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Editorials

The opinions and ideas expressed in papers and editorials are those of the respective authors. The expressions of the Association are completely recorded in the transactions.

". . . Food Sanitarians, Inc."

IN one of the earliest written books of the Bible, there is found this admonition: "Ye shall not eat of anything that dieth of itself; thou shalt give it to the stranger that is in thy gates, that he may eat it; or thou mayest sell it unto an alien." Ethics then was not as highly developed as it is now. So we make allowance for this rather "practical" (!) outlook, and commend that far off generation for making a start in pure food control.

But it was only in the last century that we made really substantial progress in this matter. The main effort was in the milk, meat, and general food adulteration fields. Then, early in this century, the epidemiological importance of milk became emphasized by the work of the (then) U. S. Public Health and Marine Hospital Service, supplemented by the pioneer work of the New York City Health Department, and several leaders in industry, government, and university. As a result, milk control rose to a great height in effectiveness of regulatory measures, in usefulness of laboratory analytical methods, and in enhanced nutritive and organoleptic quality of milk itself. Milk quality control made great strides.

The ante- and post-mortem inspection of meat was considered primarily an agricultural problem. Food adulteration was treated more as an economic problem, at any rate only secondarily as a health problem. However, the annual publication of outbreaks of disease charged to foods woke up food inspectors and responsible health officers to recognize that existing practises in the general food industry were not negligible health hazards. On top of this came the great increase in the commercialization of food-serving, notably in restaurants, drug stores, and road stands. Improved diagnostic methods and more critical epidemi-

ological studies added their quota to the sum total of factors which showed that general foods needed study and regulatory supervision for the protection of the public health.

Milk sanitarians in official work had been usually required to handle the occasional food poisoning outbreak. So the newer recognition and emphasis found the dairy people to be possessed of the know-how and of the organization to take hold of this new aspect of food quality control. Laboratory methods, useful in milk plant inspection, were applied immediately to general food plant work. Milk plant equipment had been developed to such a high degree of sanitary utility that much of it was seen as being applicable to general foods. This closer relation in the sanitary field stimulated application of dairy equipment to general food uses—and we now have homogenized bread and pasteurized dates and vitaminized food and sanitary piping. Vice versa, we have packaged dairy products and continuous processes and stimulated consumer appeal. First one and then another of the branches of the food industry that formerly were leaders in the sanitary and technological field are looking to the milk industry for leadership in sanitary equipment, processing, regulatory procedure, and laboratory control.

The INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. has just been authorized by constitutional amendment to expand its activities into the general food field (heretofore, the Association devoted itself exclusively to dairy products). It constitutes the professional organization where such activities receive inclusive and exclusive emphasis. Its stated objectives include the sanitation technology that is involved in food handling in general. Most of its members have to supervise both milk and food anyhow. The enlarged scope of the work of the Association broadens the base for membership and gives a recognized place to general food sanitation in the programs of the annual meetings and in the papers published in its *JOURNAL OF MILK AND FOOD TECHNOLOGY*. It offers professional fellowship to all who are concerned with food sanitation, and comprises within its membership most of the authorities, researchers, and regulatory officials in the nation (and many abroad).

This broadening of declared interest in general foods does not envisage any new activity in food research as such nor in food technology as now comprehended in the work of other well known professional organizations in the dairy and food fields. These latter groups are recognized as doing such excellent work in their respective dairy research and general food manufacture and public health nutrition and laboratory standard methods that there is no occasion for the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., to engage in other than just the sanitary and organoleptic aspects of food production, handling, and control. Specifically, we are interested in: milk and general dairy products sanitation and quality as heretofore; and additionally, in general food sanitation in its production, processing, and distribution; and in restaurant operation from the standpoint of cleanliness, safety, and quality of food and equipment; in short, in food sanitation—its healthfulness, its organoleptic quality, its attractiveness, its cleanliness, its public health safety.

We have come a long way in our knowledge and practise of food handling. But there is yet much more to learn. Well, we are on the way. Maybe some day we shall know a lot about it.

J. H. S.

Minnesota Dairy Fieldmen and Inspectors Association

AT the recent Milwaukee joint meeting of the Wisconsin Milk Sanitarians' Association and the International Association of Milk and Food Sanitarians, the application of the Minnesota Dairy Fieldmen and Inspectors Association for affiliation with the International was approved. The great state of Minnesota has made outstanding contributions to the dairy industry in able personnel, stimulating ideas, and high quality products. In the milk and food sanitation world, "Minnesota" means excellence. The whole country—and increasingly, various parts of the world at large—can benefit by the more intimate contact and exchange of ideas that stem from the kind of collaboration made possible by this new affiliation.

A man is known by the company he keeps. The International Association of Milk and Food Sanitarians and its affiliated groups are honored by this action of our Minnesota colleagues. We bid them cordial welcome into our widening activities. We invite them to take hold. Again—in union there is strength. Minnesota, we greet you heartily. J. H. S.

Correction

In the article entitled "New Qualifications in New York State for Public Health Engineers, Sanitarians, and Inspectors", this JOURNAL, September–October issue, pages 301–302 stated that an Associate Sanitarian would have charge in a municipality of not over 350,000 persons. The word "not" was incorrectly inserted. The correct statement reads,

> "Associate Sanitarian . . . . in a municipality having more than 350,000 population".

DR. BREED RETIRES

ON November 1, Dr. Robert S. Breed, Professor of Bacteriology in the Division of Food Science and Technology at the Experiment Station at Geneva, retired after thirty-four years of service at the Station.

In recognition of his contributions to the dairy industry, he was presented with a scroll from the Milk Industry Foundation, Laboratory Section, at the recent annual meeting of the Foundation in Miami Beach, Florida, climaxing a series of similar awards from national and state organizations which he has served through the years.

The citation read in part as follows: "A distinguished leader in the field of dairy bacteriology for forty years. Revered for his contributions to dairy science which are legion, renowned for his part in the development of the Direct Microscopic Method for enumerating bacteria in milk, for his internationally recognized work on the classification of bacteria, for his untiring work down through the years in the standardization of official methods for the examination of dairy products, and for his success in developing younger dairy scientists by his sound teaching, his steady influence, and his inspiring nature."

Dr. Breed obtained his B.S. degree from Amherst College in 1898, the M.S. degree from the University of Colorado in 1899, and his Ph.D. degree from Harvard in 1902. He also studied at the University of Göttingen in 1910 and that of Kiel in 1911. After serving for several years on the faculty of Allegheny College, he joined the staff of the Geneva Experiment Station in 1913, and served as Chief of the Division of Bacteriology for thirty-two years. During his years at Geneva, Dr. Breed's work received worldwide

recognition and he participated in many international gatherings in the fields of microbiology and botany in his capacity as permanent secretary of the International Commission on Bacteriological Nomenclature. He attended meetings of the World Dairy Congress in Berne, Washington, London, and Rome as an official United States delegate. He was also a member of the U. S. delegation to the second Inter-American Conference of Agriculture in Mexico City in 1942. This summer he flew to Copenhagen for the fourth International Congress for Microbiology.

Since 1937 he has served as editor-in-chief of *Bergey's Manual of Determinative Bacteriology,* the sixth edition of which will appear about January 1st. Of equal significance is his editorship since 1917 of the *Standard Methods for Dairy Products* of the American Public Health Association, the ninth edition of which will appear soon. He is the author of numerous Station publications and of many articles in scientific and technical trade journals.

Locally, he has served for twenty-five years as supervisor of Geneva's milk and water supply. He has been active in the Geneva Rotary Club, the Geneva Historical Society, the University Club, and the First Presbyterian Church. In 1941 he was recipient of the Kiwanis Award for outstanding service to the community. He also assisted Mrs. Breed for several years in Girl Scout work in Geneva, especially as chaperon of the girls who won trips to the circus as a reward for good work within their Scout troop.

Although Dr. Breed has an international reputation for his work in microbiology, he is best known in this country in connection with his work on the microscopic examination of milk and the editing of the numerous editions of the book *Standard Methods for the Examination of Dairy Products* (title of the eighth edition).

As early as 1897, the microscope had been used by several investigators to examine microorganisms in milk. In 1897 Stokes reported leucocytes in the milk of a diseased cow. Then Slack in 1905 used this procedure to examine market milk, and Prescott used it regularly in his Bio-Chemical Laboratory to diagnose pathologic conditions in cows' udders when the milk contained leucocytes and streptococcic chains. Prescott and Breed presented a paper on body cells in milk before the Richmond meeting of the American Public Health Association in October 1909. From this work, the present direct microscopic method is sometimes referred to as the Prescott-Breed method. However, Breed continued to work with it and studied its possibilities and limitations. From all this he developed a technique for estimating the numbers of bacteria in milk, and interpreting to a degree the sources of the contamination. Many persons refer to this (official) "Direct Microscopic Method" as the "Breed Method", the "Breed Smear", the "Breed Count", and others. This technique seems to be widely replacing the more expensive and less critically interpretative agar plate method for estimating the microorganic content of milk.

Closely related to this work has been Dr. Breed's long editorship of the book of methods. His ability to get good people to work with him, his attention to the details of technique and nomenclature, and his indefatigable industry, are tempered by his experience as a milk control official. Such a happy balance of erudition and practicality has given strength and authoritativeness to this useful standardization work on milk examination.

In retirement, he will continue to travel and carry on his investigations. He plans to be in Puerto Rico in January, will lecture at the University of Louisiana in February, and will visit the Inter-American Experiment Station in Costa Rica in the spring. He will continue to make his residence in Geneva.

The Detection and Correction of Bacterial Contamination of Milk Bottles in a Bottle Washer*

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Sometime ago, rinse count examinations were begun to supplement the visual inspection of milk bottles immediately after they came out of a four-bottle-wide soaker brush type of bottle washer. As a result of this work it was found that the bottles were bacteriologically contaminated even though they appeared physically clean. The rinse counts were made by pouring 10 ml. of sterile water into a milk bottle, twirling the bottle so that the water came in contact with most of the inside of the bottle, and then returning the water to the sterile tube. These tubes were taken to the laboratory where appropriate dilutions were made and plated (using tryptone-glucose-extract-medium) within one-half hour. The plates were incubated for 48 hours at 37° C., and then counted. Bacteria counts ranging from 10,000 to 94,000 per quart milk bottle were obtained. Although *Standard Methods for the Analysis of Milk and Dairy Products* (1) state that milk containers yielding not over one bacterium per milliliter of capacity (1000 bacteria per quart size milk bottle) are satisfactory, experience has shown that routinely these bottles, regardless of size, contain 100 or fewer bacteria when they are properly washed and sanitized.

Daily Rinse Counts of Milk Bottles before and after Chlorine Treatment

Repeated daily testing revealed that the high counts of recently washed milk bottles persisted; see Table 1. When it became obvious, after six consecutive days of testing, that the source of contamination was continuous, immediate chlorination of the milk bottles was instituted. The bottle washer in question had a chlorination attachment but prior to this time it was used merely as another inside water cooling rinse. The reduction in bacteria count of the bottles to 30 bacteria or less, see Table 2, due to the action of the chlorine, was satisfactory.

Bacteria Counts of Milk Bottles through Various Stages of the Bottle Washers

Although chlorine treatment sanitized the milk bottles, the recontamination which occurred after the soaking period and prior to the chlorine treatment was not eliminated. Therefore, further work was done to determine the sources of the bacterial contamination.

To determine the bacteriological condition of the milk bottles at various stages, the bottle washer was stopped and suitable bottles removed for rinsing. The sampling points were: (1) just out of the caustic soaking solution, (2) through the outside brushes, (3) through the inside rinse, (4) through the inside brushes, (5) through another inside rinse, and (6) completely through the washer. At each point rinsings were made of the four bottles across the washer belt. The counts obtained are presented in Table 3.

When no colonies were obtained upon plating 1 ml. of rinse water, the

* Journal article No. 899 (N. S.) from the Michigan Agricultural Experiment Station.

TABLE 1

THE TOTAL NUMBER OF LIVING BACTERIA RECOVERED FROM RECENTLY WASHED MILK BOTTLES WHEN RINSED WITH 10 ML. OF STERILE DISTILLED WATER

Tryptone-glucose-extract-medium was used in the plating procedure; plates were incubated at 37° C. for 48 hours.

Day of sampling	*Bacteria in bottles*		
	½ pint	*pint*	*quart*
1	20,000	50,000	70,000
2	15,000	30,000	54,000
3	23,000	45,000	60,000
4	20,000	34,000	65,000
5	17,000	40,000	55,000
6	20,000	30,000	70,000

results were recorded as 0; actually, this means less than 10 bacteria were recovered per bottle. The bacteriological condition of the bottles was satisfactory as they came out of the caustic. In addition, the bottles did not become contaminated during the outside brushings and rinsings as indicated by the counts of 0 to 20, even though this water had a high bacteria count at this time (45,000 per ml.). Apparently very little if any, of this water entered the milk bottles at these points. On this account, the inside of the bottles remained in a satisfactory condition. The gross contamination occurred during the inside rinses, since here bacteria counts up to 94,000 were obtained per quart bottle.

BACTERIA COUNTS OF THE WATER SUPPLY

The data of Table 3 directed attention to the water system. Consequently, samples were collected from appropriate points at the washer and in the dairy plant. The bacteria counts reported were confirmed by repeated testings. The raw water supply was satisfactory as indicated by its bacteria count of 10 to 30. On alternate days this water went through two zeolite water softeners prior to its use in the milk plant. Neither softener was a source of contamination since the treated water had bacteria counts of 20 and less.

BACTERIA COUNTS OF WATER COLLECTED AT THE BOTTLE WASHER AND THE CRATE WASHER

The high count of 45,000 of first drawn water from a rinse jet which was reduced to 40 after five minutes of running the water while the washer was idle, indicated that possibly the contamination occurred during periods of operation only. This was confirmed by samples of water collected during operation which yielded bacteria counts of 35,000 to 60,000.

TABLE 2

THE NUMBER OF BACTERIA IN MILK BOTTLES AFTER THE CHLORINE RINSE ATTACHMENT, OF THE BOTTLE WASHER, WAS PUT INTO OPERATION

The chlorine content of the rinse applied by jet varied from a minimum of 20 p.p.m. (parts per million) to a maximum of 75 p.p.m. throughout the day's run.

Day of sampling	*Bacteria in bottles*		
	½ pint	*pint*	*quart*
1	0	10	0
2	10	0	30
3	10	0	10
4	0	30	10
5	20	10	0
6	0	20	10

TABLE 3

THE NUMBER OF BACTERIA RECOVERED BY RINSE COUNTS FROM QUART MILK BOTTLES IN VARIOUS STAGES THROUGH THE BOTTLE WASHER

All bottles were physically clean. The causticity and temperature of the soaking solution was 4.4 percent and 145° F., respectively.

	Bottle position (left to right)			
	1	*2*	*3*	*4*
A. No final chlorine treatment.				
1. Just out of caustic	0	0	0	0
2. Through outside brushes	0	10	0	0
3. Through inside rinse	70,000	94,000	66,000	81,000
4. Through inside brushes	80,000	73,000	48,000	94,000
5. Through inside rinse	76,000	62,000	53,000	87,000
6. Completely through washer (no chlorine)	88,000	75,000	50,000	72,000
B. Chlorine (30 p.p.m.) treatment of milk bottles on the same day as in A.				
1. Just out of caustic	0	0	0	0
2. Through outside brushes	10	0	20	0
3. Through inside rinse	76,000	84,000	75,000	80,000
4. Through inside brushes	62,000	77,000	50,000	63,000
5. Through inside rinse	83,000	65,000	77,000	75,000
6. Completely through washer (treated with chlorine)	0	20	10	10

The water in the chlorine vat (no chlorine being used) which was being recirculated during operation had a bacteria count of 54,000. Obviously milk bottles going through these water treatments became contaminated.

SUBMERGED INLET AT CRATE WASHER. BACK-SIPHONAGE?

A study of the arrangement of the water pipes was in order. The main feed line from the water softeners divided into two smaller pipes; one led to the case washer while the other supplied water to the hot (left) side of the bottle washer. A steam injector heated the water for the hot side while the washer was in operation. The pipe leading to the case washer divided so that water could be drawn into each of the two compartments prior to the operation of the case washer; therefore, the valves in these pipes were closed during operating procedures. The outlets of these two pipes were submerged in the washing solutions during operation.

The tri-sodium phosphate washing solution, in tank 1 of the case washer, yielded a bacteria count of 250,000 per ml. during operation, while the clear water rinse of tank 2 had a count of 200,000. At the end of the day run, when the solutions had been drained from the compartments of the case washer, a sample of water was collected from each inlet (which was submerged during operation). The bacteria count of this water was 200,000. This bacteria count was reduced to 2,000 by merely letting the water run for five minutes.

This reduction in count, as well as that obtained after five minutes of discarding water at the bottle washer, suggested that the bacteria were pulled into the line from the case washer during operation of the bottle washer. Observation during operation of the bottle washer revealed a great deal of vibration, from the action of the steam injector, along the water lines. The thought is suggested that this vibration may have carried over to the crate washer and jarred open the valves on the submerged pipes. Further the spurts of steam at the injector may have created a negative pressure on this line to pull water from the crate washer into the line to the bottle washer. No measurements were made of the pressures to prove this point,

TABLE 4

THE NUMBER OF BACTERIA RECOVERED FROM QUART MILK BOTTLES RETURNED TO THE DAIRY BY THE CUSTOMER

Bottle	*The physical condition of the bottle*	*The number of bacteria present*
1.	Milky sediment	80,000,000
2.	Brown dirt (dry)	30,000,000
3.	Milky film	850,000
4.	Fairly clean	12,000
5.	Clean	300
6.	Clean	20

but the installation of a vacuum breaker (about two years ago) on the line to the crate washer corrected the contamination problem. Subsequent water samples collected at the bottle washer (rinse jets) had bacteria counts of under 100 and the bacteria counts of milk bottles, in all stages of treatment through the bottle washer, have been fewer than 100 per quart bottle for approximately two years.

