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Journal of

MILK and FOOD TECHNOLOGY

Official Publication

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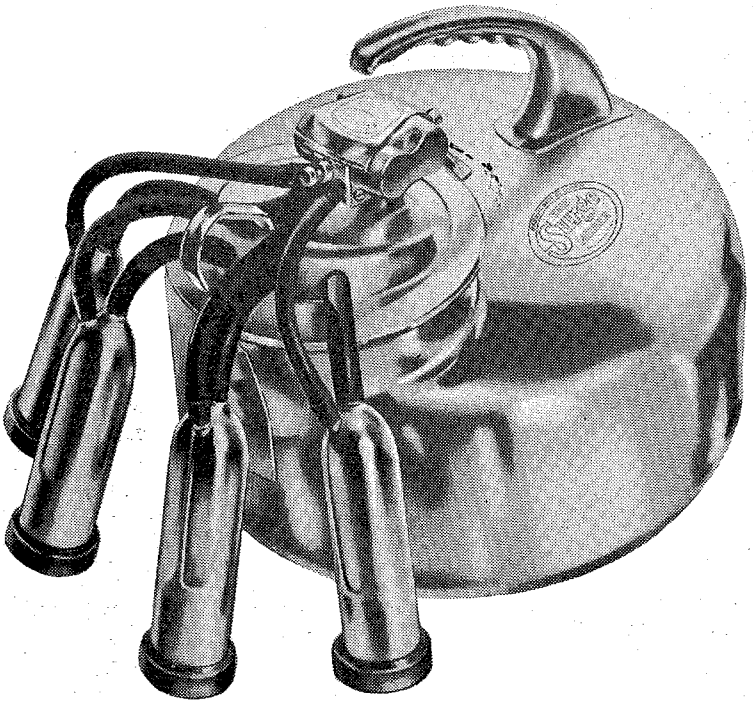
SURGE



Whoever you are or wherever you happen to be—if you know of some dairy farmer who is making bad milk because he has a dirty Surge Milker, please tell us who he is and where he lives.

We can help him get straightened out and on the right road and we can do it promptly.

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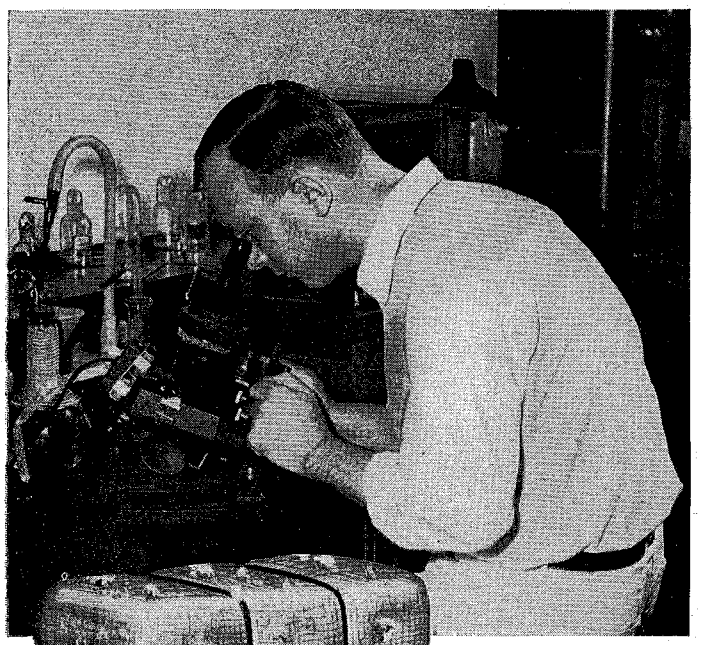

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It's no wonder that field men and dairy sanitarians find their jobs so much easier in attaining quality milk production when the producers regularly use Rapid-Flo Fibre-Bonded Filter Disks as their own Farm Sediment Check-Up. That's why Johnson & Johnson takes extra care in every step along the way in producing Rapid-Flo Disks:

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The fibers are carefully classed, processed and Fibre-Bonded.

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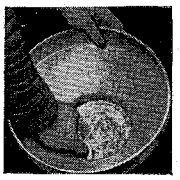
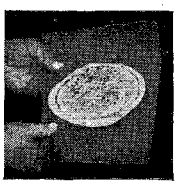
1. After filtering each can of milk (10 gallons or less), the producer should carefully remove the used filter disk from the strainer and place it on a cardboard to dry.



2. When filter disk is dry, it should be examined closely. The producer can identify the sediment or extraneous matter to determine its origin, and take precautions to prevent its recurrence.



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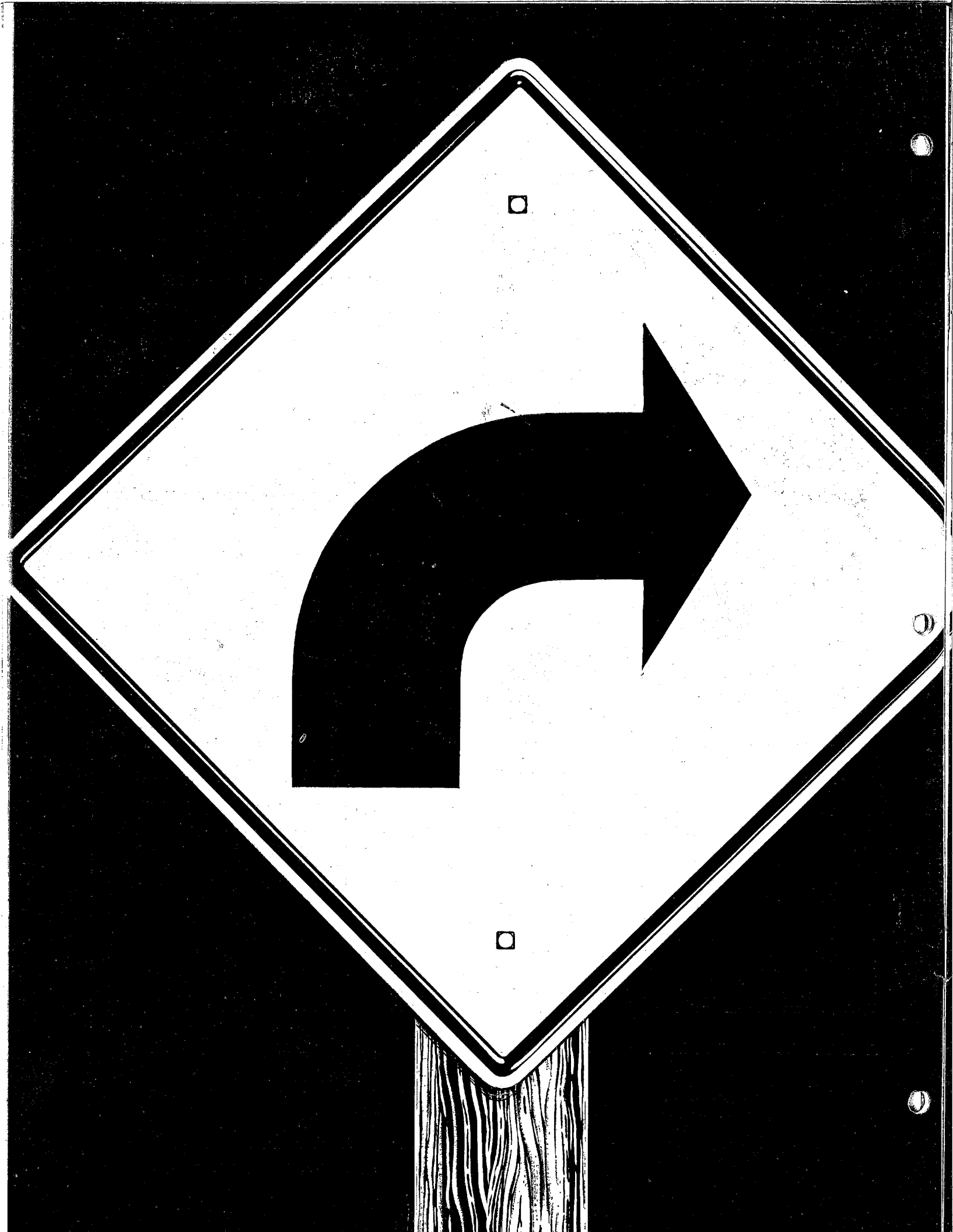


Sanitation in milking . . .

AND THE U. S. PUBLIC HEALTH SERVICE STANDARDS

STANDARDS set by the U. S. Public Health Service in 1939 were calculated to improve the quality of milk produced on America's dairy farms. If generally adopted, it was believed that dairymen and dairy equipment manufacturers who adhered to these standards would eliminate most of the common hazards to good sanitation.

In section 7 of this Milk Ordinance and Code, the standards for sanitary *construction* of milking machines were defined. Here were *basic* standards. Without such standards, later efforts to improve sanitation would be for the most part ineffective.

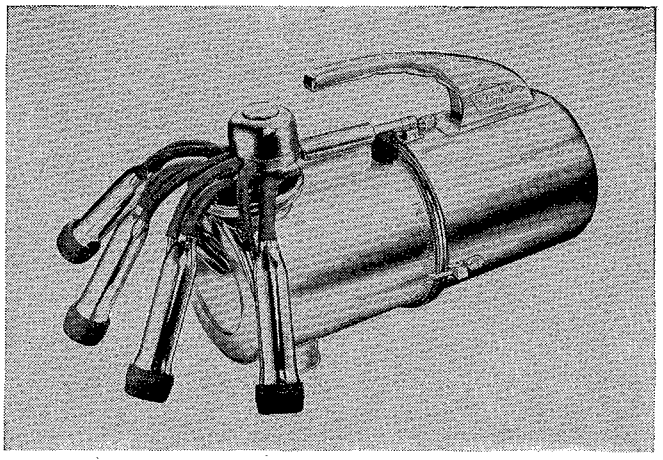
In creating a new suspended type milker, our Rite-Way designers—working closely with U. S. Public Health Service engineers—carefully met every condition of section 7. Our goal was to make sanitation *practical*. We reasoned that a genuinely sanitary milker would be well worth any possible additional cost incurred in its manufacture.

Two design features were considered to be of primary importance:

(1) the vacuum line and pulsator should be separated as far as possible from the milk line. It was recognized that the cleanest vacuum lines would be those most difficult for milk to enter under average farm operating conditions.

(2) the milker itself must be *easy to clean*. Since prompt cleaning after each milking is absolutely necessary, the entire milker and pail must be designed for quick and thorough cleaning under normal procedures.

The result was a completely new idea—a pail that unfastened in the middle and came completely apart, exposing every square inch of its interior for quick, thorough cleaning. To keep the milk line clean, the pulsator was attached to the vacuum line in a way that made it impossible for the milk to enter either the pulsator or the vacuum line. These features were rigidly tested in the laboratory and on the farm. The result: the most practical and sanitary milker yet devised.



Swing is the only suspended or floor-type milker whose construction standards are approved by the U.S.P.H.S.

Rite-Way called their new milker the "Swing". Today, it is widely advertised and a large part of our sales message stresses such important features as its proper teat cup positioning, lighter weight, narrower shape, and its ease of adjustment to any cow.

But the outstanding feature of "Swing" is its contribution to good sanitation. Today, *it is the only suspended or floor-type milker whose construction standards are approved by the U. S. Public Health Service.*

The standards established by this agency are available—indeed they are urged upon all manufacturers. We feel we have measured up to our responsibility by adhering strictly to these standards in manufacturing our products.

We invite further inquiry and will be glad to send complete information on the Swing Milker or any other item in the Rite-Way line.

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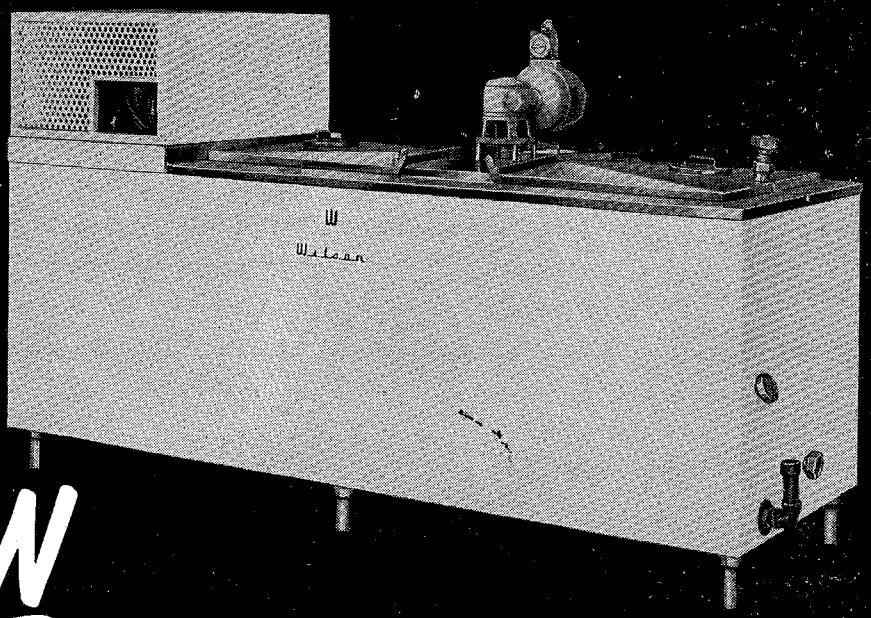

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3. *Drop-In Refrigeration Unit.* Easy to clean. Easy to service.

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12. *Designed for the Dairy Farmer by the pioneer manufacturer of Farm Milk Coolers.*

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Editorial Notes

FLUORIDATION OF MILK?

It has been suggested* that consideration be given to the idea of using milk as a vehicle for fluoridation. No doubt the idea of fluoridation of milk, instead of water, comes as surprise to many who understand that fluoridation of municipal water supplies is a highly successful method of fluoridation. By mid-1954 approximately 30 million people will be receiving municipally fluoridated water.

What are the problems which would be encountered in attempting to use milk, instead of water, as a vehicle for fluoridation?

Water Fluoridation. Some years ago scientists discovered that water containing certain levels of fluorine exhibited a cariostatic effect. Approximately 10 percent of the water supplies have an adequate concentration of fluorine to reduce the incidence of tooth decay. It was natural that man should take advantage of this knowledge by successfully reproducing such benefits in fluorine deficient waters by adopting the practice of fluoridation of municipal water supplies. Water fluoridation has been endorsed by the American Medical Association, American Dental Association, and the American Public Health Association. It is not known whether fluorides in milk are assimilable, whether the same benefits as fluoridated water could be obtained, and whether added fluorides in milk would affect the palatibility, keeping quality, or nutritive value.

Concentration. The average American diet, exclusive of water, provides 0.2 to 0.3 milligram of fluorine per day. From 0.5 to 1.0 ppm in drinking water has an inhibitory effect on the frequency of dental caries of children. However, the total daily diet intake should not exceed approximately 1.0 to 1.2 milligrams per day of assimilable fluorine to avoid possible skeletal damage or mottling of dental enamel. In an average size man a dose of 230 milligrams will cause digestive disturbances and 4 grams is capable of causing death.

Under normal conditions the average fluoride content of milk is in the range 0.1 to 0.2 ppm, which is not significantly increased by fluoridation of the cows drinking water. To achieve the desired levels of fluorine milk would require the addition of fluorides, but the addition of which would be made extremely difficult because of variations in the normal fluoride content of the milk, due to such factors as breed, feed, and season.

Supervision. There is a critical maximum of fluoride content above which the addition of this toxic material becomes dangerous. The problem of supervision—which no doubt would become the responsibility of the milk sanitarian—would be greatly increased because of the numerous milk sources involved.

Testing for the fluoride content in water is more rapid and accurate than it is in milk. In assaying the fluorides in milk more highly skilled laboratory personnel and facilities would be needed.

Dairies would of course be adding another line of products, which would need to be separately handled, processed, tested, bottled, labelled, distributed, and advertised.

Consumption. Water consumption by children is highly irregular, varying with the season, temperature, humidity, and muscular activity. But, we cannot assume that milk consumption among the various age groups of children is sufficiently constant to be able to decide to what extent the milk would need to be fluoridated. In the case of water, it is occassionally necessary to vary the concentration from a high of 1.0 ppm in January down to 0.6 ppm in July to compensate for seasonal variations in water consumption. No such simple formula would work for milk since many factors contributing to variability of concentration would need to be considered.

Only about 90 million people in the United States would benefit by fluoridation if all public water supplies were fluoridated since such water supplies do not extend to suburban and rural areas. It is doubtful whether any more people in small communities would be reached with commercially processed milk unless fluoridation of milk was universally required, which is highly unlikely in view of the fact that even pasteurization is not universal. It is inconceivable that acceptance by the consumers, the dairy industry, and the public health officials would be unanimous, judging from the bitter controversies which have occurred in some areas when the question of water fluoridation was considered.

Legal Aspects. The food and drug laws are very strict regarding the addition of chemicals to foods. Exceptions have been made, such as fortification with Vitamins A and D, when proven benefits could be obtained. Fluorine is a highly toxic element, capable of causing death. Obviously, such potent material should not be allowed on the premises of a food establishment to avoid accidental entry into milk. Because of the great number of dairies involved, the probability of accidents would be greater than in the case of water.

Cost. Water fluoridation would be more economical than milk fluoridation even though most of the added fluorides in water are not consumed. Water fluoridations costs approximately 15 to 30 cents per capita per year, when financed community wide. In the case of milk, an additional one cent per quart would be required to be paid by the consumer. Increased cost of milk in itself is sufficient reason to oppose the idea of milk fluoridation. A reduced consumption of milk might result in nutritional losses more harmful to children than any benefits gained by fluoridation.

Socialization. The arguments against any kind of public fluoridation include the accusation of "socialized medicine" or statements to the effect that it is compulsory medication opposed by certain religious sects. Fluoridation is not a medication but a preventative. The case favoring milk fluoridation includes the argument that acceptance would be optional. When fluoridation is placed on a non-compulsory basis —

*—McKee. J. E. A Rational Approach to Fluoridation. J. Amer. Wat. Wks. Assoc., 45(4): 376-385. 1953.

fluoridated tooth powders are readily available — public acceptance is not great. The optional feature would appeal to a relatively small religious minority. Up to the present time five court cases have ruled that actions affecting a whole society must conform to the rules of society based upon what is best for the society as a whole. A fundamental objective of a sound public health program is to attempt to aid all people. All children living within an area supplied with fluorinated water consume in some manner some of the beneficial water and thus obtain such benefits regardless of economic status or religious background.

Conclusion. From the point of view of those intimately acquainted with the dairy industry, either commercial or regulatory, there does not appear to be any sound basis upon which further thinking or research would be justified regarding the idea of fluoridation of milk. Insurmountable problems would be encountered if we were to accept this idea and attempt to put it into commercial practice. Water fluoridation is highly successful while milk fluoridation appears infeasible. It must be concluded that fluoridation of milk is not necessary and would be impractical and unworkable.

Howard H. Wilkowske

UNCLEAN MILK CANS — WHOSE RESPONSIBILITY?

