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THE DAIRY INDUSTRY'S RECORD

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Every business must occasionally appraise its past, if it expects to have a future. The dairy processing industry receives bouquets or brick-bats depending upon the group that appraises its past. What are the facts? What is the record? The recent Census of Manufacturers provides the basis for a realistic appraisal and this article reports an analysis made primarily from that Census.

The Record for Manufactured Dairy Products

Inputs required to produce a given output of manufactured dairy products fell by 74 per cent between 1919 and 1954, or 2.1 per cent per year (Table 1). This is a good record. It has been reported that the meat packing industry between 1919 and 1947 was able to reduce its inputs per unit of output by about one per cent per year. Other reports have shown that from 1919 to 1947, American farmers reduced inputs per unit of output slightly over one per cent per year and the record for the total economy was only slightly better.

Table 1. Inputs Necessary for a Given Net Output, Manufactured Dairy Products, 1919-1954, (Based on 1947 prices).

Year	Labor	Captial	Total
1919	100	100	100
1929	32	70	51
1937	26	52	39
1947	39	30	34
1954	27	25	26

This record is for the total dairy manufacturing industry. Unfortunately, we do not have figures for appraising the record for individual products. Shifts have occurred within the industry in regard to products and processes. On balance, the record shows that these changes were for the most part good. So, let us look back quickly at some of them.

Between 1919-1929, the inputs, milk, capital, and supplies other than milk, increased per unit of output. Labor, however, decreased. Intimately associated with these changes was the adoption of the farm separator. The gathered cream system was accompanied by the introduction of cream buying stations, centralizer creameries, large selling co-operatives, national dairy organizations and the advent of direct marketing of dairy products that were beginning to appear in more convenient packages.

Technological innovations markedly influenced basic methods of manufacture and distribution in this period. Some important factors were the introduction of the electric motor, the motor truck and improved all weather roads, expansion of railroad mileage, better methods of communication, higher standards of quality and sanitation, improved refrigeration, and spread of manufacturing knowledge generally.

From 1929-1937, the gains made in the previous decades were solidified. Much emphasis was placed on greater utilization of whole milk. The development of techniques for drying milk in the 1930's made feasible the collection of skim milk and whey previously fed to farm animals or indiscriminately poured down the drain. Although utilization of by-products received its major impetus from World War II, manufacture of milk powder was stimulated by about a 10 per cent decline in marketings of farm skimmed cream between 1929-1937, and about a 30 per cent decrease from 1937-1947. This meant that manufacturing plants were receiving about 40 percent less cream in 1947 than they received in 1929, and a correspondingly greater amount of whole milk. It also meant that a more profitable use had been found for skim milk and incomes of farmers and dairy manufacturing firms were increased.

As a part of the shift towards direct marketing which gained support in the 1930's, many marketing functions formerly performed by other marketing agencies were assumed by the manufacturers. New packaging materials and techniques made possible reductions in packaging costs.

The 1937-47 period was war-influenced. During this period many of the technological changes were concerned with efficiency in plant operation. Labor was scarce. The areas of materials handling, labor efficiency and cost control were emphasized. Also quality control was furthered. Better utilization of skim milk and whey and reductions in plant losses "stretched" the supply of manufactured dairy products available for human consumption. Export needs markedly altered the product lines.

The period from 1947 to 1954 was again a period of reorganization and consolidation of the gains in efficiency forced by World War II. Consumers found that the variety and convenience of many foods had increased tremendously after World War II. Competition among foods was severe and dairy distribution methods caused many alterations in product lines. Small plants failed and mergers were a sign of the times. Further efficiency gains were made. However, these have brought with them the fear that small numbers of firms may result in reduced competitive strength in the over-all economy.

