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MILK and FOOD TECHNOLOGY

Official Publication

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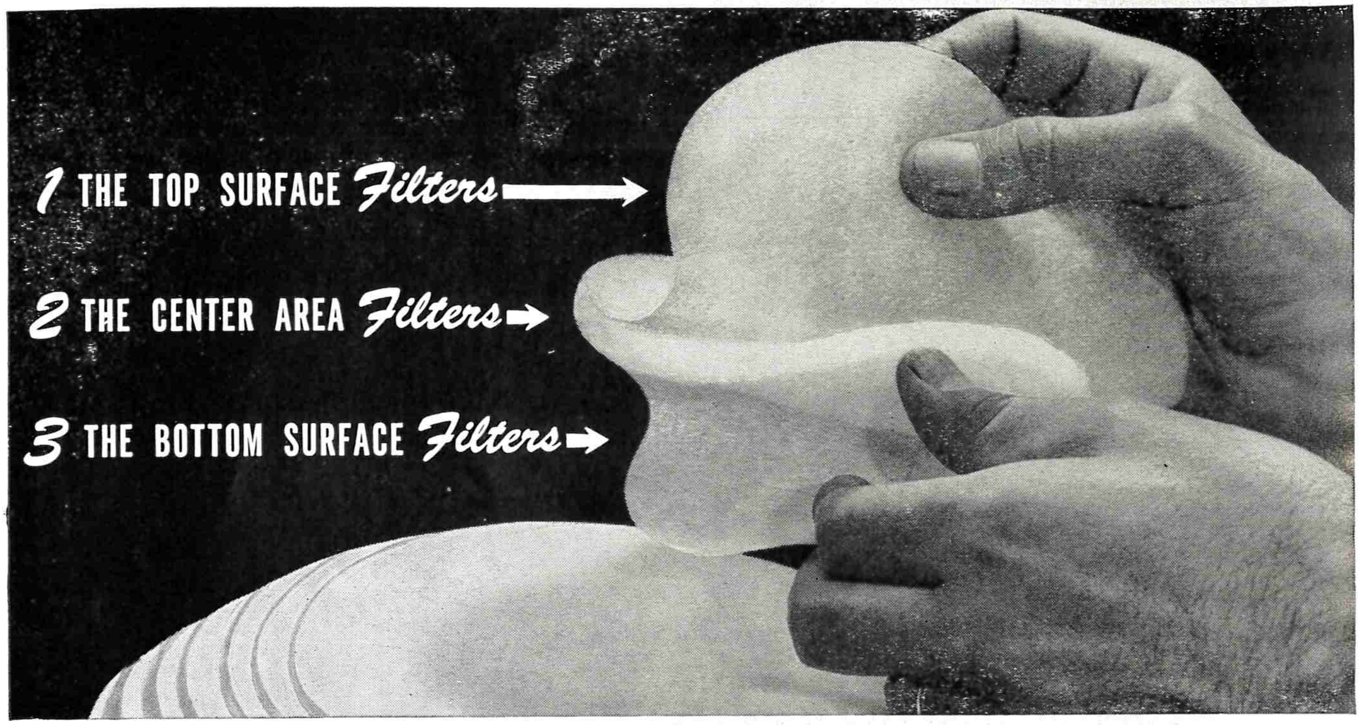

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INDEX TO ADVERTISERS

CLASSIFIED ADS

THE EFFECT OF FREEZING ON THE STANDARD PLATE COUNT OF MILK[1]

C. K. JOHNS AND I. BERZINS

Canada Department of Agriculture, Ottawa

(Received for publication October 3, 1955)

Milk and cream samples were subjected to (a) slow or (b) rapid freezing, and analysed after 24 and 48 hours storage by the standard plate count method. Bacterial destruction was much less than that reported for liquid egg.

Milk samples are sometimes shipped a considerable distance for analysis. Dry ice is frequently used to refrigerate them in transit, and occasionally samples become frozen. While freezing of liquid whole egg was found to reduce the bacterial count appreciably (2), no published data were found concerning the effect of bacteria in milk. Consequently, some tests were carried out in this laboratory.

EXPERIMENTAL

Samples of pasteurized milk, cream and chocolate drink were obtained from the Ottawa laboratory of the Ontario Department of Health, and brought to our laboratory. A few raw milk samples were also obtained from a local pasteurizing plant. At the laboratory, after the initial plating, 5-ml. replicate portions of each sample were dispensed into four sterile test tubes (16 x 150 mm.) closed with rubber stoppers. Two of these were laid on the refrigerated shelf in the freezer for quick freezing at 0°F (−17.8°C); the other two were placed at a 20° angle in racks on the floor and subjected to slower freezing at approximately 14°F (−10°C). After 24 hours, one tube of each was removed, defrosted rapidly in water and plate counts made (1). This was done with the remaining tubes after 48 hours. Duplicate plates were poured with tryptose glucose extract milk agar (1) and incubated at 32°C. for 48 hours before counting.

RESULTS AND DISCUSSION

For ready comparison the initial count on each sample was given a value of 100, and subsequent counts were expressed on a percentage basis. From the data summarized in Table 1 it is evident that freezing causes much less destruction of bacteria in milk or cream than in liquid whole egg, where the plate count was reduced by almost two thirds after 48 hours freezing at −19°C (−2°F) (2). This probably reflects a difference in the bacterial flora; in pasteurized milk and cream, the bulk of the organisms are Gram-positive species which are more resistant to freezing (3), while in liquid egg Gram-negative species predominate (2). Faster freezing of the much smaller portions of milk may also have been a factor here.

Contrary to expectation too was the frequently greater level of survival after 48 hours than after 24 hours in the freezer. The reason for this is not known. On the other hand, the faster freezing generally resulted in a higher rate of survival than the slower, as might be expected.