In the battle against poor quality milk coming from the farm there is a weak spot in our line of defense. It is dirty milk cans.

Milk stands in milk pails and strainers for only a few minutes and, as a rule, great care is taken to keep these utensils free from soil. But milk stands in farm milk cans as long as sixteen to twenty hours, and in spite of our milk ordinances the cleanliness of these cans is often neglected.

At least one dairy farmer has said: "If the milk inspector looked at milk cans as closely as he inspects pails and strainers, he would find plenty to kick about." Why is farm milk can sanitation neglected?

The job of keeping all farm cans clean at all times is too much to expect of a mechanical can washer. The machine, and likewise the detergent used in the mechanical washing operation, have been designed to remove the average soil of one daily trip to the milk plant. The can washer must do its job by a series of sprays only, and within a time interval of a few seconds, and the detergent strength has to be limited in order not to corrode the metal of the cans. Milk cans, therefore, that accumulate more than an average one day deposit of soil, present to this can washer a bigger job than it has been made to handle.

Milk plant operators can not afford to examine every farm can every day, to see if it has been properly cleaned, and they can ill afford the cost of hand scrubbing every can that has not been completely cleaned by the mechanical washer. Some plants have been required periodically to clean-up dirty farm cans at huge expense. But one is forced to wonder about the sanitary condition of these periodically scrubbed cans, some of which, at least, become bacteria traps in between the clean-up periods.

In order to assure clean farm cans consistantly, the responsibility for the cleanliness of these cans should rest on the shoulders of the party best suited to carry on the job economically and effectively. The dairy farmer has only a few cans in service in comparison with the total number of cans at the milk plant, and he is the first in line to assume this responsibility. Milk plant operators are held responsible for putting milk into clean recepticles, and every reliable party handling milk should bear a similar responsibility. In order to assure clean farm cans, then, the farmer who fills these cans should be charged with examining each can before putting it into service, and if need be, of scrubbing it.

On this phase of sanitation some health inspectors have grown lax, and too many milk plant operators have undeservedly been pressed into assuming the complete responsibility for clean farm cans, a responsibility they are not equipped to bear. These plants accepted this responsibility in the days when dairy farm detergents were inadequate. At the present time there are numerous detergents on the market that will serve the farmer well in doing an effective cleaning job.

The milk plant should certainly be required to return to the farmer a can as clean as a well operated can washer will wash it, but upon inspection, the cleanliness of farm cans should be the farmer's responsibility. Put the responsibility of clean farm cans on the shoulders of the dairy farmer, and we will approach more nearly to success in keeping these cans clean.

This will require the leadership of local health authorities. The health office will have to lead the way with a closer can inspection and with an enforcement program, but the job can be done as near-perfectly as the job of cleaning pails and strainers and other farm milking equipment has been done. A farm can-cleaning program would have to be directed by a central authority because some competing milk companies would find an advantage in not enforcing farm cleaning of farm cans.

If the health inspector examines farm cans as closely as he inspects pails and strainers, and if he enforces farm can sanitation with equal earnestness, our farm milk can problem, that the milk plant is not able to solve successfully, will approach as near to a satisfactory conclusion as we can get it.

Donald Fitzgerald

THE MILLIPORE FILTER TECHNIQUE IN THE DAIRY INDUSTRY*

FRANKLIN W. BARBER, CARROLL P. BURKE, AND HARVEY FRAM
National Dairy Research Laboratories, Inc., Oakdale, Long Island, N.Y.

The Millipore Filter technique is a new method for the concentration, removal, and enumeration of bacteria in liquids and air. Its application to the evaluation of the sanitary condition of pipe lines cleaned in place is discussed, together with other possible applications to water, milk, and food bacteriology. This procedure will be a valuable tool in quality control and bacteriological research.

INTRODUCTION

The Millipore Filter Technique is a comparatively new method for the concentration, removal, and enumeration of microorganisms from liquids or the air. The terminology used when referring to this technique varies inasmuch as it is known as the "Molecular Filter Membrane", "Membrane Filter", the "Molecular Filter", or the "Millipore Filter". The term "Millipore Filter" (MF) is the name used by the Lovell Chemical Company of Watertown, Massachusetts, which manufactures and distributes the filters and accessories.

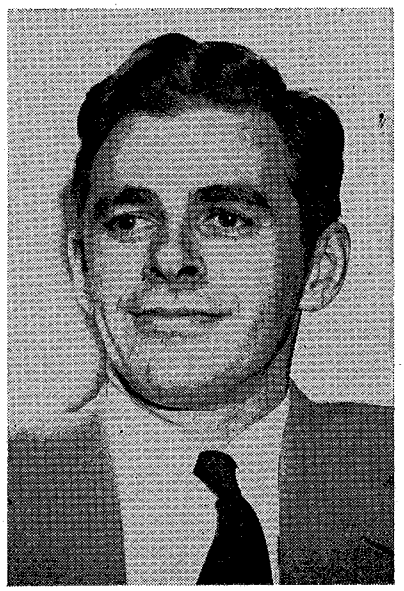
Originally the technique was developed as a method for testing the sanitation of small-scale water supplies in the field in Germany during and after World War II. The first report in the United States was prepared by Dr. Alexander Goetz in 1947 as Report 1312 of the Joint Intelligence Objectives Agency, Washington, D.C., a report of the Department of Commerce of the U. S. Government. The first public reports on this technique appeared during the summer of 1951. A write-up in *Life* on biological warfare describes the technique and discusses its application to the examination of water supplies as a method of defense against biological warfare. This report followed the Public Health Report release on the "Membrane Filter in Bacteriology" in July 1951. The technique was not released for commercial application until early 1952 and at the present time details of the methods of preparation of the membrane are still under military classification. However, the membranes are now available commercially and their application is unrestricted.

The important contributions in this field have been made during the last five years primarily through the efforts of Dr. Goetz and his collaborators at the California Institute of Technology and the investigators at the Environmental Health Center. These workers have studied methods for the manufacture of the membranes and the development of suitable media for the growth of bacteria collected on the membranes. Now the technique can be visualized as having many applications in the field of bacteriology.

DESCRIPTION OF EQUIPMENT

Briefly the filter membrane is a small (2 inches in diameter) circular paper-thin disc containing about 500 million pore openings. Although the membrane looks like paper, it has no fibrous structure and no binding agent. This membrane will filter out and collect on its surfaces all the bacteria present in any liquid which is forced through it, usually with the aid of suction. After the bacteria have been collected, the membrane is aseptically removed from the filter mount and placed on an absorbent pad to which has been added a small amount of double-strength nutrient broth. An indicator is usually added to the broth which aids in the identification of the colonies. In some diagnostic studies a series of nutrient materials are utilized and the membrane is transferred from one to another after varying periods of incubation. The membrane and pad are incubated in a highly humid atmosphere at suitable temperatures. Within four to eight hours colonies usually develop which can be observed with a low magnification microscope. After a 12 to 15 hour incubation period the colonies develop to such a size that they can be readily distinguished by the naked eye.

The filter membranes may be sterilized by autoclaving at 15 pounds pressure for 15 minutes if they are packed with absorbent pads between each filter disc and the discs and pads wrapped in kraft paper. They also can be sterilized by exposure to ethylene oxide. The filter mount, which consists of any suitable funnel arrangement capable of supporting the membrane filter under vacuum, also can be sterilized by autoclaving or by exposure to vapors resulting from the burning of methyl alcohol. This last method of sterilization makes the equipment adaptable to field work where laboratory facilities are not available. (Figures 1-4).



Dr. Franklin W. Barber has been connected with the Research Laboratories of National Dairy Products Corporation since 1945 and is now Senior Scientist in charge of the Fundamental Laboratory at the company's research headquarters, Oakdale, Long Island, New York. He is a graduate of Aurora College, Aurora, Illinois, and received his M.S. and Ph.D. degrees from the University of Wisconsin. He has been active in the field of dairy bacteriology since 1937, and has numerous publications in this field.

APPLICATIONS

The applications of this technique reported to date have been concerned primarily with water bacteriology. In these studies the investigators have been interested in the recovery of certain types of microorganisms from water supplies, and the development of suitable differential media for the classification of these organisms. Reports indicate that coliform organisms are easily detected and that by proper differential media the

*Presented at the 40th Annual Meeting of the International Association of Milk nad Food Sanitarians, Inc., at Michigan State College, East Lansing, Michigan, September 1, 1953.

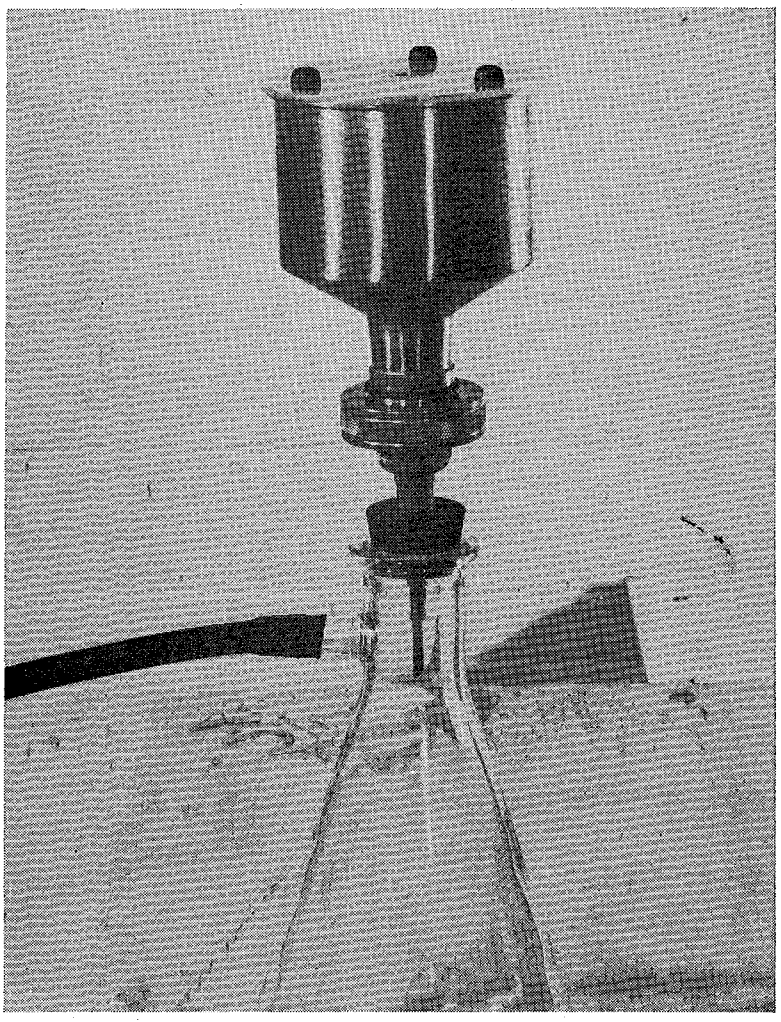


Figure 1—Millipore Filter Apparatus

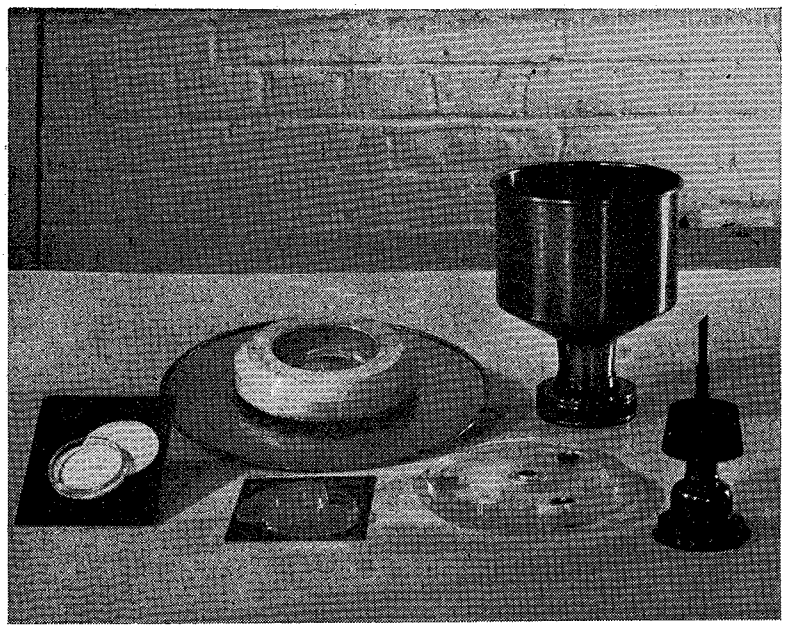


Figure 2—Millipore Filter Apparatus Disassembled
Left to Right—Membrane Filter and Pad, Alcohol Sterilizing Base, Plastic Petri Dish, Sterilizing Cover, Funnel, Filter Holder Base.

typhoid organisms also can be recovered from polluted water samples.

One investigator has shown that the method can be applied to marine microbiology. He states that results would indicate that higher numbers of bacteria capable of multiplying on sea water broth may be determined than by the usual plating methods. Other investigators have been concerned with the use of this technique in the recovery of organisms from aerosols or various air supplies.

During the past 18 months, studies have been made on the application of the Millipore Filter technique to problems of the dairy industry by investigators at National Dairy Research Laboratories. Preliminary studies were concerned with the recovery of *Escherichia coli* from artificially infected water supplies. Low concentrations of this organism were added to sterile water and the water passed through the Millipore Filter apparatus. Control counts were made by standard plating procedures. These studies indicated that when low numbers of coliform organisms were present in a water supply, the Millipore Filter results were higher than those obtained by standard plating procedures. Further studies using the public water supply available at the Laboratories resulted in higher counts when the Millipore Filter technique was employed. These results indicated that when only a few organisms were present in a large volume of liquid the Millipore Filter technique was a more reliable procedure to use in their enumeration than standard plating techniques.

The evaluation of the sanitary condition of cleaned and sanitized dairy equipment has always been a problem. Theoretically there should be no organisms present on equipment which has been properly cleaned and sanitized. However, it is realized that frequently small numbers of bacteria may be present. Rinse techniques and swab techniques have been applicable when the equipment is disassembled for the cleaning and sanitizing operations. However, since in-place cleaning is becoming an acceptable method for cleaning and sanitizing dairy equipment, it was realized that the swab technique, at least, could be applied only with difficulty. With a rinse technique

the large volumes of water necessary to rinse lines cleaned in-place made standard plating procedures impractical.

The Millipore Filter technique was applied to the evaluation of pipe lines cleaned and sanitized in-place. Preliminary studies were conducted at the Research Laboratories and also in a plant where in-place cleaning was practiced. After the line had been sterilized (either with chlorine or hot water) and drained, water from the public supply was circulated through the line and samples taken for bacteriological examination after 5, 10, or 15 minutes of circulation. Using the Millipore Filter, it was possible to enumerate the bacteria in the circulated water in volumes up to 1000 ml whereas with standard plating procedures an accurate count would not be possible at all. By comparing the counts on the water before and after circulation, the number of bacteria contributed by the pipe line could then be estimated. Ideally a sterile water rinse would be more desirable since all the organisms recovered would then come from the equipment. However the volumes of water needed for circulation through the equipment made the use of sterile water impractical. Work is now in progress to establish standards for this procedure.

OTHER APPLICATIONS

At the present time it would appear that the Millipore Filter technique can be applied in any situation where the diluting fluid is low in organic matter. For example in addition to the bacteriological examination of water supplies and the sanitary condition of cleaned and sanitized pipe lines it is possible to determine the bacteriological content of such containers as milk bottles, beverage bottles, ice cream containers, glassware, etc. In the ice cream industry the technique could be used to determine the bacteria content of flavoring materials, bacteria present on fruits and nuts, the numbers of organisms in sugar solution, etc. Here it may be necessary to develop special culturing media which would favor the types of organisms which might be present on these products.

It has been noted that the applications of the Millipore Filter are limited by the amount of

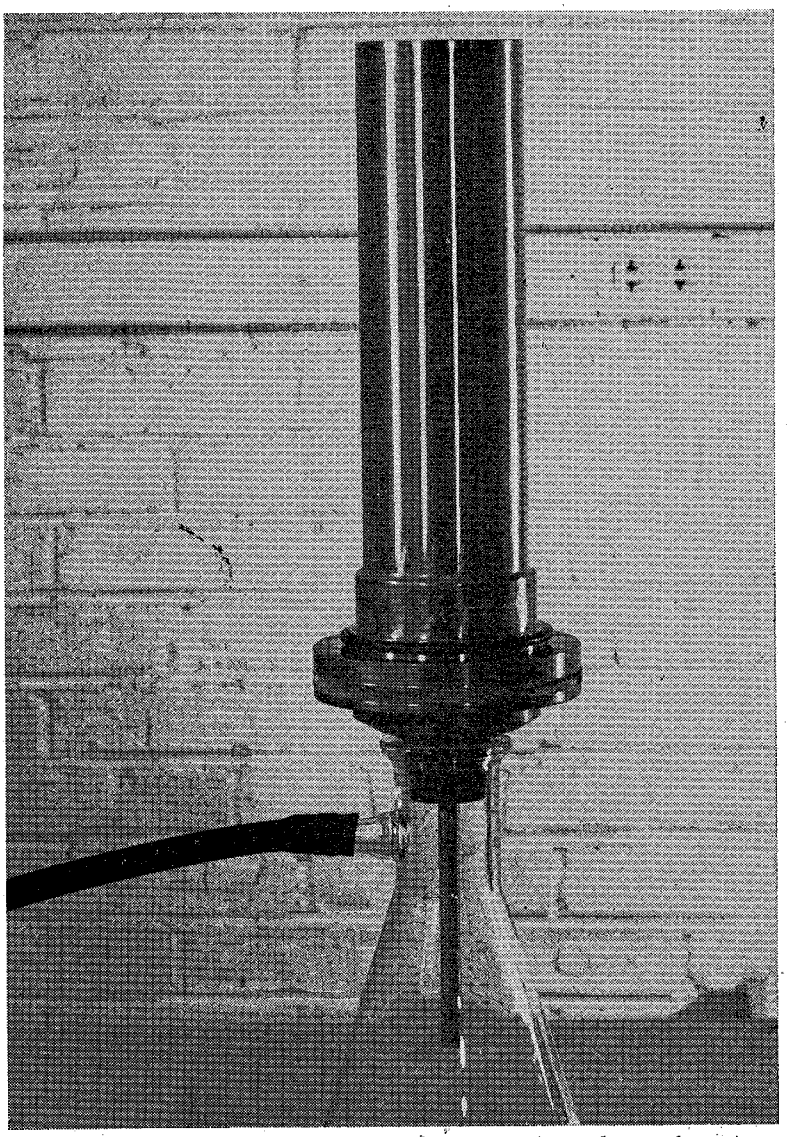


Figure 3—Modified Millipore Filter Apparatus (4 Inch Membrane)

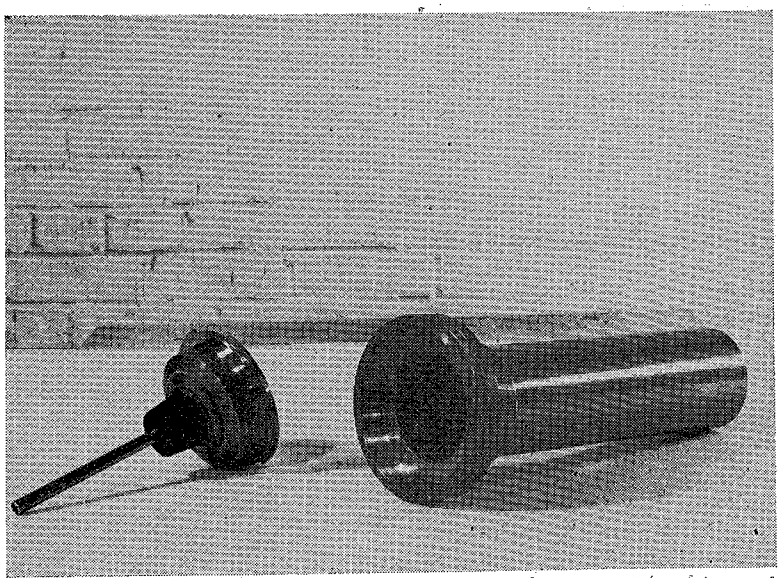


Figure 4—Modified Millipore Filter Apparatus Disassembled (4 Inch Membrane)

suspended matter present in a solution which ultimately may clog the membrane. Under such conditions the difficulty may be overcome by using membranes of larger sizes. If this can be done, the technique will have applications in the determination of the sterility of various products. This phase of the work is being investigated at the present time but as yet the proper combination of increased filter size and dilution of the product with sterile water have not been thoroughly studied. It is hoped that it will be possible to adapt this technique to testing various high-temperature pasteurization procedures, and to the enumeration of special types of organisms present in dairy products such as psychrophilic or thermophilic organisms. Such applications will require considerable further investigation.

