

## Post-War Planning on Dairy Equipment\*

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MUCH thought is being given these days to post-war problems and naturally the dairy industry is vitally concerned with what type of equipment will be available after the war and what are some of the new developments which can be anticipated. Individual dairies, dairy machinery manufacturing concerns and industry as a whole are actively considering these problems.

This is all very good and worthwhile, however, at the same time we must not forget that the War is not yet won and that is our first consideration. The dairy industry can be proud of the contributions it has made and is making towards the winning of the war not only from the standpoint of producing food and machinery necessary to feed the people of America and her allies, but also because many concerns who normally manufacture only dairy and food equipment are turning out large quantities of direct war goods. These may vary from parts of airplane motors to submarine and torpedo parts. The industry has gone all out for doing its share in the War Effort.

In view of the laws in some states regarding fortune tellers and soothsayers, it is rather dangerous for an individual to try to prophesy just what may be ahead in an industry like ours for certainly no one knows exactly what the future may bring forth. We do know, however, that the old saying of "coming events cast their shadows before" has a certain amount of truth in it and if we do not take ourselves too seriously, it probably will not be

out of place to speculate somewhat about the future.

In spite of newspaper articles and much discussion concerning how our industries are to be revolutionized by the use of plastics, or electronics as the case may be, we do not believe that our dairy industry will be revolutionized over night. There is no question, however, but what there will be many new developments and improvements after the war, both as a result of our experience in the use of new materials and methods during the war, and as a result of the gradual completion of research and development work, much of which was under way before the start of the war.

We believe that the process of placing these new developments into commercial operation will be orderly and, for most items, will take some period of time, as it takes time to make drawings, new jigs and fixtures, and train field erection men.

The dairy industry has learned to work together much better during the present war emergency and should take pride from the fact that it was the first branch of the food industries to cooperate and so organize its efforts and present its problem to the W.F.A. and the WPB that an industry wide orderly plan of supplying dairy equipment on a yearly planned basis during the emergency could be worked out as embodied in the War Production Board Order L-292.

We believe this cooperative effort and spirit will be continued and will assist greatly in the reconversion from war-time to peacetime operation when the time comes. It is significant that

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through the machinery set up under L-292 the industry has been able to go along reasonably well for war-time conditions. The allotment of materials and equipment for certain uses has been adjusted where necessary to prevent hardship and to meet a real need. For example, when the industry found that they needed more 10 gal. milk cans to handle the amount of milk the country needed, data were collected and the facts presented to WPB at Washington and an adjustment promptly made which allowed the manufacture of sufficient milk cans to take care of the situation. This same principle was applied more recently in a number of instances, as for example when the allotment of soaker type bottle washers was increased to take care of a need in small plants where there was an acute shortage of help. Equipment manufacturers are still faced with the problem of acute shortage of labor and some purchased materials and supplies which cause serious delays in the production of authorized equipment.

In discussing the post-war aspects of our problem we might consider the following points:

- (1) The amount of equipment which will be needed.
- (2) The demand for improved quality of dairy products.
- (3) The interest in processing efficiency.
- (4) The improvement in materials and fabrication.
- (5) The training of technicians.

#### INCREASED DEMAND FOR EQUIPMENT

In considering the amount of equipment which will be needed immediately after the war closes, most individuals in the industry agree that the need for replacement of equipment will be at least 50 percent greater than normal on account of the extreme wear and tear during war-time due to long hours of operation, to handling products of lower fat contents, and due to operation by less experienced and less com-

petent help due to manpower shortage and shifting of workers to higher paid war industries. Of course, some items of equipment will be less in demand, spray dryers may be a drug on the market because of the large number which were built during the war, and unless the powdered milk and powdered egg industries can find some way of marketing on a large scale during peacetime, there will be an over supply of these items. On the other hand, take the matter of ice cream freezers. A great many of these will be badly worn because so few new freezers were obtainable during much of the war period and the wear and tear was much accentuated due to the operation on such large quantities of ices and sherbets which lack lubricating properties.