The findings in these studies indicate that where milk or cream samples must be shipped long distances to laboratories, partial or complete freezing, before or during shipment, is unlikely to cause an appreciable change in the bacterial content.

TABLE 1 — RELATIVE COUNTS BEFORE AND AFTER FREEZING

				Average Percentage of Initial Count			
				Fast Frozen		Slow Frozen	
Product	No. of Samples	Initial Range of Counts	Median Count	24 hrs	48 hrs	24 hrs	48 hrs
Pasteurized							
Milk — regular	14	9,900 - 100,000	44,000	86.9	102.4	83.2	93.0
Milk — homogenized	16	2,900 - 78,000	47,000	88.2	96.4	84.2	88.3
Milk — high test[a]	7	21,000 - 140,000	36,000	107.0	97.6	99.7	82.2
Milk — chocolate	3	2,700 - 44,000	36,000	76.1	54.7	95.1	77.2
Cream — whipping	5	13,000 - 39,000	23,000	93.9	94.5	133.8	100.9
Cream — table, etc.	9	6,100 - 160,000	46,000	80.1	109.9	79.9	99.9
Raw							
Milk	6	10,000 - 1,200,000	24,000	101.6	74.6	86.3	68.6
Average for all samples				90.11	95.53	90.02	88.95

[a]Jersey and Guernsey milk.

[1]Contribution No. 397 from the Bacteriology Division, Science Service, Canada Department of Agriculture, Ottawa.

(Continued on Page 299)

AN OUTBREAK OF BOVINE MYCOTIC MASTITIS ASSOCIATED WITH DRY STORAGE OF TEAT CUP INFLATIONS[1]

JOSEPH SIMON AND ROBERT HALL[2]

Department of Veterinary Science, University of Wisconsin and the State Department of Agriculture, Animal Disease Diagnostic Laboratory, Madison

(Received for publication July 5, 1955)

Cryptococcus neoformans and *Candida sp.* have been isolated from cases of bovine mastitis (1, 2, 3). These organisms were indistinguishable from pathogenic human strains. Therefore, bovine mycotic mastitis constitutes a potential public health hazard. The increased frequency of observation of mycotic mastitis is perhaps the result of the antibiotic age and a greater awareness of mycotic disease. This report describes an outbreak of bovine mycotic mastitis and the probable role of dry storage of teat cup inflations in its spread.

Dr. Joseph Simon received the B.S. degree in dairy manufacturing from Cornell University. He received the M.S. degree in dairying in 1942 from Texas A. and M., and the D.V.M. degree from Kansas State College in 1946. He practiced veterinary medicine and was engaged in milk inspection work until 1948 when he entered the graduate school at the University of Wisconsin. In 1951, he received the Ph.D. degree. He has been an Assistant Professor in the Department of Veterinary Science at the University of Wisconsin since 1951 and has engaged in research with major emphasis on bovine mastitis and reproductive diseases.

HISTORY

The herd consisted of 31 milking animals maintained under good conditions of husbandry and sanitation. Milk samples from four heifers were submitted by the local veterinarian to the Animal Disease Diagnostic Laboratory on January 20, 1954 and yeasts were isolated from each of the four samples. A request was received by the Animal Disease Diagnostic Laboratory on January 28, 1954 to investigate the problem which had persisted in the herd for at least 10 days. The general symptoms consisted of partial agalactia, pyrexia, extensive swelling of the infected mammary gland, anorexia, and listlessness. Some animals shivered unless blanketed. The highest body temperature recorded was 107° F. A few of the infected quarters secreted milk that was stringy, clotted or discolored. Abortion, icterus, or bloody urine were not observed in any of the infected animals.

The treatment schedule which had been instituted by the attending veterinarian for each of the affected animals, in general, consisted of the following: streptomycin, 5 to 10 grams daily for five days, intramuscularly; aqueous penicillin, 3 to 6 million units daily for five days, intramuscularly; sulfamethazine intravenously; Soxsipent*R intramammary infusions; and bacitracin 25,000 units daily, intrammary infusion. Each animal in the herd also was injected with 5 ml. of staphylococcus toxoid.

EXAMINATIONS AND OBSERVATIONS

Quarter milk samples were taken from 7 cows on January 28, 1954 and yeasts were isolated from samples from 3 of the animals. The report of the laboratory findings was submitted to the attending veterinarian

[1]Published with the approval of the director of the Wisconsin Agricultural Experiment Station as paper NS 186 from the Department of Veterinary Science, University of Wisconsin, Madison.

[2]From the State Department of Agriculture Animal Disease Diagnostic Laboratory, 2115 Linden Drive, Madison 6, Wisconsin.

Soxsipent*R—antibiotic ointment (Fort Dodge Laboratories).
Capralan**R—fungicide (Strasenburgh).

[3]Phenol crystals 20.0 gm; Lactic acid 20.0 gm; Glycerin 40.0 gm; Distilled water 20.0 gm. Dissolve ingredients by heating gently under a stream of running hot water. Add 0.05 gm. of cotton blue (Poirriers Blue).

with the recommendation that all antibiotic therapy be discontinued and that some antimycotic agent be administered. Each of the infected quarters was injected with 30 ml. of Capralan**R.

Milk from each quarter of the entire herd was taken on February 18, 1954 and in 10 cows a total of 18 quarters were shedding yeasts. Two of the animals which were shedding yeasts on the first sampling were not shedding yeasts at this time.