THE CONDITION OF MILK BOTTLES THAT ENTER THE BOTTLE WASHER

The data presented in this study reveal the effective work done by a properly installed and operated bottle washer. To determine the load placed on the washer a number of rinse counts were made of milk bottles of various physical appearances; see table 4. These bottles were returned to the dairy in the condition indicated. In general, the rinse counts of some of these clean appearing bottles were low and those of the dirty bottles were high. Apparently some customers did an excellent job of washing and sanitizing the returned bottles as indicated by a bacteria count of 20 and a clean physical appearance. Consumers of milk should respect a milk bottle and use it only for milk and should wash it thoroughly before returning it to the dairy. Such cooperation will be reflected in fewer problems for the dairy plant operator.

SUMMARY

An instance of bottle washer contamination of milk bottles is described. Physically clean bottles yielded bacteria counts up to 94,000 per quart bottle. Chlorination, as the final treatment, yielded satisfactory bottles, although contamination continued at the inside rinses. The installation of a vacuum breaker on the water line between the bottle washer and the crate washer corrected the combination problem. The data presented emhapsize the importance of proper installation of case and bottle washers.

LITERATURE CITED

1. *Standard Methods for the Examination of Milk and Dairy Products.* Eighth edition, American Public Health Association, New York, N. Y.

New York City's Restaurant Clean-up Program*

ISRAEL WEINSTEIN, M.D.
Commissioner of Health, City of New York

MILK was the first food to be subjected to control by the New York City Health Department. In 1896 the Sanitary Code was amended requiring anyone who desired to sell milk in the City of New York to obtain a permit from the Board of Health. Such permits are now recognized as the indispensable basis for the administrative control of a city's milk supply. At first, milk dealers did not like this regulation. But time proved that as the sanitary quality of the milk improved, public confidence grew and the consumption of milk and milk products increased to make the milk industry what it is today.

Milk producers know that if the public's confidence in the wholesomeness of milk were shaken, the milk business would suffer tremendously. They are fully aware that good sanitary practices mean good business. They have profited by complying strictly with the regulations governing the sanitary standards of their product.

NEED FOR RESTAURANT CLEAN-UP

The New York City Health Department embarked on a program to convince the rest of the food industry that cleanliness pays good dividends. The restaurant clean-up program which was begun in June, 1946, was long overdue. Many individuals are aroused to action only after some great disaster has occurred. It needed a fire in a night club with the loss of several hundred lives for a community to realize the importance of removing inflammable decorations from crowded public places. There had to be the sinking of a ship and hundreds drowned before indignant citizens rose up and demanded proper inspection of life-saving equipment. Is it necessary that there be an epidemic of food-borne disease with its vast toll of illness and death in order that officials realize that hazards in food establishments must be eliminated? New York City said no. It would not wait. Steps were taken to remove the danger, even though there were many who, because of ignorance or indifference, were unaware that the health of the people was in jeopardy, and did not see the necessity for stringent measures to correct the perilous situation.

Thousands of letters have come to the New York City Health Department from all over the country written by people in all walks of life commenting on the "drive" to clean up the restaurants. Health officers have asked about the techniques that have been used. To begin with, the term "drive" or "campaign" is unfortunate. Both terms imply that the movement is a temporary one, that a climax in effort will be reached, that it will then taper off, and finally become quiescent. The inspection of restaurants and the insistence on their compliance with the provisions of the Sanitary Code are part of a continuous service of the Health Department. There will be no let-up. The work will go on as long as there is need for it; and as long as there are food establishments in the city, the need for inspection will remain. It is hardly necessary to point out that food is a culture medium for bacteria, and

* Presented at Thirty-fourth Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., Milwaukee, Wis., Oct. 16–18, 1947.

that unless measures are taken to protect it from becoming infected, it may be the source of disease in human beings.

"Food-poisoning" is a general term that includes food infections as well as poisoning by heavy metals and other substances. The New York City Health Department receives annually reports of over 3,000 cases of food-poisoning in the city, and that is only a small fraction of the total number of cases. The less severe and many of the serious cases are unreported. A large proportion of all the food-poisoning cases are referable to food establishments.

During the war, when the entire effort of the country was concentrated on the destruction of the war-making potential of the enemy, important peace time services had to be neglected. It is quite possible that the owners of some of the food establishments took advantage of the situation, and in order to save expense, made no effort to correct even the gravest sanitary defect. When the war was over, they still preferred inaction, and tried to hide their negligence behind such excuses as unavailability of labor and material. It is true that many items were and still are scarce, but that is no reason for closing one's eyes to the presence of health hazards. Dishwashing equipment suitable for each type of restaurant may not be ready for immediate delivery, but there are plenty of detergents and hot water. There is no reason why patrons should be forced to use eating utensils that are dirty and that have particles of the food served to the preceding customers adherent to them.

New York City is most fortunate in having a mayor who recognizes that the health of the people is the primary concern of government. Mayor O'Dwyer has a deep interest in all services that deal with the health and welfare of the seven and one-half million residents and the million or more daily visitors in this city. He is determined that New York will be the cleanest and healthiest large city in the world, and he will give an attentive ear to any suggestion that will further this resolve. This presentation would tell less than the whole truth if it minimized the essential role of the chief executive of the city in initiating and making possible the continuance of a restaurant sanitation program. It is no exaggeration to state that the success that the plan has attained in New York City has been due in large measure to the whole-hearted support of the mayor. Any health officer who cannot be assured of such support might well hesitate before embarking upon a project that has so often ended in failure.

Conditions Prevailing

New York City has 110,000 food establishments. Included in this number are 15,000 butcher shops, 16,000 candy stores, 18,000 fruit and vegetables stores, and over 22,000 restaurants. These restaurants vary in size from the fountain luncheonette and the "hole-in-the-wall" eating place to the palatial dining halls where over 15,000 patrons are served daily.

One of the primary reasons for the lack of good sanitary control in so many restaurants, a reason that is not generally recognized, is the fact that the great majority of the operators are not restaurateurs. For the most part they are former waiters, salesmen, or just plain business men who have some money to invest, and feel that this type of enterprise will give them the best yield on their investment. The great majority of them are entirely ignorant of the techniques of the preparation and serving of food. They cannot instruct the staff of cooks, pantry-men, and other food handlers who are to be entrusted with the task of caring for the food from the time it is received from the wholesaler until it is served to the patron. They do not understand

the basic principles of restaurant sanitation; they have no conception of the structure of kitchen equipment; and they do not comprehend the need of cleanliness and sterilization in the operation of their establishment. They fall an easy prey to the glib arguments of salesmen, and they often purchase equipment that is so unsuited to their needs that it is practically worthless. They judge a machine by its attractiveness and pay little or no attention to the ease or difficulty of its operation, and to the accessibility of its component parts for inspection and cleaning. To make the problem still more difficult, many of the smaller eating places have space that is totally inadequate for their needs. Fountains that were originally built to handle sandwiches, cakes, and soft drinks now are used for full-course dinners. There just is not room for the proper washing of dishes, to say nothing of the other essential operations. The owners of these establishments have in a sense been the victims of circumstances. Ignorant of the most elementary principles of restaurant sanitation, with more patrons than they can serve, and therefore never feeling the need of attracting customers, they have gone merrily on from bad to worse until all pretense of complying with sanitary regulations has been abandoned.

Even in some of the most pretentious and high-priced restaurants, the kitchens and stock rooms were found infested with rodents and other vermin, and no adequate measures taken to protect food from spoilage and contamination. The owners spend their entire time in the dining rooms greeting patrons, supervising decorations, and seeing that the service is prompt and efficient, but they pay no attention to the back rooms where the food is stored and prepared. Of course this is not the story in all restaurants. Hundreds of them are clean and sanitary and operated on the very highest plane of safety and scientific knowledge. But that is not enough. *Every* restaurant must be safe or must be forced to close the doors.

SANITARY REQUIREMENTS

In New York City the regulations governing the conduct of restaurants are part of the Sanitary Code. They specify that all food that is served must be fresh, sound, wholesome, and safe for human consumption. Foods must be protected from contamination by dust, dirt, flies, or handling by customers. The restaurants must be kept free from rats, mice, cockroaches, and other vermin. All perishable food must be adequately refrigerated. All rooms in which food is prepared or stored must be properly lighted and ventilated, and kept in a clean and sanitary condition. All equipment must be kept clean and must be of sanitary design and construction. There must be no poisonous metals or other harmful substances near the food. All eating utensils must be properly washed and sterilized. Adequate toilet facilities must be provided for patrons and employees. All food handlers must be cleanly in their habits. They must thoroughly wash their hands before they begin their day's work, and must keep their hands clean all the time that they are engaged in handling food.

These rules are simple and definite. It must be apparent even to the most callous and indifferent operator that they are the minimum requirements for the protection of the public. Yet the neglect of the most elementary principles of sanitation and hygiene on the part of a considerable number of food handlers was astounding. The employees were not always to blame. In spite of the requirement that adequate washing facilities be available, there was a lack of soap and towels and even of running water. Employees blamed the owners, and owners complained that it was impossible to get the employees to abide by the rules

which they laid down. Whoever was at fault, and in most cases both were at least partly to blame, sanitary conditions in many restaurants were permitted to deteriorate.

Rats and mice paraded unabashed often in full view of the kitchen help. They gnawed at sacks of flour, they deposited their excreta on unprotected food. Cockroaches and other insects bred in garbage and filth, hid in the crevices of poorly constructed tables and serving counters, and then tracked bacteria across dishes and pans, across uncovered bread and cake.

Perishable foods were not properly refrigerated. Putrid meat, wormy cereals, rancid fats, and rotten fish were not uncommon sights. In some of the small luncheonettes food was prepared in dark and damp cellars. In one place food was placed on a table underneath the stairs. When anyone walked up or down the rickety stairs large particles of accumulated dirt on the underside of the steps were shaken off and fell on the exposed food. If the whole story were told, the confidence of the public in the thousands of eating places in the city would be badly shaken. Yet there were a great many clean and sanitary restaurants. As is often the case, the innocent must suffer with the guilty. The reputation of the entire industry is stigmatized because a large number of its members have disregarded the law, which was written to protect both them and the public.

Plan of Procedure

The New York City Health Department's carefully planned program was based on years of experience, including experimentation with both well-known and little-known techniques. A three-months survey of conditions in the spring of 1946 convinced both the mayor and the Health Department that any further delay would be hazardous to the health and safety of the public.

The administration appropriated $265,000 for the hiring of 101 new inspectors. This brought the total number of health inspectors in the Department to 354. Of these, 142 were assigned to restaurant inspection. Some of the new inspectors were appointed from an existing civil service list. When the list was exhausted, provisional appointments were made pending a new examination. All applicants were interviewed by the Health Department Director of Personnel and by the Director of the Bureau of Food and Drugs. They had to meet the qualifications set by the Civil Service Commission. Preference was given to veterans. Many of the applicants had had considerable experience in the food industry. A group of capable inspectors was selected. Before being sent into the field they underwent a month of intensive training. After ten days of lectures and demonstrations they accompanied the most experienced inspectors on their tours for several weeks. They were permitted to go out alone only after they had demonstrated their ability to make a proper inspection.

The Health Department program can roughly be divided into two parts: (1) educational and (2) law enforcement. Courses for food handlers were part of the routine work of the Bureau of Food and Drugs. These were now greatly intensified. Owners and employees of eating places were invited to attend a lecture on restaurant sanitation. The importance of cleanliness and sterilization was demonstrated. Stereopticon slides and motion pictures were used to illustrate the lecture. Health centers, local neighborhood halls, churches, schools, YMCA's were all pressed into service. The number of those attending increased rapidly until an average of 7,000 persons a week was receiving instruction in the proper methods of foodhandling.

At the request of the Catholic Archdiocese of New York a 14-week course covering all phases of foodhandling was

given for over two hundred nuns, brothers and lay workers, who supervise the serving of 120,000 meals daily in hospitals, homes, and other institutions. This was the first time that the Health Department had been asked to give detailed instruction in food care to administrators. The Archdiocese published the lecture notes in book form. The Federation of Protestant Charities of New York City then asked for a similar course. The Health Department was very happy to grant its request. The demand for instruction in scientific foodhandling has increased by leaps and bounds and courses have been organized by the Board of Education as well as by the Health Department.

From the outset it was made clear that the Health Department was not out to "catch" restaurant owners and to have them punished for infractions of rules. On the contrary, it announced clearly that it desired to aid in every possible way to have the restaurants operate on a high sanitary plane. Punitive measures were not to be used except as a last resort. Representatives of restaurant associations were invited to the Health Department. The program was outlined. There was to be no unnecessary hardship placed upon anyone. Perfection was not required. But it was made very clear that anything that jeopardized the health of the people would not be tolerated for an instant. Where there were minor violations, warnings would be given and a reasonable time permitted for the removal of these violations. The cooperation of the restaurant owners was pledged. Trade journals printed the pertinent regulations of the Sanitary Code, and advised their readers to lose no time in complying with them.

Next on the program were meetings with the representatives of 60,000 organized restaurant workers. They were quick to see their duty to help protect the public as well as themselves. In nearly all restaurants the workers get meals as part of their pay. Thus they eat the same food as the patrons. They not only pledged their wholehearted support, but translated it into immediate action by arranging for the printing of leaflets and pamphlets, and organizing courses of instruction in the proper methods of foodhandling.

Members of the Boards of Trade in various parts of the city responded to invitations to meet at the Health Department. Since the summer season had just started and there was a rush of hundreds of thousands of people to the beaches, special attention had to be given to the restaurants in Coney Island, Rockaway, and other resorts in the city. The great crowds of people that seek food, especially during the week-end, tax all existing facilities, and there is often a temporary breakdown in sanitary technique. It was made clear that "extenuating circumstances" would not be accepted as an excuse for unhealthful practices.

Since the luncheonettes and soda fountains constituted the most serious problem, special meetings were arranged for them. Their chief difficulty is lack of space. The Sanitary Code specifies that dishes must be washed with hot water and soap or other detergent. Then they must be rinsed in clear water, and finally sterilized by proper heat treatment. In over two-thirds of these eating places there was not even a pretense at sterilization. Dishes were washed in cool dirty water which contained pieces of bread, meat, and other food that had been brushed off the plates. Then they were rinsed in water that was equally dirty but did not have quite as much food in it. Since it is not possible to hold one's hands in water above 135° F. for more than a few seconds, it was apparent even to the most casual observer that the water in the small basin behind the soda fountain was not even uncomfortable to the touch. Needless to say, the bacteria in it remained alive and active. In order to comply with the

requirements of the Sanitary Code regarding dishwashing, it is necessary to have three sinks or a dishwashing machine. There was not sufficient room for either. Many of the places converted to single-service paper utensils. Health Department engineers and inspectors showed the owner how to arrange his space so that proper equipment could be installed. Manufacturers of paper cups have been swamped with orders, and due to shortages in their own industry, have been unable to supply all who need their product. Paper dishes alone cannot solve the problem for all establishments. It may be necessary for the Health Department to order dishwashing removed to some place other than behind the counter.

Many restaurant owners complained that they could not get needed equipment. Meetings were held with manufacturers of dishwashing machines and other kitchen equipment, of soap, detergents, and other products essential for maintaining the restaurant in a sanitary condition. Mutual problems were discussed. Not all needed equipment was available, but there was a good deal more than most people believed. The manufacturers were invited and urged to consult with the Health Department in the designing and construction of new machines. The experience of the Department was put at their disposal. A considerable amount of restaurant equipment in New York City is condemned by inspectors because it cannot be properly cleaned. Particles of food accumulate in pockets where they undergo putrefaction. The manufacturers recognized that it was distinctly poor business to spend money on the construction of machines that would not be approved by the Health Department, which was another way of saying that the machines were of little or no help in doing the job properly. It was to their advantage to heed the counsel of Health Department engineers, and they promised that they would avail themselves of the opportunity. Good equipment, so built that it can be easily taken apart to be cleaned and inspected, is one of the essentials in restaurant sanitation.

Inspection by the Industry

It must be apparent to all that no program aimed at maintaining restaurants in a sanitary condition at all times can have much chance of success unless the operators themselves appreciate the need of continuous inspections, and are willing to assume part of the responsibility for them. If New York City had to do it alone, the cost of maintaining the tremendous staff of inspectors would be prohibitive. The job simply could not be done efficiently without restaurant organizations employing their own inspectors. The fact that they realized that such an investment would bring generous dividends in the form of increased efficiency and public confidence was very encouraging. At present some 1,000 restaurants receive regular inspections by men employed for that purpose by the industry. These restaurants for the most part belong to large chains, but the same thing is being done for many individual establishments by their organizations. The inspectors are hired by the associations to whom they are fully responsible.