We also believe that there will be a considerable increased demand for dairy equipment, particularly for ice cream, market milk, and butter manufactured in order to take care of the natural increased demand resulting from the fact that many of our population have learned for the first time during the war of the advantages of liberal use of dairy products. If we are to believe the stories which come back to us from boys at the front and in the Army telling of their interest in ice cream and milk, we can look forward to a greatly increased demand in civilian use when these men are again at home. We are reminded of the story of a young naval lieutenant whose ship was sunk near Guadalcanal and who spent about 36 hours in the water before being picked up and taken to shore. After a few days on the island he and his buddies were sent to a hospital ship and were told that they could have either ice cream or a beautiful nurse, whichever they wished. Believe it or not, he stated that they all chose the ice cream.

We believe that improved merchandising methods which are available to the dairy industry will be made use of in stimulating greater sales of dairy products. These greater sales, how-

ever, will not come automatically since the dairy industry is going to have to compete with other industries for a part of the food dollar and wide awake merchandising methods must be used by our industry in order to obtain our share of the post-war business.

#### QUALITY IMPROVEMENTS

Dairy machinery manufacturers are very conscious of a definite interest on the part of industry in equipment which will give finer tasting and more healthful products, as we recognize that this will help the sale of more milk products. Dairy machinery is continually being improved with this in mind.

We look for a continued active interest by public health agencies in the quality of dairy products. Dairy machinery manufacturers appreciate the constructive suggestions of public health organizations, sanitarians, and dairy products manufacturers, and look forward with interest to further co-operative efforts to rationalize and standardize new developments, where practical.

In the improvement of quality of dairy products time and temperature of processing play an important part. Manual control is often inaccurate and unreliable and with the improvements that have been made in automatic control we look forward to a much wider adaptation of automatic control to pasteurizing equipment, washing equipment and the like. Just previous to the war a number of improvements in automatic controls, as for example the flow diversion valve, for use on high temperature short time pasteurizers was developed and many were used. This apparatus has great possibilities for further improvement of certain processes. In connection with ice cream freezers there are numerous opportunities for better and more accurate controls. The same is true in the manufacture of butter.

The dairy industry has advanced perhaps more than any other food in-

dustry in the adoption of sanitary type construction which enables every piece of equipment which comes in contact with the product to be thoroughly and completely cleaned. Much remains to be done along this line and in some parts of the country much of the old equipment will need to be replaced with the newer type, which can be more readily and completely dismantled. Efforts are being made to simplify the construction of sanitary equipment where possible in order to make the work of assembly and disassembly as easy as possible. The use of stainless types of metals will undoubtedly be much greater than at the present time, thus making equipment easier to clean. Studies are being conducted at the present time on the use of glass tubing which can be left in position and thoroughly washed by circulating special cleaning solution through the line. Some very promising results are obtained, and we can see numerous instances where this type of construction would be advantageous due to the saving in labor required in the normal dismantling of pipe lines.

Pasteurization of milk products is so commonplace these days that we are tempted to think of its being universally adopted. There are many parts of our country besides many other places on the earth where raw milk is still sold. We look for many of these places to adopt pasteurization after the war.

It has been shown in many instances that farmers who make it their principal business are in general, producers of better quality milk. This is logical because they are in the business on a scale sufficient to justify the necessary investment in good equipment and facilities for properly handling their milk. There will always be large milk producers and those who sell only a few gallons of milk or a small amount of cream per day. However, with the continued emphasis upon milk quality it appears that the trend will be toward more of the dairy farms who make the

production of milk their main business.

Refrigeration is one of our fastest growing industries. We expect this trend to continue and with the availability of the small individual type low pressure refrigeration units, there will undoubtedly be more widespread use of artificial refrigeration on the farm and for cooling milk during transit. We expect the use of quick-frozen foods to increase and more people will have refrigeration facilities for storing frozen foods all the time, thus keeping their dairy products in better condition.