Development of clinical evidence of the disease followed the milking order and suggested mechanical transmission. The dairyman was questioned about milking procedure and equipment care. He revealed that the local milk sanitarian had recommended dry storage of teat cup inflations. Teat cup washings were taken at random from two of the four teat cups in each respective cluster of the three milking machine units. The washing medium was sterile one per cent peptone broth. The washings were pooled and 0.1 ml. aliquots were cultured on Sabouraud's dextrose agar. After incubation at 37° C. for 48 hours, the surface of the agar plate was completely covered with a confluent growth which was grossly indistinguishable from that obtained from the infected mammary glands. Microscopic examination of suspensions of the growth in lactophenol cotton blue mounting medium[3] revealed yeast-like organisms. The carbohydrate fermentation reactions, the cultural growth on Sabouraud's agar and corn meal agar suggested that these isolates belonged to various species of the genus *Candida*.

The importance of a laboratory determination of the etiologic agent prior to future therapy was further emphasized to the dairymen and local veterinarian. In addition, it was recommended that teat cup inflations be stored in 0.5 per cent lye solution instead of being stored dry. The presumption that the average dairyman can and will adequately cleanse his equipment is not well-founded. Furthermore, sound precept and instruction by inspection, extension, and veterinary agencies should be undertaken. Mycotic mastitis and excessively high bacterial counts have been observed by the authors on other farms where dry storage has been practiced. These outbreaks have been overcome following institution of the lye method of storage.

Subsequent investigation revealed that the occurrence of clinical mastitis and abnormal milk had been virtually eliminated. It is recognized that only through adequate laboratory tests can the true prevalence of the infection be determined. Since this herd was located nearly 150 miles from the laboratory, repeated laboratory testing was impracticable.

The findings in this outbreak suggest that the promiscuous use of antibiotic agents in the absence of an etiologic diagnosis may be useless or even detrimental; it is probable that the administration of antibiotics accentuated this bizarre mastitis outbreak. Such a presumption is based on the observation that the prevalence and severity of the disease abated with the cessation of antibiotic therapy.

Everyone is aware of the insurance value of pasteurization and, analogously, that of a lye, or other type disinfectant solution, or heat treatment for teat cup sanitization. It is believed that the practicability of dry storage of teat cups should be carefully scrutinized under experimental field conditions. Limited field experience in Wisconsin has revealed definite shortcomings in this method of storage.

REFERENCES

1. Pounden, W. D., Anderson, J. M., and Jaeger, R. F. A Severe Mastitis Problem Associated with *Cryptococcus neoformans* in a Large Dairy Herd. Am. J. Vet. Res., **13**: 121-128. 1952.

2. Simon, J., Nichols, R. E., and Morse, E. V. An Outbreak of Bovine Cryptococcosis. J. Am. Vet. Med. Assoc., **122**: 31-35. 1953.

3. Stuart, P. An Outbreak of Bovine Mastitis from which Yeasts were Isolated, and Attempts to Reproduce the Conditions Experimentally. Vet. Record, **63**: 314. 1951.

THE EFFECT OF FREEEZING ON THE STANDARD PLATE COUNT OF MILK

(Continued from Page 297

ACKNOWLEDGMENTS

We wish to thank the Ontario Department of Health Laboratory, and the local pasteurizing plant, for their cooperation in making samples available for these studies.

ADDENDUM

Since this paper was prepared, an abstract has appeared in Dairy Science Abstracts **17** (9), 738 of a paper by E. G. Samuelsson in *Suenska Mejeritidn.* 47 (5) 59-62, 1955. This abstract states that "the bacteriological state of the milk is practically unaltered by deep-freezing."

REFERENCES

1. American Public Health Assoc. Standard methods for the examination of dairy products. 9th ed., New York, N. Y., 1948.

2. Johns, C. K. and Berard, H. L. The effect of freezing and cold storage upon the bacterial content of egg melange. Sci. Agr. **26**: 34-42, 1946.

3. Jones, A. H. and Fabian, F. W. The viability of microorganisms isolated from fruits and vegetables when frozen in different menstrua. Mich. Agr. Expt. Sta. Tech. Bull. 229, 1952.

SUGGESTED PROCEDURE FOR THE INVESTIGATION OF FOODBORNE-DISEASE OUTBREAKS[1]

PREPARED BY THE
COMMITTEE ON COMMUNICABLE DISEASES AFFECTING MAN,
INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC.[2]

FOREWORD

This outline has been designed as an aid to public-health workers who find it necessary to investigate a reported outbreak of foodborne disease. It is not intended to supplant the health officer or trained epidemiologist. Its purpose, rather, is to assist them in epidemiological investigations where foods may be involved, by suggesting to other public-health personnel who may be called upon to assist, procedures which will assure proper collection and preservation of relevant data, samples, and exhibits.

U. S. Public Health Service records indicate that many outbreaks of foodborne diseases cannot be included in its official summaries because the reported data are incomplete. Foodborne diseases are not investigated because of a lack of trained, "on-the-spot" personnel. It is hoped that this outline will be of material assistance to health officers, epidemiologists, veterinarians, sanitarians, and other public-health workers in their investigations of an outbreak of foodborne disease.

For these reasons, the scope of the outline is limited to those matters which require prompt action, such as locating and interviewing exposed individuals, securing menu data and samples of leftover foods, preserving, identifying, and submitting proper samples to the laboratory, etc. In addition, public-health workers who do not have available the services of a trained epidemiologist will find herein guidance which may enable them to attempt to complete investigation and analysis of an outbreak of foodborne disease.

In view of the fact that this Procedure is still in draft stage and because of lack of space in the Journal the various report forms, the classification of illnesses attributable to foods, and the list of references pertaining to foodborne disease (all of which will be included in the final document) are deleted from this printing.