The Health Department gave every assistance in the selection of the men. It recommended that they have the same high qualifications as regular Health Department inspectors, namely, that they have an adequate academic background with college courses in chemistry, bacteriology, and the allied sciences. In addition, they should be able to teach food handlers how to comply with the pertinent provisions of the Sanitary Code and get them to realize the importance of doing so. The Health Department organized a training course for these inspectors similar to the one given to its own inspectors. Frequent conferences are held with

Health Department officials. Company inspectors are required to inspect a restaurant about twice a month until it is in good sanitary condition. After that, a monthly inspection is usually all that is necessary. The Health Department requires that the company inspectors' reports be left with the operators of the establishments and be available for review by the Department at all times. It is, of course, clearly understood by the restaurant industry that the Health Department will continue its regular inspections of the establishments. A self-inspection system merely supplements the official inspection. The results in the food establishments that have accepted this self-inspection program are highly gratifying. Sanitary food handling practices are rapidly becoming a routine part of the daily work in those establishments.

LAW ENFORCEMENT

Education is an essential part of any program aiming to bring about sanitary, or for that matter any, reform. But education alone is not a panacea for all human ills. In a broad sense every method that is used has an educational value. But if the program were limited to formal instruction and conferences, it would progress very slowly and would not reach some of the worst offenders. It is thereore necessary to supplement the educational phase with one of law enforcement. To this end the Corporation Counsel who is in charge of all legal matters involving the city was consulted. He, like the Mayor, realized the necessity for strict compliance with the provisions of the Sanitary Code on the part of operators of food establishments. One of the weakest parts of an organization like a health department, made up of doctors, dentists, nurses, chemists, and other technicians, is the lack of trained legal personnel. Cases are brought to court, often poorly prepared; defendants are able to engage highly skilled counsel who get repeated postponements and may finally, after months of delay, have the case thrown out of court on a technicality, or obtain a nominal fine or suspended sentence for their clients. This time, however, the Health Department was prepared. Six able assistant corporation counsels were assigned to the Department. The cases are fully prepared, evidence is in the proper form, and there are no legal loopholes through which dismissal of the cases without considering their merits can be obtained. The City of New York owes a real debt of gratitude to the magistrates who have seen to it that justice has been meted out promptly and effectively. From June 12, 1946 to September 30, 1947, 35,653 restaurants were inspected. Of these, 3,182 received summonses. The total amount of fines was $256,799. In addition, one operator received a 60-day jail sentence and another a ten-day penalty. There is no question but that the disposition of the cases promptly and equitably has had a salutary effect upon the restaurant owners throughout the city, and has awakened in a great many of them a zeal for cleanliness and sanitation which they might otherwise never have experienced.

To complete the law enforcement phase of the program, the Board of Health empowered the Commissioner of Health to seal, on 48 hours written notice, any restaurant that in his opinion was not in fit condition to operate, and to keep it sealed until he was satisfied that all violations had been removed. This severe penalty was imposed in several instances. In other instances, written notices of closure were served, but because strenuous efforts were immediately made to put the places in good sanitary condition, the order was rescinded.

PUBLIC SUPPORT

That the public is keenly aware of lax methods of operation in many food establishments is attested to by the thousands of letters that have been received by the Health Department.

With very few exceptions, they have been loud in their praises of the efforts being made by the Department to protect the public. Hundreds of citizens in all walks of life volunteered to give their services free to the city to help speed up the inspections. All of these offers were declined with a note of appreciation for the fine spirit that prompted the suggestion. Inspection is not work for amateurs, no matter how well meaning they may be. The restaurant owners are entitled to inspections by highly qualified men who know what the law requires, who understand the problems of the industry, what materials and equipment are available, and who will not make unreasonable or impossible demands.

Many of the letters contained suggestions. A very common one was that the Department grade restaurants either by a letter—A, B, C, etc.—or else by the words unsatisfactory, satisfactory, fair, good, excellent. The objection to that system is twofold. One is that it demands repeated inspections to be certain that the rating has not changed. In other words, if a restaurant is marked "excellent," there must be reasonable assurance that it will not continue to display the rating several weeks or months later when conditions may have changed for the worse. If that occurs, the public will soon lose its confidence in the ratings and they will serve no purpose whatever. It is obvious that such a system would not be practical under any circumstances in a large city like New York with 22,000 restaurants to supervise and grade. The other objection is that if a low-priced restaurant is marked "unsatisfactory" and its patrons feel that they have no alternative because of their limited financial status to experiment with other restaurants, there may be no falling off of patronage. There may be other reasons for the patron's indifference to the rating. The restaurant may be close to a factory and therefore very convenient. The individuals eating there may not appreciate the importance of insanitary handling of food. Or, they may be completely indifferent to it. Again the rating becomes meaningless and it is of no help in improving sanitary conditions in eating places. It is conceivable that in a small community with very few restaurants an energetic health officer might make the scheme work but it is wholly inapplicable to a large city like New York. However, the idea of a poster or sign in the restaurant calling the attention of the public to good sanitary practices is a sound one. The Health Department is urging those restaurants which meet high sanitary standards to display proudly notice of that fact. A number of restaurant chains in the city have put up such a notice. The statement is brief and to the point. An example is the one that appears in a popular chain of cafeterias: "We comply with all the regulations of the Health Department for the protection of the public. We sterilize all our dishes." It is hoped that all of the good restaurants in the city will follow this example. It is good advertising for them. They also know that if on inspection it is found that they are not telling the truth, that they do not sterilize their dishes, their misrepresentation will be brought to the attention of the court.

Summary

The various techniques used by the New York City Health Department in its restaurant clean-up program have been briefly described. The program is an ambitious one. Its aim is not merely the removing of violations. Actually it seeks to reorient the point of view of restaurant operators toward sanitation. There has been considerable reluctance and even some open opposition. But the operators are slowly coming to realize that it is to their own advantage, as well as to the best interests of the public, that their places be clean and healthful. We are

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The Question of Sanitary Standards for Ice Cream Mix Ingredients*

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WHEN your secretary-treasurer inquired concerning my willingness to present a paper on this subject, he suggested that I think out loud. I assume that he meant I was to express myself quite frankly and without inhibitions. In preparing this paper I have tried to do just that. I trust that these remarks will be received with the same openness of mind as was required in preparing them.

In contrast to sanitary standards for market milk, the question of sanitary standards for ice cream mix ingredients is extremely complex. It is complex for several reasons: (1) because of the multiplicity of ingredients that legitimately come into consideration for use in ice cream mixes; (2) because the demand for ice cream is subject to sudden fluctuations, and the peak seasonal demand does not coincide with the peak in milk production; and (3) it is further complicated by the inclination of sanitarians to apply to ice cream the sanitary standards which have been elaborated over a period of years for the market milk industry.

Let us examine the first of these two premises in detail in order to develop a background against which the feasibility of the last premise may be appraised.

ICE CREAM INGREDIENTS

The number of potential ingredients for ice cream is large—dairy products, stabilizers and emulsifiers and sugars. In general three types of dairy products are required in an ice cream mix: (1) a fat-rich product, (2) a serum-solids-rich product, and (3) a product of relatively low fat and serum solids content. The various dairy products under these three classes should be further classified according to whether they are perishable, or whether they are suitable for storage as a reserve against a fluctuating demand.

Fresh cream is, of course, the chief fat-rich product, but where long shipments are involved and storage is necessary, frozen cream, plastic cream, unsalted butter, and butter oil are legitimate supplements. Of these, plastic cream is the newest product, and the extensive use of butteroil is probably just around the corner. When the continuous butter-making processes, which have been developed, come into use, either butteroil or butter can issue from such processes within an hour from the time the milk is received. Butteroil will then not be a product of a salvaging operation, but a high quality product, which when dried and deaerated is ideal for economical storage. In my opinion prohibiting the use of any of these ingredients cannot be justified on the basis of public health, nor on the basis of quality, and certainly not from the standpoint of the consumers' pocketbook.

Under the class of serum-solids-rich dairy products, we have a very extensive list of ingredients. We have condensed skimmilk and condensed whole milk, and each of these may be in the form of the perishable plain condensed product and the superheated condensed product, or in the sweetened condensed

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form, suitable for storage. In addition to these six condensed milks, there are skimmilk powder, condensed buttermilk, and dried buttermilk. Use of these products is generally accepted, with the exception that objections may be raised against the use of the buttermilk products. In defense of the use of buttermilk products let me point out that buttermilk is rich in phospholipids, containing about one-fourth of the amount that was present in the much larger volume of milk from which the buttermilk stemmed. It is because of this rich phospholipid content that buttermilk has a characteristic richness of flavor. It is also because of this richer phospholipid content that the buttermilk solids contribute qualities ordinarily sought from the use of eggs. When the buttermilk stems from unripened cream of a quality that is acceptable for use in ice cream, there can be no legitimate objection to the use of the buttermilk solids in ice cream.

Before leaving the serum-solids-rich products, mention should be made of "Low-Lac", and caseinates. The use of "Low-Lac" and soluble caseinates represent an effort to use the milk proteins more generously than would otherwise be possible from the standpoint of sandiness, which is due to excessive lactose content. "Low-Lac" is condensed skim milk made with some sugar added, and concentrated to such a point that an appreciable portion of the lactose crystallizes out for removal by filtration or centrifuging. The function of the added sugar is to cause a lower viscosity so as to permit successful filtration or centrifuging. The sugar content is not high enough to have preservative effects, and the product is to be considered perishable. Soluble caseinates are made by precipitating and washing the casein, and redissolving it by the use of alkali to a controlled pH. It is difficult to see how categorical prohibition of the products in ice cream can be justified on the basis of public health. The more generous use of milk proteins is nutritionally sound, and there is no question of inferior food value involved to justify prohibition.

As dairy products that are neither rich in fat nor in serum solids, we have skimmilk and whole milk, and also sweet buttermilk. The comments that have already been made in connection with condensed and dried buttermilk also apply here.

With respect to sanitary standards, our chief interest is in the dairy ingredients of ice cream, and it is here also that there is the greatest likelihood of controversy. Therefore, we shall pass over the subject of stabilizers, emulsifiers, and sugars very briefly. The history of stabilizers and emulsifiers in ice cream is one of change and innovation. Early in the industry gelatin was the chief stabilizer. Also permitted and used to a limited extent were the "harmless vegetable gums", natural gums, i.e. gummy exudates from certain semi-tropical or tropical trees or shrubs. Starch was also used to a limited extent, but has long since become taboo. Then came various ice cream improvers—mixtures, usually with a generous proportion of sugar, offered with fanciful claims to exploit the industry. More recently the development has been in offering extracted and refined gums, partly synthetic hydrophylic organic compounds, and emulsifiers. The latter are considered by some as stabilizers in the sense that they stabilize the fat emulsion. The newer products undoubtedly involve less question of sanitation than the gelatin of old, and than the natural gums which are exposed to dust accumulation and contact with insects. With respect to gelatin, the edible gelatin manufacturers have done an outstanding job of improving sanitation and lowering bacterial counts, so that there is now little need for a standard. There is little or no question of sanitation with respect to the use of the newer types of stabilizers and emulsifiers. What questions may be raised

are more likely to be on the basis of food value and harmlessness. In passing, let me note that their harmlessness should, of course, be proven, but in my judgment they need not contribute to food value to be acceptable. These products are, in any case, not added for their food value, but for their functional use in the product.

The use of eggs and egg products is related to the field of stabilizers and emulsifiers. Here we have a product which is subject to fermentation and deterioration both before and during processing, and sanitary standards are in order. It is also desirable to have composition standards to exclude or control the admixture of cheaper ingredients.

Great changes have occurred in the use of sugars by the ice cream industry. From exclusive use of sucrose, and controversy between cane and beet sugar, the industry has gone to extensive replacement of sucrose by dextrose and corn syrup. This replacement had its inception with the development and improvement of the latter products shortly after World War I. It had proceeded to a considerable extent before World War II, which, of course, greatly expanded the replacement. This replacement does not involve questions of sanitation, nor of food value, and its ultimate determination may well be left to the decision by consumer preference. With respect to sugars the chief point of sanitation is the protection of dry products against dirt and vermin, especially when ordinary sacks are used.

PROBLEM OF SANITARY REQUIREMENTS

Returning now to the problem of dairy supplies in relation to a fluctuating demand for ice cream, sudden changes in weather may drop the sales of ice cream to a fraction of preceding days, or may suddenly stimulate demand. Holidays affect ice cream sales more than is true for market milk. In any case there is the decided seasonal peak in sales during July and August, coming later by several months, than the peak in milk production. As a result there is the need for mix ingredients that can be stored to use as supplements when fresh supplies are inadequate. In the case of dense population areas the normal milk shed does not provide enough milk for both the market milk needs and the needs of ice cream. Therefore, both perishable and storage products must be drawn from more distant points from a supply that is responsive to this need. This distant supply can be responsive to this seasonal and fluctuating need only if its market outlet during a large part of the year is in the form of products that yield a lower return to the producers. In other words, this supplemental supply must come from typical dairy manufacturing areas.

If we accept these facts, as we of necessity must, then we must resist any attempt to impose the same sanitary standards on this supplemental supply as are generally accepted for market milk. Let us ask ourselves the question: Why are the sanitary standards for market milk generally accepted by producers and distributors, and with acquiescence by consumers? The consumer generally does not realize what these standards are doing to his pocketbook. The distributors in many cases were largely instrumental in this build-up of standards because it made their efforts at quality improvement easier by shifting the burden to municipal inspectors. The producers, once they were in compliance with a highly artificial set of rules and requirements, were anxious to maintain the standards as an effective trade barrier. Because of the trade barrier, the bargaining position of producers is greatly strengthened, and the consumer pays the bill without realizing what factors are contributing to the leak in his pocketbook.

Even with respect to market milk it is high time that we re-examine the

elaborate structure that has been evolved. As milk sanitarians we should re-examine our duties and lay our course in terms of basic principles. It is our duty to safeguard the public health, but this duty should not be pursued with reckless disregard of the consumer pocketbook. In terms of basic principles it is our duty and right to insist that the milk be produced from healthy cows, that the milk be clean (not cleaned by straining), that the milk meets suitable standard of cleanliness as measured by such objective tests as the methylene blue test or bacterial counts, that the use of preservative be excluded, and that the water supply be clean and safe. In my judgment and in terms of basic principles it is neither our duty nor our right to specify detail for detail how the producer must meet these specifications. In this connection, let us recall the demonstrations that it is possible to produce clean, low-count milk under conditions which would be rated as sordid in terms of presently accepted standards for market milk.

With respect to market milk the pattern of the standards has been thoroughly established and is difficult to change, as committees charged with this duty have found. It must also be admitted that, even though many of the detailed requirements are highly arbitrary, some semblance of consistency in enforcement can be maintained because the demand for market milk is fairly steady and there is less need for supplemental supplies than in the case of ice cream. It would, however, be a serious mistake to assume that similar standards for ice cream mix ingredients would be equally acceptable and workable. The extent to which non-observance of requirements in supplemental supplies would have to be condoned would be demoralizing; yet the requirements would exist and serve as the basis for higher costs to consumers. You cannot expect a producer to rebuild his barn in order to become eligible to a higher priced market with only an occasional shipment to such market. Before detailed requirements are imposed on the producing farms of ice cream mix ingredients, let it be demonstrated that the need for such action exists in terms of the public health record of this industry.

These remarks should not be construed as arguing against quality improvement. Instead, they are an argument for quality specifications in terms of herd health records and quality standards as measured by objective tests.

NEW YORK CITY'S RESTAURANT CLEAN-UP PROGRAM

(Continued from page 330)

still in a sellers' market and pretty nearly anyone who has anything to sell need not worry about getting buyers. But this condition will not last forever. When business returns to a competitive basis, the advantage as far as restaurants are concerned will definitely be with those who have acquired a reputation for sanitary operation.

This article has been limited to a discussion of the restaurants but the same problems exist in bakeries, delicatessens, butcher shops, produce markets, and all other food establishments. They are not being neglected. This program is not a "drive." It is simply the routine work of the Department intensified and brought up to a level where it is effective. There will be no letdown. On the contrary, the work will be intensified. The people of New York City realize that the Health Department will not relax its efforts until every food establishment in the city is operating in accordance with the highest standards of sanitary control.

Annual Report of the Committee on Sanitary Procedure, 1947*

THE Committee on Sanitary Procedure has been engaged in several closely integrated projects during the past year, although individually they have been of a rather divergent nature. They include: (a) a search for a more accurate procedure for the timing of high temperature-short time pasteurizers, (b) collaboration with the other two agencies (U.S.P.H.S. and D.I.C.) in the formulation of sanitary standards for two types of milk-plant equipment, and (c) the exploration of the possibilities for the registration of a symbol to designate equipment which conforms to the 3-A Sanitary Standards.

The 1946 Annual Report of this Committee made reference to the organization of a study of the timing of H.T.S.T. pasteurizers, in order to obtain data upon which to found a standard procedure for determining the holding time with a reproduceable degree of accuracy. This involves the calibration and the precise location of all the timing and temperature measuring devices employed. The study is being financed by the National Sanitation Foundation and by manufacturers of H.T.S.T. pasteurizing equipment, including the Cherry-Burrell Corporation, the Creamery Package Manufacturing Company, and the York Company. The Dairy Department of Cornell University has accepted the grants, and the study is now under way, under the supervision of Dr. R. Holland.

The acquisition of the equipment was begun last spring, but because the delivery of certain necessary electrical apparatus was delayed, the study did not actually begin until the latter part of August, 1947.

The sub-committee met at Cornell University on September 12, with twenty-six representatives of the dairy industry, including manufacturers of H.T.S.T. pasteurizers, pumps, thermal instruments, and timers. The University staff outlined the intent of the research, displayed the equipment, and demonstrated an experimental test run. Advantage was taken of suggestions made by the observers.

A study of this nature, when actually under way, may be considered half completed—at least with respect to the time required. Therefore, unless unforeseen difficulties arise, the subcommittee is confident that the project will have progressed sufficiently to permit the presentation of a standard method for determining high temperature-short time holding time for consideration by the membership, prior to the next annual meeting of this Association.