There is the possibility that this technique might be used in germicidal testing where a one hundred percent end point is desired. In this instance, of course, a suitable neutralizing agent would be necessary to inactivate the germicidal solution.

Our investigations have been concerned with the Hydrosol filters. However, there are available Aerosol filters which can be used for the recovery of microorganisms from gaseous materials. Using the Aerosol-type filter, checks can be made on the bacteriological condition of air in enclosed areas. For example, the possibility of air contamination of cottage cheese can be determined by placing an aerosol unit near the cheese vat and collecting samples of the air which comes in contact with the vat. The unit also might be used to check the sterility of an air supply by placing an Aerosol filter in an air line.

It has been the purpose of this paper to bring the Millipore Filter to the attention of milk and food sanitarians. Since it has not been possible to review all the literature available on the subject in this short paper, a selected bibliography has been prepared and is presented here. The technique is being evaluated quite extensively in the field of water bacteriology, but it is visualized that there are many other applications of the technique. As more investigators become familiar with this procedure, new and improved applications will become available. There is little doubt that the Millipore Filter technique will eventually become a valuable tool in quality control and research in water, milk, and food bacteriology.

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"DOCTOR JONES" SAYS:*

PAUL B. BROOKS, M. D.

When I was a boy, on my uncle's farm, we naturally used to have turkey occasionally—Thanksgiving or some other special occasion. We "picked on" the turkey, afterward, as long as there was anything left on the carcass. The nearest thing they had to refrigeration was a cool cellar. None of us ever got sick from our turkey picking. If we had we'd, maybe have laid it to something else: a change in the moon or something. But the turkeys didn't come frozen. They came fresh from some neighbor's farm.

But, here of late, we've been picking on turkey's from a different point of view. That is: as a cause of outbreaks of food poisoning and infection. Well, here's one that looked like the "irony of fate." It was an outbreak of food infection from turkey "a la king", at the annual convention of the International Association of Milk and Food Sanitarians. A very complete and scientific story about it was published, recently, in the association's journal. With the evidence all in it was irony—not of fate but of failure. It was due to failure of hotel food handlers to stick to certain recognized and standard rules of food hygiene.

There was one unusual feature. A thorough investigation showed a heavy contamination of the turkey dish with paracolon bacilli—the apparent cause. They're germs that don't ordinarily cause sickness. But good authorities say they've been known to cause outbreaks, under certain conditions, when the food was loaded with 'em.

Here's something more recent. Psittacosis ("parrot fever") has recently been found in turkeys for the first time. During the past few years it's been found in pigeons and in ducks and other poultry. Down in Texas there were 63 cases of the disease among workers in poultry dressing plants. Investigators from the University of California traced the source to turkeys and found the virus. The workers apparently caught it from handling 'em.

All this turkey business—it at least goes to show one thing. Whether it's poultry or people, the more we know about 'em the better we know what to look out for.

*From New York State Department of Health Bulletin, Jan. 11, 1954.

ABSTRACTS OF SOME PAPERS PRESENTED AT THE FEBRUARY MEETING OF THE INSTITUTE OF AMERICAN POULTRY INDUSTRIES.

Military Tests Uncover The Best Way To Stabilize

B. W. GARDNER, JR.
QM Food & Container Institute

Utilizing research work connected with the stabilization of whole egg solids by removing the glucose, the Quartermaster Food and Container Institute conducted pilot plant work and storage studies for several years, in cooperation with industry and other government research agencies. This was climaxed recently by a full-scale production test at the Armour and Company plant in Springfield, Missouri. The results provided answers to practical production questions, which the Armed Forces needed in order to publish a realistic military specification for stabilized whole egg solids.

The most important facts brought out in this test include: (1) the yeast treatment and enzyme treatment methods of removing glucose were equally adaptable to large scale production; (2) both fresh shell eggs and frozen whole eggs can be used in large scale production of glucose-free whole egg solids; (3) the eggs may be heat treated (pasteurized) either before or after the glucose is removed; (4) glucose-free whole egg solids produced from either fresh shell eggs or frozen whole eggs by the yeast treatment method were unsatisfactory when prepared for consumption as scrambled eggs, unless they were acidified to a pH of 7 to 7.5 (in the finished product); (5) the yeast treatment is less costly but somewhat slower in its reaction, than the enzyme treatment; (6) when sensory evaluation tests were conducted on scrambled eggs made from the finished product, it was found that in general there was a good acceptance, regardless of whether it was made by the yeast fermentation method (acidified) or the enzyme treatment (the product manufactured from shell eggs was slightly preferred.)

Quality Controls Can Do A Lot For Your Business

RICHARD H. FORSYTHE
Henningsen, Inc.

In a plant processing frozen eggs or egg solids, the quality control program will be based on these general quality factors: (1) organoleptic qualities (odor, color, texture, flavor); (2) nutritional qualities; (3) toxigenic qualities; (4) sanitary qualities; (5) compositional qualities (solids, fat, weights, protein).

The quality control manager must: (1) prescribe quality specifications for all raw materials and accept or reject all incoming products on this basis; (2) prescribe processing procedures that cover all phases of product quality, including specifications and sanitary conditions, and supervise the technical aspects of these procedures; (3) prescribe or assemble quality specifications for all finished products and pass or reject all finished products on the basis of these specifications; (4) have authority from top management to carry out his responsibilities and back up his decisions. The quality control manager must first of all be a technologist trained in chemistry, bacteriology, engineering or some other related physical science. He will require people on his staff with this same training and ability, the number depending on the number of plants involved and the extent of the program. In addition, he will probably need one or more technicians in each plant and the main laboratory, skilled in some special techniques and capable of carrying them out on a routine basis.

The tools required to operate the quality control department are many and varied. The first tool is probably the refractometer. Others include the balance and vacuum oven for oven solids and moistures, a colorimeter for whole egg and yolk colors, ether extraction equipment for fat analyses, special glassware and chemicals for sugar and salt analyses, beaters for evaluating the functional performance of products, and finally a stove and other equipment for baked-out products evaluation. Smaller operators who cannot afford a complete laboratory layout can have these things done for them at a nominal cost through the Institute of American Poultry Industries' egg products laboratory.

What does a quality control program do for the egg processor? First of all, it insures that the products meet all the specifications of any particular customer, or local, state, or federal regulatory agency. It shows up defects at the plant, so they can be corrected at minimum expense and without loss of customer goodwill. It puts sanitation on a routine, economical basis, eliminating expensive overtime jobs required when regulatory officials find sanitation is not adequate to continue plant operations. It saves from "giving away" extra quality —such as a higher percentage of solids than the customer's specification calls for. These savings, plus others that can't be price-tagged, make a sound quality control program pay for itself many times over.

Sub-Scald Turkeys Present New Handling Problems

A. A. KLOSE
Western Utilization Research Branch, USDA

Our tests show that rancidity development during frozen storage is no greater in subscald turkeys than in semiscald, so *flavor* is no problem. But when it comes to the effect of subscald on *tenderness,* there are conflicting reports. Some investigators have indicated subscalding produces a toughening effect while others have differentiated between the effects of the scalding temperatore and scalding time, concluding that a higher temperature for a shorter time may lead to a more tender meat. It has been suggested that the finish (amount of fat in the skin) may modify these effects. Our work has shown no differences in the tenderness of the *meat,* due to changes in the scalding temperature, with time of scald held constant. More work is needed to clear up these discrepancies. Tenderness of the cooked *skin,* however, is a different story. Birds scalded at 140° F develop a much tougher skin during ordinary roasting, than those scalded at 126° F. This toughening may be reduced in part, but not eliminated, by covering the roasting bird with oiled cheese cloth. Accompanying the toughness, there is also a wrinkling of the skin. So much for eating qualities.

The loss of the cuticle in subscalding accounts for the marked contrast between the diffused white color of the semiscald turkey and the shiny pink color of the subscald. The standards of perfection for the two products are different.

Loss of moisture in subscald birds is accompanied by an objectionable darkening, which may develop within an hour in the open air. The dehydration and darkening at this stage can be prevented either by slush ice or cold water chilling, or by immediate packaging and freezing. In freezing, the skin may be cooled to the freezing point so slowly that it has ample time to dry in the thawed state, shrink, and become darker. Also, in slow freezing, ice crystals are larger, causing more darkening. Rapid refrigeration will minimize these changes. So far we've found that a -20° F, 1330 feet per minute blast on plastic bagged but unboxed turkeys produced a light appearance. When bagged turkeys were placed in a wire-bound wooden box, however, and the box surrounded by boxes on all sides to simulate conditions in a heavily loaded tunnel, freezing time was lengthened to the extent that a significantly darker appearance developed. Skin tight packaging will help to prevent formation of dehydrated and freezer burned areas on the skin during the freezing operation. Differences in the finish of birds may exert a greater effect on the final appearance than small variations in chilling and freezing.

Processing Pre-Cooked Frozen Poultry Products

HELEN L. HANSON
Western Utilization Research Branch, USDA

The precooked frozen food industry has expanded rapidly in recent years because of the demand for convenient, completely cooked foods that require only thawing or reheating. This demand has come from restaurant chains, air lines, hospitals, railroads, and the armed forces, as well as from the many recent purchasers of home freezers. It is desirable, from the viewpoint of the poultry industry, that poultry and eggs be utilized to the fullest possible extent in the preparation of precooked frozen foods.

Problems in freezing cooked foods concern the maintenance of flavor and texture during freezing and storage. Rancidity develops more rapidly in cooked frozen poultry, for example, than in uncooked frozen poultry. And in

the freezing of cooked eggs, changes in the texture of the egg white presents a serious problem. Our research efforts have been aimed at decreasing these defects. We found, in testing medium weight fryers, that precooking methods are an important factor in weight losses. Re-heating in the thawed or unthawed state also influenced weight loss after freezing. We found minor changes in the juiciness and tenderness of precooked frozen birds, which might not be recognized if birds were not compared directly with freshly cooked birds. Storage stability varied somewhat with the type of precooking process used. We found little or no flavor change as a result of storage until after precooked frozen birds had been held for six months at 0° F. It might be well to use one precooking method for birds to be used by commercial or institutional concerns, and another for birds to be used in the home.

We have also studied precooked poultry products such as creamed chicken, creamed turkey, chicken and gravy, and chicken a la king. We found the liquid separation problem in the sauce or gravy could be overcome by using waxy rice flour as the thickening agent. Creamed turkey develops greater rancidity than creamed chicken. We found, however, that rancidity in frozen creamed turkey can be adequately retarded, if not completely prevented, by the presence of sufficient antioxidant during both cooking of the turkey and storage of the final product.

Incentives and Supervision Build A Quality Broiler Program

FRANK LIPMAN
Lipman Brothers, Inc.

Our firm buys commercial broilers—a good many of them roaster size—from local growers on a contract basis. Under this agreement, we agree to furnish the baby chicks, and all feed, grit, fuel and electric power needed to raise them to market age. The grower agrees to furnish all the labor, buildings, equipment and facilities required for the proper care of the birds. The number of chicks to be grown is determined by mutual agreement between the two parties. The grower agrees to complete supervision by our firm, and if we find the poultry is not being cared for properly at any time, we have the right to install a man on the farm, to provide proper care. As one safeguard against disease, the grower agrees not to keep any other poultry on the farm during the term of the contract. He also gives us the sole and exclusive right to sell or dispose of any and all poultry raised under our agreement, and to decide when the birds should be marketed.

We agree, in the contract, to pay the grower a certain sum each week for each bird he delivers to us when the birds are ready for market. We are not obligated in any way to make any compensation for mortality losses or for birds which are unfit for market. We have a bonus system for efficient growers, however, over and above the base pay for "average" growers.

This program fits into our geographical location, our farm economic system, and our needs for procurement. It assures us poultry of good stock, a dependable volume, and the consistency and uniformity in quality and size we need to satisfy our customers. It lessens the grower's market risk, and through our supervisory service, helps him achieve greater livability and efficiency, for which he is duly rewarded.

Invest Your Sanitation Dollars Where They Will Do The Most Good

EDWARD L. HOLMES
American Sanitation Institute

In my opinion one major factor is probably responsible for more waste in the operation of a food plant sanitation program than any other factor. I'm talking about the lack of proper interest in, and appreciation for, sanitation on the part of *top management.* I know of one case, for example, where management's failure to correct unsanitary conditions pointed out several times by Food and Drug inspectors resulted in a series of newspaper writeups that eventually cost the company anywhere from $250,000 to $500,000 in lost customers and lost business. All this would never have happened if management had been on its toes and invested five or six hundred dollars, or a thousand at the most, in corrective sanitation measures. And it wouldn't have happened if they'd had a full-time sanitarian on their staff or if they had at least retained a sanitation consultant to advise them. Then there's the case where a company spent about $7,000 to rebuild a plant so it could sell to the army, and in so doing not only eliminated a number of conditions that could have brought on regulatory action that might have involved as much as $100,000, but also improved their operating efficiency to the point where they were able to close two small nearby branches at a material savings of around $25,000 a year.

Another major factor in preventing waste in plant sanitation is an adequate *follow-through* program that assures day in and day out application of the sanitation practices by employees who know they will be held responsible for doing the job right, with no neglect or slip-ups.

A recent editorial in a leading sanitation journal pointed out that in the vast majority of cases of bona fide adulteration from insanitary conditions, the basic cause is simply failure of management to set up sustained operational procedures for sanitation. Contamination of foods in processing plants usually stems from ignorance, carelessness, or indifference on the part of the employees. The only way management can prevent this is to provide a responsible agent within itself to enforce plant sanitation as a matter of common decency and good business. This same editorial recommended that Food and Drug *require* a plant where insanitary conditions have been found, to establish an adequate *management* setup to maintain sanitation. It costs something to run a sanitary plant. But done right, it will mean savings in at least two ways: (1) it will prevent future regulatory action; (2) it will simplify production procedures. And in some cases, it may make it possible to consolidate multiple operations into a single, more efficient operation.

STATE'S COMMUNITIES HIT MILK HONOR ROLL

Kentucky has ten cities and thirteen counties listed in the U.S. Public Health Service Milk Sanitarian Honor Roll for 1951-1953. No community is included unless its pasteurized milk and its retail milk ratings are 90 percent or more. The community's milk supply must be under an established program of routine inspection and laboratory control.

All ratings are determined in accordance with the U.S.P.H.S. Rating Method, and the Public Health Service makes occasional check surveys in each state .

Communities with 100 percent market pasteurized milk are: Calloway County; Campbell County — Newport; Christian County; Daviess County—Owensboro; Fulton County; Grant County —Williamstown; Jefferson County —Louisville; Muhlenberg County—Central Ciy; Owen County—Owenton; Pendleton County; and Warren County—Bowling Green.

Fayette County—Lexington have 97 percent pasteurized milk for sale; Caldwell County—Princeton have 94.7 percent market pasteurized milk for sale.

Since July 1953 (when the above U.S.P.H.S. survey ended) ratings by the Kentucky State Department of Health have added Frankfort and Paducah to the list of Communities which have milk sanitation ratings of 90 percent with 100 percent of the milk supply pasteurized. In addition, Bowling Green, Campbell County—Newport, Fulton and Hopkinsville have been resurveyed in the last four months and their ratings have continued to be 90 percent with 100 percent of the market milk supply pasteurized.

A COOPERATIVE HEALTH-AGRICULTURE-INDUSTRY APPROACH TO THE PROBLEMS OF SANITATION*

G. MALCOLM TROUT
Michigan State College, East Lansing, Michigan

The need continues to exist for cooperation among involved agencies concerned with sanitation. Problems change with progress. Some of the current problems of sanitation are closely associated with labor, presence of coliform organisms in the finished product, pest control, milking machines, psychrophiles, plant housekeeping, and mastitis control. Representatives of health, agriculture, and industry might well meet with open minds in a sanitation workshop or conference for the purpose of discussing fully the objectives and weaknesses of a sanitation program. Out of such a meeting would come certain understandings of mutual benefit to all concerned with general improvement of sanitation.

ACCOMPLISHMENTS

Few associations can look back upon an era of progress and public acceptance as the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS and its forerunner the International Association of Dairy and Milk Inspectors. Assembled here at its 40th annual convention, the Association may well take pride in its participation in the development of America's food industry. In the supreme joy of accomplishment we soon forget the struggles of many of the members in advancing the cause of food sanitation and public health. Naturally, some of the newer members of our Association are not familiar either with the efforts put forth by the earlier sanitarians or with the emphasis placed on some fundamentals of food preparation and handling which are accepted unquestionably today. Glancing back but a few short years, we are startled at the shift in emphasis of sanitarians and the change in topics which command their attention. This means not a vacillating inspectors' mind, but rather attainments of goals which made new emphases necessary.

Twenty-six years ago the International Dairy and Milk Inspector's Association met in Toronto, Ontario. At this fine meeting, the thread of thought running through the entire program centered around pasteurization—its importance, efficiency of, quality of raw milk for, experiences with, positive pasteurization, bacteria counts in, communicable diseases, *et cetera.* A quarter of a century later, the program of the 40th annual meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS contains not a single paper devoted to commercial pasteurization. During that span of years pasteurization has been accepted as an economic and health necessity to the extent that the sale of bottled raw milk is now a minor market factor throughout the length and breadth of the United States. In fact, in some states and in scores of urban centers pasteurization is compulsory. The achievement of proper pasteurization and packaging of milk subsequent thereto would seem to be the hub of all the activities centering around a safe milk supply.