Distribution of the current draft of the Procedure will be limited to each state and territorial eqidemiologist for their review, and also to each of those who provided special technical assistance in its development. Suggestions for improvment of this Procedure shold be sent to Dr. R. J. Helig, U. S. Public Health Service, Washington 25, D. C before March 1, 1956 in order that they can be considered by the Committee on Communicable Diseases Affecting Man in preparing the Procedure for final form. Printed copies of the complete manual are expected to be available at the time of the next Annual Meeting of this Association in Seattle, Washington.

INTRODUCTION

Milk and food sanitation continues to be one of the major public-health programs of state and local health departments. It is a program which benefits practically everyone by preventing possible illness which may result from the consumption of contaminated milk, food, and water. All foods, including beverages, are subject to contamination by microorganisms and toxic substances, and certain foods support bacterial growth. Therefore, illnesses, ranging from slight discomfort to death, may result when such foods are not adequately protected from contamination, or are stored at temperatures favorable to bacterial growth.

Because of the importance of epidemiological investigations of outbreaks of illness in milk and food sanitation programs, and because some states and many municipalities do not have epidemiologists, a manual of procedures for the epidemiological investigation of outbreaks of foodborne disease, is suggested by the Committee on Communicable Diseases Affecting Man, International Association of Milk and Food Sanitarians, Inc. "Foodborne", as used herein, includes diseases originating from any solid food, or from milk, water or other beverage.

In the preparation of this manual, the Committee recognizes that the investigation of outbreaks of foodborne disease calls for cooperative teamwork with the epidemiologist by the health officer, practicing physicians, nurses, veterinarians, sanitarians, sanitary engineers, laboratory technicians, and statisticians.

The principal objectives in undertaking this project were:

1. To provide public-health workers with a suggested procedure for guidance when confronted with an outbreak of disease which may be milk-, food-, or waterborne.

2. To stimulate an active interest on the part of public-health workers in the epidemiological aspects of their programs.

3. To improve reporting of foodborne disease.

4. To prevent future outbreaks, through application of knowledge gained as a result of complete and thorough epidemiological investigations.

This procedure is not intended to replace or conflict with procedures or instructions already issued by state or local health departments. Before using this outline public-health workers should determine if such a procedure is provided by their state health department. If written guidance is available, they should familiarize themselves with it.

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[1]This Procedure contains changes suggested by the Association of State and Territorial Epidemiologists, and has been endorsed in principle by this Association.

[2]Membership of Committee: R. J. HELVIG, *Chairman*; H. L. BRYSON; RAYMOND FAGAN; JOHN H. FRITZ; STANLEY L. HENDRICKS; HARRY G. HODGES; E. R. PRICE; H. H. ROTHE; T. E. SULLIVAN.

Although some public-health workers may be compelled by circumstances to play a leading role in the investigation of outbreaks of foodborne disease, it is recognized that few of them will have had sufficient specialized training and experience to carry out a complete epidemiological study. With this in mind, the manual includes suggested procedures for (a) conducting the investigation of a suspected outbreak, (b) collecting and handling food samples for laboratory examination, and (c) collecting and handling specimens of feces and vomitus for laboratory examination. Included, also, are suggested report forms, a detailed classification of illnesses attributable to milk, food, and water, and a list of publications to which the public-health worker may refer for further information.

Foodborne diseases should be thoroughly investigated and promptly reported to local and state health officers who, in turn, will report them to the Public Health Service. Thorough investigation may prevent further spread of the outbreak, and provide vital information in the event of biologic warfare. Dissemination of the information obtained in an investigation of an outbreak may serve as a warning of possible occurrence elsewhere or possible spread from one area to another.

PART I

PROCEDURE FOR THE INVESTIGATION OF FOODBORNE DISEASE

No two outbreaks of foodborne disease are exactly the same. The etiology of illness often will be difficult to ascertain, and the investigator may become frusrated. Sufficiently detailed instructions cannot be given which will apply in every instance; however, certain fundamentals can be outlined which, if followed, should result in a successful investigation.

The purpose of an investigation is to determine the circumstances leading to the outbreak, and to supply information that may be used to prevent a recurrence. It must be remembered that an investigator often has but one opportunity to collect the facts which may point to the cause of the outbreak. Ordinarily, it is not practicable to return several times over a period of days to obtain information which could have been collected earlier. The food involved may be consumed or discarded. The persons involved may become scattered, or may forget pertinent facts. Therefore, it is imperative that all the facts be collected and studied as soon as possible after the outbreak occurs. With these thoughts in mind, the following suggestions are made:

1. Visit the establishment or establishments where the suspected meal, meals, or drinks were prepared and consumed, and make a complete inspection. As a part of this inspection, (a) secure a copy of the menu for the day or meals; (b) inquire from the cook, proprietor, and others as to the source and method of preparation of each item of food shown on menu; (c) inquire as to the method of storage of all perishable foods—poultry, meats, salad dressings, broths, dairy products, etc. – before and after cooking; (d) determine where the establishment purchased various foods served at the suspected meal, (i. e., the retailer, wholesaler, distributor, canner, processor, manufacturer, or producer); (e) make inquiries regarding the health of food-service employees in the establishment[3]; (f) obtain the assistance of the health officer or a physician to determine the cause, if food-service employees have been away from work because of recent illness; (g) note any employees who have infections on hands or other exposed surfaces of their bodies; (h) make a complete sanitary inspection of the establishment, including a determination for toxic metals, such as cadmium, antimony, zinc, and copper in the equipment, and the presence of poisonous pesticides and cleaning agents on the premises (if such substances are found, investigate the possibility of their having contaminated food); and (i) if there is evidence of the presence of insects or rodents, determine whether or not they have had access to the food involved. These findings should be recorded on "Sanitation Inspection Report" (Form A).