The main activity of the Committee has consisted of collaboration with the other two agencies in the formulation of sanitary standards for dairy industry equipment. The year achievements have already appeared in print. These are: "Sanitary Standards for Weigh Cans and Receiving Tanks for Raw Milk", which appeared in the *Journal of Milk and Food Technology*. Sept.-Oct., 1947, pp. 277–279; and "Sanitary Standards for Pumps for Milk and Milk Products". *Journal of Milk and Food Technology*, Sept.-Oct., pp. 280–281. These standards were formulated and adopted after careful study and full discussion in a two-day joint meeting with the U. S. Public

* Presented at the Thirty-fourth Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., Milwaukee, Wis., Oct. 16–18, 1947.

Health Service and the Sanitary Standards Subcommittee of the Dairy Industry Committee, in Washington, on March 26 and 27, 1947, and in a one-day meeting at Buffalo, N. Y., on June 23, 1947.

The formulation of these standards is a lengthy process, involving much time and considerable travel by more than a few individuals. At the risk of repetition which may prove boresome to some, but in the belief that it may be informative to a greater number, the evolution of standards, from inception to adoption, is outlined.

1. Upon recommendation by regulatory groups or the industry, equipment widely used in the dairy industry is taken up for study by the Sanitary Standards Subcommittee of the Dairy Industry Committee.
2. A task committee of the Sanitary Standards Subcommittee, including manufacturers or fabricators and users of the equipment, is appointed to draft tentative sanitary standards for study purposes.
3. The task committee submits its report to the Sanitary Standards Subcommittee.
4. After considering the tentative standards at a meeting, at which any modifications agreed upon are made, the Sanitary Standards Subcommittee submits the revised tentative draft to the sanitary standards or simplified practice committees of each of the industry branches. This subjects the tentative draft to review at the national level.
5. The comments received are reviewed at another meeting of the task committee with the Sanitary Standards Subcommittee, following which another tentative draft, revised to include valid suggestions, is re-submitted to the several branches of the industry.
6. Upon agreement on tentative sanitary standards for the equipment, irrespective of the number of meetings required, they are transmitted to the Dairy Industry Committee.
7. Upon approval by the Dairy Industry Committee, the tentative sanitary standards are submitted to the U. S. Public Health Service and to the Committee on Sanitary Procedure of this Association, with a sufficient number of copies for all members.
8. After a period of study by these latter two agencies, a joint meeting of the three agencies is held, at which differences in viewpoint, if any, are coordinated.
9. The standards finally agreed upon are designated to be 3-A Sanitary Standards for the equipment, and are published in the *Journal of Milk and Food Technology*, reprints being made available.

Your Committee, one of the final arbiters on these sanitary standards, has adhered to the principle that standards must provide the highest degree of sanitary construction practically attainable, without making the cost prohibitive. The standards fixed, in some instances, necessitate major revisions of design, at considerable cost in engineering effort and re-tooling.

The far-reaching effect of these sanitary standards upon manufacturers and fabricators is cited in order to emphasize the responsibility which participation by the Committee on Sanitary Procedure in their formulation and adoption places upon every member of this Association. These sanitary standards apply to equipment used in all of the six main branches of the dairy industry—butter, cheese, dry milk, evaporated and condensed milk, ice cream, as well as the fluid milk industry. Equipment manufacture is in a stage such that individual pieces reaching purchasers will shortly embody the features of design and construction prescribed in the 3-A Sanitary Standards, and sanitarians are urged to recognize conformance to these standards.

This collaborative program has no limitations. Standards for milk transportation tanks, homogenizer and high pressure pumps, gauges for storage tanks, dairyware (milk pails and strainers), milking machine, and can-washers are already in the tentative stages. The formulation of sanitary standards for other types of equipment is being considered. The range and extent of the program provide an index of its potentialities for benefit: to milk sanitarians, because of design and the use of structural materials which facilitate effective sanitization; to manufacturers, by providing a universal pattern for design and by making it possible to eliminate obsolete lines and styles; and to users, because of assurance that purchases predicated upon conformance with 3-A Sanitary Standards will meet with approval by

milk sanitarians when installed. However, we—as milk sanitarians—can benefit from this program only to the extent that we cooperate in making it effective.

Dr. E. H. Parfitt, chairman of the Sanitary Standards Subcommittee of the Dairy Industry Committee, in a paper delivered at the 1946 Annual Meeting of the New York State Association of Milk Sanitarians, named the following three types of support upon which the success of this program is dependent:

1. The backing given published sanitary standards by the individual milk sanitarian, exemplified by his insistence upon conformance of newly installed equipment with these standards and his readiness to approve equipment conforming to them, rather than insistence upon modifications in design or construction to meet personally devised amendments.

2. The degree of publicity given these standards, so that buyers of equipment for which standards have been developed will be cognizant of them, and will specify that it conform to them.

3. The degree of support exercised by regulatory groups to assure that only equipment which conforms to the fixed standards is labelled, or stamped, or offered with the understanding that it conforms to 3-A Sanitary Standards.

This report has already elaborated upon the first of these types of support. Those who have amendments to propose are invited to communicate with the chairman of the committee.

It is with respect to publicity—the spreading of the gospel of sanitary standardization—that the Committee on Sanitary Procedure and the Association have not yet attained their full stature. Planographs of drawings and dimensions of fittings have been made, reprints of the Sanitary Standards for Storage Tanks have been purchased and widely distributed, and reprints of the standards recently published have been ordered, by the Dairy Industry Committee. The milk sanitarians have acquiesced in this manner of making the standards known, and have in numbers of instances applied to the Dairy Industry Committee for reprints. There is no valid basis for serious criticism of the manner in which these standards have been made known. The Association has had little experience in publicizing a policy or program. Nevertheless, we, as the association of those who are largely responsible for the ultimate acceptance and requirement of these sanitary standards, should take an active interest in the dissemination of knowledge of them, and should be participating more actively in that dissemination.

A presentation or discussion of sanitary standards for milk-handling equipment used on farms, for its transportation, and for its processing, should be a standard part of the program of every annual meeting of milk sanitarians, of meetings of dairy products associations, of short courses, and of conferences of fieldmen, for the next several years, or until it is felt that audiences have been completely saturated with the concept of the program. Members of the Committee on Sanitary Procedure could well become apostles of this campaign of information among milk sanitarians in their respective parts of the nation, as members of the Sanitary Standards Subcommittee are preaching the gospel at meetings of the several branches of the industry. It is suggested they be invited to address your local or State meetings.

Concerning reprints of published sanitary standards, it is most desirable —in the interest of Association prestige —that a milk sanitarian who needs a copy of the sanitary standards for a specific type of equipment be able to obtain it from the Association; that is, from the office of the Secretary-Treasurer. To this end, the Association should also order and have available reprints of the standards thus far published.

It appears to be appropriate and

desirable that the Association should send reprints to the Health Departments of States and large cities and should be able to provide, for those who at any time wish to secure a complete file of sanitary standards, a folder or binder containing all the standards which have been published, to which may be added others as reprints become available. It is not implied that such a service should be free to all who request it. But, binders and single reprints might be made available at cost, plus a nominal fee for assembly and mailing.

Having recognized the need for the third type of support listed by Dr. Parfitt—that is, the control of misrepresentation regarding conformance of specific equipment to sanitary standards—the Executive Board of the Association has explored the possibilities for registering the 3-A symbol, in accordance with the provisions of a resolution adopted by the Association at the Atlantic City Meeting, in 1946.

As a result of the waiving of proprietary rights in a trade-mark in which the capital letter "A" was a prominent feature, the DeLaval Separator Company has made it possible for the Association to register the symbol 3-A, when it has been demonstrated to be in actual use, in the manner and under conditions such as are proposed in the application for registration. When registered, the Association acquires the right to use the symbol, or to delegate its use.

The details of an organized system for the use of the registered symbol have not been fully developed; development should necessarily proceed slowly and cautiously. Assurance has been given that the steps necessary to fulfil the legal requirements for registration of the symbol will be taken. When fully developed and ready for application, the system adopted will be made known in the Journal.

Several years ago, Mr. Russell R. Palmer, then President of the Association, suggested that records and data pertaining to adopted sanitary standards be deposited with the Secretary of the Association, so that reference might be made to original sources in event the chronology or intent of any action were questioned. Accordingly, there are herewith presented complete files of correspondence, and the several steps in the development of:

Sanitary Standards for Storage Tanks for Milk and Milk Products.

Sanitary Standards for Weigh Cans and Receiving Tanks for Raw Milk (except a reprint).

Sanitary Standards for Pumps for Milk and Milk Products (except a reprint). Also a partial file, since June, 1945, on Standards for Sanitary Fittings and Valves for Milk Piping. It is recommended that these records be made a part of the archives of the Association.

It is with sincere regret that the resignations of Ralph Irwin, of Camp Hill, Pennsylvania, and of Sol Pincus, of New York, from this Committee are announced. Mr. Irwin has not been connected actively with milk control for several years, and plans henceforth to enjoy complete leisure. Mr. Pincus retired from his connection with the New York City Health Department early this month, and also plans to indulge in work only as a reflex from boredom. Both have served the Association and the Committee well.

Respectfully submitted

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Some Aspects of Fishery Sanitation*

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THE purpose of this report is to indicate some of the aspects of sanitation in the fishery industries with the idea of acquainting sanitarians in other food industries with some of the problems involved. Unlike most other foods, seafood is produced at its primary source, in an uncontrollable environment. This is not true of a product such as milk, for example, where control can be practiced all the way from the pasture to the bottle delivered to the consumer's door. Because of this factor which is peculiar to the fisheries, and the added fact that fish, after removal from the sea, cannot be handled and processed like milk or cereals or meat in its usual forms, fishery sanitation has developed slowly and along lines different from those in other food industries. The further fact that the fisheries, for the most part, have grown without careful developmental planning, has made the problems of sanitation more difficult in most instances than would be the case in the dairy industry.

Although the fundamental principles of sanitation are applicable to all food production, the manner in which they can be applied to the fisheries vary somewhat from the usual practices. It is important to bear this in mind because too frequently sanitarians attempt to apply the standards for milk production to fishery problems. This leads to misunderstandings and difficulties which do little or nothing to improve the quality of the product. For this reason it is hoped that this brief discussion will lead to a better understanding of the fishery sanitation problems.

SIZE OF INDUSTRY

In terms of food production, how important are the fisheries? Without becoming concerned with the most recent figures, let us look at some prewar averages. In an average year the total production was about 4,400 million pounds. Of this total, 1,500 million pounds were canned, 340 million pounds were filleted, 150 million pounds were cured, 130 million pounds were frozen whole, 680 million pounds were sold fresh and the remaining 1,600 million ponds were made into meal, oil, and other byproducts. This required the full-time effort of 65,300 fishermen and the part-time aid of 59,500 others. These employment figures at the primary level do not include persons working in processing plants. The capitalized value of the fishery resources of the United States is 5,855,000,000 dollars (See U. S. Department of the Interior, Fish and Wildlife Service, 1945, *Fishery Resources of the United States of America*). The average annual production of oysters alone (1938–1940) was 89.8 million pounds which is equivalent to the edible meat obtainable from 160,360 beef cattle. These figures clearly indicate the economic importance of the fisheries. They also show the fisheries to be an important segment of the total food production picture.

* Presented before Thirty-fourth Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., Milwaukee, Wis., October 16–18, 1947.

WATER QUALITY

The problems of fishery sanitation arise, in some cases, before the fish are caught. The quality of the waters from which they are taken is of primary importance in the case of shellfish and to a lesser extent this is also true of certain tin fish. This matter of standards of water purity will be shown later to be a more complex matter than is ordinarily supposed. From a bacteriological viewpoint, the waters where shellfish are harvested must meet the standards for drinking water. This is necessary because clams and oysters are frequently eaten raw. The bacteriological quality of the water will also be of importance in the keeping quality of certain fish after catching (sardines) or in the determination of cooking time of crabs or lobsters.

The chemical purity of the water is also important. Industrial wastes may impart off-flavors or odors in certain instances (blue-pike from certain sections of the Great Lakes). Such wastes also contribute to a decrease in fish production, as in the case of the east coast shad. Paper mill wastes have had a detrimental effect on oyster production certain areas. Sports fishing has also been influenced by industrial pollution. Both the bacteriological and chemical quality of the waters influence subsequent aspects of the fisheries. Where live storage of crabs, lobsters, clams, etc. is concerned, water quality is of primary importance. This is also true when natural waters are used in processing. Water quality therefore, is one of the major concerns of the fishery sanitarian.

HANDLING THE CATCH

The methods of catching and handling fish are many and varied. Gear varies from the single hook and line to complicated trawls and drags. These varied technics each present problems of sanitation. One might anticipate that a small boat fishing inshore with hooks and lines might produce top quality fish because the catch can be landed almost as soon as caught. This is usually not the case however, since the boats are too small to carry ice or refrigeration in warm weather and their size prevents them from fishing during the winter. Large otter-trawls may bruise or otherwise injure the fish and this increases the susceptibility of the flesh to bacterial invasion. Stowage in the hold or on deck offers further difficulties. Icing must be adequate and must not damage the fish. Bilge water must be kept away from the catch. The period of transport must not be excessive. These are but a few of the problems which arise at the time of catching.

The discharge of the cargo also presents problems. In some instances fish are unloaded by the use of forks very similar to hay-forks. As long as the forking is confined to the head of the fish, a satisfactory product is obtained. But fish which have been stabbed through the viscera may be of poor quality. Failure to protect the catch from flies, vermin, gulls, etc. leads to poor quality, and this is equally true when the fish are exposed to direct sunlight or high temperatures. These and other factors enter the sanitary picture before the fish are ready for processing and each unfavorable condition influences the primary quality of the final product.

PROCESSING PLANTS

Fish processing plants, generally speaking, are accumulative rather than built with any particular plans in mind. As business expanded, new additions were made to existing facilities, the type of construction depending upon the immediate needs. Hurricanes and tidal waves offer the best solution to most of the sanitation problems of most of the fish-handling facilities. Big establishments such as the city fish

piers in Boston and Gloucester or the modern plants of the larger producers are exceptions to this general rule. The majority of small operators, however, are working under constructional handicaps which will probably remain for some disaster to remedy.

Since such plants are usually located on a waterfront, it is customary to dispose of wastes by dumping them overboard on the assumption that the tides will remove them. This fallacious reasoning leads to accumulations of filth under the docks and in the piling. Overboard toilets are also a menace to good sanitation.

Waterfront buildings, unless of recent construction, are not rodent-proof, and a continual campaign against rats and mice is almost neessary. It is extremely difficult to rat-proof old buildings, and the use of poisons is dangerous in food-producing establishments. So the rodent problem is not one of easy solution. This is also true in regard to insect infestations. Proper use of DDT, however, can effectively eliminate roaches, flies, water bugs, etc. Possibly similar methods can be worked out for rodent control but at present residual treatments are not available.

Where plants are located in areas where public water supplies are not available or where such supplies are too costly, the water used in processing fish may be a problem. The installation of proper toilet and washing facilities needs constant attention. Tidal flushing of septic tanks may make them ineffective, particularly where such tidal action is frequent and regular. Tidal back-washes of ordinary privies also leads to unsantiary conditions. Another sewage problem is the "exclusiveness" of the flush toilet. In certain instances the sole sanitary installation is reserved for the aristocracy of the establishment and the hoi-polloi use a catch-as-catch-where technic, which may be democratic but leaves much to be desired from a sanitation standpoint.

NEED FOR SANITATION

Where a seafood commodity is produced entirely by hand is consumed without further cooking, we have a situation which is quite analagous to that of raw milk. This is the case of fresh crabmeat or raw oysters. In addition to the above factors, there is the health of the worker to be considered. State and federal regulations are not rigidly enforced in this regard, dependence being largely upon the bacteriological content of the final product. There is little logic to be found in this method and such a procedure would be strongly frowned upon in the production of certified milk. Most seafood workers are proud possessors of cards indicating that they are free of venereal disease but no one has ever become infected with such disease through seafood despite the undisputed pleasure of fish-eating.

The transportation of seafoods, management of the retail store, and a variety of other aspects of fishery sanitation cannot be discussed here because of the shortage of time. The problems are many and varied. Only by continual research and education can they be solved and even then it will require considerable time. Fishery sanitation rests today where milk sanitation rested in 1910. It is believed that the gap can be bridged in less than 40 years but it will require all the help that can be borrowed from the other food industries to do it.

To this end the Fish and Wildlife Service appreciates this opportunity to make milk sanitarians aware of some of these fishery problems, since it will be through contacts of this type that we can more effectively improve the sanitation of the fisheries.

Correct Interpretation of Bacteria Counts*

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THOSE who are not bacteriologists do not understand about bacteria and their significance. As a result there is a great deal of misunderstanding and misinterpretation of bacterial plate counts and the direct microscopic counts by the laity and even some public health officials. This is most aptly illustrated by an actual occurrence in one of our large cities. One of the dairies was producing a high quality milk and by almost superhuman efforts had reduced their bacterial plate counts to around 2,000 per ml. or less. They were so proud of the accomplishment that they announced the fact by having it printed on their delivery trucks and wagons. Their competitors knowing the ignorance of the average milk consumer regarding bacteria were quick to sense the mistake and took advantage of it by having their drivers canvass the customers of the company producing the high quality milk and asking them, "Do you want to drink milk containing 2000 bacteria per ml.?" "Do you want to feed such milk to your children?" Needless to say the signs were quickly removed and a real campaign started to regain the customers which they had lost.

