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CHANGES IN MILK PRODUCTION AND TRANSPORTATION*

by

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Introduction

Changes are occurring so fast in dairy marketing that I often wonder where these changes will lead us. The picture certainly becomes more complex and confusing as time goes on. We might even go so far as to ask ourselves if we will have dairy marketing indefinitely. Will substitutes be found for milk and dairy products that will force dairy farmers and handlers as well as dairy marketing specialists out of business? Perhaps not, but we will see changes and many people will be forced to accept and adjust to those changes. It is ironical that while dairy production is undergoing changes that bring in dry-lot feeding, artificial breeding, pipe-line milkers and bulk tanks, which some people compare to the industrial revolution, we hear politicians and see dairy advertisements attempting to convey to the consumer a picture of dairying as it was years ago --as a way of life, of the quiet countryside, where a bare-foot boy and his dog bring in the family herd of cows for the evening milking.

Our purpose here today is to point out some of the changes that are taking place and discuss their implications. The nature of the assignment is such that it's difficult to avoid making statements that future events will prove to be wrong. The late Professor Norton of the University of Illinois, used to say that nothing looked sillier than a wrong prediction that was down in black and white. But as they say in politics, before conventions the platform committee goes into hiding, and after the election the platform goes into hiding.

In dairy marketing the major changes that have occurred are the expansion of the milk supply areas on the one hand, and the expansion of the distribution areas on the other.

In my paper I will emphasize changes on the supply or procurement side of the picture and Mr. Mathis will emphasize changes in processing and distribution.

I have divided my paper into two parts. First, I will review major changes that have occurred or are likely to occur and secondly, I will discuss the implications of these changes.

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Changes That Have Occurred or are Likely to Occur

Increasing Farm Size. Within milk supply areas an often talked about change is the ever-increasing farm size, if not in acres then certainly in volume of milk sold. Many dairymen are quite concerned that to be competitive they must continually get bigger and bigger. In 1952, the average daily delivery per producer in the Puget Sound, Washington, milk marketing area was 483 pounds.[1/] By 1959 it had increased to 798 pounds, a 65 per cent increase in seven years, or an average of 9.3 per cent per year. Somewhat similar figures could probably be quoted in almost every major milk supply area of the United States.

New technologies such as, bulk handling, pipe-line milkers, and artificial breeding make it possible to have larger herds and higher production per cow.

According to recent statistics[2/] in January 1960 we had 140,793 producers who delivered milk from bulk cooling tanks. In a study of the Puget Sound market we found that bulk tank shippers over a 5 year period increased their milk deliveries almost 40 per cent more than did those who continued to ship in cans. Thus, if producers throughout the country showed the same tendency to increase production after they put in a bulk tank, we can see the impact this one improvement in technology has had in increasing farm size as measured by volume of milk delivered per producer.

Just what the incentives are for a dairy farmer to increase milk production when he adopts a new technology, such as a bulk tank, are difficult to determine. Several can be suggested. One that an agricultural economist might most readily accept is that with increased investment, the producer is impelled to increase output to reduce average unit cost. When combined with bulk tank premium payments this results in net purchasing power equal to or greater then existed prior to the adoption of the new technology. However, many county agents told me that the farmers in Washington wanted to increase their production in order to get more money from the bulk tank premiums paid and thereby shorten the repayment period. Still others said the farmers wanted to fully utilize their new purchase; they didn't like to see a half empty tank and were anxious to get more cows so that the tank could be filled.

Although it is true that most dairy farmers are increasing their milk production not all dairymen are. In the Puget Sound area about two-thirds of the producers increased their 1960 daily base over 1959, while one-third lowered their base.[3/] Of the one-third who lowered their base, those shipping less than 1000 pounds daily accounted for 83 per cent of the total. This group of

1/ Marketing Service Information for the Puget Sound, Washington, Milk Marketing Area, Volume 10, No. 3, March 1960.
2/ American Milk Review, May 1960, p. 44.
3/ Marketing Service Information, op. cit., Volume 10, No. 6, June 1960.

smaller producers also accounts for the greatest number of producers who quit dairying. In the Puget Sound market producers with less than 600 pound bases accounted for more than 75 per cent of those quitting.[4/] These included both can and tank shippers.