2. Visit all persons known to be, or suspected of having been present at the time the questionable meal was eaten. This would include those who prepared, served, or ate the meal. During these interviews, fill out a "Case History Questionnaire" (Form B) as completely as possible, using a separate form for each person interviewed. Do not suggest answers to the questions, but permit the patient or person to answer the questions to the best of his ability. All the different types of foods eaten by the persons involved over a period of 48 hours preceding onset of symptoms should be listed, if

[3]A simple inquiry regarding the health of food-service employees is often not sufficient for the epidemiological investigation of certain enteric infections, such as typhoid fever and dysentery. Since organisms which cause foodborne disease may be found in respiratory and skin infections, physical examination of the employees, including laboratory tests, may be indicated. It is important to remember that the food may have been merely the vehicle for dissemination of pathogenic microorganisms, the actual source being a carrier who can be identified only by stool, nose, or throat cultures.

possible. (In an outbreak of typhoid fever, the offending meal may have been consumed 7 to 21 days prior to onset of symptoms.)

3. If patients to be visited are hospitalized, or are being treated by a physician, obtain from the physician information relative to symptoms, available laboratory findings, diagnosis, and treatment from the physician, and include such information on Form B.

4. Samples of all perishable leftover foods served at the suspected meal or meals, including water samples, should be taken aseptically and kept under refrigeration. The procedure for collecting these samples, as outlined in Part III of this manual, should be followed, and the "Sample-Collection Report" form (Form C) should be completed.

5. In some instances, carbon monoxide from improperly ventilated heaters, gas refrigerators, and similar appliances may be the cause of the illness. Therefore, if reported illnesses are confined to members of one household or employees of one establishment, a check for faulty gas appliances is suggested.

6. Correlate, on "Investigation Summary" (Form D), the information obtained from patients and others interviewed and from the place where the suspected meal was served.

If the information collected is completely accurate, the responsible food or foods will be found to have been consumed by all of those who became ill; however, errors of memory, especially if considerable time has elapsed between the meal and the interview, will cause a few sick persons to give a false negative history of consumption of the responsible food. On the other hand, the fact that one food was consumed by all persons who attended the meal is not conclusive evidence. It is necessary to determine, also, how many of those *not* attacked ate each food item. For various reasons (variations in susceptibility, ingested dosages of toxin or bacteria, etc.), there may be some persons who have a history of eating the responsible food, but who did not become ill. The determination of which food was the vehicle requires a comparison of the percentage of persons who ate the food without becoming ill with the percentage of those who were ill. In making this comparison, a tabulation by food items, as shown in Table 1 would be helpful.

The results of this comparison should be recorded at the bottom of Form D. The responsible food should have a very high figure in column one and a much lower one in column two. If the data are complete and accurate, and if proper samples of the particular food have been secured and prepared according to directions, the laboratory analysis may confirm the findings.

TABLE 1 — SUMMARY TABULATION OF MORBIDITY DATA (FIGURES SHOWN ARE FROM AN ACTUAL OUTBREAK IN WHICH POTATO SALAD WAS THE OFFENDING FOOD.)

	Persons who became ill		Persons who did not become ill	
Food item	No. eating	% of total No. ill	No. eating	% of total No. not ill
Buttered rolls	110	85.0	17	85
Potato salad	120	92.0	3	15
Coffee	90	69.0	17	85
Summer sausage	50	38.0	4	20
Spiced ham	40	31.0	4	20
White cake	40	31.0	4	20
Pickles	40	31.0	7	35
Baked beans	30	23.0	13	65
Chocolate cake	30	23.0	6	30
Cabbage salad	20	15.5	7	35

It must be pointed out that, in preparing this summary, discrepancies in the statements made by various patients may be observed, in which case it may be necessary to interview some of the patients a second time.

Included as Part V of this manual, is a list of diseases which may be foodborne, the causative agents, signs and symptoms, and foods which may be implicated in such outbreaks. This is a fairly complete list, and includes the organisms or chemicals usually involved in past food-poisoning outbreaks. A comparison of the signs and symptoms among the patients, and the incubation period, may suggest the cause of the outbreak. The health officer or an epidemiologist should make this determination.

Occasionally, food-poisoning outbreaks result in civil suits for damages. Therefore, the investigator should keep in mind the need for accuracy in determining the cause of the outbreak. Contaminated food served in a public eating establishment may result in illness ranging from only 2 or 3 cases to hundreds of cases, depending on the extent of contamination of the food and the number of persons eating the food involved. When an establishment has served multiple portions of a given food and only one person has become ill, it is questionable that the food caused the illness. Similarly, when commercially prepared food is suspected as being the cause of one case of reported illness in the home, whereas many hundreds of units of the same food have been distributed, it is questionable that the food itself, as received in the home, was the cause of the illness. In the latter case, it is more likely that the food was contaminated in the home after it was removed from the container, or that some other condition was responsible.

However, when reliable information indicates that a commercially prepared food is the cause of illness, data must be obtained immediately as to the source of this food, where it was purchased, and any identifying codes or marks on the containers. The information should be forwarded immediately, for appropriate action, to the State Board of Health or other regulatory ageny having jurisdiction. The U. S. Food and Drug Administration would be concerned if interstate shipment of the food is known or suspected.

A trained epidemiologist from either the local or state health department should be available for conduction the investigation of a foodborne disease. However, since public-health workers in the municipality or county where an outbreak occurs usually have the first opportunity to obtain data and collect samples of leftover foods, the initial part of the investigation should be pursued by the local official as quickly as possible, even though awaiting arrival of assistance.