While no little credit is due the public health officials for the attainment of this goal, one must not overlook the role played by the engineers, the industry itself, and the development of allied technology which made the attainment of a safe city milk supply possible.

Few countries can boast of the doorstep, soda-fountain, automatic dispenser or super market availability of a safe, nutritious, highly palatable unit of milk as the United States and Canada. One can drink with relish and with complete confidence as to its safety, milk from Toronto to Tucson and from Vancouver to Vicksburg. With just pride we can boast that no countries in the world have such a universally high level quality of beverage milk throughout their realms as does the United States and Canada. A common experience in foreign lands is to hear Americans express a yearning for a glass of good cold milk. Likewise, foreigners who visit our shores regret exceedingly upon returning to their native land that they cannot get beverage milk so readily available and of such good quality as they found in their travels in the United States and Canada.

Our millions of returning American soldiers in World War II and in the Korean conflict opened our eyes to the possibility of milk consumption among adults. Upon returning home, they literally cried out for two foods — milk and ice cream. Not until they had been deprived of milk had they appreciated what a fine wholesome product was readily available in their own country. Truly, the milk sanitarian and public health official can take pride justly in his role in making available universally throughout the United States high quality beverage milk.

G. Malcolm Trout attended Iowa State Teachers College during the winter of 1916-1917 and served in World War I in the U. S. Artillery. He received the B.S. degree in Dairy Industry, Iowa State College, 1923; M.S. Iowa State College, 1924; and the Ph.D. degree, Cornell University, 1936.

He served on the dairy husbandry staff, West Virginia University from September, 1923 to November, 1928; and Dairy Department, Michigan State College since 1928. Appointed Professor and Research Professor, 1941.

Named Clinton DeWitt Smith Fellow, Cornell University, 1935; Borden award in Dairy Manufactures, 1945; official U. S. delegate 12th International Dairy Congress, Stockholm, 1949; official U. S. delegate 13th International Dairy Congress, The Hague, 1953.

Author and co-author of over 100 papers, articles, and bulletins in dairy technology including co-authorship of *Judging Dairy Products, and Homogenized Milk; a Review and Guide.*

*Presented at the 40th annual meeting INTERNATIONAL ASSOCIATION MILK AND FOOD SANITARIANS, INC., E. Lansing, Michigan. September 1-3, 1953.

The average yearly per capita milk consumption of Canada and the United States, 425 and 387 pounds respectively, is somewhat lower than that in the Scandinavian countries and Switzerland, which have the highest per capita milk consumption average about 515 pounds. (*Bul. 16, Food and Agr. Org.* of United Nations, 1949). Nevertheless the high level of milk consumption in Canada and the United States is phenomenal when one considers that the average consumer is confronted with quantities of innumerable varieties of food, at the established super-markets in every sizeable city in those countries. One marvels that fluid milk consumption is as high as it is with all the other foods of the world beguilingly seeking a place in man's stomach. Nevertheless, there must be some basic reason for the relatively high level of milk consumption by 160,000,000 people in the United States who have the opportunity to buy other foods.

It is believed that aside from its nutritional qualities, its availability, its relative cheapness, and the influence of constant advertising, promotional schemes, and education in the schools, *people drink milk primarily because they like it* and have the assurance that it is safe and that it is produced hygienically.

Emphasis has been placed herein on milk because it (a) is symbolic of all good foods; (b) is more subject to unseen contamination than other foods; (c) is highly perishable unless adequately refrigerated; (d) requires more detailed supervision in processing and handling than most foods; and (e) is always of primary concern to the health official.

Now *if* beverage milk in America has attained a status of unquestioned acceptability, why concern ourselves today with a cooperative health-industry-agriculture approach to the problems of sanitation? Why not preserve the *status quo* of milk regulations as it now exists *if* the present endeavors are yielding a highly acceptable milk supply? After all these years of milk regulations and often multiple-milk inspection, do problems of sanitation sufficiently serious to merit our attention actually exist? Am I to infer that with all the facilities at our disposal today to secure sanitation that we do not have that for which we have striven? Think of our facilities now many of which were nonexistent twenty-five years ago. Even a new terminology glibly rolls off our tongue. The list includes: aureomycin, DDT, penicillin, wetting agents, QAC, antibiotics, tyrothricin, streptomycin, methoxychlor, lindane, chlordane, dieldren, microsol foggers, chelating agents, sequestering agents, polyphosphates, and many others.

Our faces flush when we realize our inadequacies in getting the sanitation job done with so many aids at our disposal. Actually, the list of the problems of sanitation seemingly grow longer with progress. Often the solution of one problem unearths another which neither could be calculated nor predicted. For example, antibiotic treatment of animals for mastitis may have cured the mastitis, but inclusion of the milk from the treated quarters too soon after treatment gave rise to the problem of "slow starter" or "dead vats," which has harassed many a dairy processor.

PROBLEMS

Time does not permit a listing and discussion of all the current problems of sanitation. However, a few are worthy of our serious thinking.

1. *Labor.* One of the chief problems of sanitation today is closely tied in with labor, particularly in the processing plants. Not only is the per-hour wage relatively high for this type of work, but often the turnover is great. Consequently, too much of cleaning labor is inexperienced and inefficient. Thus, plant sanitation from the labor standpoint alone becomes costly. Figures recently released from the Oregon Agricultural Experiment Station indicate that a very high percentage of plant labor cost was due to labor cost of cleaning. Earlier figures from the Michigan station showed that from 38 to 44 percent of total cleaning labor was required simply in dismantling and reassembling pipe lines. Obviously, this phase of dairy sanitation, highly important as it is, must be studied, perhaps revamped entirely, be made effective, and drastically reduced in cost.

2. *Presence of coliform organisms in the finished product.* This problem is still with us. Basically, research gave the answer years ago when data showed that no coliform organism survived proper pasteurization exposures. Extensive studies reported at the 12th World's Dairy Congress, Stockholm, 1949, indicated that not a single one of ninety-some odd strains of coliform organisms survived high-temperature short-time pasteurization. Yet, in too many plants today the presence of coliforms not only confounds but harasses the earnest manager especially when prodded by the milk inspector who himself may not be able to offer helpful suggestions to eliminate them.

3. *Pest control.* The admission that a pest problem exists today with all the control facilities available is almost an indictment on man himself. Seemingly, he wishes to catch flies rather than to eliminate them entirely from his operations. Speaking facetiously, man apparently enjoys placing fly traps in strategic places and noting with pride how many more flies he caught than his competitor. Likewise, with the rodent problem, traps are set sporadically. The trapper beams with accomplishment that he set eight traps and caught eight mice — then loses his enthusiasm lest unfortunately he catches the last pair. Also, roaches are not exempt from the annual round up. In some plants they seem to be molested just often enough to keep their spirit alive and their mating instincts at a high potential.

4. *Milking machines.* Despite all its perfections and improvements, the widely accepted milking machines must still be washed and sanitized. Much progress has been made in raising the general level of farm milking machine sanitation. Research has been of real service. But the attainment of universal satisfactory milking machine sanitation yet remains a dream. Perhaps the foreign scientists were nearer right than we think when they reported at the recent 13th International Dairy Congress, The Hague, Netherlands, that the farmer could not be depended upon to keep the machine properly washed. I disagree entirely. However, the human element in keeping the milking machine sanitized has

to be reckoned with wherever the milking machine is used. The role of thermodurics today in the pasteurizability of milk emphasizes the need of closer scrutiny on the sanitation of all the utensils used to produce and handle the milk. In fact, with prompt, sharp cooling of milk mechanically today, these bacteria often furnish the sole clue to farm insanitation.

5. *Psychrophylic bacteria.* Every-other-day and three-times-a-week delivery of milk has resulted in longer-than-heretofore holding of bottled milk before consumption. This change in distribution of milk has created an awareness of the problem of psychrophilic bacteria in milk. Much research has been done in this field. Some startling results and hard-to-believe conclusions, based upon pure research, have been presented. I say "hard-to-believe" because few sanitarians want to believe the conclusions: (a) that little correlation exists between the bacteria count of the raw milk and the keeping quality of the same milk pasteurized and adequately stored; (b) that psychrophilic bacteria do not survive either holder or H-T S-T pasteurization; and (c) that the presence of these bacteria in pasteurized bottled milk appears to result largely from post-pasteurization contamination. Frankly, I feel that psychrophilic bacteria furnish a tool by which the sanitarian can work most effectively with industry in approaching perfection in milk plant sanitation, with particular reference to the elimination of post-pasteurization contamination.

6. *Plant housekeeping.* Unfortunately, too few milk plant managers experience the satisfactions of good plant housekeeping. Likewise, too many coli-minded sanitarians looking for bacteria (worthy as that is) fail to catch a glimpse of the public health benefits derived from a well executed, plant housekeeping program. Sometimes we are so close to the details that we fail to see the whole problem.

7. *Mastitis control.* Mastitis continues to be the nation's No. 1 dairy cow disease problem. While not as spectacular as some diseases, its widespread incidence exacts a heavy toll yearly in milk production. Fieldmen, milk inspectors, sanitarians, all public health officials concerned with milk have to cope sooner or later with this problem. Authorities are in full agreement that mastitis control involves in part good dairy farm management. Any sensible farm program designed to prevent predisposing the udder to mastitis not only should be permitted but actually encouraged.

A Cooperative Approach to Sanitation Problems

The above problems have been presented briefly to show the nature and extent of some of the sanitation problems with which milk producers, processors, and regulatory officials are all involved. Quite evident, the solutions are not readily forthcoming; otherwise, many of the problems would have ceased to exist years ago. The solution to the problems are not as easy as reaching into a barrel for a little more detergent or opening a steam valve for increasing the temperature. The real cause lies deep; the cure must deal with fundamentals.

The weakest link in the 1953 dairy sanitation program, as it has been in the years gone by, is *the man himself* — the milk producer, the milk processor, the fieldman, the inspector, and the sanitarian. The job is a cooperative one, and the various agencies involved fail to give that full, honest, spontaneous, unselfish cooperation which brings results. Recognizing that human nature being as it is and not changing much, what approach can be made toward the solution of the problems of sanitation? A few suggestions are given herewith for consideration.

1. *Let representatives of health, agriculture and industry meet with open minds in a sanitation workshop or conference for the purpose of discussing fully the objectives and weaknesses of a sanitation program.* Self centered conferences of only one segment of those concerned in sanitation often avail little for mutual ultimate good. They frequently end in suspicion, distrust, and a strengthening of the barriers between groups. Out of a three-group workshop should come some understandings relative to the following.

a) Agriculture and industry needs, desires, and welcomes a sensible and strong sanitation program.

b) Pretty, "small-potato" grievances now interfering with sanitation accomplishments will be banished.

c) The milk industry needs the benefit of good public relations accruing from a sense of "oneness" of health, agriculture, and industry.

d) The regulatory officials must honestly and sincerely be *for* the industry for which they are working.

e) Recognition that sanitation in dairy plants is costly and that new devices and techniques to obviate the high labor cleaning costs will be tried.

f) Adequate inspection takes more time than is possible with available man power, and therefore the present inspection program should be scrutinized carefully and possibly recast for the sake of efficiency. More platform inspection offers possibilities which should not be overlooked. Paul C. Johnson, Editor, Prairie Farmer, Chicago, writes challengly under date of August 15, 1953:

> *"MORE AND MORE DAIRY LEADERS AND SCIENTISTS* are suggesting that we keep the quality of milk high by platform inspection alone. They say we have the tests to do a good job. It would be a tremendous load off the back of dairying if we could eliminate farm inspections and farm sanitation rules, many of which are just plain foolish. *Unfortunately, many of these rules were set up to keep people out of the dairy business rather than clean up the milk.*
>
> "This will be a great shock to people who have worked hard to build and enforce sanitation codes. The dairy industry can't afford unnecessary expense, *so the sooner we face the facts, the better."*

g) Competition within the industry and constant cost awareness forces industry to be alert for and acceptance of new technological developments, sometimes without public health knowledge or approval.

2. *Improvement of the individual upon whom the responsibilities of sanitation inevitably rest.* I feel sincerely that if and when the sanitation program is sound, the key man in accomplishing results is the individual himself. Call him fieldman, inspector, sanitarian, public health official, or what you will, the man has a responsibility that he cannot evade. With that responsibility comes opportunity: opportunity to improve himself scholastically and professionally; to rid himself of "old-wives' tales" in sanitation; to fortify himself with

the latest results of research and to surround himself with good current literature of his field. What an opportunity for the trained sanitarian to lead the milk producer and processor confidently out of the existing confusion and muddle of sanitation into a sound, inexpensive, routinely effective sanitation program!

In drawing these remarks to a close may I add that I believe sincerely that agriculture and industry would welcome a firm, clean-cut farm and plant sanitation program based upon the findings of research. The time is at hand for studying the problems of sanitation and revaluating, if necessary, many of our health, agriculture, and industry programs involving sanitation with the aim of minimizing or eliminating the problem entirely. The handwriting is in black and white on the pages of many of our farm journals and dairy industry trade magazines today.

Such editorials as previously given not only make us think but arouse us to action. The three-way cooperation among health, agriculture, and industry groups can be depended upon to accomplish much.

Probably no conclusion is more fitting than the words of the late Ernest Kelly spoken twenty-six years ago at a convention similar to this. He concluded:

> "Laws and principles are clear, measuring devices are adequate, and we have only to solve satisfactorily the human equation. If we fail, it is because we do not care to master the principles of our profession or because we are not painstaking in their application."

CORRECTION

In the February issue, page 53, column 3, paragraph (c), line 5, the figure "3" should be "30" making the sentence read "To obtain bacterial destruction comparable with 160° F for 30 minutes, Tracy[18] found it was necessary to use 177.5° F for 30 seconds, and with 155° for 30 minutes required 175° F for 30 seconds."

SECOND NATIONAL CONFERENCE OF TRICHINOSIS

E. R. Price, D. V. M.
The Division of Health of Missouri Jefferson City, Missouri.

The Second National Conference of Trichinosis was held in the American Medical Association Auditorium in Chicago, Illinois on March 1, 1954. The group, totaling 123 registrants, consisted of health personnel, research workers, meat industry representatives, as well as other allied professions.

The meeting was called to order promptly at 9:00 A.M. by the Chairman, S. E. Gould, M.D. The morning was devoted to the formal presentation of papers and discussions.

The importance of continuing a broad educational program was stressed. While the average housewife and restaurateur realize the importance of thoroughly cooking pork we still hear of a few liking pink pork. It was recommended that the programs in the schools be intensified and that an effort be made to have attractive placards placed in retail meat stores advising the purchaser to cook all pork thoroughly.

It was reiterated that about 16 percent of all adults in the United States have at sometime in their lives had live trichina in their muscle tissue. This statement is based on the examination of several thousand human diaphrams obtained at post mortem. Since this work was done in the late 30's it was recommended that it again be repeated to ascertain if any appreciable change has occurred because of the great volume of publicity given to the need for thoroughly cooking pork and pork products. However, the reported incidence of the human disease is not comparable to this figure. This is due primarily to the difficulties incurred in making a diagnosis in most individual cases. Of the 376 cases reported to the National Office of Vital Statistics in 1953, the majority came from group infections. One epidemic involved 73 individuals. Several had nine or more cases.

It was pointed out that 41 states have adopted laws or regulations requiring the cooking of all garbage fed to hogs. These laws or regulations were passed not to control trichinosis but to stamp out vesicular exanthema. It is realized that in many states these regulations are not being enforced. Furthermore, it is logical to believe that in the near future a prophylaxis will be available to control vesicular exanthema, in which case the cooking of garbage regulations may be rescinded in many states. It was also stated that a small percentage of hogs receiving no garbage are infected by eating infected rats. Research indicates that this method of transmission of trichinosis is much more common than formerly believed. It was recommended that intensified studies be undertaken in several of the larger hog producing states to determine the exactness of this public health problem.

The use of ionizing radiation appears to offer much promise to the breaking of the trichinosis cycle. Experimentally it has been proven that the gamma ray in a radiation dose of 30,000 roentgens to the surface of a hog carcass will produce a dose of 25,000 roentgens at the center of a fourteen-inch carcass. A radiation dose of 15,000 roentgens will sterilize trichina encysted in the carcass.

The method recommended would require the building of a radiation chamber into which the hog carcass would pass on an overhead conveyor chain. The individual carcass would be exposed for a short time to the gamma rays and then pass out of the radiation chamber. The exposed carcass does not retain any of the rays and the flavor is not affected. The keeping quality of the meat is materially improved.

The adoption of such a method is feasible for our larger packing

plants. The cost over a period of time would be nominal, probably amounting to less than ½c per pound of pork.

In the afternoon the constituents divided into the following groups: public health, animal health, education, legislation, research and organization for a two-hour discussion period. Following the discussion period, the findings and recommendations of the various groups were presented and acted upon by the entire assembly. These reports will be printed in the Journal at a later date.

RECOMMENDATIONS ADOPTED BY 1952 NATIONAL CONFERENCE ON TRICHINOSIS

I. PUBLIC HEALTH

Trichinosis is a preventable disease of public health significance for which known methods of control are available. Public health organizations should encourage, support and cooperate with animal disease control agencies in efforts directed toward the ultimate eradication of trichinosis. Control measures against trichinosis are also effective against other diseases of swine transmissible to man.

The following research should be encouraged:

1. Effect of ionizing irradiation on trichinae in hog carcasses
2. Specific diagnostic tests for trichinosis in man and swine
3. Alternate methods of garbage disposal
4. Standardization of garbage-processing methods, including development of equipment with time and temperature studies.

Public health education should be accelerated in order to (1) emphasize to the public and to physicians the hazards of contracting trichinosis, and (2) disseminate all existing information on methods of control of trichinosis, including alternate methods of garbage control. Such information should be consolidated in one publication.

It is recommended that the feeding of raw animal offal to swine be prohibited; that all garbage to be fed to hogs shall be adequately heat-treated; that States be encouraged to adopt uniform garbage-cooking regulations; that the U. S. Public Health Service Interstate Quarantine Regulations relating to raw garbage be enforced; and that these recommendations be brought to the attention of the Council of State Governments.

It is recommended that the Bureau of Animal Industry prohibit interstate shipment of all raw pork from swine that have been fed raw garbage.

II. ANIMAL HEALTH

Swine diseases that are garbage-borne include hog cholera, vesicular exanthema, foot-and-mouth disease, salmonellosis, tuberculosis and trichinosis. Other diseases including brucellosis, anthrax and pork tapeworm may also be transmitted by ingestion of contaminated flesh. Adequate cooking of garbage would control the route of garbage transmission of these diseases.

It is recommended that the respective states allow the sale of garbage-fed hogs for slaughter only at a federally inspected plant or plant having equivalent inspection.