BACTERIA COMMON TO MILK

The conditions under which milk is produced procludes the possibility of it being produced sterile. So it always has a few hundred or even a thousand bacteria present when first produced. In fact if one were to produce milk aseptically under the same conditions as a doctor would perform a major operation, that is with everything sterile, the teats, the pails, the milking machine, and everything sterile, even then the milk from most cows would contain from a few hundred to a few thousand or in some cases a few hundred thousand bacteria per milliliter. This is because as, numerous experiments have shown, certain bacteria inhabit the udder of cows and apparently live there all or most of the time. So no matter how carefully the cows and milking equipment are cleaned, normal milk from the average herd has a few hundred (usually less than a thousand) bacteria per milliliter present.

Now every operation except pasteurization from the time the milk is drawn from the cow until it is used, may and usually does add from a few hundred to thousands of bacteria to the milk. Therefore, if milk is handled carelessly from the time it is milked until it reaches the pasteurizer, it will have a large number of bacteria. The type and kind of bacteria will depend upon how and who handled the milk. For this reason many health departments have a bacterial standard for raw milk. This is justifiable because there is nothing in pasteurization to correct the biochemical changes which these millions of bacteria have caused in the milk. Likewise there is no evidence to indicate that the large number of bacteria present are superior in nutritive value to the milk which they have consumed. On the contrary there is evidence that the metabolic products of certain bacteria are irritating to the

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intestines and may cause nausea, vomiting, and diarrhea especially when present in large numbers.

Happily nature has provided an abundance of lactic acid bacteria which sours the milk under ordinary conditions before the bacteria producing undesirable changes can do much harm. The lactic acid produced not only warns us that the milk has been handled carelessly but it also prevents the multiplication of many harmful bacteria.

PASTEURIZATION AS A SAFEGUARD

Many think that pasteurization is a cure-all or panacea for dirty or unclean milk. All pasteurization does is to kill the asporogenic pathogenic bacteria and most of the asporogenic, nonpathogenic. The temperature is not sufficiently high to inactivate toxins or destroy any undesirable metabolic products. A milk that is dirty and insanitary before it is pasteurized is dirty and insanitary after it is pasteurized. The most one can say is that if properly pasteurized the milk is usually safe.

METHODS FOR DETERMINING THE SANITARY QUALITY

Since it is highly desirable to know the sanitary quality of milk, several methods have been used to try and determine the sanitary quality of milk. The first and oldest is known as the plate method. This method has been in use since it was first introduced by Koch in 1883. The merits and demerits of this method has been discussed in the literature many times. Briefly they are that it does not give you a correct picture of the bacterial population of the milk since only a certain percentage of the bacteria present grow due to nutritive, temperature or oxygen requirements. One cannot tell whether those growing are pathogenic or non-pathogenic. And finally it is time consuming and expensive.

The direct microscopic method was next introduced and had certain advantages over the more slow and cumbersome method. While only a fractional part of the milk can be examined, yet it can be done quickly and cheaply. A very good idea of the many types of bacteria present their numbers and to some extent their significance may be obtained.

DYES FOR DETERMINING SANITARY QUALITY

Other methods in use are the methylene blue and the resazurin methods. Both are used as preliminary tests to pick out grossly inferior milk usually at country receiving stations. These tests help eliminate the poorer grades of milk before they make the long haul to the city and before they contaminate the good milk. These tests are valuable to the milk inspector. Some inspectors, however, use the microscopic test for the same purpose. Here again it is quicker and cheaper and tells more than either the methylene blue or resazurin tests.

For raw milk all four tests may be used, *viz.*, plate count, the microscopic count, methylene blue test and resazurin test. However for pasteurized milk only the plate count and the microscopic count are usually used.

MOST INFORMATION FOR LEAST WORK

Within the past few years, several state and city health departments have settled on three tests to determine the sanitary quality of milk, *viz.*, the microscopic test for the general overall bacterial picture, the phosphatase test to determine whether the milk has been properly pasteurized, and finally the coliform test to determine recontamination after pasteurization.

TENDENCY TO ELIMINATE DIFFERENT GRADES OF MILK

There has also been a tendency to do away with grades of milk based on bacterial counts. The feeling has been that there are just two grades of milk from a health standpoint—good

and bad. A milk is either fit to use or it is not. If it is not, then it should not be used.

This is aptly illustrated by an analogous situation in surgery. If you had to have an appendectomy and your surgeon told you in discussing the operation that he had three grades of operation. The best or grade A was where the operation was done under aseptic conditions, that is all instruments, sutures, linen, and bandages were sterilized and the abdomen shaved and sterilized. The hands washed and sterilized as nearly as possible and then sterile gloves worn in addition and the cost was $100.00. In the grade A operation your chance of surviving was most excellent. In a second or grade B type operation not all the instruments were sterile, the sutures, linen and bandages might have a few bacteria present. The cost was $50.00 and your chance of surviving was about 50-50. A third type of operation known as grade C, in which nothing was sterilized. It only cost $25.00 and your chances of surviving were practically nil. There is little doubt which of the three operations you would choose. In medicine there is but one type of operation or one treatment—the best that science provides.

So it should be in the dairy industry. Every dairyman should be taught his responsibility in producing milk or dairy products. He should produce the best according to the latest and best scientific methods available. Then there would be only one grade—the best.

Unfortunately there is no one general method to determine the presence of pathogenic bacteria in milk. If we want to determine the presence of any of the many pathogenes which might be present, we must use special or specific methods.[1] The best we can do is to determine the presence or absence of certain types such as excessive numbers of sporogenic, saprogenic bacteria whose presence indicates carelessness in washing utensils, equipment, etc. Excessive numbers of acid-producing bacteria is indicative of improper cooling of the milk, washing, and care of the utensils. Large numbers of coliform bacteria in raw milk indicates improper washing of udder, fecal, feed, or dust contamination as well as improper cooling. Yeasty milk or cream comes from improper washing of udder, utensils, and cooling of milk. Ropy milk is caused by certain groups of bacteria such as *Aerobacter aerogenes, Alcaligenes viscosus, Lactobacillus casei, Lactobacillus bulgaricus,* and *Streptococcus hollandicus.* Ropy milk usually appears in spring and fall and is greatly influenced by the temperature and other conditions at this time of year.

[1] Fabian, F. W. The Function of the Laboratory in the Control of Milk Supplies. *Jour. Milk Tech.* 6, 278-284 (1943).

SUMMARY

In conclusion then it is evident that there is no one method for determining the total number of bacteria in milk. The method that gives the most complete information in the shortest time possible and for the least cost is the misroscopic method. To determine the presence of pathogenic bacteria in milk, specific and in some cases laborious, time consuming methods must be used.

In view of these facts the bacteriologist has assumed that the presence of excessive numbers of bacteria in milk was indicative of carelessness in some particular such as the health of those handling the milk or of the cow or in the method of milking the cows, cleaning the utensils and equipment, and cooling and transporting the milk. Carelessness in handling such an easily contaminated product as milk can not be condoned or tolerated from the public health standpoint since it is a potential health hazard. Therefore, milk containing excessive numbers of bacteria has always been condemned as unsafe for human consumption.

Developments in the Market-Milk Industry During World War II

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NEVER before in our history has the market-milk industry supplied so great a quantity of fluid milk to so many people. Of the nearly 120 billion pounds of milk produced annually on United States farms, more than 40 billion pounds, or more than one-third of the total, is consumed as fluid milk and cream in the cities and villages. The market-milk industry is therefore the most important branch of the dairy industry in value of products, investment in buildings and equipment, and the number of men required to do the work. Indications are that it will remain so. In fact, its importance may be expected to increase because the consumption of fluid milk, abetted by improved quality and economies of distribution, will increase. Furthermore, the industry is now in a better position than it has ever been before to expand and furnish an ample supply of safe and palatable fresh milk throughout the continental limits of the United States and its possessions.

In these developments the Army, which during the war made fresh milk a regular item in the soldier's diet for the first time in the history of any nation, had a significant part. The fact that one of the first desires of a soldier on returning to the States was a glass of fresh milk shows that a habit was formed which will not soon be forgotten or abandoned. Such a habit, if properly promoted by the market-milk industry, will extend to the soldiers' families and further increase the per capita consumption of milk.

INDUSTRIAL PRACTICES

The conditions under which milk for fluid use is produced and handled are regulated to a greater extent than are those under which milk is produced for any other purpose. State and local control officials deserve credit for the part they have played in assuring consumers a safe milk supply. Sanitary regulations governing the production and handling of market milk are strict, but the Army's milk buying and inspection program revealed that much needs to be done in the enforcement of the regulations, that many regulations ought to be simplified, and that more uniform milk ordinances with uniform enforcements are needed.

Throughout the emergency there was a downward trend in the quality of the milk received at market milk plants, largely because of the competitive demand for dairy products other than fluid milk—cheese, evaporated milk, dried milk, etc. In many localities the price of milk for manufacturing purposes so nearly approached that of milk for direct consumption that the producer of market milk frequently was unwilling to burden himself to meet the stricter sanitary regulations of the fluid milk market. When this condition prevailed the fluid milk plants either had to accept milk of a lower quality than that formerly accepted, or go out of business. The industry, how-

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ever, has become more conscious of the need to sell a product that is safe, clean, and of good flavor, with consumer appeal. Plans formulated by members of the industry to establish laboratories for the sanitary control of their products and to promote research work indicate that the downward trend will be reversed.

The introduction of improvements and the extension of previous developments were hampered by war conditions. In the field of production, the use of detergents for cleaning utensils, chemical agents for destroying germs, and mechanical milkers increased, but mechanical cooling and refrigeration of milk on the farm were not expanded normally. In the field of processing, there was a trend toward the greater production of homogenized milk and, especially where large volumes of milk were processed, toward short-time high-temperature pasteurization.

The advantages of stainless steel in equipment for processing milk have been firmly established. More and more equipment with which milk comes into contact on the farm and in the plant is being made of stainless steel.

Public health officials agree unanimously on the value of pasteurization (1). The public is fast becoming aware that pasteurization does not harm the flavor or food value of milk and that it is the only suitable measure known which, if properly applied to all milk, will prevent milk-borne diseases. The proportion of milk that is pasteurized before delivery to the consumer is increasing steadily. All milk for our armed forces and approximately 85 percent of the fluid milk supply in United States cities with populations over 10,000 is now pasteurized, and the number of cities that require that all milk be pasteurized is increasing. A large proportion of the cases of milk-borne diseases reported each year occur in small communities and are caused by consumption of raw milk. No case has been traced to the consumption of milk which has been properly pasteurized and handled. Indications are that, before long, pasteurized milk will be available in all communities. Reliable and accurate automatic time and temperature controls are replacing the manual control of pasteurizing equipment; the automatic controls help to insure that the milk is pasteurized properly.

The substitution of every-other-day for every day delivery was an outstanding innovation in the market milk industry. Its first objective was to conserve equipment, rubber, gasoline, and manpower. It was successful mainly because of improved refrigeration in the home and the improved keeping quality of market milk. It effected economies in distribution that the industry and the consumer want to maintain. There is now a trend toward delivery three times a week that omits delivery on Sundays. This trend is furthered by the use of square containers, which require less refrigerator space.

The sale of milk through stores has increased. Many dealers report that their sales through stores exceed those of retail routes. This development is bringing about the sale of milk through industry-owned stores located in suburban areas and handling only market milk and milk products. The establishment of a uniform bottle deposit system applicable throughout the country will accelerate the practice.

TESTS FOR QUALITY

The Army introduced new phases of inspection and promoted useful tests and practices. It established that the methylene blue reduction test cannot be relied upon for determining the bacterial quality of milk. Some experimental evidence indicates that the method of conducting the test can be altered so that the results will more nearly show the true bacterial quality of milk, but now control officials and

the industry tend to rely upon the direct microscopic count and the standard plate count for determining the bacterial quality of milk before pasteurization.

The use of the phosphatase test to determine whether milk is properly pasteurized has been extended. Civilian control officials were adopting it when the Army applied it widely, demonstrated its usefulness under practical conditions, and proved that, without it, a safe milk supply cannot always be assured. Workers in the Bureau of Dairy Industry of the United States Department of Agriculture (2) improved the phosphatase test, so that more precise results can be obtained. Control officials can rely on it to determine whether milk has been properly pasteurized and the industry will use it increasingly to prevent underpasteurized milk, or pasteurized milk contaminated with raw milk, from being delivered to consumers.

Many health departments have not considered the coliform test sufficiently important to require its use. Its most extensive application has been by the Medical Department of the Army. It is applied to all milk received at Army installations throughout the country. It was seldom used in milk plant laboratories before the war, but some plants began to use it during the war, mainly because the repeated presence of a significant number of coliform organisms in milk supplied to the Army was considered sufficient cause for disapproving the pasteurizing plant as a future source of milk. Its use is becoming more widespread, not as a test for proper pasteurization, but as a test for contamination after pasteurization.

This extensive use showed that the coliform test has a definite place in a milk control program, not only from an enforcement standpoint, but within the plant. Coliform bacteria found in pasteurized products probably entered after the product was pasteurized. Their presence usually indicates that greater care should be taken in cleaning and sterilizing equipment and containers, and protecting them and the pasteurized products from subsequent contamination. Its use by the Army further showed, however, that the presence of coliform organisms in a pasteurized product is not always due to contamination after pasteurization. At times their presence, in detectable numbers, was found to be due to improper pasteurization, presence of heat-resistant strains, or growth, and there were indications in a few instances that they were apparently due to gross contamination of the raw milk. These facts must be taken into consideration whenever the results of this test are used for enforcement purposes. It was also learned that there is no correlation between the results of the coliform test and the standard plate count of pasteurized milk. Positive and negative coliform results are obtained on both low- and high-count milk. Also, except in rare instances, whenever coliform organisms are found in pasteurized milk as delivered, the condition can be corrected by a thorough cleaning of the plant equipment. The test, therefore, is an ideal means of checking the clean-up operations in a plant (3).

Control officials and the industry are making greater use of the coliform test. Its use by the Medical Department of the Army showed, however, that to be of the greatest value, definite standards should be set up as to the number of organisms permissible in a sample of milk and the frequency of their appearance permissible in samples of milk processed by a plant. The regularity with which the organisms are found in the milk processed by a plant has as much significance as the number of organisms found in any one sample. Furthermore, uniformity should be established in the method of conducting the routine laboratory determinations for coliform organisms in milk and of interpreting the results.

The Army milk program also estab-

lished that fresh fluid milk can be supplied to any place in the United States or its possessions. Pasteurized milk packaged in quart paper containers was shipped from Minnesota and other northern states to Florida, Texas, and other southern states. The milk was shipped in refrigerator cars and kept cold by suspending dry ice in burlap bags from the ceiling of the car. The milk was of excellent quality upon arrival at its destination.

There were instances, however, when the milk had a high titratable acidity due to the absorption of carbon dioxide. Although the containers were packaged in corrugated fiber cartons, the carbon dioxide at times became so concentrated in the car that it penetrated both container and carton and was absorbed by the milk. When the milk was heated or aerated, the titratable acidity returned to normal. Whenever the acidity exceeded 0.25 percent, the milk was not palatable and the soldiers refused to drink it. It was found later that tight and efficient refrigerator cars could be used successfully without resorting to dry ice, provided both cars and the milk were sufficiently cooled before loading.

For troops stationed in areas where milk was scarce, the Army bought concentrated milk. Instead of attempting to ship whole milk long distances before pasteurizing, the milk was concentrated to one-half its volume by evaporation under vacuum. The milk, after concentration, was not sterilized, and therefore did not have a cooked or caramelized flavor. The concentrated milk was shipped under refrigeration to milk plants located in the area of consumption. There it was reconstituted and, wherever possible, blended with the available fresh milk before pasteurization and bottling. At times, however, only the reconstituted milk was used. This milk was not only acceptable to the Army but to civilians. Where the reconstituted milk was blended with fresh milk before pasteurizing and bottling, complaints based on the lack of depth of the cream line were received unless the product was homogenized. The reconstituted milk was a satisfactory means of supplementing local milk supplies in time of shortage. Concentrating it before shipment lowered carrying charges and improved the keeping quality. But such milk is not sterile, and is subject to contamination like fresh milk. Furthermore, lactic acid organisms are largely destroyed during processing with the result that the concentrated milk does not sour readily, thus eliminating a useful indicator of the age and quality of the milk. Furthermore, proteolytic organisms, which may be present in the concentrated milk, are capable of multiplying in it and causing decomposition. Therefore, whenever concentrated milk is used in the preparation of reconstituted milk for fluid-milk consumption, it must be handled in a sanitary manner and used while fresh.

FROZEN MILK

During the war, with the evacuation of the sick and wounded from the theatres of operation, there arose a demand for fresh milk on hospital ships. Properly homogenized milk was frozen and used by the Army, Navy, and War Shipping Administration. The homogenized milk was packaged and frozen in square paper containers having a capacity of not more than one quart. It could, therefore, be thawed as needed and served from the original container without danger of contamination. Freezing caused separation of the fat phase in unhomogenized milk to the extent that the milk was not acceptable. Frozen concentrated milk was tried, but it did not maintain its flavor long enough and was difficult to reconstitute in a sanitary manner aboard hospital ships.

Milk for freezing was processed and frozen by milk dealers mainly on the east and west coasts. Much of it was frozen by placing the filled containers

in ice cream hardening rooms or other low-temperature storage rooms; some was frozen in wind tunnels. The milk was usually thawed aboard the hospital ships by setting it out at room temperature, usually in the diet kitchen. This milk usually kept well for 3 months, and occasional reports were received that it remained palatable for 6 months or more.