PART II

PROCEDURE FOR COLLECTING AND SUBMITTING FOOD SAMPLES FOR LABORATORY EXAMINATION

Often, samples of food suspected of causing outbreaks of foodborne disease are received in nonsterile containers wrapped in newspaper or other unsuitable coverings, and are not refrigerated. Consequently they are partly or wholly decomposed. They may be received, also, with no identification other than the sender's name, and with no information other than a statement that the food had caused such an outbreak.

Foodborne outbreaks are frequently the subject of court proceedings, and the laboratory personnel are called upon to testify as to their analysis of the food. Obviously, such testimony is of little or no value when the record of the sample is incomplete, and laboratory results are of no significance if the sample is received in a nonsterile container or in a state of decomposition. Therefore, the following procedures should be followed:

1. Aseptic technique must be followed in preparing the sample. Knives, spatulas, or other instruments, when used to obtain a sample, must have been previously sterilized in an open flame or by using one of the methods described in (2). Foods in small closed or covered containers should not be removed from the container, but should be sampled in their entirety.

2. Bulk samples must be placed in sterile containers. Sterile water-sample bottles, which may be obtained from the local water company or state health department, are ideal for liquids, semisolids, or shredded material. A lard pail or lard bucket with a tight-fitting lid may be used for large samples, provided it is thoroughly cleaned and sterilized. A local hospital or laboratory may be able to furnish a sterile container, or to sterilize containers furnished by you. If you must sterilize containers, either of the following methods is acceptable; (a) steam under pressure – exposure at 121° C. (250° F.) under pressure of 15 pounds for 20 minutes, (b) dry heat – 160° C. (320° F.) for 4 hours, or (c) boiling water – complete immersion for 30 minutes.

A statement of the method used to sterilize the container must appear on the sample-collection form.

3. The sample must be properly identified. Proper identification would include the place and time the sample was collected, the method of collection if indicated, the reason it is being submitted for analysis, and any other pertinent information.

4. The sample must be sealed. Gummed paper tape, surgical adhesive tape, or plain paper covered with cellophane tape may be used to seal the sample container. The date and time of sealing and the name of person who collected and sealed the sample should be written on the tape. The seal should be affixed to the inner food container in such a manner that the container cannot be opened without breaking the seal.

5. The sample should be accompanied by as much information as may be immediately available, such as (a) the number of persons who may have become ill, (b) the elapsed time between ingestion of of the food and onset of symptoms, (c) the symptoms observed or reported, and (d) the reason for suspecting this food. An accurate statement of the symptoms experienced, particularly the incubation period, is especially valuable as a guide in the conduct of laboratory tests.

6. Perishable samples must be refrigerated from the time they are collected until they are received at the laboratory. Those not immediately sent to the laboratory for analysis should be retained under refrigeration for possible later study. All perishable samples should be refrigerated until they are either sealed in their original containers or placed in sterile containers. The sealed sample container should be enclosed in an outer container (preferably insulated), with sufficient dry ice added to provide refrigeration during transit. Insulated dry-ice containers may be purchased for a small sum from many locker plants and dry-ice distributors. (Refrigerant must not be added directly to the food itself.)

7. When samples must be sent to the laboratory by public conveyance or mail, it must be remembered that they may be delayed in transit. Therefore, sufficient refrigerant should be used for some of it to be present when the sample is opened. The container must be prominently labeled: "Perishable Food Sample for Bacteriological Examination – Rush," and should be sent by fastest possible means of transportation. Samples so labeled should receive immediate attention, regardless of time of arrival. Since laboratory analysis of food samples require some preparatory work, it is important that the laboratory director be given advance notice, preferably by telephone or wire, of the number and types of samples being submitted.

PART III

Identification of Human Sources of Contamination

Regardless of the specific nature of the outbreak, all food handlers most closely associated with the suspect meal or foods should receive a competent medical examination. A well-taken history, with emphasis on recent acute illness and chronic digestive disturbance, as well as skin and respiratory disease, is essential. The physical examination should include observation of the skin, eyes, ears, nose, throat and the perianal region. The taking of nose and throat cultures and fecal specimens for bacterial culture from all food handlers involved in an outbreak must be routine. Subclinical infections of the respiratory tract may contaminate food with the enterotoxin-forming staphylococci. Should there be evidence of suppurative skin lesions, or of an otitis media or externa, cultures from these infected areas may be indicated. When bacteriologic study of the contaminated food reveals the presence of Salmonella or Shigella organisms, at least three successive stool specimens should be taken from each food handler before such person is eliminated as a possible carrier. If a food handler had also partaken of the contaminated food at the suspect meal, a positive stool culture yielding the same organism would have no significance, other than to indicate another victim, unless the food handler gives a definite history of gastrointestinal disturbance prior to the outbreak.

In outbreaks with relatively long incubation periods, the possible etiology of Salmonella and Shigella groups enters into consideration, and laboratory examination of vomitus and stool specimens from ill persons who ate the suspect meal would be indicated. The chain of transmission is completed when the same species of organisms is isolated from the human or animal carrier, the vehicle, and the patients' stools. It is not to be expected that successful isolation will be achieved in all patients, therefore, fecal samples from a representative number of patients must be submitted for study. For adequate species identification, it may be necessary to forward the cultures to laboratory centers having Salmonella typing facilities.

Because of the difficulty of isolating Shigella organisms from patients' stools, it is of the utmost importance that fecal specimens be procured from patients as early as possible in their illness. It is desirable that more than a single specimen be obtained, and that specimens from an adequate number of patients are obtained. Multiple fecal specimens must be obtained from food handlers before they can be eliminated as possible carriers. Should the Shigella groups isolated from patients, food, and carrier or other source be the same, typing of the organism would then be indicated.