It is further recommended that no indemnity be paid for losses from animal diseases at piggeries where raw garbage is fed. It is emphasized that most important in the problem of swine diseases that are garbage-borne are the animal vesicular diseases and hog cholera.

It is urged that research be initiated on the advantages of feeding cooked garbage in comparison to feeding with raw garbage, with particular reference to its nutrient qualities and the control of communicable diseases.

It is suggested that studies be made on means of identification of garbage-fed hogs, such as ear-tattooing.

III. LEGISLATION

The National Conference on Trichinosis resolves to encourage its members and their organizations to do everything possible to promote and obtain the enactment and enforcement, in each of the 48 states and territories, of laws and/or regulations prohibiting the feeding of raw garbage or offal to swine.

It is recommended that the member organizations of this Conference and the Federal Government study the possibility of implementing by January 1, 1955, federal quarantine on a state-wide basis, and of refusal to allow live hogs or raw pork to move out of any state which shall not have and enforce a regulation requiring the cooking of hog-feed garbage and offal at licensed cooking establishments where adequate mechanical recording controls are maintained.

IV. EDUCATION

It is recognized that educational measures are an essential part of a trichinosis-control program.

It is recommended that educational measures should be further developed and extended into the following areas:

1. Where garbage is fed commercially to swine, disinfection of garbage and adoption of other sanitary measures should be promoted.
2. Continuation of the program of informing housewives and other food handlers on the necessity of cooking all pork and pork products thoroughly.
3. Increased efforts toward improvement of diagnostic procedures to reveal the number of infections in man and hogs, such as making available antigen for the rapid flocculation test in Health Department and other laboratories.
4. Since most control of garbage feeding is directed toward the commercial feeder, a program is necessary to persuade the farmer, feeding his own household garbage to swine for his own use, to separate all raw pork scraps and offal from his swine feed.
5. Greater dissemination to communities of available information on other methods of garbage disposal.

The proceedings of this Conference shall be duplicated and distributed for informational purposes to agencies and individuals represented at this Conference and to other organizations having an interest related to this problem.

V. RESEARCH AND PERMANENT ORGANIZATION

All groups engaged in research on trichinosis and related diseases should be encouraged to continue their operations and activities.

The Conference authorizes the establishment of a Continuing Committee which shall consist of all the speakers on the 1952 program and a representative of each sponsoring organization. This Continuing Committee shall submit proceedings and resolutions to the sponsoring organizations, receive interim correspondence and arrange for another conference approximately one year from the close of the 1952 Conference.

MILK and FOOD SANITATION

PROCEDURES FOR SAMPLING AND TESTING MILK BY THE BABCOCK METHOD*

B. Heinemann, *Chairman*[a], W. A. Cordes[b], J. E. Edmondson[c], T. I. Hedrick[d], L. M. Lampert[e], and J. J. Willingham[f].

For several years, committees of the American Dairy Science Association have been working on various aspects of the Babcock Test for milk. In 1947, one committee[1] reported on the diversity of the procedures recognized by the different States in the United States. This report has been amplified and made current as of June 1, 1953, by Herreid[2]. Another committee[3] recommended that the volume of the milk pipetted be increased and glymol added to the fat column before reading the test. This procedure has been approved by the American Dairy Science Association and is now under consideration by the Association of Official Agricultural Chemists.

The following Committee report has also been approved by the American Dairy Science Association, the action having been taken in June, 1953. It is presented here as a recommended set of procedures for sampling and testing both fresh and composite milk samples for butter fat to the end that the Babcock Test may become standardized in the United States.

The construction of the weigh tank is important from the standpoint of securing an accurate sample. The care of composite samples is likewise very important. For these reasons, the first three sections have been included in a report dealing primarily with the Babcock Test.

I. Weighing Milk

1. The weigh tank shall be of such size and shape as to accomplish complete mixing of all the milk added. If it is not of this type, it shall be equipped with a mechanical agitator. It shall be maintained in a satisfactory mechanical and sanitary condition, free from dents or bulges which may prevent adequate draining.

2. Scales shall be checked daily with test weights. Twice each month scales shall be checked for accuracy at the maximum capacity from the weigh tank.

II. Sampling Milk from the Weigh Tank

A. Mixing or stirring before sampling

1. The milk shall be thoroughly mixed to insure the withdrawal of a representative sample for testing.

2. Verification of mixing efficiency.

a. The method of securing a representative sample shall be verified at least monthly on several shipments of milk.

b. When a weigh tank is used, the efficiency of the sampling procedure shall be determined by testing samples of the same lot of milk taken from five different portions of the weigh tank. When the tests of these samples differ by more than 0.1% fat, the mixing efficiency shall be considered unsatisfactory.

c. If the mixing efficiency is not satisfactory as indicated by results secured in the above paragraph, each lot of milk shall be stirred vigorously with a hand stirrer for one minute prior to sampling.

d. The accuracy of sampling milk which is not to be dumped in a weigh tank shall also be verified monthly by taking 5 samples at different time intervals of mixing or from different sampling locations of the same lot of milk.

3. Abnormal milk

a. All milk dumped into the weigh tank shall be sampled unless it is severely frozen. The producer, however, should be notified promptly if his milk is frozen, churned, or otherwise unsuitable for thorough mixing and corrective measures taken.

III. Care of Composite Samples

1. Preservative

a. A preservative containing color shall be added to milk samples if they are to be tested more than 24 hours after taking. Formalin (36% solution of formaldehyde) may be added at a rate not to exceed 0.1 ml for each 30 ml or 2 drops per fluid oz of milk, or tablets containing a preservative of proven efficiency may be used provided that the weight of the tablet or tablets does not exceed 0.5 gm per 8 oz bottle.

2. Period of composite sampling

a. Composite samples shall be collected over a period not to exceed 16 days.

b. Composite samples shall be tested within 24 hours after the last addition thereto, except where other arrangements have been made with the local regulatory agency.

3. Quantity of milk to be taken

a. A minimum of 10 ml shall be taken from each producer's delivery of milk. The quantity removed shall be the same for each day during a compositing period.

b. The total composite sample at the time of testing shall be not less than 100 ml. If, for example, a producer delivers milk only two days during a compositing period, then a minimum sample of 50 ml must be taken on each of the two days.

4. Size of sample bottle

a. Composite sample bottles shall have a capacity of not less than eight ounces, free from cracks, and tightly fitted with a sanitary rubber stopper.

b. Each bottle shall be identified with a legible, permanently attached mark of identification.

c. Every sample bottle shall be clean and dry before the addition of a preservative and maintained in such a manner as to prevent the accumulation of moisture which may dilute the sample of milk.

d. Each milk plant shall be provided with at least two complete sets of sample bottles.

5. Method of sampling

a. When a dipper, thief, or similar manual device is used, it must be rinsed once with the milk which is to be sampled.

b. When an automatic device is used, evidence must be available to verify the adequacy of rinsing the device with the milk to be sampled.

c. If the weigh tank does not hold all the milk from one producer, the milk may be split into two equal portions and the same size sample taken from each portion. This practice must be followed during the full length of the compositing period even if the volume of milk delivered daily should drop to a point where one weigh tank would hold it all. This procedure requires the use of two composite sample bottles. These samples may be mixed prior to testing or each bottle may be tested and the tests averaged for pay purposes.

d. The composite samples should be gently rotated after the addition of each daily sample. Violent handling of trays or bottles should be avoided. Breakage or spillage should be avoided but if either occurs, a permanent record must be made showing date of accident and the identity of the sample.

6. Storage conditions

a. The composite samples shall be stored away from strong light, in a clean, sanitary cabinet maintained at a temperature between 35° and 50° F.

b. The samples shall not be kept at room temperature for longer than one hour each day during the compositing period.

7. Period held after testing

a. All milk samples from completed and recorded tests shall be held at 50°F or under for at least five days after testing.

IV. Preparing Both Fresh and Composite Samples For Testing

1. Tempering

a. Place the sample bottles in a tempering bath with the surface of the

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*Prepared by a committee of the American Dairy Science Association appointed for the period 1952-1953, to standardize methods for conducting all phases of the Babcock Test. This report is based on the work of committees headed by Dr. G. H. Wilster during the period 1950-1952.

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[b]National Dairy Products Company, Inc., New York, New York.

[c]University of Missouri, Columbia, Missouri.

[d]United States Department of Agriculture, Chicago, Illinois.

[e]State Department of Agriculture, Sacramento, California.

[f]Texas Technological College, Lubbock, Texas.

water slightly above the level of the milk in the bottles.

b. The temperature of the bath should not exceed 110°F at the time of placing the cold samples in it. Shortly thereafter, the temperature may be adjusted as the temperature of the milk rises, so that the final temperature of both bath and samples lies between 90° and 100°F. Two baths may be used; one for heating and one thermostatically controlled for holding at 90° to 100°F.

c. Do not shake or mix the milk in the sample bottles until it has reached a temperature of 90° F.

d. Any sample bottle which may become diluted with water must be discarded and a permanent record made of the date of accident and the identity of the sample.

e. Any cream adhering to the sides of the bottle and the stopper must be reincorporated with the contents by gently rotating and inverting the bottle. A rubber policeman may be used to dislodge the adhering cream if necessary.

2. Mixing before pipetting

a. The composite sample, after reaching 90° F to 100° F is poured into a mixing container and back into the original sample bottle until at least two round trips are made. The mixing container shall be drained at least 15 seconds prior to re-use.

b. If the bottle is not over 2/3 full, the sample may be mixed by shaking horizontally back and forth six round trips through a distance of about six inches within a period of three seconds. Care must be used to avoid churning when this procedure is used.

c. The sample for testing shall be pipetted immediately after mixing.

3. Temperature of milk for pipetting

a. The temperature of the milk at the time of pipetting shall be between 90° and 100° F.

4. Pipetting

a. The tip of the milk pipette (calibrated to contain 17.6 ml water at 20° C) should be at level approximately equal to ⅛ the height of the milk in the sample bottle. The pipette is then filled until the top-most surface of the milk is even wtih the graduation mark on the pipette. The mlik is then discharged into a test bottle by inserting the whole length of the long delivery tube of the pipette into the neck of the test bottle before releasing its contents. The lip of the test bottle must be vented to permit air to escape readily from the bottle, preferably by means of a grooved rubber washer at the base of the bulb of the pipette.

b. When the charge has drained, usually about 10 to 15 seconds after free flow has stopped, blow out the last drop or remove the pipette from the test bottle with a quick upward movement in order to remove the last drop from the bottom tip of the pipette. Two pipettes, used alternately, may be found advantageous.

V. Testing Milk For Butterfat

1. Sulphuric acid

a. The sulphuric acid used for the test shall have a specific gravity of between 1.82 and 1.83 at 68° F.

b. The temperature of the acid shall be between 65° and 75° F.

c. The amount of acid used shall be such that the fat column of the finished test will be clear and free from foreign material. (This amount shall not be less than 14 ml.)

2. Adding acid to the milk

a. The temperature of the milk at the time of addition of acid shall not exceed 80° F.

b. The test bottle shall be held at an angle and the acid added slowly all at one time. The blending of milk and acid should be avoided until such time as actual mixing is begun.

c. The mixing of milk and acid should be started gently by rotating the test bottle until visible curd disappears. Continue shaking for an additional period of at least 30 seconds. The length of the time of shaking is very important in obtaining accurate tests. If formaldehyde is used as a preservative, a total mixing time of three minutes is recommended.

d. The bottles should be placed in a heated centrifuge as soon as possible after mixing milk and acid.

3. Centrifuge

a. The temperature within the operating area of the centrifuge shall be thermostatically controlled at 140° to 150° F while in operation. An accurate thermometer shall be permanently attached to the centrifuge in such a manner that it will indicate the temperature in the general area wherein the test bottles are being whirled.

b. The centrifuge shall be mechanically driven, free from vibration, and at the following speeds:

Diameter of Wheel In Inches	Minimum Revolutions Per Minute
16	848
18	800
20	759
22	724
24	693

By diameter of wheel is meant the distance between the inside bottom of the opposite cups, measured through the center of rotation when the cups are extended horizontally. This diameter shall not be less than 16 inches.

c. The speed of the centrifuge shall be checked at least monthly and shall not be any less than the figures in the preceding table, nor exceed them by more than 40 RPM. Speed should be determined with the door of the tester closed. An accurate tachometer permanently attached to the centrifuge is desirable.

4. Centrifuging procedure

a. The centrifuge shall be operated for 5 minutes for the first period, 2 minutes for the second, and 1 minute for the third, from the time operating speed has been reached. A satisfactory timing device shall be used.

b. As an alternative method, the centrifuge may be operated for 5 minutes for the first period, and 3 minutes for the second period. This procedure requires only one addition of water to bring the fat into the neck of the bottle.

c. Soft water, free from oil, at a temperature of at least 140° shall be used for filling the bulb and adjusting the level of the fat column in the neck of the test bottle.

d. The test bottles shall be transferred to the water bath immediately after the final centrifuging period.

e. At the time of reading: the entire fat column must be within the graduated neck of the test bottle.

5. Tempering baths.

a. The temperature of the water in the bath shall be between 130° and 140° F, preferably 135° F.

b. The water shall be maintained at a level equal to the top of the fat column in the test bottles.

c. The test bottles shall remain in the water bath for a period of not less than three minutes.

d. Tests shall be read immediately after removal from the water bath.

6. Reading tests

a. Sharp needle-pointed dividers or calipers shall be used for measuring the fat column.

b. The bottle shall be held vertically and at eye level in front of a source of indirect light at the time of measuring. One type of illumination is the "Flourescent Titration Illuminator" manufactured by the Fischer Scientific Company.

c. The use of a five-inch magnifying lens as an aid in reading the top and bottom meniscus is recommended.

d. The fat column shall be measured in its entirety from the bottom of the lower meniscus to the top of the upper meniscus. (The word "meniscus" refers to the saucer shaped surface at each end of the fat column. The bottom of the meniscus would correspond to the bottom of the saucer and the top of the meniscus would correspond to the outer rim of the saucer).

e. The fat column shall be measured on the ungraduated side of the neck and the test read from the graduated scale.

f. The fat test shall be read to the nearest 0.1%.

g. Tests in which the fat column is foamy, burnt, or curdy shall not be read.

VI. Glassware

a. Calibrated glassware used in making the Babcock test shall conform to the minimum standards set forth in the latest edition of the *Official Methods of Analysis of the Association of Agricultural Chemists* or any supplement thereto.

NOTE

In the event that the American Dairy Science Association Modification of the Babcock Test [*Jour. Dairy Sci.* 33, 685, (1950)] is adopted by the Association of Official Agricultural Chemists, the following changes in this report are necessary.

1. Pipette (Section IV-4-a). The A.D.S.A. modification requires a pipette calibrated to contain 18.05 ml of water at 35° to 36° C.

2. Reading the fat column (Section V-6-d). The A.D.S.A. modification requires the addition of two drops of glymol before reading the test. The fat column is then measured from the bottom of the lower meniscus to the fat-glymol line.

Continued on Page 125

DAIRY PRODUCTS IMPROVEMENT INSTITUTE MEETING*

The Seventh Annual Meeting of the Dairy Products Improvement Institute, Inc., met in New York City on January 20, 1954.

The main address, entitled "Consideration of Significant Sanitary Standards for Cream for Manufacturing" was presented by Professor Harold S. Adams, Department of Public Health, Indiana University Medical School, Indianapolis, Indiana.

He stated that fluid milk supplies which meet Grade "A" or equivalent high standards came closest to fulfilling our idea of quality: absence of pathogenic bacteria and toxic substances, cleanliness and freedom from extraneous matter, low bacterial content, good flavor, satisfactory keeping quality, and high nutritive value. These standards have been evolved from the best thinking of control officials, dairy technologists, and research scientists over the past thirty years. The early hazards of milk-borne diseases have largely passed, due to the general improvement in farm production methods, rapid transportation, improved refrigeration, and almost universal pasteurization.

In the case of milk for manufacturing purposes, especially cream for the manufacture of ice cream, the conditions of handling are different from those of fluid market milk. After separating, the cream is pasteurized at high temperature. The mix itself is pasteurized at 155-160° F for 30 minutes by the vat-holding process, or at 175° F for at least 25 seconds by the high-tempertaure short-time heat treatment. The greatest present health hazard is involved in the addition of the flavoring ingredients. Field inspections of production practices are necessary.

The production of milk for manufacturing purposes is supervised under two schools of thought. The first school advocates a single sanitary standard applicable for all milk regardless of its ultimate use. This involves the same rigor or supervision accorded fluid market milk supplies.

The second school of thought relies on so called platform tests. This group reasons that the product should stand on its own merits, and should comply in standards of measurement with quality requirements, thereby obviating the need for production supervision.

Both viewpoints can be fused into the following procedure. The production environment and procedure should be clean, the utensils clean, the milk refrigerated, the farms uniformly scored with only relatively minor emphasis on construction features of stable, milk house location, and general layout. Education of the producers is necessary in connecting the present situation wherein many cannot meet the most modest of requirements.

The 1949-1950 study of sanitary ice cream legislation revealed that 10 of the 48 states had no such enactments, and the standards for the pasteurization of ice cream mix varied as shown by the following cases: 142° F for 30 minutes, 160° F for 10 minutes, 160° F for 20 minutes, and 170° F no specified time.

The number of milk samples examined in the laboratory have been shown to correlate with bacterial quality – more samples, higher quality. In the fluid milk industry, samples should be taken twice a month. For manufacture one sample should be taken from each producer every month. The author prefers the direct microscopic examination first and the standard plate count second. Milk for cream production should not exceed two million organisms per milliliter at the beginning of the control program. An accessory test for sediment exerts a helpful psychological effect on the producer to encourage or stimulate his interest in preventing dirt from getting into the product. Of course, organoleptic tests are necessary.

Inspection, testing, and educational programs should be practiced by the industry with the advice and assistance of regulatory agencies.

*Abstracts of papers delivered.

Mr. Adams is Assistant Professor of Public Health at Indiana University Medical Center, a position he recently assumed after some five years as Director, Division of Hotel and Resort Inspection, Minnesota Department of Health. He has been in county, municipal, and state health department work for over twenty years. He is the author of *Milk and Food Sanitation Practice* and was among the earliest sanitarians to develop training cvourses for food workers.

PANEL DISCUSSION*

State Sanitary Regulations Pertaining to Milk Production and Product Control for Cream to be Used in Ice Cream

H. Clifford Goslee

Chief, Dairy Division, Department of Farms and Markets, Hartford, Connecticut

In Connecticut the sanitary regulations pertaining to the production of milk cover all milk produced for sale regardless of its ultimate use.

Our state regulations are closely parallel to regulations for the production of milk in our two adjacent major markets, New York and Boston.

In actual practice, cream is imported every month of the year for use in ice cream, bakery, and other products. Obviously in seasons of shortage we must reach far and wide for cream. Hence a flexible control program is more practical and workable than a fixed program.

Our cream sources must receive

only whole milk from producers who are registered, inspected, and approved and the company records shall be clear and complete on these points. This approval may be the result of state, municipal, or company inspection. The source shall administrate a quality control program which must include routine frequent sampling of producers milk and testing for presence of bacteria; frequent and regular tests for temperature and sediment.