Sometimes the frozen milk was not acceptable after being held in the frozen state for even less than 3 months because the casein had flocculated. In other instances the milk developed an oxidized flavor. From all practical observations this unsatisfactory milk was processed, handled, and frozen in the same manner (in some instances by the same plant) as milk that was satisfactory. Research work has been conducted at the Army Medical Center in Washington, D. C., to ascertain why some frozen milk develops an inferior body or an oxidized flavor. The studies have shown that storage conditions largely govern the stability of the product. The lower the temperature of freezing and storing the longer it remains of a satisfactory quality. A rise in the temperature of storage is very detrimental to frozen homogenized milk (4) (5).

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Excerpts from Annual Report of Chief of Bureau of Dairy Industry, 1946

DHIA Herds Reach New Production Peaks

THE average production of all cows in dairy-herd-improvement association herds in 1945 was 8,592 pounds of milk and 346 pounds of butterfat per cow per year, the highest in DHIA history.

During the year the Bureau analyzed the records of butterfat production and feed consumption for more than 400,000 cows in the association herds. The cows that produced at the rate of 400 pounds of butterfat per cow per year yielded a return above feed cost of $208, whereas the cows that produced at the rate of 200 pounds of butterfat yielded a return of only $78 above feed cost.

The improved practices adopted by the members of the herd-improvement associations are gradually increasing the number of cows in the higher producing classes. In 1926, about 45 percent of the association cows produced less than 275 pounds of butterfat per cow and only 15 percent produced more than 375 pounds. Now only 23 percent produce less than 275 pounds and 34 percent produce more than 375 pounds. Approximately 100,000 cows in the association herds at the present time produce more than 425 pounds of butterfat per cow per year.

Better Milk Yields Obtained by Housing Cows in Pen Barns

At the Huntley, Mont., field station, where both the conventional type of stanchion barn and the pen-type barn are used for housing milk cows, better milk yields have been obtained from the cows housed in pen barns than from those in stanchion barns.

In an experiment to compare the merits of the two systems of handling cows in milk, two comparable groups of cows were used. One group was fed a rather liberal grain ration and the other a limited grain ration, each group being housed first in one type of barn and then in the other. All cows were milked three times a day. The seven cows that were fed the liberal grain ration produced on the average 18,402 pounds of milk and 684 pounds of butterfat (calculated to maturity) when housed in the pen barn. This was 19 percent more milk and 18 percent more butterfat than they had produced when they were kept in the stanchion barn. The seven cows that were fed the limited grain ration produced on the average 14,319 pounds of milk and 501 pounds of butterfat (calculated to maturity) when housed in the pen barn. This was 8 percent more milk and 6 percent more butterfat than they produced when kept in the stanchion barn.

DDT Controls Flies on Cattle and Around Dairy Barns

An emulsion spray was prepared by making up a 25-percent DDT stock solution, using Xylene as the solvent and Triton X-100 as the emulsifying agent. The stock solution was then diluted with water to make 5-percent and 2-percent emulsions of DDT. The 5-percent emulsion was used as a spray inside the barns and dairy houses, and the 2-percent emulsion was used as a spray on the cattle.

The barns and milk houses were sprayed once, at the start of the fly

season, and in all cases one spraying was effective for the entire season. The cattle were sprayed once every week or every 2 weeks. The combined spraying of the barns and the cattle practically eliminated the houseflies, stableflies, and horn flies. These are the principal flies found around dairies.

UNIDENTIFIED NUTRIENT IN MILK AND CERTAIN OTHER FOODS AFFECTS FOOD CONSUMPTION, GROWTH, AND REPRODUCTION

Research by the Bureau of Dairy Industry several years ago gave conclusive evidence that an important but still unidentified growth-promoting substance (nutrient X) is present in milk and certain other foods and feeds, including skim milk, dried nonfat milk solids, cheese, commercial casein, egg yolk, beef and pork muscle, lettuce, bluegrass, and various kinds of hay. It is also abundant in the liver extract that is used intramuscularly in treating pernicious anemia.

Tests have also established the fact that the so-called X nutrient is not present in whole wheat flour, white flour, enriched white flour, wheat bran, corn meal, soybean oil meal, linseed oil meal, heat-coagulated egg white, yeast, or farm grains.

Feeding investigations with rats this year have shown that the substance has an important effect on the amount of feed they will consume and use.

Milk from cows that were fed in various ways was always a good source of the X nutrient. Cows on pasture possibly produce milk of higher potency than cows on grain, hay, and carrots, whereas cows on grain and corn silage produce milk of intermediate potency.

Previous experiments with rats had shown also that the presence or absence of the X nutrient in the diet affected their reproduction—a deficiency of X retarding the development and early functioning of the sex organs. By more drastic methods of depleting the rats of their body stores of X, the Bureau scientists have now shown that rats on X-deficient diets may conceive but may fail to bear young, or they may bear small litters that fail to survive.

Continued efforts to determine the physical and chemical nature of the X nutrient indicate that it probably is closely associated with the protein of the plant or animal product in which it occurs. It probably is not a new protein constituent that occurs, as do the amino acids, in characteristic amounts in casein; but is, rather, a substance carried somehow by some molecules of the casein or in absorption combination.

ALFALFA SILAGE MAINTAINS HIGH VITAMIN A IN WINTER MILK

As a result of the nation-wide survey completed last year by the Bureau of Dairy Industry and 21 state experiment stations, which showed that much of the winter butter is considerably lower in vitamin A potency than summer butter, it seems very desirable to develop winter feeding methods that will be practical and economical enough to encourage farmers to produce winter milk and butter higher in vitamin A.

Since pasture grasses, hays, and other roughages are the usual sources of the carotene used by cows in manufacturing vitamin A, the Bureau is studying ways to harvest and preserve these crops so as to save as much of the original carotene as possible. One promising way is to harvest the hay crops in an early stage of maturity, when the carotene content is highest, and make "grass" silage instead of making field-cured hay.

An experiment was completed during the year in which one group of cows was fed alfalfa silage made by the wilting method and another group was fed U. S. No. 2 field-cured alfalfa hay throughout the entire winter-feeding period of 170 days. Both groups also had corn silage and concentrates.

The average vitamin A content of the milk (per pound of butterfat) is shown by monthly periods in table 6.

TABLE 6

RELATIVE EFFECT OF WILTED ALFALFA SILAGE AND FIELD-CURED ALFALFA HAY ON THE VITAMIN A CONTENT OF WINTER MILK

Sampling date	Vitamin A content of winter milk produced by cows on —	
	Alfalfa silage	Alfalfa hay
	International units per pound of fat	*International units per pound of fat*
Oct. 29	[1] 20,180	[1] 19,320
Nov. 28	17,200	16,200
Dec. 28	17,190	12,450
Jan. 28	18,790	9,327
Feb. 28	18,075	9,190
Mar. 26	19,485	10,095
May 6	[2] 23,165	[2] 20,005

[1] Cows on good pasture. Changed to experimental ration Nov. 9.
[2] Cows on good pasture after Apr. 20.

All cows were on good pasture before the test started, and it is apparent from these figures that the alfalfa-silage ration produced winter milk practically equal to summer milk in vitamin A value, whereas the field-cured hay produced milk in late winter with less than half as much vitamin A as the summer milk.

Other experiments by the Bureau have shown that cows will produce somewhat more milk on alfalfa silage than on U. S. No. 2 alfalfa hay and that the labor and machinery costs are no greater (per unit of dry matter) for making silage than for making hay. Harvesting the alfalfa crop for silage therefore is a practical and economical method of producing not only more milk but milk high in vitamin A potency.

DRIED WHOLE MILK

Experiments this year have shown that heating milk at 87° C. for 5 seconds is sufficient to destroy the lipase activity for market milk purposes, but when milk is treated the same way and dried it develops the rancid odor in 3 to 4 months. Apparently the lipases are practically inactivated by heating at 87° for 5 seconds and therefore do not act in a short time and at the temperatures used in storing and handling market milk, but become active in dried whole milk as a result of the higher temperatures and longer storage time. Keeping quality can be prolonged greatly if the oxygen concentration is reduced to approximately 1 percent or less.

In packaging dried whole milk, the oxygen content in the free space of the container can be reduced to 3 percent by a single evacuation and refilling with an inert gas; it can be reduced to less than 2 percent by two evacuations, with a time interval of several days between, and refilling with inert gas; but it is difficult with present procedures to lower the oxygen content to 1 percent. This is caused by firm absorption of the oxygen on the particles of milk powder. In order to remove these gases more effectively, the dried milk has been heated to higher temperatures *in vacuo* before packaging. However, these higher temperatures actually decreased the ease of removing the sorbed gases because the vaporizing water from the dried milk produced the vacuum pressure. This has been overcome, on laboratory scale, by placing a dessicant in the drying system.

EVAPORATED MILK

Earlier experiments have shown that forewarming milk to temperatures of 230°-270° F. for short periods of time increases its heat stability. Commercial heaters are available to heat the milk on a large scale to 265° F. An entirely new design of heater has been developed on a laboratory scale to heat milk to a temperature up to 280° F. in a few seconds, with consequent formation of only a slight amount of milkstone.

IMPROVEMENTS IN PHOSPHATASE TEST FOR CHEESE AND MILK

The successful application of the phosphatase test last year to cheese has been followed up this year by fundamental studies of the chemical reactions involved. As a result, it is possible now to detect a decrease of 1° F. in the high-short pasteurizing temperature, or as little as 1 pound of raw milk in 2,000 pounds of pasteurized milk used in making the cheese. In the case of whole milk, as little as 0.05 percent contamination with raw milk can be detected. Even small amounts can be detected in cream.

Although the content of phosphatase in goat milk is low, the improved test reveals as little as 0.25 percent of raw milk in either goat milk or cheese.

BAKERS' CHEESE FROM DRIED SKIM MILK

Shortage of bakers' cheese has led this year to a method of making this product from dried skim milk, enabling bakeries to make their own. Dried skim milk is reconstituted with water to a higher solids content than that of normal milk. Good lactic starter and a small amount of rennet are added. This batch is allowed to coagulate for 4-16 hours, depending on the temperature. When the curd is firmly coagulated it is placed in muslin bags (without being heated or cut) and allowed to drain. It is then ready for use or for packaging in suitable containers for marketing.

The yield of cheese varies from 1¾ to 2¼ pounds per pound of dried skim milk. The total cost of manufacture, shipping, and handling is usually less than when the cheese is made from fresh skim milk.

Experimental cheese so made was equally as good as that made in the usual way and was more uniform in quality.

SOME NEW PROCEDURES DEVELOPED FOR INCREASING YIELD OF RIBOFLAVIN FROM WHEY BY BACTERIAL ACTION

Sizable quantities of riboflavin (vitamin B_2) are being produced commercially from cheese whey, largely for enriching poultry and livestock feeds. Bacterial organisms are added to the whey to increase the natural riboflavin content manyfold. But in recent years methods of producing this important vitamin synthetically have reduced the price considerably, and greater yields from whey are necessary to meet the competition.

Liquid whey normally contains about 1.37 micrograms of riboflavin per gram, or at present prices about 15 cents worth in 2,000 pounds. Under ideal conditions, as demonstrated by research work in the Bureau of Dairy Industry, the riboflavin content of whey can be increased perhaps 50 times by using the bacterial organism, *Clostridium acetobutylicum,* to ferment the sugar in the whey. This organism digests the sugar and produces waste products of metabolism, including riboflavin, butyl alcohol, and hydrogen peroxide. Experiments by the Bureau this year have shown that the hydrogen peroxide produced by the organisms acts as a deterrent if too much iron is present in the whey.

It has been known for some time that the iron content of the whey, or of any other medium used for producing riboflavin by bacterial action, must be kept low in order to obtain high yields. Commercial producers attempt to overcome the iron interference, either by avoiding contamination of the whey by processing equipment or by using iron-precipitating reagents. In attacking the problem by more fundamental research, the Bureau discovered that it is the hydrogen peroxide formed by the bacterial organisms which destroys the riboflavin in the presence of small quantities of iron, rather than the iron itself. The destructive action can be prevented by

adding substances to the medium which destroy the hydrogen peroxide, and also by adding potassium iodide to protect the riboflavin at the point in its molecule where it is susceptible to attack by hydrogen peroxide. Adding such substances not only increases the possible yield of riboflavin, but extends the range of iron concentration in which high yields can be obtained.

Research with a yeast organism, *Candida guilliermondi,* shows this organism to be capable of synthesizing greater quantities of riboflavin than *Cl. acetobutylicum,* but the conditions of growth and fermentation require much more delicate control.

CHANGES INVOLVED IN AGING ICE CREAM BEING INVESTIGATED

Practical experience has shown that it is desirable to age the ice-cream mix, because aging improves the whipping properties of the mix and this results in a smoother, better-bodied ice cream. Both experience and research have shown that the mix should be aged at a temperature under 40° F. for at least 4 hours, and that aging for 1 day is even better.

The changes involved in the aging process have not been studied heretofore, but if the nature of the reaction can be determined it may be possible to speed up the aging process and save the ice cream maker's time. Preliminary studies by the Bureau of Dairy Industry this year indicate that aging is a recovery from some condition that occurs in the mix when it is subjected to heating by pasteurization and homogenization. It has been shown to be a reversible reaction, probably involving the equilibrium of the milk salts, that is, the benefits of aging can be obtained repeatedly by alternately heating the mix and cooling and holding for the required time. The effects of aging the mix can be undone slightly by warming it to 50° F. and completely by warming it to 100°. Curiously, 100° is the temperature closely approximating that at which milk fat is completely fluid.

PROCESS BUTTER ACT STRENGTHENED BY NEW LEGISLATION

Weaknesses inherent in the existing law pertaining to the administration of the process butter act were remedied by Congress on June 24, 1946, by enactment of Public Law 427. Added authority is given the Secretary of Agriculture under the new law, and through him to the Bureau of Dairy Industry, which will involve strict enforcement of new regulations and continuous inspection at all qualified process-butter factories. The proper administration of the new law should insure future consumers of process butter a safe, clean, and wholesome food product.

Five qualified process- or renovated-butter factories were in operation during the year. These factories produced approximately 3 million pounds of finished product and afforded a market for farm-made butter throughout the southeastern section of the United States. The process-butter factory is frequently the only market outlet for farm-made butter.

New Books

Milk Marketing Under Federal Control, by Carl McFarland. Published by Milk Industry Foundation (Washington, D. C.). 1946. 205 pages.

This book describes clearly and interestingly the history and development of the misnamed Agricultural Marketing Agreement Act of 1937, and its application. The first chapter, "I. Regulation and Administration," discusses the nature of government regulation, tracing the "how" of milk regulation. Under "II. Marketing Act History," the vicissitudes of legislative enactments are presented, culminating in the present complex accumulation of acts and parts of acts used descriptively in this book as the Marketing Act. Chapter "III. Substance of the Statute" discusses the provisions—what may be done. Chapter "IV. Procedure and Administration" presents in detail the "how" of regulation. Finally, under "V. Marketing Agreements and Orders," the book contains (I) a summary of typical marketing order provisions and (II) an outline or review of the issues which underlie marketing orders.

Appendices carry a copy of the "Agricultural Marketing Agreement Act," "Rules of Practice and Procedure," "Legislative History of Marketing Act Relevant to Milk," "Marketing Order References." A well arranged table of contents and index facilitate reference. The book should be useful to milk control officials in public health work in view of the growing interest in the federal government in all aspects of the milk industry.

"This book is privately printed in a limited number. It is distributed only to the members of the Milk Industry Foundation. The few available extra copies may be purchased from the Foundation. Should demand justify it, revisions may be issued in the future."

Statistical Quality Control, by E. L. Grant. Published by McGraw-Hill Book Company, New York and London. 1946. 562 pages. $5.00.

In the Preface the author states that his object has been to explain simple but powerful statistical techniques that can be widely used in industry to reduce costs and improve product quality. For example, it shows how to separate variations into their respective causes, one result of which is to locate and measure the importance of the variation and thereby ascertain when to leave a process alone as well as when to take action. It has found application in the aircraft industry, the chemical industry, the milling industry, in food canning and preserving, and in many others. The mathematics comprises no more than the operations of ordinary arithmetic. The descriptions are clear. Forty-five examples are given with full analysis, and 145 problems apply the principles of the text.

Foods: Their Values and Management, by H. C. Sherman. Published by Columbia University Press, New York, 1946. 221 pages. $3.25.

There is a general introductory view of the present food supply, then a chapter on each food group, and a concluding one on food adjustment problems. Each article or type of food is briefly but clearly discussed from the standpoint of its main nutritive value: energy, protein, mineral elements, and vitamins, with attention to distribution and conservation of vitamin values and the amounts of the individual amino acids in the different food proteins. The Appendix carries a table of recommended dietary allowances and a selected reading bibliography of 21 pages. The text is an excellent combination of practical information for the intelligent reader, interestingly presented, in non-technical language.

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Association News

Philadelphia Dairy Technology Society

At our first meeting for the 1947–48 season held at the Whittier Hotel, 15th and Cherry Streets, October 9th, we had an attendance for our dinner of 108. Our speaker was Professor James J. Reid of the Department of Bacteriology, School of Agriculture, Pennsylvania State College. His subject was "Newer Knowledge of Mastitis". Professor Reid's talk was very well received and created an interesting discussion.

From the turnout we had for our first meeting it looks like we are going to have a very busy and interesting year.