Further indication of the changes in dairy farm size are shown in census reports. Farms with herds of 1 to 10 cows in 1954 accounted for over 77 per cent of all farms with milk cows. (Table 1) Farms with more than 30 cows were only 3.2 per cent of the total. If we were considering only commercial dairy farms as defined by the census and not all farms with milk cows, the figures would be quite different. Farms with herds of 30 cows or more would then account for about one-fifth of the dairy farms. Since many of these small herds are kept to provide milk for home use the increased availability of packaged fluid milk in rural areas and the increased use of powdered and concentrated milk will hasten the decline in the number of small herds. The decrease in the small herds and the growth of larger herds has been going on for a long time but in the last 10 or 15 years the rate of increase in larger herds has stepped up. However, I wouldn't expect the predominant herd sizes to go beyond what one or two men can handle with the full use of prevailing technology. This means that herds of more than 100 cows will continue to make up only a small fraction of the total dairy herds. Herds of 30 to 60 cows will be popular and economic for quite awhile.

Table 1.--Percentage Distribution of Milk Cows by Size of Herd, for the United States: 1929, 1939 1944, 1950, 1954

	Farms with Milk Cows				
Size of Herd (number of milk cows)	1929	1939	1944	1950	1954
Total Number (thousands)	4,616	4,663	4,481	3,648,257	2,956,900
Total	100.0	100.0	100.0	100.0	100.0
1 to 9	87.9	87.3	84.5	81.9	77.6
10 to 19	9.8	10.0	11.8	13.1	14.1
20 to 29	1.6	1.8	2.5	3.3	5.1
30 or more	0.7	0.9	1.2	1.8	3.2

Source: 1929, 1939, 1944 data from U. S. Department of Agriculture, BAE, "Changes in the Dairy Industry, United States, 1920-50," U. S. Government Printing Office, Washington 1950.
1950, 1954 data from 1954 Census of Agriculture, Special Report, "Dairy Producers and Dairy Production," Vol. III, Pt. 9, Chap. V.

Integration

Cow pools where the cows of several farmers are taken to one farm to be housed, fed, milked and otherwise cared for under supervision of the cow pool manager, were developed in the Midwest a few years ago.

4/ Marketing Service Information, op. cit., Volume 9, No. 9, September 1959.

To what extent we will see the development of cow pools in the West is difficult to say. Cow pools seem to be most popular among so-called factory shippers who want to go grade A. Since we have a relatively small number of these dairymen plus the fact that the individual dairyman would be limited in alternative employment, I am a little doubtful that we will see very many cow pools in the West.

At one time I thought we would begin to see the milk handlers integrate vertically and produce their own supply of milk. With the prospect of having to pay a higher price for milk as a result of such factors as stronger bargaining associations, the possible entry of labor unions into milk supply areas, etc., I thought milk handlers would be encouraged to set up large herds of their own similar to what meat packers are doing in feeding beef cattle. Handlers, however, tell me that they have no desire or intention of producing milk. The reasons why they are not interested include management problems, investment required, product perishability, seasonality of production, and the shifting of risk for surplus disposal to the producer. It is more economical for them to continue buying milk from individual producers.

Location of production within supply areas

Another change that is likely to continue, partly as a result of reduced transportation costs, is a shifting of the milk supply area and a decrease in the intensity of production close to the market. Population increases and higher production costs near the market center will also be factors in pushing milk production farther and farther from the market. I have often wondered why so many of the big dairy farms in California continue to be located so close to the market. It would seem to me that with our bulk tank handling of milk it would be more economical to haul the milk to market from some lower production cost area. Apparently institutional factors, market organization and custom are a partial answer to why production is so close to the market. According to Mr. Klein, U. S. Department of Agriculture, Agricultural Economist in Berkeley, the production area for Los Angeles is moving but so far has attained only a marginal supply position to the Class I market.

In recent study of the Puget Sound market we found that the supply area has grown but we could not determine how much of the growth was influenced by lower transportation costs, and how much by population increases, higher costs of production near the market, and institutional factors, such as, the Federal Milk Order.

Hauling rates

Bulk milk handling has changed the cost structure of milk collection from farms. Because of the greater proportion of fixed costs per stop the per gallon cost of pickup from a small producer has increased relative to the large volume producer. Consequently, in some cases the bigger shippers are in effect subsidizing the hauling costs of the smaller shippers. In addition to volume considerations, distance becomes increasingly important, in determining individual producer's hauling charges, especially as the milk supply areas expand. In some areas, distance and volume both are used in determining hauling rates

but the flat rate is still frequently used. However, with more and more milk being handled in bulk the cost structure of hauling will become important in hauling rate determination in addition to competition, custom, and what the traffic will bear.