Our major input has always been milk, but we have been using increased quantities of supplies other than milk such as fuel, water, electricity, improved containers, vitamins, and other ingredients (Table 2). The general trend toward larger units of manufacture have involved large absolute outlays for productive equipment. This shift has been generally from largely steam-powered batch-type equipment in the early years to the electric-powered, continuous-process equipment of recent years. This is now being augmented some by automatic control equipment but not to such an extent that we can as yet say that automation has basically influenced the industry. Apparently, the influence has been one of increasing the relative proportion of supplies such as fuel and electricity but not the basic proportion reflected in depreciation of fixed capital.

Except for the supplies other than milk, relative input proportions have shown little change through the years. It must be recognized, however, that our data on individual input factors are not as good as for the total picture.

Table 2. Percentage Breakdown of Inputs in Dairy Manufacturing Industry for Selected Years.

Year	Milk	Supplies Other Than Milk	Labor	Capital	Total
	(percentage of total)				
1919	69	6	12	13	100
1929	67	8	8	17	100
1937	64	15	7	14	100
1947	51	27	12	10	100
1954	66	18	8	8	100

The Record for Fluid Milk

Available figures for the fluid milk industry are not as detailed as those for the manufacturing sector. Probably our best figures came from the Milk Industry Foundation studies conducted at Indiana University since 1941. These allow us some basis for a reasonable apparisal of the record here.

Inputs required to produce a given output of fluid milk fell 37 percent between 1941 and 1954, or 2.8 percent per year (Table 3). Thus, this indicates that the record in the fluid segment has been roughly comparable with that of the manufacturing segment. Both were good by comparison with other industries.

Table 3. Inputs Necessary for a Given Net Output, Fluid Milk, 1941-1954, (Based on 1947 Prices).

Year	Labor	Capital	Total
1941	100	100	100
1947	61	39	54
1954	66	56	63

War induced savings from improved processing materials handling, and distribution methods have been reasonably well maintained. Every-other-day delivery, high speed pasteurizing and many other advances are now commonplace. If we can now build upon these advances which are apparently solidified, the efficiency record need bear no apology.

Milk again has been our major input in the fluid segment. However, supplies other than milk have increased their proportion of the total (Table 4). To appreciate how this group of inputs has entered the picutre, we need only to read such an imprint as this on a typical half-gallon paper container: "Grade A, Pasteurized, Homogenized, Vitamin D, Milk; 400 U.S.P. Vitamin D units (activated ergosterol) added per quart by A.R.P.I. process."

Table 4. Percentage Breakdown of Inputs in Fluid Milk Industry for Selected Years

Year	Milk	Supplies Other Than Milk	Labor	Capital	Total
1941	63	13	17	7	100
1947	55	21	19	5	100
1954	54	22	18	6	100

Labor is a big item and has shown little change in its proportions. Progress in the industry is going to require that we improve labor efficiency. Further adoption of continuous processes, in-place cleaning, efficient delivery practices and ultimately, automation seems assured in the fluid sector.

Conclusions

The dairy industry has shown remarkable ability to increase output per unit of input. The past record certainly suggests a potential to continue to meet the needs of growing demand for dairy products.

Great strides have been made in imporving the use of milk itself. There appears to be doubt that such a rate of improvement in the use of milk can be maintained. However, much of the non-fat part of milk is not now used for human food. This must be a continued source of important improvements.

Labor seems to be one input in which a plant manager, or workers themselves, can effect improvements in output per unit of input. Work simplification and labor methods improvement systems must be encouraged. Minor products probably need this more than the major ones.

Extremely wide variation exists in the input-output ratios of individual plants. Although the over-all record appears good, this wide gap between the good and poor plants should be an obvious incentive to all.

The declining demand for fat should warn the industry to scrutinize policies in regard to meeting consumer preference for products and services.

The improvements in the industry have for the most part been more evolutionary than revolutionary. Each tends to be small in itself, but the total is impressive. A Latin phrase, "Natura non facit saltum" meaning essentially "Nature never takes a leap." This should be a part of our thinking about efficiency.

The dairy processing industry can keep its economic chin up. Its record stacks up well. Yet, it must keep a hand on the wheel. Future demands will require a high average level of efficiency. Any processor that wants to figure in that average must accept the motto "Progress is my most important product."