A field service must be maintained which will follow-up all unsatisfactory test results.

The work of the sampling and testing service and the field service must be coordinated as to show improvement or ample control.

At time of shipment, the product must be suitably identified and we must be advised of the shipment that we may prepare to sample the product on arrival in our markets.

The laboratory examinations on our official samples of imported cream include phosphatase—flavor — odor — oiling off — neutralization — acidity — pH — microscopic clump count — plate counts at various temperatures 4° C — 20° C — 35° C — 45° C — coliform.

The laboratory report shows, in addition to the results of the tests, the name of source, date processed, batch number, when and from whom sample was procured, when and by whom delivered to laboratory.

Cream sources are required to submit monthly summary reports indicating the extent of their quality control work, the volume of cream shipped and to whom (in Connecticut).

Connecticut cream buyers must report monthly the volume of cream received and from whom.

While our source requirements are fairly stringent, we will give tentative source approval where an efficient quality control program is in operation.

Inspectional surveys are made routinely with semi-annual frequency at sources shipping regularly.

Transportation costs are the only limitation of the distance cream sources may be situated from our markets.

H. Clifford Goslee served an apprenticeship of twenty years in dairy farming. He joined the Connecticut Department of Farms and Markets in 1927.

He has been Secretary, Connecticut Associations since 1938. In 1948 he was honored Division Chief and Clerk of Milk Regulations since 1938. In 1949 he was honored by the University of Connecticut for outstanding service in the fields of dairy manufacturing and collegiate training. He has authored dairy legislation, and collaborated in many research projects.

In 1952 he was program speaker on tank truck pickup at colleges in Connecticut, Massachusetts, Pennsylvania, Rhode Island, Vermont, and at state and national conventions in Connecticut, Illinois, Minnesota, New York, and Vermont.

Maryland Sanitary Regulations Pertaining To Milk Production And Product Control For Cream To Be Used In Ice Cream

C. S. BRINSFIELD
Chief, Division of Food Control
Department of Health
State of Maryland
Baltimore, Maryland

Most of the milk we export goes into Pennsylvania, New Jersey, and the District of Columbia with lesser amounts finding their way into New York, Delaware, Virginia, and West Virginia. Our state maintains amiable relations with our neighboring states concerning the free flow of like quality milk and milk products across state lines. An out-of-state dairy has no trouble in obtaining a Maryland permit as long as it reasonably complies with our dairy laws and regulations and have no record of adulteration, fraud, etc.

Milk that is not good enough to put in a bottle to drink should not be considered acceptable to be frozen into ice cream and related products and eaten. Consequently our Milk Law of 1941 makes provision for only one grade of milk to be used for both fluid purposes and the manufacture of ice cream and related products.

Every dairy farmer in Maryland (excepting only those who produce exclusively for interstate sale and who hold a valid permit for that purpose issued by the state or District in which the milk so produced is sold, and those who do not sell for human consumption) must hold a permit for each dairy farm operated by such producer. Every dairy farmer outside the State of Maryland who ships to a dairy plant in Maryland processing milk or milk products for sale in Maryland must also hold a Maryland producer's permit. There is no fee for this permit.

Dairy plants in Maryland and all those wishing to sell milk products in Maryland must first obtain a processor's permit at an annual fee of ten dollars ($10.00).

(Then followed a summary of the sanitary regulations for milk control in Maryland).

Our Frozen Dairy Foods and Ices Law, calling for the licensing of the manufacturers of ice cream sold in the counties of Maryland, has been in effect over two years. Yet our regulations promulgated as a result of this law have been in effect not quite a year.

C. S. Brinsfield was born and raised on a dairy farm on the Eastern Shore of Maryland. He graduated from the University of Maryland, College Park, Maryland, in 1927, with second honors in the College of Agriculture receiving a B.S. Degree in Dairy Manufacturing.

Upon graduation he became associated with the Hagerstown Dairy Co., Hagerstown, Maryland, where he was in charge of quality control work, and remained with this company until 1939 when he resigned as plant manager to become affiliated with the Maryland State Department of Health as Sanitarian. In 1948 he was appointed to his present position of Chief, Division of Food Control.

He is a member of the Phi Kappa Phi, Maryland and District of Columbia Dairy Technology Society, the Association of Food and Drug Officials of the United States, the National Association of Sanitarians, and the Institute of Food Technologists.

Massachusetts Sanitary Regulations Pertaining To Milk Production And Product Control For Cream To Be Used In Ice Cream

GEORGE A. MICHAEL
Director, Division of Food and Drugs, Massachusetts Department of Public Health, Massachusetts

Massachusetts definitely requires a single high level of sanitary standards for all of the milk produced for use as fluid milk or as a source for ice cream and other

dairy products. Other health departments share this perspective and that a program will eventually evolve from this work towards a common goal, wherein this philosophy will extend itself to all inspectional services, whether or not they be in public health fields or agricultural fields.

The pasteurization regulations of the Department of Public Health set a maximum bacterial count of 100,000 colonies per gram of pasteurized cream, and the frozen dessert standard of 100,000 colonies per gram for the entire mix in the case of ice cream mix. Most ice cream manufacturers in Massachusetts pasteurize their mix at a temperature in excess of 150° F for a period of thirty minutes. In some cases the pasteurization cycle is started at approximately 155° F and carried up as high as 170° F and then generally tapered off during a thirty-minute holding period.

In cases where contamination is indicated without the Massachusetts milk shed, the Federal authorities have been of considerable assistance in correcting the contaminating circumstances.

The one thought I would like to leave with you concerning Massachusetts perspectives towards dairy products is that from a public health point of view a dual standard for dairy products is professionally unsound. Therefore, we recognize a single standard of sanitation for milk and other dairy products to be consumed in the Commonwealth of Massachusetts.

George A. Michael graduated with honors from Suffolk University with a B.S. degree in Chemistry. His training in chemistry was obtained at Northeastern University. He studied food technology under Professor Proctor at Massachusetts Institute of Technology. He has been employed by Arthur D. Little, Inc., in Cambridge, and Sylvania Electrical Products Company of Salem. He entered the Department of Public Health in 1941, and in 1949 was promoted to the position of Assistant Director; the duties of Director were taken over in 1951.

State Of New Jersey Regulations Pertaining To Milk Production And Product Control For Cream

MILTON RUTH

Chief, Bureau of Food and Drugs
Division of Environmental Sanitation
New Jersey State Department of Health

The enforcement of laws and regulations relating to milk, cream, and milk products is a direct responsibility of the New Jersey State Department of Health.

The person engaged in collecting or assembling such milk or cream shall have first obtained a permit from the New Jersey Department of Health.

In the interpretation of the bacterial analyses, the 3-out-of-4 system is used in evaluating a supply; that is, a supply is considered acceptable if three of the last four analyses indicate compliance with the above standards. However, the attention of the operator is called to excessive total counts and to coliform counts exceeding 10 per milliliter in pasteurized cream with the request that immediate corrective measures be taken.

In order that an operator may have a continuous check on his compliance with standards, it is expected that adequate field inspection and laboratory service will be maintained. His quality control program should include and his records should show the results of:

1. Sampling and analyses of the finished products weekly,
2. Sampling and analyses of the milk of each producer at least monthly,
3. Field inspections of each producer at least twice a year; plus,
4. Follow-up inspection when previous inspection or sampling showed unsatisfactory conditions or milk was rejected for cause.

Out inspection policy calls for a minimum of two inspections per year of each milk plant, and inspections of a number of dairies selected at random delivering milk to that plant.

In determining if "minimum requirements" of the State are being complied with, we review and evaluate: our laboratory analyses; inspection reports of our sanitarians; and the findings of municipal, state, and federal agencies which enforce requirements equivalent to ours.

Permits are presently issued in many classifications for the distribution of milk and cream to be used as fluid milk and to be used for manufacturing purposes. We are developing a program whereby the permits might be issued in only two categories. Plants holding one class of permit may ship or distribute milk, cream and/or milk products for fluid use and for manufacturing purposes. Plants holding the other class of permit will be restricted to the sale of milk, cream and/or milk products for manufacturing purposes only.

After high school, Milton Ruth took a clerical position in 1923 with the Bureau of Food and Drugs of the New Jersey State Department of Health, and continued his education at Rider College, Trenton, Rutgers University, New Brunswick, and Temple University, Philadelphia.

He advanced through the ranks of Food and Drug Inspector, Senior Food and Drug Inspector, Principal Sanitarian, Assistant Chief, to his present position of Chief of the Bureau of Food and Drugs.

New York Sanitary Regulations Pertaining To Milk Production And Product Control For Cream To Be Used In Ice Cream

REX STILWELL

Supervising Inspector, Bureau of Food Control Department of Agriculture and Markets
State of New York
Albany, New York

Article 4-A of the Agriculture and Markets Law, relating to frozen desserts, with rules and regulations, went into effect in 1933. Our main thought was a clean, wholesome product, properly pasteurized, free from pathogenic bacteria and held under sanitary conditions until consumed.

The law and regulations could be much more specific than they are for the requirements for the dairy products entering the mix. The law does state that the ingredients be pure and that they comply with the Agriculture and Markets Law.

In actual practice our food control inspectors check in a general way the quality of the dairy

products received at the frozen dessert manufacturing plant. Raw milk is checked for off odor, and occasional sediment tests are made. Cream may be tested for acidity where thought to be suspicious. Samples of any dairy product may be sent to the State Food Laboratory where the product appears to deviate from the normal in any way. On rare occasions, due to a complaint, an inspection of the dairy barn and equipment where the milk is produced may be made. However, a very large percentage of the cream, milk, and condensed milk produced from New York State dairies and used in frozen dessert manufacture is surplus from dairy farms and plants under municipal inspection.

We do not have, at the State level, a bacteria standard for dairy products entering into frozen dessert mix or for the finished product. We do think that consideration should be given to the study of proper bacteria standards for frozen desserts and dairy ingredients entering therein.

In conclusion, we have not done very much work on the dairy products entering into the mix, but have concentrated on proper pasteurization of the mix, on plant sanitation and proper handling of the product during and after manufacture, and checking to make sure the frozen desserts meet the standards as set up in Article 4-A of the Agriculture and Markets Law.

Rex D. Stilwell was herdsman on a dairy farm for one summer and general farm manager for one year. He attended short courses at N.Y.S. College of Agriculture and Cornell University in Dairy Products Manufacture and Egg Grading. He was supervisor of Advanced Registry Records for four (4) years under Dr. Wing, N.Y.S. College of Agriculture, Cornell University.

Starting as dairy and food inspector for the N.Y.S. Department of Agriculture and Markets, May 1, 1927, he has been supervising inspector since March 15, 1951. In 1943 he was recognized by the N.Y.S. Department of Education as an instructor in public employee in-service training courses in food sanitation.

Pennsylvania Sanitary Regulations Pertaining To Milk Production And Product Control For Cream To Be Used In Ice Cream

PAUL M. RICHARDS
Chief, Division of Milk Sanitation
Department of Agriculture
Commonwealth of Pennsylvania
Harrisburg, Pennsylvania

In Pennsylvania, the milk used in the manufacture of ice cream must be produced and processed under the same requirements as fluid milk.

I believe Pennsylvania is unique, as it is the only state, as far as I can ascertain, that requires the inspection of all dairy farms at least twice a year by an Approved Inspector, sometimes called plant inspectors. The reports must be filed at the plant of the permit holder, for the inspection and approval of the Secretary of Agriculture. The permit holder shall not receive milk in the plant from any farm unless the farm has been inspected by an Approved Inspector.

This procedure makes the permit holders responsible for their supply, and they can take on new dairies or exclude dairies without contacting the official enforcement agency.

This system of making permit holders responsible for their supplies eliminates a great deal of work for the state enforcement officials, as we only check a percentage of the farms before issuing a permit. In fact, when we inspect farms, we are actually checking on the efficiency of the Approved Inspector to determine if he is scoring the farms properly, so we can get an accurate picture of the total supply by analyzing the reports filed at the plant.

Pennsylvania has used this method of enforcement for about twenty-five years and has found it to be effective as the results of bacteriological analyses have shown that our milk supply is of good quality and safe for human consumption.

At the present time a committee, comprised of local and state enforcement agents, is attempting to develop a farm inspection report that can be used and accepted by all enforcement agencies in this milk shed.

We appreciate and encourage the co-operation of all state and local agencies in working out this program, as we believe the co-operation of all is necessary to accomplish the results that we are all attempting to attain.

Paul M. Richards graduated from Pennsylvania State College with a B.S. Degree in Agricultural Chemistry. He was employed by the Pennsylvania Department of Agriculture for about three (3) years, and then went with the Keystone Chocolate Company in a supervisory capacity. From 1934 to 1940, he has been field representative of the Pennsylvania Department of Health, Bureau of Milk Sanitation, Assistant Director of the Bureau of Milk Sanitation from 1940 to 1953, and since April 1, 1953, has been Director of the Bureau of Milk Sanitation.

BABCOCK METHOD

Contiued from Page 121

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[2]Herreid, E. O., and Heinemann, B. Techniques Used in the Babcock Test for Milk in the United States. *Univ. of Ill. Agri. Exp. Sta. Circ.* 709 (1953).

[3]Herreid, E. O., Burgwald, L. H., Herrington, B. L., and Jack, E. L. Standardizing the Babcock Test for Milk by Increasing the Volume of the Sample and Eliminating the Meniscus on the Fat Column. *J. Dairy Sci.* **33**, 685-691 (1950).

DAIRY FOODS SERVED

If you wanted coffee at the recent Minneapolis Farm Forum you had to ask for it.

The event sponsored by the Minneapolis Chamber of Commerce, featured dairy foods at two luncheons. Half pints of milk were served at each place along with generous amounts of butter and cheese.

The dairy products had been contributed by Land O'Lakes Creameries, Inc., Minneapolis, in an effort to encourage other civic luncheons to follow suit.

The gesture gained the attention of Governor C. Elmer Anderson, who told a joint meeting of the Minnesota Farm Bureau and Minnesota Dairy Industry Committee that he recommended the practice at all similar functions.

FOOD STANDARDS AND THEIR MEANINGS

SHELBEY T. GREY

Chief, Chicago District, United States Food and Drug Administration, Chicago, Illinois

The Federal Food, Drug, and Cosmetic Act prescribes that standards of identity, quality, and fill of container shall be set up by the Secretary. Misbranding is described as non-compliance with a food standard of identity, quality, and fill of container. Standards must be "reasonable" and adopted by the Secretary after public hearings. Provisions are made which permit a manufacturer to develop a new product and test it without risking competitive loss or regulatory action when the commercial procedures are conducted in compliance with specific permit provisions.

LAW MISBRANDING

Section 401 of the Federal Food, Drug, and Cosmetic Act says, "Whenever in the judgment of the Secretary such action will promote honesty and fair dealing in the interest of consumers, he shall promulgate regulations fixing and establishing for any food, under its common or usual name so far as practicable, a reasonable definition and standard of identity, a reasonable standard of quality, and/or reasonable standards of fill of container: *** In prescribing a definition and standard of identity for any food or class of food in which optional ingredients are permitted, the Secretary shall, for the purpose of promoting honesty and fair dealing in the interest of consumers, designate the optional ingredients which shall be named on the label. ***."

To appreciate the meaning of Section 401 fully, we must give considerate attention to the implementing paragraphs of the law which declare a food to be misbranded "If it purports to be or is represented as a food for which a definition and standard of identity has been prescribed by regulations as provided in Section 401, unless (1) it conforms to such definition and standard, and (2) its label bears the name of the food specified in the definition and standard, and, insofar as may be required by such regulations, the common names of optional ingredients (other than spices, flavoring, and coloring) present in such food." [Section 403 (g)]. Further, "If it purports to be or is represented as (1) a food for which a standard of quality has been prescribed by regulations as provided by Section 401, and its quality falls below such standard, unless its label bears, in such manner and form as such regulations specify, a statement that it falls below such standard; or (2) a food for which a standard or standards of fill of container have been prescribed by regulations as provided by Section 401, and it falls below the standard of fill of container applicable thereto, unless its label bears, in such manner and form as such regulations specify, a statement that it falls below such standard." [Section 403 (h)].

You will observe that the law defines as misbranding failure to comply with a definition and standard of identity. A number of states have laws and regulations that define such noncompliance as adulteration and this may be occasioned by the fact that the earlier food standards issued by the Federal Government for advisory purposes were called standards of purity for foods. Legislative considerations preceding the Food and Drugs Act of 1906, commonly and popularly referred to as "The Wiley Act", proposed to give to the Secretary of Agriculture authority to adopt standards of purity for foods because he had this authority by virtue of the Appropriation Acts beginning in June 1902; however, it lapsed with the passage of the 1906 Act. Obviously it was the theory then that failure to comply with standards that might be adopted would be considered substitution of one article of food for another, and this is usually defined as adulteration.

After the passage of the 1938 law, which contains the provisions and grants the authority for establishing standards, we approached the situation with the assumption that changes in the composition of foods for which standards were adopted could not be made at will by the manufacturer by resorting to the practice of stating the variation on the label. However it was some time before this very important difference between definitions and standards of identity under the 1938 Act and the advisory standards under the 1906 Act became routinely recognized in the regulated industries.

STANDARDIZATION PROCEDURE

You will have noted that the law provides for the promulgation of three different types of standards (1) identity, (2) quality, and (3) fill of container, and each is required to be "reasonable." We are now thinking of the standardization of foods, so what do we mean by that term? The Encyclopaedia Britannica defines standardization as the establishing, by authority, custom or general consent, of a rule or model to be followed. In its broadest sense, standardization applies not only to such matters as weights and measures and material objects, but it permeates most fields of human activity.

Shelbey T. Grey was born and educated in Texas. He entered the government service as Sea Food Inspector in 1934 in the New Orleans District, and became Supervising Sea Food Inspector on the Atlantic and Gulf coasts. He has served as head of the field inspection stations at Jacksonville, Florida, and at Charlotte, North Carolina, and then on to be Chief Inspector of the Philadelphia and Boston districts in 1949 and 1951 respectively.

Address delivered September 1, 1953 to the 40th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. East Lansing, Michigan

Editorial note: President Eisenhower's Reorganization Plan No. 1 of April 11, 1953 abolished the Federal Security Agency and created the Department of Health, Education and Welfare. The Food and Drug Administration was a constituent of the Federal Security Security Agency and was under the direction and supervision of the Federal Security Administrator, but now is a constituent of the newly created Department of Health, Education, and Welfare since April 11, 1953. The new Department is of cabinet status and Mrs. Oveta Culp Hobby is the Secretary of this Department.

The Department has issued a pamphlet entitled "Federal Food Drug and Cosmetic Act and General Regulations for Its Enforcement", Food Drug, and Cosmetic No. 1, Revision 4, June 1953. It incorporates all changes made in the Act and general regulations after the printing of the third revision since March 1949 and incorporates changes in the text resulting from the reorganization.