Fewer factory shippers

Many farmers who are now producing factory milk will probably discontinue milk production or improve their facilities so that they can qualify as grade A producers. The encouragement to produce grade A milk comes mainly from (1) higher prices received for grade A milk, because the producers can share in the class I market, and (2) the trend toward regulations requiring the use of grade A milk in making cottage cheese, ice cream and other dairy products. There is also the consideration that if factory producers adopt the technologies that presumably lead to efficient production they will also meet the standards required for grade A milk production.

Emphasis toward solids-not-fat and milk concentrates

One change on the demand side which has important implications for dairy marketing is the rapid increase in the sales of low-fat content milk, skim milk, and non-fat dry milk powder. Figures from the Seattle market showed a 45 per cent increase for May 1960 compared to May 1959 in the sale of 2 per cent butterfat content milk which is fortified with non-fat solids; the sales of regular, homogenized, and hi-test milk in packaged form were down almost 4 per cent.[5/]

In addition to the trend toward consumption of solids-not-fat is the tremendous potential change offered by milk concentrates which can be used as a substitute for fresh whole milk. Dr. R. W. Bartlett of the University of Illinois predicts that "by 1970 milk concentrates including fresh, sterile, and those in dry form, may be 25 per cent of the total milk market."[6/] One of the impacts according to Dr. Bartlett will be an increase in prices paid to producers in the low-cost manufacturing areas and a decrease in class I and blend prices in all high-cost fluid milk areas of the country.

Direct marketing

A change which is not new but seems to be growing in importance is the sale of milk by farmers directly to consumers through drive-ins on the farm or in the city. The recent interest on the part of farmers in becoming producer-handlers can partly be traced to institutional factors and the price paid for milk. For one thing coops and other handlers are reluctant to set up drive-ins because this would mean competition to their store accounts. Another important factor in federal order markets is that producer-handlers generally are exempt from regulation except for periodic reports. A producer-handler can develop sales outlets which provide a Class I utilization for

5/ Marketing Service Information, op. cit., Vol. 10, No. 6, June 1960, p.8

6/ Bartlett, R. W., "The Probable Impact of Milk Concentrates Upon the Fluid Milk Industry," paper presented at the Agricultural Industries Forum, University of Illinois, Urbana, Illinois, February 3, 1960.

all of his milk. In periods when he is short of milk he can buy additional supplies from handlers, which means that he does not share in carrying the surplus milk on the market in a way that other producers do. Thus producer-handlers take advantage of the difference of 50 cents or $1.00 between the class I and blend price. Another institutional factor in some markets is retail price fixing of milk which may provide additional incentive for a producer to sell his milk direct to consumers. However, the extent of direct sales is limited in that it would be impractical for all producers to supply customers directly as was done in the early history of U. S. milk marketing.

The growth of producer-handlers offers one other possibility that may be limited in terms of volume of sales but nevertheless important. That is, the direct tie-in of producer-handlers with chain stores. The producer-handlers are often held responsible for starting price wars because they sell milk below the regular retail price and chain stores follow by cutting their price. With over half of our milk being sold through stores it may be a neat arrangement if some producer-handlers could supply the stores directly.

Implications

The changes I have described have many implications for dairy marketing. Certainly it means that the need for adjustments will continue. Dairy farmers as well as milk handlers will have to adjust to keep pace with the improvements in technology. Pressure will continue to force increases in the size but decreases in the number of farms. We will see our figures on production per cow continue to increase, partly because of actual higher production and partly because of the culling of cows that keep the average down. Greater emphasis will be given to production of solids-not-fat. The adoption of improvements in technology should mean that we will have more efficient use of resources with benefits to society in general. It also means that if any measures are put in in an attempt to maintain conditions as they are we would tend to promote inefficiency in the use of farm resources. We take pride in the fact that our agricultural output per man is high and we admire those who are early adopters of improved technology.

With fewer but larger farms it may be easier for dairymen to strengthen their bargaining power.