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PERFORMANCE CHARACTERISTICS OF VARIOUS BULK MILK TANKS [1,2]

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Studies indicate that power required for ice bank bulk milk tanks averaged about 1.0 kw-hr per cwt. of milk while direct expansion tanks averaged 0.65. Both compare favorably with 2.0 for mechanical can coolers cooling to the same temperatures. Lower purchase prices for ice bank coolers may offset most of the power increase over the direct expansion type. Some ice bank tanks were underpowered and some had insufficient ice bank capacity to complete milk cooling to 40° F. within two hours after milking. One direct expansion tank using air cooling only did not meet this cooling requirement when operating in the 84° to 88° F. temperature range.

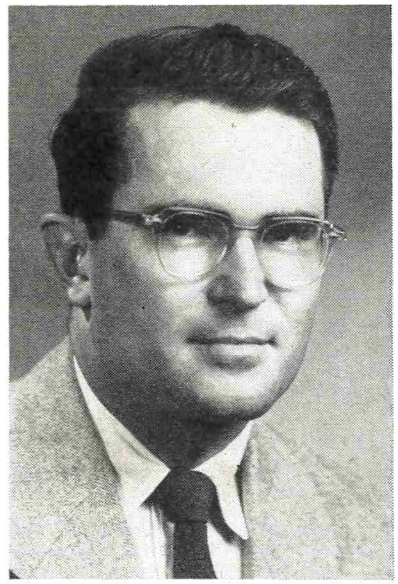
The prospective purchaser of a farm bulk milk tank has some important decisions to make. These decisions are considerably more involved than those needed for purchase of a mechanical can cooler because of the greater investment required and the variety in design of commercially available farm bulk milk tanks.

The purchaser must decide on the type of refrigeration system he desires. Should he use an ice bank or a direct expansion cooler? After choosing the type, the purchaser must decide between a model using only air to cool the compressor and one using both water and air. He also will find that some tanks operate under a vacuum during milking while others do not. At present there are at least thirteen different commercial makes of farm bulk tanks available to dairymen in Wisconsin.

To make his choice with confidence, the purchaser must know the initial cost, installation costs, and operating costs involved. He must know the expected performance of each type and make of bulk tank. The initial and installation costs can be readily obtained from the tank dealer, and possibly the electrician. However, the comparative performance and operating costs of the different types have not been available.

The objective of this study was to obtain information helpful in answering some of these questions. The study was designed to determine the following performance characteristics:

1. Rate of cooling.
2. Consumption of electrical energy.
3. Cycling of the compressor to maintain the ice tank or the proper milk temperature during the holding period.
4. Condenser water consumption by air and water cooled compressors.
5. Period of operation of the compressor.



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METHODS

The 3A Sanitary Standards (2) for Holding and/or Cooling Tanks includes specifications on the minimum requirements for performance of the refrigeration system. These standards specify the following test procedure to determine the cooling rate: Water at 90° F. may be substituted for milk and added to the tank in no less than five equal amounts at equal time intervals during a one and one-half hour filling period. The refrigeration system, operating at a 90° F. ambient temperature[1] for air cooled condensing units, or 120 lbs. head pressure for water cooled units, is required to cool 50 percent of the rated volume of the tank from 90° to 50° F. during the first hour after the end of the filling period and from 50° to 40° F. during the second hour.

[1]Approved for publication by the Director of the Wisconsin Agricultural Experiment Station.

[2]Supported in part as North Central Regional Project N.C. 23.

[1]Ambient temperature is the temperature of surrounding air (the milk house temperature for the bulk tank).

The procedure for determining cooling rates used in this study did not conform strictly to the test procedure described above. The filling rate and both water and room temperatures were selected to conform to conditions of actual farm operation.

In this study, water at 95° F. was substituted for milk and was added to the tank in five gallon lots at regular intervals over a 90-minute filling period. The tank was filled to one-half its rated capacity in the first half of the test cycle and to its full rated capacity twelve hours later. The tank was emptied about four hours after filling. The cycle was completed each 24 hours. Therefore, data collected covered requirements for cooling and maintaining the proper temperature of a simulated first milking during the overnight holding period.

It is important to note that in this study the tanks were tested both in a low ambient temperature range of 38° to 40° F. and in a high ambient temperature range of 84° to 88° F. Thus, both summer and winter operating conditions were simulated.

It was impossible to study all the different commercial tanks and their variations in design. Therefore, six tanks were selected for study. These included models by four different manufacturers which contained some of the most common differences in construction and operation.

The tanks studied were classified into four general groups. Ice bank and direct expansion coolers, both with air and with water and air cooled condensers, were studied. Within these groups some variation was found both in design and performance between the different commercial makes. Table 1 contains a description of the tanks and their refrigeration systems.

Results obtained with water substituted for milk are not exactly the same as those obtained with milk. The specific heat of water is 1.00, while the specific heat of milk containing 3.5 percent fat is 0.93. The only corrections made in the results were in the data on current consumption. It should be noted that cooling water required about 7 percent more refrigeration capacity than is required for cooling milk. Data on current consumption (the electricity required for cooling) was calculated for 93 lbs. of water to make it correspond to 100 lbs. of milk.

Total power consumption was measured by watt hour meters that could be read to the nearest watt. A recording watt meter indicated load variations and operating periods for the compressors and for the water pump when the latter was used. Recording or indicating thermometers were used to measure the room temperature, the temperature rise of the condenser water, and the temperature of the contents of the tanks. A water meter or tank was used to measure the water consumption by the air and water cooled condensers.

Additional studies were made on three direct expansion type farm tanks installed on the University farms. Data were collected using the test procedure followed in the laboratory and also using actual operating conditions.