Folkways, taboos, moral codes, ceremonies, religious rituals, educational procedures, social and business customs, industrial practices and law itself, are all forms of standardization. Language is the most important example of standardization that man has brought about. Words are sounds whose meanings have become established and so form our principal means of communication. The main use of the term standardization is, however, in connection with technology, industry and business, their products and processes."

What is "reasonable"? Should a standard be reasonable from the standpoint of the manufacturer of the standardized food or must the standard be reasonably calculated to promote honesty and fair dealing in the interest of consumers? The distinction may be presumed to be one without difference, because if a standard is not reasonable from the viewpoint of the manufacturer, it is likely, in the final analysis, not to be in the interest of the consumer, since a standard that is commercially impracticable to meet would cause ethical manufacturers to turn to some other field of production.

The procedure set up by the Act for the adoption of standards is prescribed in Section 701 (e), which states, in part: "The Secretary, on his own initiative or upon an application of any interested industry or substantial portion thereof, stating reasonable grounds therefor, shall hold a public hearing upon a proposal to issue, amend or repeal any regulation contemplated by *** sections *** 401, ***. The Secretary shall give appropriate notice of the hearing, and the notice shall set forth the proposal in general terms and specify the time and place for a public hearing to be held thereon not less than thirty days after the date of the notice, except that the public hearing on regulations under section 404 (a) may be held within a reasonable time, to be fixed by the Secretary, after notice thereof. At the hearing any interested person may be heard in person or by his representative. As soon as practicable after completion of the hearing, the Secretary shall by order make public his action in issuing, amending, or repealing the regulation or determining not to take action. The Secretary shall base his order only on substantial evidence of record at the hearing and shall set forth as part of the order detailed findings of fact on which the order is based. No such order shall take effect prior to the ninetieth day after it is issued, except that if the Secretary finds that emergency conditions exist necessitating an earlier effective date, then the Secretary shall specify in the order his findings as to such conditions and the order shall take effect at such earlier date as the Secretary shall specify therein to meet the emergency."

Much has been written and more said about the standards-making procedure, and I must admit that this is a controversial subject; we are in agreement with the conclusion that much remains to be done by all of us in simplifying and improving the techniques and procedures for formulating and prescribing standards, but it is not my intention to go further into this phase of the Federal standards at this time. There is now pending legislation designed to improve the standards-making procedures.

STANDARDIZATION

Because of the stated objectives of the Act, and of the food standards, it is evident that in considering an identity standard there are at least issues in two broad groups: (1) the physical wholesomeness of the proposed ingredients, and (2) the economic problem of the proposed standards limitations or restrictions. The creed of the Food and Drug Administration, as stated by Dr. Dunbar, former Commissioner, includes a belief that most American food manufacturers are honest and imbued with the desire and ability to produce clean, wholesome food, properly labeled. Certainly we do admit that no responsible food manufacturer would actually desire to manufacture a noxious product.

We find though that this premise does not always hold true when we consider the potential economic problems of proposed standards restrictions. In this connection, I am reminded of a statement made by Mr. L. M. Beacham, Chief of our Canned Foods Branch, Division of Foods, in considering the complex ramifications of attempting to develop a standard that will encompass all these variables. He said: "I have been reminded of an old colored man on my father's farm when I was a boy. He was sent out to the barnyard to count the new arrivals in a fresh litter of pigs. It seems there was one more pig than nature had provided nutritional outlets for, and he, not content to remain a 'have-not' was rooting and scrouging aggressively among his more fortunate brethren trying to displace one or another of them. When he succeeded, the one displaced would take up the fight to get back into the circle of the elect, with the result that the litter was kept in a state of writhing, dynamic turmoil. The old fellow stood off and counted slowly and laboriously, only to have his count thrown off time after time by one pig suddenly scampering from the counted to the uncounted area or vice-versa. Finally he came back and reported that he had counted all of the pigs except one because he had never been able to get that one to stand still long enough to be counted." So it seems to be with the identity standards; no matter how many variables we try to foresee, we frequently find we have overlooked one.

The authority for the promulgation of standards of quality, and of fill of container, with provisions for compulsory labeling of products failing to comply with these standards with the so-called "crepe label," is similar to the authority granted the Secretary of Agriculture in 1930 to establish such standards for certain canned foods by amendment to the 1906 Act known as the McNary-Mapes Amendment. It must be recognized that it is difficult to enforce Section 403 (d) of the Act which reads, "A food shall be deemed to be misbranded if its container is so made, formed, or filled as to be misleading," in the absence of a standard of fill of container. Failure to comply with the latter means that the product must be labeled "Below Standard in Fill" in specified type, enclosed in a lined rectangle, and occasionally more specific labeling may be required to indicate the degree to which the container is slack-filled. On the other hand, a product whose container is so filled as to be violative of 403 (d), i.e. "filled as to be misleading," must be repackaged to legalize it.

Quality standards have possibly caused more discussion and contro-

versy than identity standards. It must be recognized that to formulate a quality standard it is necessary to determine first where the dividing line between standard and substandard quality should be. Our experience has been that there is a natural inclination on the part of many food manufacturers of standardized products to draw the dividing line such that only a small proportion of a particular type of food will be substandard in quality. We have tried to approach the problem from the viewpoint of the average consumer and to draw the line so that all products that are of unsatisfactory quality for ordinary use will fall below it.

Section 401 contemplates definitions and standards of identity for single foods and for classes of food. Obviously, distinction between these types of definitions and standards has brought up a number of problems. It has been our theory that definitions and standards for individual foods should be specific and mutually exclusive. This theory, although apparently simple and easy to follow, has led to unexpected difficulties. For example, flour, or wheat flour, is generally recognized as a single definite food. However, a special type of flour is widely sold as cake flour. Cake flour is flour, but not all flour is is cake flour.

STANDARDS IN RELATION TO PROGRESS

We often hear the fear expressed that food standards retard progress. Hypothetical cases have been cited where a food manufacturer, after long and costly years of research and experimentation, discovers an ingredient suitable for use in a standardized food. Before it may legally be used, the manufacturer must request the Secretary to hold a hearing in a proposal to amend the standard; he must assume the risk of being able to show at the hearing that the new ingredient will promote honesty and fair dealing in the interest of consumers. To do so he will have to disclose the identity of his new ingredient and if he succeeds in getting the amendment, all of his competitors may use it and reap the benefits of his costly and time-consuming research, unless the ingredient or the process of producing or using it is patentable. We then hear that manufacturers would indeed be rash to spend their assets in efforts to produce better foods if they are to run such risks that may result in the fruits of their ingenuity being lost to competition. It is true that an amendment must be obtained to permit use of a new ingredient in a standardized food but this has not been such a barrier to progress as is shown by the record of a long series of amendments, the hearing of which in several cases lasted not more than one-half day. I suggest that if the patent law does not adequately safeguard inventive genius, it would seem that it should be changed rather than the consumer protective provisions of the Federal Food, Drug, and Cosmetic Act.

The Department of Health, Education, and Welfare has made the following provision for including new ingredients in standardized foods.

"The Department recognizes that appropriate investigations of potential advances in food technology sometimes require tests in interstate markets of the usefulness and consumer acceptance of new ingredients in foods for which definitions and standards of identity have been prescribed under section 401 of the Act. It is the purpose of the Department to permit such tests where they are necessary to the completion or conclusiveness of the investigation and where the interests of consumers are adequately safeguarded. The Department will therefore refrain from recommending regulatory proceedings under the Act on the charge that a food contains an ingredient not permitted by an applicable standard, if the person who introduces or causes the introduction of the food into interstate commerce holds a permit from the Secretary for the use of the new ingredient in such food and the permit is in effect at the time of such introduction.

"Any person desiring a permit may file with the Secretary a written application in triplicate containing as part of the application the following:

(1) name and address of the applicant;
(2) a statement of whether or not the applicant is regularly engaged in producing the food involved;
(3) a reference to the applicable definition and standard of identity;
(4) a full description of the new ingredient proposed for use in the food;
(5) basis upon which the ingredient is believed to be wholesome and nondeleterious;
(6) amounts of the ingredient to be used in the food;
(7) purpose for which the ingredient is to be used;
(8) labeling to be used for the food containing the ingredient;
(9) period during which the applicant desires to introduce the food into interstate commerce with all available information supporting the need for such period;
(10) probable amount of the food that will be distributed;
(11) area of distribution;
(12) address at which the food will be manufactured;
(13) permission by the applicant for officers or employees of the Department to make inspections as provided by Section 704 of the Act;
(14) statement of whether or not the food has been or is to be distributed in the state in which it is manufactured;
(15) if it has not been and is not to be so distributed, a statement showing why; and
(16) if it has been or is to be so distributed a statement of why it is deemed necessary to distribute the food in other states.

"The Secretary may require the applicant to furnish such additional information as deemed necessary for action on the application. If the Secretary concludes that the ingredient to be added is harmless, may serve a useful purpose, and will not result in failure of the food to conform to any provision of the Act except Section 403 (g), he may issue a permit to the applicant covering the interstate shipment of such food containing such ingredient. The terms and conditions of the permit shall be those set forth in the application with such modifications, restrictions, or qualifications as the Secretary may deem necessary and state in the permit.

"The terms and conditions of the permit may be modified by the Secretary in his discretion or upon application of the permittee during the effective period of the permit. The Secretary may revoke a permit if he finds that the permittee has introduced a food into interstate commerce contrary to the terms and conditions of the permit, or that the application for a permit contains an untrue statement of a material fact, or that the need for the permit no longer exists. During the period within which any permit is effective, the Department will deem it to be included within the terms of any guaranty or undertaking otherwise effective pursuant to the provisions of Section 303 (c) of the Act.

"Information contained in an application will be held confidential

unless and until publicly revealed by the applicant. The fact that a permit has issued or is in effect will also be held confidential." (21 CFR, 1952 Supp., 3.12)

One of the problems of standard making is to promote a better understanding on the part of the food industry as to the probable results of the adoption of new standards. Since the adoption of a standard may cause some basic changes in manufacturing procedures, at times the reaction by the manufacturer is that he does not want a standard; however the modern industrial trend of food manufacturers is toward standardization, and they take a forward-looking approach by furnishing all pertinent data and cooperating in framing proposals and giving testimony so that the finally adopted standard will embrace only wise restrictions and will accomplish its purpose.

SUMMARY

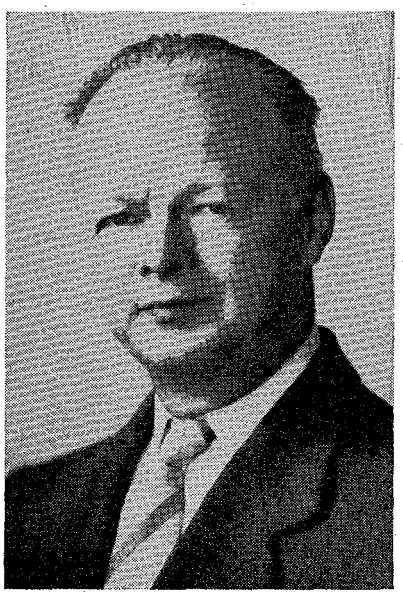
In summary the purpose of standards of quality is to assure the consumer of obtaining a product of reasonably good quality, especially in foods where there are great variations in quality, or to advise of low quality before the product is bought. In the case of identity standards, the basic purpose is to assure the consumer of obtaining a worthwhile article without the necessity of studying and interpreting the label or labeling to determine what is being purchased. In the case of fill-of-container standards, the purpose is more directly connected with prevention of fraud or deception from slack-filling.

Better understanding between regulatory officials and the food industry is often facilitated by well-established trade associations. We in the Food and Drug Administration believe that all trade associations in the food industry should have regular committees interested in and dealing with the subject of food standards.

ERRATUM

The authors regret to report an error in their paper entitled "Determination of Protein Reducing Value of Milk As An Indication of the Presence of Nonfat Dry Milk Solids", published in this Journal, volume 16, pp 241-246, 1953. On page 242 column 1, line 14, the factor given for converting the potassium ferrocyanide reading from the reference curve to protein reducing value expressed as milligrams of potassium ferrocyanide per 100 milliliters of milk is incorrect and should have been 40 instead of 66.7 as published. Since the factor 66.7 gives a protein reducing value for 167 milliliters of milk, all of the protein reducing values given in the paper, therefore, should be changed from the basis of 100 milliliters of milk to the basis of 167 milliliters of milk. To convert the reported protein reducing values to the basis of 100 milliliters of milk, these values should be multiplied by the factor 40/66.7 or 0.60. This error in the conversion factor, however, does not in any way affect the reliability of the method.

R. P. Choi
A. F. Koncus
Gerald Cherrey
R. J. Remaley
American Dry Milk Institute, Inc.
Chicago 1, Illinois



Dr. Arnold H. Johnson has been elected as president of National Dairy Research Laboratories, Inc., Oakdale, L. I., He has been associated with the research work of National Dairy for over 24 years and, since 1950, has served as vice-president and research director of the Laboratories at Oakdale. He received his Master of Science and Doctor of Philosophy degrees in biochemistry at the University of Minnesota, teaching bio-chemistry there in 1925 and 1926. He was a Strietmann Fellow at the University. He was a Rockefeller Foundation Fellow at the Carlsberg Laboratories in Copenhagen, Denmark in 1927.

Dr. Johnson was formerly Technical Advisor to the Quartermaster Corps of the U. S. Army and is a member of many scientific societies. In 1946 he won the C. E. Gray award for "achievement in research, development of standards for dry milk, and for general industry and public welfare."

NEW YORK STATE ASSOCIATION NEWS

"Progress Through Cooperation by Affiliation".

There is strength in numbers, providing each contributes to the objectives of the whole. A handful of milk sanitarians recognized this fact when they met in Milwaukee, Wisconsin, forty-three years ago to found the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS. For the next twenty-five years, they attempted to increase their strength through the collective efforts of their individual members. In 1938, progressive sanitarians who were members of both the IAMFS and similar state sanitarian associations, foresaw the advantages to be gained by coordination and affiliation to attain a common goal.

The New York State Association of Milk Sanitarians is proud to have been one of the first, if not the first, state association to make application to the International Association for affiliation. Affiliation was granted in 1939 but it was not until twelve years later that an appropriate certification was issued. The benefits that accrue from such affiliation were soon recognized and at present, 25 state or regional associations are cooperative members of the International Association.

What is good for the goose is good for the gander. Here in New York State, our Association has grown so large that it could not supply the needs and desires of all of our members through an Annual Conference. Two years ago, a Committee was appointed to study and report on the feasibility and desirability of providing a liason with local groups. That Committee recommended that our con-

Continued on Page 131

Association News

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Association News

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CALIFORNIA DAIRY SERVICE CONFERENCE

The Bureau of Dairy Service of the California State Department of Agriculture held its annual staff conference beginning February 15, 1954.

A question and answer panel type program was provided, each panel relating to a major function of the bureau. The panel subjects included were: Babcock testing; weighing, sampling, and checking records; milk product imitations; laboratory procedure; permanent pipeline circulating cleaning systems; farm tanks, tank trucks, containers; dairy buildings; market milk surveys; platform grading of manufacturing milk; field inspections; manufactured products and administration.

Bureau members were asked to submit questions in writing in advance. However, general questions were accepted from the floor during the conference.

Each bureau member was assigned to at least one panel so that there was 100 percent participation by the staff.

All city and county milk sanitarians were invited to attend and to participate in the program. Forty local representatives were in attendance as well as sixty-seven members of the Bureau of Dairy Service staff. Several local health department milk sanitarians were also assigned to panel membership as well as specialists from the Dairy Department of the University of California.

Many interesting and varied staff conferences have been held in the past but none have had the sustained interest through the week as the one just concluded. The group was unanimous in voting to hold the same type of conference program in 1955.

M. E. McDonald

ANNUAL MEETING GEORGIA ASSOCIATION

November 13, 1953

The second annual meeting of the Georgia Chapter of the International Association of Milk and Food Sanitarians was called to order at 7 P.M., in the Dairy Building, University of Georgia, by President James P. Gibbs.

The Secretary-Treasurer's reports were read by Dr. John J. Sheuring and approved unanimously by the membership.

No old business was conducted.

After some discussion, the membership voted to have the 1954 meeting on the weekend of October 1st, the final dates to be selected by the Board of Directors and Officers.

Upon proper motion and seconding, the membership voted to send the Secretary of the Georgia Chapter as the official delegate to the International Meetings in the Fall of 1954.

Upon request of the President, Mr. C. C. Russell discussed the proposed Sanitarian Registration Bill that was prepared for legislative action by the Georgia Chapter of the National Association of Sanitarians.

Upon proper motion and seconding, the membership voted to have a committee, appointed by the President, to work closely with the N.A.S. and aid in every possible way to secure the proper type of legislation that would be of most benefit to the sanitarians of the State. President Gibbs appointed Mr. C. C. Russell and Mr. B. E. Ivey as members of the Georgia Chapter of the International Association of Milk and Food Sanitarians and the sanitarians of the State.

Upon proper motion, seconding and voting of the membership, the following officers and members of the Board of Directors were elected for the year 1954:

Officers: President, Mr. P. L. Musick; Vice-president, Mrs. Louise Stephens; Sec.-Treas., Dr. John J. Sheuring.

Board of Directors: N. E. Region, Roy Perry; N. W. Region, G. T. Knowles; West Central Region, James Brown; E. Central Region, Lamar Hartley; S. W. Region, Jimmy Drake; S. E. Region, George Weatherly.

NEW YORK STATE ASSOCIATION NEWS

Continued from Page 129

stitution and by-laws be amended to provide for affiliation of local groups having similar objectives. This was enthusiastically approved at our 1953 annual meeting. Before the necessary application forms were prepared, two locals were asking for membership. On February 6, 1954, applications were granted by the Executive Board to the Metropolitan Mohawk Milk Sanitarians Association and the St. Lawrence County Association of Milk Sanitarians. There are more than a dozen active local milk sanitarians' organizations in the area covered by our state association to whom we shall be proud to present affiliation certificates at our next annual meeting. Each will be strengthened by such union.

C. W. Weber

State milk-sanitation officials from 7 states watch a demonstration conducted on pasteurization-plant equipment especially designed for demonstration purposes. The demonstrators (in shirtsleeves, clockwise from left) are: John H. McCutchen, Missouri Division of Health, Jefferson City, Mo.; Milton E. Held, PHS Regional Milk Consultant, Kansas City, Missouri; Hugh E. Eagan, PHS Communicable Disease Center, Atlanta, Georgia; Harold B. Robinson, PHS Division of Sanitation, Washington, D. C. This seminar was held in Lincoln, Nebraska.

AN EVALUATION OF MILK SANITARIANS AND THEIR WORK

J. C. FLAKE
Evaporated Milk Association, Chicago, Ill.

This paper is based on a talk given at the Wisconsin Milk Sanitarians Association meeting on Sept. 14, 1953 and the Associated Illinois Milk Sanitarians on Dec. 14, 1953. Material for the talk, entitled "John Q. Public Looks at the Milk Sanitarian", was obtained from replies to a questionnaire circulated among sanitarians and dairy industry leaders throughout the United States.