Our milk supply areas will widen because of the tendency to move production out to the lower-cost areas where there are lower opportunity costs for labor and cheaper sources of feed. The continued widening of our milk supply areas will bring us a further merging of these areas. As mergers occur producers near the overlapping areas will be able to switch from one market to the other as alternative market prices and transportation costs dictate. As a result we will have a closer alignment of prices paid to producers. Producers in a local market no longer have the advantage of being the only possible suppliers for that market. The threat of inshipments of packaged or bulk milk from adjoining markets will have a tendency of softening producer demands for prices that are higher than in the neighboring market. Factors that limit flexibility

and market choice are customary sources of supply and institutional factors of health and economic control regulation. As these are broken down a greater measure of market outlet choice will become available to production areas.

The trend toward consumption of low-fat products has many ramifications. The immediate result is pressure for a milk pricing method that gives more emphasis to the solids-not-fat portion and less to the butterfat content. With the development of a rapid and inexpensive test for solids-not-fat more interest is expressed in having a pricing plan that directly takes into account the non-fat portion of milk. This would result in a preference for cows that produce relatively more solids-not-fat. It could also bring about a change in points of emphasis in the various herd improvement associations.

The most significant implication of the increased use of products such as non-fat powder, whole milk powder, concentrated milk, and canned sterile milk is that they might eventually replace fresh whole milk. This, in turn, could have far-reaching effects on all segments of the dairy industry. To some dairy farmers who now enjoy a relatively high class I price because of their distance from lower priced milk in other areas it would mean a downward adjustment in prices received. For dairymen who now supply the bulk of the milk used for manufacturing it would probably mean a higher price. Increased consumption of these substitutes for fresh whole milk would result in an even greater regional specialization in milk production than we have today.

These potential changes also raise the question of whether we can maintain classified milk pricing. Classified pricing now is based primarily upon four factors: (1) the high quality of milk needed for class I use, (2) the uniform production needed to satisfy class I needs, (3) the bulkiness and perishability of milk which necessitates production relatively close to the consuming areas, and (4) the relatively inelastic demand for fluid milk and relative elastic demand for dairy products. If the potential of the fresh whole milk substitutes is realized so that fluid milk sales to consumers as we know it today is largely discontinued, will the above four factors be meaningful? We can see the trend toward use of grade A milk for all dairy products so that quality may no longer be as important in pricing. If the dairy products can be stored for long periods of time uniformity of production will be less important. The concentrated products can be transported over long distances so bulkiness and perishability decline in importance. If the elasticity of demand for the substitutes for fresh whole milk tends to be relatively elastic as it is for other dairy products could we not accomplish our objectives in milk pricing without a classified pricing system?

The various changes taking place in milk production and transportation have implications in other areas of dairy marketing. The increasing volume of production without a corresponding increase in demand brings with it requests for more state and federal milk marketing orders and for some type of production control. In the state of Washington we hear a lot of talk about a state order that would permit the use of marketing quotas. We have had several federal order hearings in which demands have been made to regulate producer-handlers. The proponents of such provisions claim that producer-handlers do not share in carrying the load of surplus milk and thus are in a position to

undersell their competitors with disastrous results in the level of retail prices.

Concurrent with these demands for more regulation are demands to reduce or eliminate regulations relating to the movement of milk between markets. Sanitary regulations in particular hinder or prevent the movement of milk into many markets. Minnesota dairymen, for example, according to their representatives in Congress are barred from shipping milk into Washington, D. C. because Washington D. C. requires that milk sold there must come from cows whose udders are washed with two washcloths while Minnesota only requires one washcloth. This may be an extreme example, but according to a U.S.D.A. study "some markets prohibit outright the entry of milk from beyond specified limits. Others burden such entry by insisting on their own inspection and then delay or refuse to inspect, or levy discriminatory fees."[7/]

In spite of all the changes taking place, it looks as though the dairyman who can stay in production will have no difficulty finding a buyer, provided he is willing to accept the prevailing market price. The milk haulers want full loads and milk plants want to operate at full capacity, because economies of scale are generally such that larger volumes mean lower per unit costs. In our federal order markets with market-wide pools, persons other than the producers usually have nothing to gain from reduced production.

It will be interesting to see what changes do take place in the decades ahead. We can be sure there will be changes with significant implications for the dairy industry.

7/ U. S. D. A., AMS, "Regulations Affecting the Movement and Merchandising of Milk," Marketing Research Report No. 98, June 1955.