People have become more vitamin-conscious during the past few years and this had been aided by the government's program with the Armed Forces and war workers, in which the benefits of the use of vitamins have been stressed. Much thought has been given to the preservation of natural vitamins in milk and we look for considerable effort in post-war periods, too, so process milk and milk products that the natural vitamins are preserved to the utmost. Important studies are going on at the present time to determine further the advantages of dairy products from this standpoint and we are hopeful that the findings of these researches will give added reasons for people to use milk and milk products rather than cheap substitutes which have been brought forth, many of them as a result of the war.

The flavor and keeping quality of milk have long been associated with metallic contamination. The experience of the past few years together with new information obtained during the war concerning the advantages of the use of stainless steel for equipment surfaces coming in contact with milk become more and more apparent.

Emphasis upon improved keeping quality of dairy products has become great and due to the rigid requirements of the Armed Forces and Lend-Lease, we have learned a great deal regarding the preservation of dairy products. It appears that such factors as exposure to copper, freshness of the product

when processed, preheating to develop anti-oxidant qualities of the product, deoxygenation are all important. Studies of improved packages for preventing contamination of dairy products and keeping them from exposure to air will also be important.

#### PROCESSING EFFICIENCY

As mentioned before, dairy products must in the final analysis compete with other food products from the standpoint of cost although they have some enviable sales advantages which gives them consumer preference. Emphasis must, therefore, be placed upon the production and processing of dairy products as efficiently as possible. We will not at this time consider the detailed cost of production of the dairy products; however, it is of note that the cost of production of milk is greatly influenced by the output of milk per cow. The average cow in a cow testing association which is a measure of just an average good cow, produces over 300 pounds of butter fat per year, yet the average cow in the United States, consuming about as much feed as the good cow, produces only approximately 140 pounds of butter fat per year. This striking difference indicates the possibilities for reducing the cost of milk by the single item of improvement in the output per cow.

One of the factors in the operation of a milk plant is that if having equipment which can be used for a number of different purposes. We find, for example, that in some plants they have a different vat for handling cream and another for handling milk, etc. There are available today several makes of vats which, due to special type agitators might be called multi-purpose vats which can be used for any one of these purposes and thereby add great flexibility to the operation of such a plant with a consequent reduction in overhead cost. We also find that plants are being built today and being planned for the future, for flexible operation

which will enable them without much change in equipment to turn out any one of a number of finished dairy products, as, per example, sweet cream, butter, cheese, ice cream mix, or powdered milk, all in the same plant giving the plant manager an opportunity to turn his product into the particular channel for which there is a demand at the time.

Continuous operation is an intriguing thought in connection with all of the dairy processes, as compared to batch type operation. It is a fact that most small scale operations are carried on with the batch process, however, in industry in general, whether it be in the manufacture of chemicals, food products, oils, or the like, it has been found that continuous operation offers decided economies in cost of operation, provides more accurate control and higher recovery of finished goods in most cases than does the batch method.

We have seen the development of continuous ice cream freezers, the continuous pasteurizing system, continuous spray dryers and continuous evaporators. Improvements have been made in these different processes and manufacturers have been working diligently to make all of the major dairy processes continuous. We can now report that the manufacture of butter by the continuous process is a post-war certainty. Experimental size continuous butter-making equipment gives an entirely satisfactory product and justifies the hopes which were held for it by providing extreme sanitation, improved composition control, perfect uniformity, and greater operating efficiency. When it is considered that this is the first major change in the method of producing butter from cream since recorded history, it appears to take on added significance. It is an inspiring sight to see cream go into one end of this machine and butter ready to package come out of the other end. There is no reason for the product being touched by the human hand at any time

during the process since automatic packaging equipment is readily attached to the discharge of the machine. This does not mean that all plants will change over at once after the war, for it will take time to build the machines. Furthermore, there are many plants which are better adapted to batch operation; there will always be a demand for churns.