W. S. HOLMES
Secretary-Treasurer

New York State Association of Milk Sanitarians

The New York State Association of Milk Sanitarians will hold its 1948 meeting on September 22, 23 and 24 in Buffalo, N. Y. The Hotel Statler will be official headquarters.

C. S. LEETE
Secretary-Treasurer

Associated Illinois Milk Sanitarians

Our Association is planning to hold its annual fall conference at the Hotel Morrison, Chicago, on Monday, December 15, 1947.

P. EDWARD RILEY
Secretary-Treasurer

Thirty-Fourth Annual Meeting

MILWAUKEE, WISCONSON, OCTOBER 16–18

REPORT OF SECRETARY FOR 1946–1947

THE International Association of Milk Sanitarians is going strong. The extent of its influence is reflected by an occasional application for membership from foreign countries, particularly South Africa and South Amerca. At the present time (October 13, 1947) the membership consists of 2,041 members of whom 429 are Active and 1,612 are Associates. The new members for the year are 57 Active and 320 Associate. The paid-up membership lists were revised as of July 15th so that any members whose dues were not paid by that date have been placed on the inactive list and have not been counted in the membership total. This fact makes it impossible for us to compare the membership total of this year against that of last year.

During the year we lost in death one of our most loyal and productive members, namely, Mr. Horatio N. Parker, as well as other members of this and associate organizations as follows: T. G. White, F. C. Button, Glenn N. Young, W. M. Totman, William G. Kaeser, and Clarence Sontag.

The *Journal of Milk and Food Technology* in its January issue came out under its new caption which included the added word FOOD. Publication has been increasingly difficult because of the rise of cost of production with no increase in advertising or subscription rates. This situation precluded the possibility of issuing more than six numbers per year. We are seeking to improve the financial status by a necessary raise in advertising rates commencing with the coming calendar year.

Pursuant to the action of the Association last year in voting general approval to the program of granting licenses for firms to use the 3A symbol when their equipment complies with our sanitary standards, we investigated the legal status and found that the symbol "A" had previously been registered by the DeLaval Separator Company, thereby precluding our use of any modification thereof. Mr. Tiedeman brought the situation to the attention of this company with the result that the company withdrew its claim and relinquished all its rights to the use of the symbol, although it owned this for fifteen years. Such generosity and cooperation is appreciated. Further developments in the use of the symbol in the licensing program will be presented in Mr. Abele's committee report.

A count of the vote on the proposed changes in the Constitution, particularly to broaden the scope by changing the name of the Association to read *International Association of Milk and Food Sanitarians, Inc.*, yielded the following results:

In favor of the change.....268
Opposed to the change..... 17

Application for affiliation with our Associaton has been made by the Minnesota Dairy Fieldmen and Inspectors' Association. Representatives from this fine group will be present at this meeting.

In this period of rising costs, the Association found it necessary to charge for registration at this annual meeting. Our fee of one dollar is less

than the amount usually charged by other organizations in our field.

May I take this opportunity to point out that the local arrangements and entertainment features have been handled entirely by our genial host, Dr. K. G. Weckel, *President*, and Mr. L. W. Brown, the capable *Secretary*, of the Wisconsin Milk Sanitarians Association, and by Mr. E. C. Kleffen, the efficient chairman of the local committee. We thank these gentlemen and their associates most heartily for their helpfulness.

Respectfully submitted,
J. H. SHRADER,
Secretary-Treasurer

ANNUAL REPORT OF THE TREASURER

1947

Receipts

Balance transferred from Albany:			
November 7, 1946	$4,000.00		
December 10, 1947	444.09	$4,444.90	
Annual Dues		3,969.50	
TOTAL RECEIPTS			$8,403.59

Disbursements

C. A. Abele: expenses in attending Washington meeting			$ 92.66
Bank service charges: foreign check collections and non-par checks			12.75
Bonds: Fidelity Bond for J. H. Shrader	$ 12.50		
Premium on bond of managing editor of JOURNAL	10.00		22.50
Clerical services (emergency)			77.50
Honorarium: C. S. Leete			100.00
Journal subscriptions mistakingly entered as Association membership dues			3.50
Lawyer's services: 3A symbol and trade mark for JOURNAL			115.00
Membership subscriptions to the JOURNAL OF MILK AND FOOD TECHNOLOGY: $1 per paid-up members March 18, 1946, to September 30, 1947			2,674.00
Petty cash			6.00
Postage			110.00
Printing: stationery, membership cards, etc., and other office supplies			210.47
Professional reporters at Atlantic City meeting			63.80
Refunds on overpaid dues (affiliated associations and individual members)			51.00
Resolutions (engraved): C. S. Leete and H. N. Parker			118.00
Compensation: J. H. Shrader	$ 458.33		
M. B. Harris	330.00		788.33
Telephone and telegrams			22.02
TOTAL DISBURSEMENTS			$4,467.53

Summary

Total Receipts	$8,403.59
Total Disbursements	4,467.53
BALANCE	$3,936.06

Summary of the Thirty-Fourth Annual Business Meeting International Association of Milk and Food Sanitarians

MILWAUKEE, WISCONSIN

October 17, 1947

The meeting was called to order by Dr. R. G. Ross, *President*. Minutes of the 1946 meeting were read and approved.

The Treasurer's report for 1947 was read and accepted. Auditors C. S. Leete and Charles E. Carl reported that "The books of the Secretary-Treasurer of the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS and the books of the Managing Editor of the JOURNAL OF MILK AND FOOD TECHNOLOGY have been examined and found correct as of the close of business, September 30, 1947." This report was accepted.

Past-President R. R. Palmer presented the following resolutions:

1. That appreciation be expressed for the work of the officers of the Association and the Local Committee for making arrangements for the success of the present meeting.
2. That thanks be extended the participants in the program for their services to our Association at this annual meeting.
3. That thanks be extended to the management of the hotel, the Convention Bureau, and others responsible for furnishing the facilities and services.
4. That in memory of our recently deceased members, their names be spread on the minutes, and letters of condolence be sent to the bereaved families by the Secretary. The members rose and paid respect by observing a moment of silence.

Mr. Abele presented the following resolution concerning the work of the Committee on Sanitary Procedure:

WHEREAS, It is essential that milk sanitarians have printed copies of sanitary standards for equipment used in handling and processing milk and milk products conveniently available for ready reference, and

WHEREAS, Sanitary Standards for such equipment, published from time to time in the JOURNAL OF MILK AND FOOD TECHNOLOGY are dispersed through a number of volumes of that JOURNAL, and are frequently unavailable when needed,

THEREFORE, BE IT RESOLVED:

1. That the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS make available, at reasonable cost, reprints of sanitary standards published in the JOURNAL OF MILK AND FOOD TECHNOLOGY, and

2. That binders or folders, including all published sanitary standards, and the Annual Reports of the Committee on Sanitary Procedure since 1944, be made available at reasonable cost.

This was adopted.

The Secretary then presented his report (see page 359). The report was accepted as read.

The President called for a report on the result of the vote on the constitutional amendments. Dr. Shrader reported as follows: The total number of votes cast was 286. Those in favor of the change, namely, that we broaden the scope to include "Food", 268; against the change, 17; no vote (illegible ballot) 1; total 286. President

Ross formally declared that the official name of the Association from now on is the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC.

The Association voted to accept the report of the Committee on Sanitary Procedure which had been read on the program of the annual meeting.

The Association then authorized the publishing of the "Report of the Committee on Regulations and Ordinances", as delivered on the program, in the JOURNAL, with the request that comments be sent direct to the chairman of the committee, Mr. Tiedeman.

Mr. William B. Palmer stated that in view of the broadened field of the work of the Association it appeared desirable "that activities similar to those of the Committee on Sanitary Procedure would be well applicable to the other branches of the food industry, and it might be of concern to this Association to have a subcommittee or another committee working on the sanitary procedures for the other branches of the food industry." Mr. Fuchs pointed out the desirability of bringing the standards of sanitary equipment in other branches of the food industry up to a level eventually of the equipment in the dairy industry. The Association then authorized the incoming President to appoint a committee to inaugurate a systematic formulation of sanitary standards for food equipment in general, bearing in mind that the food industry is not as homogeneous nor as well-organized as the dairy industry, and that much educational contact work must be done to establish a proper background of understanding and interest for developing such a program.

Mr. Leete, our past Secretary-Treasurer for ten years, expressed his appreciation for the embossed copy of the resolution and the honorarium which were awarded by the Executive Board.

The Nominating Committee consisting of J. G. Hardenbergh, *Chairman*, L. Wayne Brown, and Paul Corash, then brought in the following slate:

PRESIDENT: Walter D. Tiedeman, State Department of Health, Albany, N. Y.
1ST VICE-PRESIDENT: A. W. Fuchs, U. S. Public Health Service, Washington, D. C.
2ND VICE-PRESIDENT: Dr. M. R. Fisher, Department of Health, St. Louis, Mo.
3RD VICE-PRESIDENT: Dr. K. G. Weckel, University of Wisconsin, Madison, Wis.
SECRETARY-TREASURER: Dr. J. H. Shrader, 23 East Elm Avenue, Wollaston, Mass.
AUDITORS: H. L. De Lozier, Department of Health, Louisville, Ky.
and
Charles E. Carl, Department of Health, Jefferson City, Mo.

After giving the floor opportunity to offer nominations, each of the above nominees was duly elected unanimously. Dr. Ross then appointed representatives to escort each of the newly elected officers to the platform where they received the greetings of the members.

President-Elect Tiedeman stated: "For myself and our newly elected officers, I wish to say that we appreciate the confidence that the Association has shown in our election. Like all new officers should, we have pretty high aspirations. We will be lucky, though, if we do as well as our predecessors. We hope at least to uphold the standard that they have set for us."

Our retiring President, Dr. Ross, was then called upon to make a few remarks in view of the allegation that "he has been rather silent throughout this whole meeting." He replied as follows: "Well, I will explain some of that by saying that there was not much time to talk between papers and get this program run on schedule. However, I do want to say that I appreciate the cooperation of all of the officers who have served with me and all of the committees, the chairmen of the committees, as well as the members. It has, indeed, been a pleasure to serve during these past few years up through the different offices, and it is an honor. There has been some work to it, but I sincerely appreciate the honor shown

me and the confidence expressed by the members of the Association in allowing me to serve as the President this past year."

The Executive Board approved the application of the Minnesota Dairy Fieldmen and Inspectors Association for affiliate membership, thereby adding seventy-eight fine new members to this Association.

Final registration report:

	Members	*Guests*	*Total*
1st Day	268	81	349
2nd Day	25	37	62
Total Men Registered			411
Milwaukee	33		
Out-of-Town	378		
Total Women Registered			40
Total Registration			451

On the formal program twenty-nine speakers presented papers and four additional speakers presented films and demonstrations on milk and general food subjects.

Large groups visited several of the plants. On the lighter side, the ladies were entertained by successful trips over the city, and the Association was entertained by an evening of refreshment and pictures, and later by a banquet with an unusually attractive floor show.

The Executive Board has decided to hold the next meeting at Philadelphia, at such time in October as will enable the members and guests to attend the annual Dairy Show which will probably be held in Atlantic City.

George C. Supplee Wins Borden Award

Recipient of the 1947 Borden Award of $1,000 and a gold medal for research in the chemistry of milk is George C. Supplee, president of the G. C. Supplee Research Corp., Bainbridge, N. Y. and formerly president of the International Association of Milk Inspectors (now the International Association of Milk and Food Sanitarians, Inc.) in 1925–26. The award was made at the 112th national meeting of the American Chemical Society in New York City. He is credited with developing the first practical methods for commercial irradiation of milk to increase its vitamin D content. In addition, he has conducted investigations in the keeping quality of milk powder, the development of methods for packing milk powder in inert gas, and the isolation of pure natural riboflavin (B_2) from whey and waste products resulting from milk manufacture. For his work on riboflavin, he received the Billings Medal of the American Medical Association in 1936.

—From *Chemical and Engineering News*, September 15, 1947, page 2621.

Sol Pincus Retires

After twelve years of service, Mr. Sol Pincus is retiring from his official work in the New York City Department of Health, where he served as Deputy Commissioner of Health and Senior Sanitary Engineer in immediate charge of food, drug and sanitary environmental activities.

Mr. Sol Pincus graduated from Columbia College, B.S., in 1913, and from Columbia University School of Engineering, C.E. (sanitary option), in 1915. He spent eight years in the U. S. Public Health Service—one year as sanitary bacteriologist and seven years on sanitary engineer assignments: coastal water pollution studies, extra-cantonment sanitation, and was District Sanitary Engineer in Charge.

From 1924–1935 Mr. Pincus was in a private sanitary engineering practice —manufacturing chlorinating equipment, design and construction of swimming pools, sanitary surveys, and a health and hospital survey in Philadelphia.

In July, 1935, he became Deputy Commissioner and Senior Sanitary Engineer in charge of the food, drugs, and sanitary activities of the New York City Department of Health, in which position he served until his retirement in October, 1947. In the milk regulatory field he directed the development of the deck testing of farmers' milk, and the routine use of the phosphatase test for control of pasteurization, and initiated the extensive training of milk and food plant workers by the Department.

Mr. Pincus has been President, Public Health Association of New York City; President, Central Atlantic States Food and Drug Officials; Chairman, Engineering Section of the American Public Health Association; Member Sanitary Procedures Committee, International Association of Milk and Food Sanitarians; Member Executive Committee, New York State Milk Sanitarians; and Member Sanitation and Milk Advisory Boards, U.S.P.H.S. He has written articles on sanitary engineering, milk and food regulation, smoke control, and sanitary landfills.

After a short vacation on his farm at Fishkill, New York, Mr. Pincus plans to establish a public health engineering consultant practice in New York City.

New Sanitary Fittings Catalog

Cherry-Burrell Corporation has recently published a rather comprehensive catalog on Sanitary Pipe and Fittings. In addition to showing large illusrations of the various fittings and valves, the catalog includes dimension drawings, specification tables and a list of the sizes and types of material in which each item is made. A two-page spread contains a display of all the items. This new catalog makes ordering a simple task. The catalog has been widely distributed to dairy plants, but anyone who has not received a copy should write the nearest Cherry-Burrell Branch or the company's general offices at 427 W. Randolph Street, Chicago 6, Illinois, for a copy of Bulletin G-443.

J. H. Frandsen Retires

AFTER forty-five years of service to the dairy industry as teacher, administrator, lecturer, and writer, Professor J. H. Frandsen retired from active service at the end of the recent academic year and was given the honorary title of Emeritus Head of the Department of Dairy Industry, University of Massachusetts, by the Trustees at their meeting June 8th.

In 1926 Professor Frandsen came to the then Massachusetts Agricultural College as Head of the Animal and Dairy Husbandry Departments, a position he held for some years before becoming Head of the Dairy Industry Department.

Professor Frandsen has always been a strong advocate for the improvement of the public milk supply and during his early years here he took a leading part in campaigning for the eradication of tuberculosis and Bang's disease in Massachusetts dairy herds, and he pioneered in advocating universal pasteurization of milk. While at Massachusetts he also was instrumental in securing the almost complete remodelling of the dairy industry building and the erection of a model abattoir which provides laboratory space for the popular meats courses.

Professor Frandsen graduated from Iowa State College in 1902 and began his career as an assistant in agricultural chemistry at that institution. After receiving his Master's degree in 1904 he went to Portland, Oregon to serve three years as dairy chemist with the Hazelwood Creamery Company. Following this he was for four years Head of the Department of Dairy Husbandry at the University of Idaho, and for the next ten years he held the same position at the University of Nebraska. During that time one of the notable university herds was developed, and Professor Frandsen had the privilege of planning and seeing completed what at that time was an outstanding dairy industry building, which is still one of the best in the country. For three years he served as Dairy Editor and Counsellor of the Capper Farm Press. He was co-author of the first textbook on the Manufacture of Ice Cream and Ices.

As early as 1907, before the days of well organized extension service, he saw in the railroads an effective tool for improving dairy conditions and succeeded in interesting railroad officials in putting on dairy demonstration trains in Idaho and Nebraska.

During the first World War he was chairman of the Nebraska Dairy Food Commission and in 1924 was appointed a member of the American Farm Bureau's Committee of twelve to develop orderly and more profitable marketing of dairy products. In 1923 he was a vice-president of the World's Dairy Congress meeting in Washington, D. C., and in 1931 was a delegate from Massachusetts to the meeting held in Copenhagen, Denmark. In 1935 he helped to organize the Association of New England Milk Dealers, and was honor guest at the annual meeting last March when he was presented a scroll "in token of its appreciation of his many years of faithful and diligent service to the dairy industry of New England." In 1942 he received a Certificate of Merit from the Massachusetts Milk Inspectors' Association "in appreciation of many years of service in the field of milk inspection."

Perhaps his most outstanding accomplishment and the one which in the long run has influenced the Industry to the greatest extent was his

activity in founding the *Journal of Dairy Science* and his work as first Editor of the publication from 1916 to 1928.

In 1940 the American Dairy Science Association paid tribute to Professor Frandsen's efforts with a scroll which said in part "In recognition of outstanding service to dairy science in America, particularly in the conception, advocacy, and establishment of the *Journal of Dairy Science* which he so carefully nurtured and successfully managed and edited for eleven years, a substantial and far-reaching contribution of inestimable value to the advancement of dairy research, teaching and practice—", and voted him an honorary member of the Association.