A total of 160 replies to the questionnaire were received from representatives of city and state health departments, state departments of agriculture, U. S. Public Health Service, U. S. Department of Agriculture, colleges of agriculture, producer organizations, fieldmen, editors of farm and dairy periodicals, and other leaders in the dairy industry. While the replies are based largely on opinion they do show the thinking on some key problems by a large number of industry, educational and sanitation leaders, and men who work directly with dairy farmers.

One of the most interesting results of the questionnaire was the relative uniformity in thinking among the different groups on most of the questions, although there were wide differences of opinion among individuals. In the tabulation the replies were divided roughly into two groups, (a) leaders and policy makers, and (b) sanitarians who work directly with farmers. In this paper the summation of all replies to each question will be given. In case of a significant difference in the replies of the two general groups the breakdown will be given.

Question 1. Has a plateau been reached on dairy farm sanitation so that further efforts are unsound economically and unnecessary from a public health standpoint?

The replies to this question were strongly in the negative with 95% answering *no*. This shows good agreement that the job has not been completed and that much work remains to be done in milk sanitation.

Question 2. Will further efforts to advance the general level of dairy farm sanitation result in an undue rise in the cost of milk or drive many producers out of business? Why?

Here again there was good agreement with 89% answering *no* to this question. Some interesting comments were received. The following are typical examples: Sanitation can be obtained more through expenditure of effort rather than money. Driving out of business producers who will not produce milk under proper conditions of sanitation is fully justified. The greatest room for advancement lies in improved methods. Efficiency should be promoted. Borderline dairy farmers will go out of the business rather then spend money to improve their facilities and this will result in fewer,

PHS MILK SANITATION SEMINARS

The goal of a uniformly high sanitary quality of market milk supplies throughout the states has been brought appreciably closer as a result of a series of seven regional seminars for state milk-sanitation officers, just concluded by the Public Health Service, U. S. Department of Health, Education, and Welfare, according to Assistant Surgeon General Mark D. Hollis, Chief Sanitary Engineering Officer.

Starting in Chicago, Illinois, last October, meetings have been held in Atlanta, Georgia; Washington, D.C.; Lincoln, Nebraska; Salt Lake City, Utah; Spokane, Washington; and Dallas, Texas. Each seminar, one week in duration, was attended by the milk-sanitation officers of the states in the region concerned. Serving as the faculty were Harold B. Robinson, of the Milk and Food Branch, Division of Sanitation, Washington, D.C.; Hugh E. Eagan, of the Training Branch, Communicable Disease Center, Atlanta, Georgia; and the Milk and Food Consultant of the appropriate Regional Office of the Public Health Service.

The series of seminars was conceived as a necessary part of the comparatively new State-Federal cooperative program for the Certification of Interstate Milk Shippers. The curriculum is designed primarily to achieve a greater uniformity of interpretation of the *Milk Ordinance and Code* recommended by the Public Health Service, on which the voluntary interstate program is based. Sessions have been devoted, also, to the demonstration of tests for pasteurization-plant equipment, discussions of operating procedures used in the certification of interstate milk shippers, and instruction on the milk-sanitation rating procedures of the Public Health Service.

but better producers from the standpoint of efficiency and quality.

Question 3. Do you believe that the general level of dairy farm sanitation has progressed to the point that sanitarians should spend most of their time on the lowest level of producers?

Replies to this question were rather evenly divided with 56% answering *yes*. The comments on this question indicated the opinion that while special attention should be devoted to the lowest level of producers, sanitarians must spend time with all producers in order to prevent the better ones from slipping.

Question 4. What do you consider the chief problems that remain to be solved in dairy farm sanitation? In this question a list of ten items was given with the request that the items be rated as to their importance as problems that remain to be solved. The replies rated these items as follows:

1) Milking machine cleanliness. 2) Cleanliness of other utensils. 3) Clean milking methods. 4) Milk cooling. 5) Mastitis. 6) Brucellosis.

The problem of milking machine cleanliness was rated first by a very wide margin. The fact that milking machines were recognized so clearly as a serious problem should aid in reaching a solution. The fact that cleanliness of milking machines and other utensils and clean milking methods were rated at the top of the list of problems shows agreement with efforts of industry and regulatory agencies to measure the effect of these items on milk quality by means of the various bacteriological tests and the sediment test.

Question 5. Have sanitarians stressed barn and milk house construction (dimensions, materials, finish, etc.) at the expense of producer methods, to the point that it is time to reemphasize basic methods?

In reply to this question 69% answered *yes*. Strangely, a higher percentage of the leaders and policy makers answered *yes* to this question than did the group working directly with farmers. The percentage was 75 for the former group and 64 for the latter.

Question 6. Could the quality control of milk received in cans be improved by more emphasis on platform testing and detection of substandard milk, and less on routine farm inspection?

The total replies were about evenly divided on this question. However, 62% of the leaders answered *yes*, while only 36% of the group working directly with farmers answered *yes*. This shows that the latter group has more appreciation for the value of routine farm calls and personal work with producers.

Some pertinent comments were received on this question:

Platform test results are in the nature of a history of the sample and do not suffice in the category of prevention of poor milk at the farm level. More follow-up should be practiced on the information now available from the platform tests. Farm inspection includes personal influence on the farmer. They go together; both are needed. A program to prevent is constructive—platform rejection is destructive.

Question 7. Do you consider that the dairy industry seriously needs a reliable rapid platform test for the detection of individual cans of high bacterial count milk so as to permit the rejection of poor quality milk that is not detected by the usual platform tests?

There was strong recognition of the need for such a test with 79% answering *yes* to this question. It is hoped that this will be accepted as a challenge by dairy scientists in some of the colleges to develop a suitable test for this purpose.

Question 8. It is said that sanitarians are personally unacquainted with dairy farm methods as actually practiced because they make few if any milking time visits. Do you agree? Should they do more work at milking time?

In answer to the first question 64% of the leaders said *yes* in contrast to only 29% of those working directly with farmers. The percentages for the second question were 86 and 54 respectively in the affirmative. The reluctance of local sanitarians to admit that they are not well acquainted with producer methods is understandable. However, the fact that 54% agreed that more work should be done at milking time and 86% of the leaders considered more milking time work needed should serve to reemphasize this important phase of the sanitarian's work.

Question 9. Do dairy farmers make the same effort to clean utensils and milking machines after the evening milking as they do after the morning milking?

The replies of both groups were heavily in the negative with 96% answering *no*. This is a serious problem. It is well known that producers generally are too careless in cleaning and sanitizing milk handling equipment. The lack of effort after the evening milking adds greatly to the problem.

Question 10. If not, what do you consider to be the typical procedure with this equipment following the evening milking?

Many people failed to give a direct answer to this question. However, a total of 111 stated the opinion that many producers only rinse the equipment after the evening milking. If this opinion is correct, that many dairymen only rinse their milk utensils and milking machines following the evening milking and do a thorough job of cleaning only once per day, it is no wonder that deposits of soil build up and are found so frequently on the equipment. How long would it take for dairy plant equipment to accumulate dangerous soil deposits if it were cleaned only after every second usage?

Question 11. Do you believe that much of the value of official inspections of milk sheds is lost because of the practice of warning the individual farmer just prior to the visit by the survey officer to his farm? Do you believe that this practice is very prevalent?

The replies show that 73% consider the practice as detrimental and 42% consider that it is very prevalent. It would seem that survey officials should give more attention to eliminating this practice in planning and conducting their surveys.

Question 12. Much is said about multiple inspection, each with different requirements, in the dairy industry. Do you consider these as serious blocks to progress? What can sanitarians do to solve this problem?

There was good agreement on the existence of the problem as a serious one, with 76% answering *yes* to the first question. Comments on the second question are as follows:

Officials should coordinate programs; accept reciprocal inspection. Agree upon basic requirements and

omit supplementary ones. Personal opinions are not standards. Our work should not be used as a tool of market control. Promote uniform regulations and cooperate with the national program for certification of interstate milk shippers. Have standard requirements and training schools for sanitarians, standardizing their enforcement. Too many are sent out without proper understanding of basic principles and are left to develop their own inspection.

Question 13. The basic purpose of the milk sanitarian's work is to improve the quality and safety of the milk supply. Do producers understand this?

A total of 61% answered *yes* to this question. However, with 39% answering *no*, we may have a key to a serious problem in milk sanitation work. How can we hope to accomplish the job unless farmers understand and appreciate the purpose of this work?

Question 14. What can sanitarians do to improve the understanding and appreciation of producers for their work?

A number of constructive comments were received:

Show enthusiasm for the program and build a story around the reasons for the requirements. Make the producer proud of his accomplishments and he will sell the program with you. Reasonable enforcement of basic principles. Better teaching methods. Be reasonable and explain why. Avoid personal whims.

More educational work to be carried on at time of inspection by company fieldmen. Company fieldmen often avoid this issue or openly sympathize with producer's complaints about the inspector.

Inform producers of what you are trying to accomplish and the methods that are being used to attain the result. Be more competent in the field—extend dairy sanitation service—not just milk inspection. Work with the producer and less at him.

Question 15. It is said that producers criticize sanitarians because they never seem satisfied. Is this criticism justified?

A total of 47% answered *yes* to this question, showing that there is room for improvement in the manner in which sanitarians present their views and market requirements to the dairy farmers.

Question 16. How can the cause for this criticism be eliminated without harming the sanitarian's work?

By doing a thorough job the first time around. Being fair but firm. Less emphasis of minor details. Explain that continuous progress is needed. Skill in handling and understanding human reactions. Be more friendly. Learn to like more people who are not like you.

Question 17. Does the dairy farmer appreciate the importance of consumer acceptance of milk and dairy products?

Only 29% answered *yes* to this question. While 40% of the leaders answered *yes* only 20% of those who work directly with farmers answered *yes*. This is important not only from the standpoint of selling milk sanitation to farmers but in selling milk and dairy products to consumers, especially now with production exceeding consumption. Surely this situation must be remedied for full success in the job of producing and selling optimum amounts of wholesome, high-quality milk and dairy products. The farmer must be made to realize the importance of consumer acceptance and the part the farmer plays in that acceptance.

Question 18. How can this appreciation be increased?

Better sanitarians and better teaching. Point out to the producer that the two basic forces in merchandising are quality and price. Publicity. More education by all farm organizations and trained fieldmen. Give the producer the facts and he will do his part.

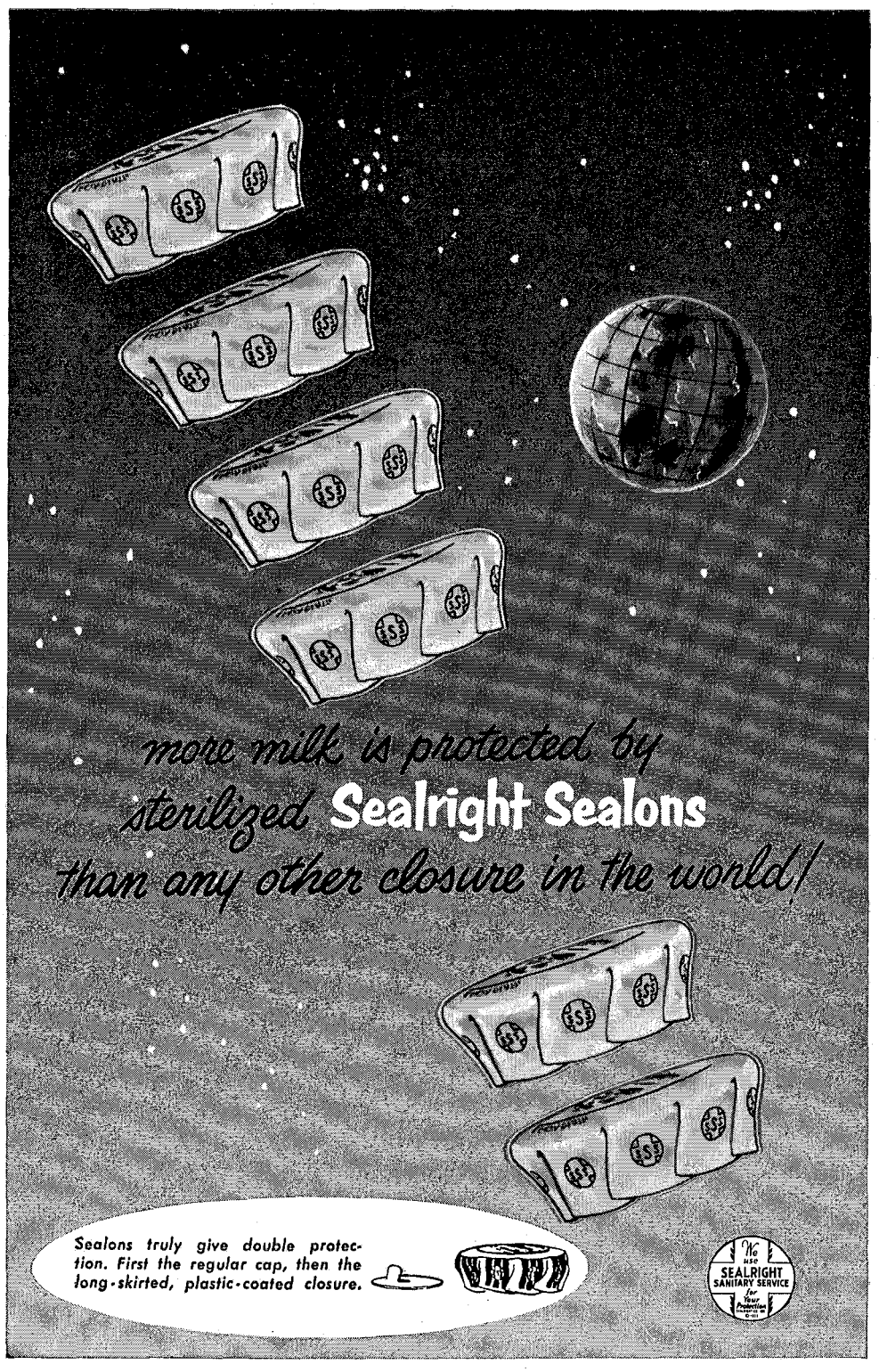
The farmer must realize that the world does not owe it to him to accept his products regardless of quality. He must be brought to see that competition with other foods must be met with a quality product and that government protection of markets thru subsidy is only an illusion.

Producers must be made to realize that they have a most important part in the fight for survival in the marketplace. The milk industry must increase appeal by promoting every day cleanliness in milking methods which will convince consumers that milk really is a wholesome, superior food. Emphasize the need for satisfying the consumer as the basic reason for all quality improvement. This is in the public interest as well as in the dairyman's own best interest. Find a medium thru which producer and consumer are brought together.

Question 19. In this question there were listed sixteen suggested items for evaluation of dairy farm sanitarians and their work. It was requested that the items considered most important be checked and numbered in the order of their importance.

The items were rated in the following order.

1. Knowledge of milk sanitation.
2. Ability to meet people and to get along with them.
3. Sell ideas rather than quote regulations.
4. Ability to get producers to follow approved practices.
5. Genuine interest in milk quality and safety.
6. Genuine interest in farm people.
7. Willing to work hard.
8. Ability to help the producer arrive at the right decision rather than merely giving expert advice.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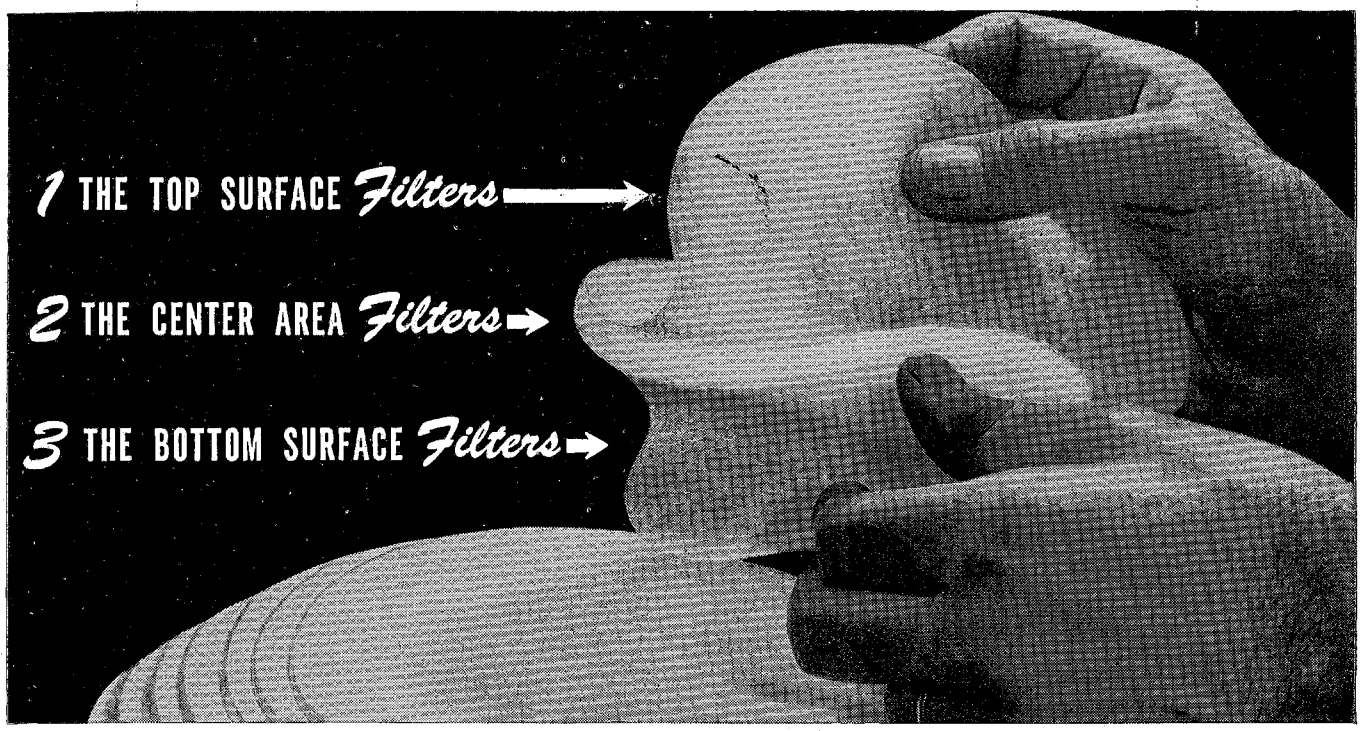

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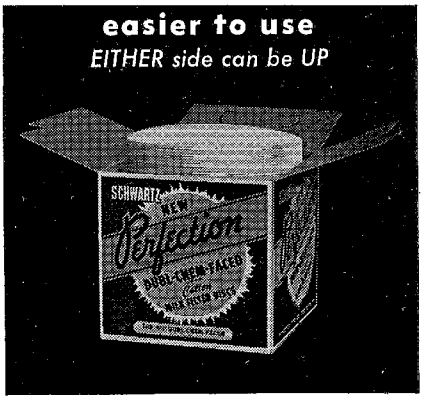

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