Proper illumination of dairy plants and equipment offers real opportunities in improvement in processing efficiency. A cooperative study by the Illuminating Engineers Society, International Association of Milk Dealers, and Dairy Machinery Supplies Association has turned up a wealth of information on this subject which can be made use of in the post-war period. Good illumination makes it easier to operate machines correctly and to make certain that proper washup and cleaning of the parts has been accomplished.

Automatic control as mentioned before under quality improvement will also play a part in the increase of operating efficiency since real economy is possible when temperatures, pressures, weights, etc., involved in processing are brought under accurate control. This is possible only when it is done automatically. Electronics will undoubtedly play a more important part in the automatic control of our equipment. Liquid level controls operated by electronic principles are already being used to great advantage in the industry.

Plant losses in products assume rather large proportions in some instances. We expect to see considerable reduction in these plant losses by the use of automatic control of machinery, and equipment which is better draining.

#### IMPROVEMENTS IN MATERIALS AND FABRICATION

The dairy manufacturer can look forward to quite an improvement in the materials and fabrication of his post-war dairy equipment. There will undoubtedly be wider use of stainless

steel, and of other wear and corrosion resistant alloys, such as cast white metal, which will make equipment stand up longer under the heavy duty services it is subjected to in larger plants.

Plastics probably will not be used as much as we are led to believe from press releases, however, we do expect plastics to serve a real purpose in the construction of small parts such as handles, decorative trim and the like. It has even been suggested that a plastic milk bottle may be possible.

We look for the design of equipment to take into account the comfort of the workman or operator such as reduction in noise, exposure to water or splash and to ease of getting to the working parts of the equipment.

Much has been learned about the prevention of corrosion which is one of the greatest enemies of equipment in dairy plants. Through the use of non-corrosive type metals, coatings and treatment we can look to improved conditions in this respect.

We hear much about the streamlining of dairy equipment and there is no question that efforts are being made to provide equipment with improved appearance, which is at the same time simplified. We are of the opinion that the mere covering of pipe and parts with a sheet metal coating is not the answer to streamlining and unless the covering of exposed parts really serves a good purpose, we believe that is hardly justified. We know personally of several instances where railroad locomotives were covered with sheet metal to give a streamlined appearance, before the war, and when help became scarce, the sheet metal streamlined covering was all removed so that the parts were more readily accessible for servicing. We believe that streamlining in its true sense means not only smooth, clean appearance, but also simplified design.

### TECHNICAL OPERATORS

At this point we should like to mention that with the more wide use of machinery in the dairy industry and the technical problems involved in operating a milk plant today, it seems evident that the dairy industry is going to need more individuals who are well trained in the fundamentals of dairy technology and engineering, if we are to obtain the best results from our plant equipment. We also see an increasing importance of the plant engineer in the operation of dairy plants. Some of the most successful plant superintendents we have known have also a good, practical understanding of engineering problems and cooperate very closely with their plant engineers. A man with such interests will find it much easier to take care of modern dairy equipment and to make it perform and function with the utmost efficiency.

In summary it appears that our first interest must be to spend every effort to win the war at the earliest possible date. When this has been accomplished we will then be able to put into operation a number of the ideas and developments which have come along in the past few years. More equipment will be needed by far than we have ever seen before. Quality improvement of dairy products demands better control, better metals, more wide use of refrigeration, conservation of vitamins, and wider use of pasteurization in the country.

New dairy equipment in the post-war period will be instrumental in increasing the processing efficiency and reducing costs through the use of continuous processes, improvement in materials of construction, simplified design, true streamlining, and multi-service type equipment.

Finally, this equipment will be better operated by technicians who are better trained in the fundamentals of dairy science and engineering.