As a fitting climax to his years of service in Massachusetts, the Dairy Club, a student branch of the American Dairy Science Association, at their April meeting presented Professor Frandsen with a beautiful leather briefcase "as a small token of our esteeem—we hope—will remind you of the many students who wish you the best of everything in this new era of your life," said Edward Larkin, President of the Dairy Club. And on April 23rd the members of the Department of Dairy Industry presented Professor and Mrs. Frandsen a travel clock and a silver antique coffee pot as parting gifts. Said Professor Lindquist, acting head, "In his busy life Professor Frandsen has accomplished much and it is hoped that now as he relinquishes his duties here at the University of Massachusetts he will have many years of leisure in which to travel and to enjoy his many friends and acquaintances and to continue his writing."

Professor and Mrs. Frandsen plan to continue their residence in Amherst.

Dairy Technology Conference—University of Maryland

The program for the Third Annual Dairy Technology Conference at the University of Maryland, December 2–4, is practically complete. The program is sufficiently varied so as to be of interest to persons in all phases of the dairy industry, including milk and ice cream plant managers and superintendents, technicians, fieldmen, and dairy inspectors and sanitarians. Ice cream will be stressed on the first day, market milk on the second, and field problems on the third. The dairy products discussions will feature Professor C. A. Iverson, Department of Dairy Industry, Iowa State College, on flavors in ice cream, and developments in the market milk industry; Dr. D. H. Jacobsen, Cherry-Burrell Corporation, on quaternary ammonium germicides and recent developments in cleaners and cleaning; V. M. Rabuffo, Editor of the Ice Cream Trade Journal, on packaging of ice cream; V. Schwarzkopf, Lathrop-Paulson Company, on the cleaning of milk cans; and D. W. Taylor, U. S. Public Health Service, and G. D. D'Ambrogi, Baltimore City Health Department on ice cream sanitation. P. B. Larsen, R. N. Doetsch, and F. E. Potter, University of Maryland, will present the results of studies on the quality of ice cream in the Washington-Baltimore area. One of the highlights of the first day's program will be a panel discussion on the subject of frozen dairy products with the panel consisting of Col. C. J. Babcock, Dr. R. W. Bell, and Dr. B. E. Webb, Bureau of Dairy Industry, U. S. Department of Agriculture, P. E. LeFevre, Chestnut Farms Chevy-Chase Dairy, Washington, D. C., and Dr. C. W. England, C. Y. Stephens

Industries, Washington, D. C., participating.

Subjects of special interest to dairy fieldmen and dairy farm inspectors will be covered in talks by Dr. J. H. Hilton, Department of Animal Industry, University of North Carolina; Dr. L. A. Moore, Bureau of Dairy Industry, U. S. Department of Agriculture; C. S. Brinsfield, Maryland State Health Department; C. B. A. Bryant, Johnson and Johnson; and R. E. Gaddis, Baltimore City Health Department.

A joint dinner meeting with the Maryland and District of Columbia Dairy Technology Society is planned for the evening of the 3rd, at which the principal speaker will be Dr. H. C. Trelogan. Assistant to the Administrator. Research and Marketing Act, U. S. Department of Agriculture.

Olsen Receives Commendation

The Queen of America's Dairyland presented flowers to H. P. Olsen at a recent ceremony recognizing his contributions to the welfare of the American public and to the dairy industries. The Queen is pretty Joanne Ruetten of Viroqua, Wisconsin.

Mr. Olson, who is known as the "Dean of the American dairy industries," has through the publications which he founded, aided the progress of the dairy industries.

Schooled the hard way in Denmark, where intensely rigid rules control the production of all dairy products, Mr. Olsen has always stressed the importance of milk quality improvement in his dairy activities in America during the last 50 years. He was the first to advocate broadly the pasteurization of milk, not only for bottling, but for the processing of all milk products.

Mr. Olsen is the Chairman of the Board of The Olsen Publishing Co., Milwaukee, publishers of The Milk Dealer, National Butter and Cheese Journal, The Ice Cream Review, and the Dairy Industries Catalog.

New Members

ACTIVE

Chamberlayne, Dr. E. C., Director, Food and Milk Control, 320 Sherbrook St., Winnipeg.

Christensen, John, Commissioner, Dept. of Farms and Markets, State Office Building, Hartford, Conn.

Fitzgerald, Donald V., P. O. Box 164, Woodstock, Ill.

Gay, Clifford Wayne, Sanitarian, City County Health Unit, 1605 College Avenue, Stillwater, Oklahoma.

Kuder, Al J., State Dairy Inspector, 604½ West Main Street, Centralia, Washington.

Lanphere, W. B., Sanitarian, Carter County Health Dept., Ardmore, Oklahoma.

Malone, Harold L., Sanitary Engineer, State Dept. of Health, 1525 N. W. 47th Street, Oklahoma City, Oklahoma.

McConaughy, Robert F., Health Dept., City Bldg., Middletown, Ohio.

Mortensen, William, State Dairy Inspector, P. O. Box No. 273, Laramie, Wyoming.

Obee, C. G., Senior Dairy Inspector, 296 Highfield Street, Noncton, N. B., Canada.

Sanborn, J. R., Professor of Microbiology, 210 Lyman Hall, Syracuse University, Syracuse 10, New York.

ASSOCIATE

Barnhart, John L., Kansas State College, Manhattan, Kansas.

Billington, Earle, Oakite Products Inc., 20 Main Street, Macedon, New York.

Brecklin, J. E., R. 1, Monroe, Wis.

Carney, Paul E., Director, Quality Control, Sheffield Farms Co., Inc., 524 West 57th Street, New York 19, N. Y.

Couffer, R. W., Machinery-Hardware Division, Flexible Shaft Company, 5600 W. Roosevelt Road, Chicago, Illinois.

Darger, Harry C., Room 1449, One N. LaSalle St., Chicago 2, Ill.

Dick, H. L., Sparkler Mfg. Co., Mundelein, Ill.

French, Benjamin F., Quality Control Supervisor, Southern Dairies, Inc., 593 Glen Iris Drive, Atlanta, Georgia.

Galante, James W., 438 W. Congress St., Chicago 44, Ill.

Georgeson, Orris, Dean Milk Co., Box C, Harvard, Ill.

Hanson, George W., Jr., Laboratory Technician, North Star Cry. Co., Kenyon, Minnesota.

Harbach, Ralph A., 3415 South 38th St., Milwaukee 7, Wis.

Hunter, M., 87 Cowlishaw St., Avonside Christ Church N. E. 1, New Zealand.

Johnson, Kenneth W., Dairymen's League Co-op Assoc., Inc., Spring Mills, Pennsylvania.

Lerner, Louis L., Tech. Dir. Allied Home Prod. Corp., 1447 Argall St., Beloit, Wis.

Mandelaro, Joseph, Cheesemaker, Blue Boy Dairy, 3 Dawson Place, Batavia, New York.

Martin, A., Travancore Dairy, 7 Kent Street, Ascot Vale, Victoria, Australia.

Miller, Alan B., Asst. Production Mgr., Abbott's Dairies, Inc., Locust Street, Oxford, Pennsylvania.

Netto, Dr. Fidelis Alves, Milk Sanitarian, Departmento da Producao Animal de, 873, Turiassu, Sao Paulo, Brasil.

Nisbet, Ruth, Baur's, 1512 Curtis, Denver 2, Colorado.

Rogers, E. D., Dairymen's League Co-op Assoc., Inc., Morristown, N. Y.

Stevens, Guy P., Supervisor Dairy Section, State Department of Agriculture, 412 A Capitol Bldg., Salt Lake City, Utah.

Toyk, M. J., Proprietor, Homestead Dairy, 75 Garcia Street, Cambridge, South Africa.

Weaver, I. A., 524 Lakewood Avenue, Youngstown 2, Ohio.

Williams, Ralph B., Director, Territorial Div., Public Health Laboratories, Juneau, Alaska, Box 1931.

CHANGES IN ADDRESS

Attoe, Arnold B., 279 Fifth St., Fond du Lac, Wisconsin, to Route No. 1, Van Dyne, Wisconsin.

Berry, Hugh S., Vosburgh Road, Averill Park, New York, to Creamery Pkg. Mfg. Co., P. O. Box 94, Troy, New York.

Black, John B., P. O. Box 27, Swainsboro, Georgia, to East Central Health Region, Georgia Dept. of Public Health, 1 Milledge Road, Augusta, Georgia.

Buechel, John N., Roberts Dairy, 220 South 20th St., Lincoln, Neb., to 212 South 20th St., Lincoln, Nebraska.

Cameron, J. Robert, 213 North 4th Ave., Ann Arbor, Mich., to Denver City-County Health Dept., Denver General Hospital, Denver, Colorado.

Clough, Ralph, Box 18, Harford Mills, New York, to Harford, New York.

Deutsch, M. N., City Health Dept., Sioux City, Iowa, to Director of Quality Milk Control and Laboratories, P. O. Box 69, Norwood, Minn.

Dodson, Lewis, Nat'l Sanitation Foundation, School of Public Health, Ann Arbor, Michigan, to City-County Health Dept., Denver General Hospital, Denver, Colorado.

Edwards, Robert L., 508 Picnic St., Shawano, Wis., to 412 South Franklin, Shawano, Wis.

Garrison, Prof. Earl R., San Francisco, Cal., to Department of Animal Industry, University of Arkansas, Fayetteville, Arkansas.

Gaylord, Clifford, 649 Woolworth Bldg., Watertown, New York, to Dairymen's League Co-op Assoc., 1234 Granite Bldg., Rochester, N. Y.

Holmes, Wesley S., Philadelphia Inter-State Dairy Council, 158 North 20th St., Philadelphia, Pa., to Dairy Council Inc., 234 South 22nd St., Philadelphia, Pa.

Horton, Mrs. Mary B., Sheffield Farms Co., Inc., New York 17, N. Y., to Sealtest Laboratory, 230 Park Avenue, New York, N. Y.

Hummer, Dr. Robert L., Prov. Sqdn. 88, APO 103, San Francisco, to 7th Vet. Det. Avn., APO 929, c/o PM, San Francisco.

Kaeder, Edward A., Maple Island Farm, Inc., Amery, Wis., to Maple Island Farm, Inc., New Richmond, Wis.

Kranaskas, Anthony Justin, Montevideo, Uruguay, S. A., to Institute of Inter-American Affairs, Health and Sanitation Division, c/o American Embassy, Quito, Ecuador, S. A.

Morgan, W. A., 33 Oak Street, Geneseo, New York, to Vogt's Dairies, Inc., New Kingston, New York.

Price, Dr. Edmund R., Kansas City, Mo., to U. S. Public Health Service No. 3720, 4321 Chamberlayne Ave., Richmond 22, Va.

Roberts, Geo. M., 40 Academy St., Skaneatolos, New York, to Ontario Milk Producers' Co-op, Inc., Mexico, New York.

Rogers, E. G., Morristown, N. Y., to Dairymen's League Co-op Assoc., Inc., 21 Carver St., Brandon, Vt.

Smith, George R., P. O. Box 35, Richmond, Virginia, to P. O. Box 35, Rice, Virginia.

Stanton, John D., Chicago, Ill., to Beatrice Foods Co., Dubuque, Iowa.

Wainess, Harold, Portland, Oregon, to 852 U. S. Custom House, Chicago 7, Ill.

Weber, Albert H., P. O. Box 283, Oxford, New York, Dairymen's League Co-op Assoc., Inc., 114 E. Ellis Street, E. Syracuse, N. Y.

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Authors

Subjects

JOURNAL OF MILK AND FOOD TECHNOLOGY

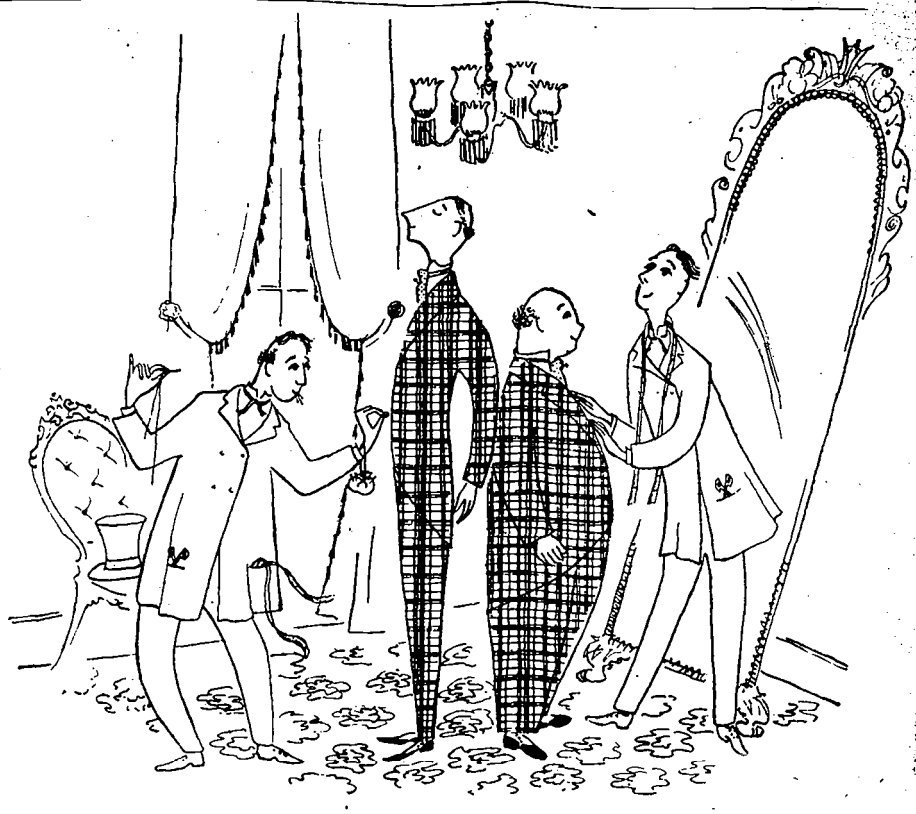
NOVEMBER-DECEMBER
1947

VOLUME 10 · NUMBER 6

THIS ISSUE INCLUDES THE INDEX
AND COMPLETES VOLUME 10

Official Bimonthly Publication of
INTERNATIONAL ASSOCIATION OF MILK SANITARIANS
(Association Organized 1911)

Designated Official Organ of
ASSOCIATIONS OF MILK INSPECTORS and SANITARIANS
and DAIRY TECHNOLOGY SOCIETIES
As Listed Herein



each made to fit

Each product in the Wyandotte line of Dairy Cleaners is *made to fit a specific cleaning need.*

Wyandotte C.W. is for washing milk cans by machine. It works well even in hard water and does not discolor or corrode. An occasional washing with Wyandotte S.R.-10 removes the most stubborn milkstone deposits.

Wyandotte Alkali Special, 721 Special*, Seneca Flakes*, and Chippewa Flakes* are for use in water of different *kinds*, as well as *degrees*, of hardness. Where water conditions are unusually difficult, Wyandotte B.W.C., used with any one of these compounds, stretches bottle-washing mileage.

For equipment cleaning, there's Wyandotte Cleaner and Cleanser*, a thorough and free-rinsing compound for use in soft water . . . Wyandotte POMA* Cleaner for medium-hard water . . . Wyandotte Keego* for very hard water . . . and Wyandotte G.L.X.* for all types of water. G.L.X. is an excellent water softener that penetrates hardened deposits and speeds cleaning action. Wyandotte Detergent is for the "brightening-up" operations in dairy plants.

For a germicidal rinse or spray, after washing, Wyandotte Steri-Chlor* is safe and efficient.

Your Wyandotte Representative will be glad to tell you more about these and other Wyandotte Products. Why not give him a call today?

For standardizing acidity prior to the manufacture of dairy products, use Wyandotte C-A-S. Readily soluble, pure and uniform.*

*Registered trade-mark

WYANDOTTE CHEMICALS CORPORATION

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Index to Advertisers

EASY-TO-HANDLE, COOL RUNNING

STEWART CLIPMASTER

Powerful air-cooled ball bearing motor inside the handle

Clipping dairy cows is a fundamental step in the production of clean, quality dairy products. Cleanliness of the cow is important. Clean, healthy cows mean milk with less sediment and lower bacteria count. Dirt falling from the body of the cow is the principal source of sediment. All the dirt cannot be strained out, for much of it dissolves. Clipping reduces this source of contamination. With the hair short, cleaning is easy, simple and quick. Cows can be prepared for milking in less time.

Now that cows are being stabled, good sanitary practice calls for a regular clipping program.

Over a period of years Clipmaster pays for itself in terms of more quality dairy products. Where electricity is not available, the Stewart hand-operated machine can be used to carry out a beneficial clipping program.

AUTHORITIES EVERYWHERE RECOMMEND CLIPPING. See:

USDA Leaflet No. 3 • USDA Farmer Bul. No. 602 • U. S. Public Health Service Bul. No. 220 • Mich. Agric. Exp. Sta. Qtr. Bul., Vol. 24, No. 3 • Miss. State Col. Ext. Cir. No. 125 • Oregon State Col. Ext. Bul. No. 630.

For further information write Livestock Specialist, Sunbeam Corporation.

Stewart clipping equipment is available at all hardware and dairy supply dealers

SUNBEAM CORPORATION *(formerly Chicago Flexible Shaft Company)*

5600 Roosevelt Rd., Dept. 142, Chicago 50, Ill.

In hundreds of laboratories, in local health boards, on the farms of America, the vital task of protecting the purity of America's milk supply goes on. Truly this is an "OPERATION ANONYMOUS"—carried on by conscientious men who seek no fanfare or glory.

It is a task in which Sealtest is proud to be associated with the milk sanitarians of America.

We are proud, too, that the quality and purity of Sealtest Milk have carried it to a position of leadership in the dairy industry.

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NATIONAL DAIRY PRODUCTS CORP. Sealtest

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