | 11 | 3 | 5 | 1 | 2 |
| 5.0 to 7.4..... | 25,214 | 5.2 | 4 | | 3 | 1 | |
| 7.5 to 9.9..... | 44,590 | 9.2 | 5 | 2 | | 1 | 2 |
| 10.0 to 14.9..... | 103,168 | 21.2 | 8 | 1 | 4 | 3 | |
| 15.0 to 19.9..... | 105,905 | 21.8 | 6 | | | 6 | |
| 20.0 and over..... | 178,526 | 36.7 | 7 | 2 | | 5 | |
| Total..... | 485,854 | 100.0 | 41 | 8 | 12 | 17 | 4 |

TABLE 32.—Number of general receiving stations by size groups and by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received | | Plants by type of proprietor | | | |
|---|-----------------------|----------------|------------------------------|-------------|-------------|--------------|
| | | | Total | Cooperative | Independent | Unclassified |
| | | | Number | Number | Number | Number |
| Under 1.0..... | 1,000 pounds 2,820 | Percent 2.3 | 5 | | 4 | 1 |
| 1.0 to 1.9..... | 9,900 | 8.3 | 6 | 1 | 3 | 2 |
| 2.0 to 2.9..... | 5,102 | 4.2 | 2 | | 2 | |
| 3.0 to 3.9..... | | | | | | |
| 4.0 to 4.9..... | 4,756 | 4.0 | 1 | | | 1 |
| 5.0 to 7.4..... | 25,153 | 21.0 | 4 | 1 | 3 | |
| 7.5 to 9.9..... | 28,760 | 24.0 | 3 | 1 | 2 | |
| 10.0 and over..... | 43,325 | 36.2 | 2 | | 2 | |
| Total..... | 119,819 | 100.0 | 23 | 3 | 16 | 4 |

TABLE 33.—Number of flexible plants by size groups and by type of proprietor and total receipts of milk from farms, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received | | Plants by type of proprietor | | | | |
|---|------------------------|----------------|------------------------------|-------------|-------------|----------------|-------------|
| | | | Total | Cooperative | Independent | National chain | Local chain |
| | | | Number | Number | Number | Number | Number |
| Under 5.0..... | 1,000 pounds 11,302 | Percent 1.5 | 4 | | 3 | | 1 |
| 5.0 to 7.4..... | 30,177 | 3.9 | 5 | 2 | 1 | 2 | |
| 7.5 to 9.9..... | 36,773 | 4.8 | 4 | | 3 | 1 | |
| 10.0 to 14.9..... | 108,881 | 14.3 | 9 | 4 | 3 | | 2 |
| 15.0 to 19.9..... | 172,680 | 22.7 | 10 | 1 | 2 | 7 | |
| 20.0 to 29.9..... | 222,885 | 29.3 | 9 | 3 | 2 | 4 | |
| 30.0 and over..... | 178,936 | 23.5 | 4 | 1 | | 3 | |
| Total..... | 761,634 | 100.0 | 45 | 11 | 14 | 17 | 3 |

TABLE 34.—Number of combination butter and cheese factories by size groups and by type of proprietor and receipts of milk from farms, Wisconsin, 1935

| Size of plant (in terms of milk receipts from farms) (million pounds) | Total milk received | | Plants by type of proprietor | | | | |
|---|---------------------|----------------|------------------------------|-------------|-------------|--|--------------|
| | | | Total | Cooperative | Independent | National and local chains ¹ | Unclassified |
| | | | Number | Number | Number | Number | Number |
| | <i>1,000 pounds</i> | <i>Percent</i> | | | | | |
| Under 2.0..... | 18,240 | 5.0 | 12 | 3 | 4 | 1 | 4 |
| 2.0 to 2.9..... | 23,760 | 6.5 | 10 | 4 | 3 | 1 | 2 |
| 3.0 to 3.9..... | 26,512 | 7.3 | 8 | 1 | 4 | | 3 |
| 4.0 to 4.9..... | 36,822 | 10.1 | 8 | 2 | 5 | | 1 |
| 5.0 to 7.4..... | 77,378 | 21.1 | 12 | 2 | 8 | 1 | 1 |
| 7.5 to 9.9..... | 50,215 | 13.7 | 6 | 1 | 5 | | |
| 10.0 to 12.4..... | 65,307 | 17.8 | 6 | 2 | 4 | | |
| 12.5 and over..... | 67,781 | 18.5 | 4 | 3 | 1 | | |
| Total..... | 366,015 | 100.0 | 66 | 18 | 34 | 3 | 11 |

¹ 1 national company plant and 2 local chain plants.

TABLE 35.—Number of cream-receiving stations, by size groups and type of proprietor, and receipts of milk from farms, Wisconsin, 1935¹

| Size of plant (cream receipts in milk equivalent) (million pounds) | Total milk received | | Stations by type of proprietor | | | | | |
|--|---------------------|----------------|--------------------------------|---------|-------------|--------------------------|----------------|-------------|
| | | | Total | | Cooperative | Independent ² | National chain | Local chain |
| | | | Number | Percent | Number | Number | Number | Number |
| | <i>1,000 pounds</i> | <i>Percent</i> | | | | | | |
| Under 0.5..... | 20,834 | 18.7 | 108 | 60.7 | 5 | 67 | 6 | 30 |
| 0.5 to 0.9..... | 22,631 | 20.4 | 33 | 18.5 | 2 | 19 | | 12 |
| 1.0 to 1.9..... | 36,492 | 32.8 | 27 | 15.2 | 1 | 17 | | 9 |
| 2.0 to 2.9..... | 16,764 | 15.1 | 7 | 3.9 | | 4 | | 3 |
| 3.0 and over..... | 14,416 | 13.0 | 3 | 1.7 | | 2 | 1 | |
| Total..... | 111,137 | 100.0 | 178 | 100.0 | 8 | 109 | 7 | 54 |

¹ Cream receipts in milk equivalents.

² Includes 1 plant not definitely classified as to type of proprietor.

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