DISCUSSION OF RESULTS

Rate of cooling

Figures 1 and 2 show the rate of cooling for the six farm bulk holding tanks when operated at an ambient temperature of 84° to 88° F. Figures 3 and 4

TABLE 1 — DESCRIPTION OF FARM BULK MILK TANKS

Tank No.	Type of cooling	Rated capacity (gallons)	Size compressor (H.P.)	Total electric requirement (H.P.)	Condenser cooling at 38° F.	Condenser cooling at 88° F.	Type expansion device
A	Ice bank	250	3/4	1 1/3	air	air	Capillary tube
B	Ice bank	250	1	1 7/12	air	air	Capillary tube
C	Ice bank	200	3/4	1 1/3	air also with water coil[a]	air	Capillary tube
F	Direct expansion	200	2	2 1/4	water & air	air	Thermo expansion valve
H	Direct expansion	200	2	2 1/4	water & air	air	Injector and surge tank
I	Direct expansion	200	2	2 1/4	air	air	Injector and surge tank

[a]This improvised water cooling system was used to permit partial water cooling in addition to air cooling. It permitted use of limited amounts of water to help cool compressed refrigerant.

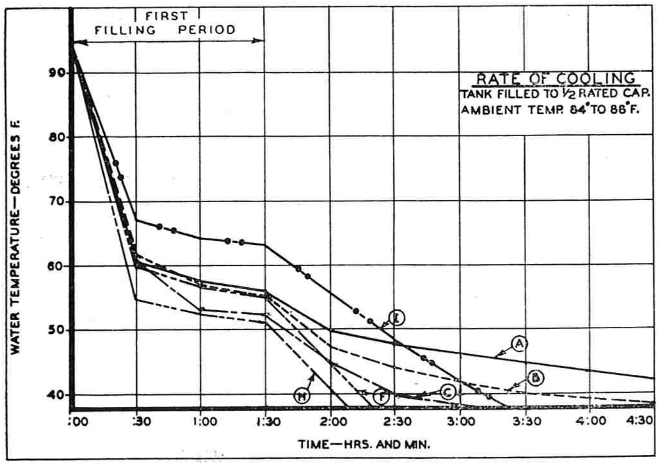

FIG. 1. Rate of cooling in tanks operated at an ambient temperature of 84 to 88° F. and when filled to one-half their rated capacity in one and one-half hours. See Table 1 for the description of the tanks.

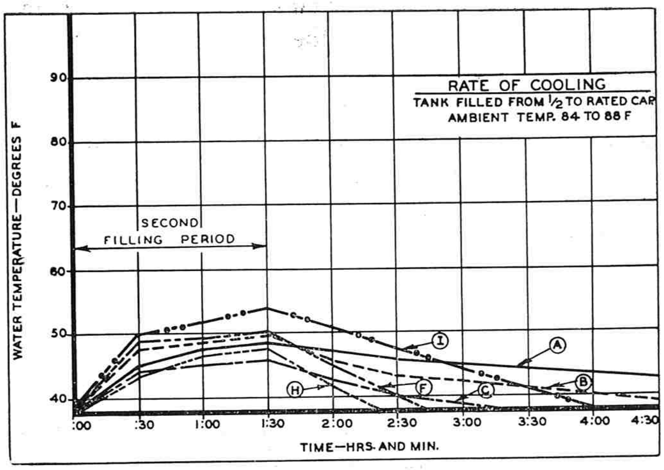

FIG. 2. Rate of cooling in tanks operated at an ambient temperature of 84° to 88° F. and when filled from one-half full to their rated capacity in one and one-half hours.

give the rate of cooling for operation at an ambient temperature of 38° to 40° F.

At both high and low ambient temperatures there was considerable variation in the cooling rate among the three ice bank tanks (A, B, and C). At both ambient temperature levels, A and B did not build up enough ice to cool their loads to 38° F. Near the end of the cooling period the compressor carried the entire cooling load, resulting in a slow cooling rate. Difficulty with tank A was caused, in part, by too small a compressor and by the compact shape of the evaporator. Evaporator coils were very close together, causing the ice to build up too thickly on the evaporator coil. The compact evaporator shape was largely responsible for the difficulty with tank B.

Tank C had enough ice to cool the load to 38° F. although the cooling rate tapered off slightly. When the cooling water coil on tank C condenser was used, the rate of cooling was the same, but there was lower current consumption and the compressor operated for a shorter time.

The direct expansion tank I, using an air cooled condenser at 84° to 88° ambient temperature, cooled the water much more slowly than similar tanks using a combination air and water cooled condenser. Figures 1 and 2 show that tank I took one hour longer to cool the simulated first milking and one and one-fourth hours longer for the simulated second milking than did tanks F and H with water and air cooled condensers.

All of the tanks cooled their load to 50° F. within the first hour after the end of the filling period. However, under certain conditions three of the tanks did not cool their contents below 40° F. by the end of the second hour (see Figures 1, 2, 3, and 4). Figure 2 shows that under warm conditions all but tank I had a maximum blend temperature of 50° F., or less, during the addition of the second milking.

Ice bank tank A cooled much faster when operating at 38° F. than in the 84° to 88° F. range. The compressor of cooler A appeared to be small for the size of tank. This was indicated by the fact that the compressor operated continuously during a 48 hour test period in the warm room and, at the same time, fell behind in building up the ice bank after each cooling cycle.

The slightly slower rate of cooling of tanks B and C at the 38 to 40° F. ambient temperature was due to less ice being formed on the coils during operation in the cold room. Less ice was formed because of the type of expansion system and the relation of refrigeration charge to ambient room temperature.

Current consumption

The current required to cool 93 lbs. of water is shown in Figure 5 and Table 2. In the 84° to 88° F. ambient temperature range, the three ice bank tanks (A, B, and C) using air cooled condensers required a little more than 1.3 kw-hr per 93 lbs. of water. Ice bank tank C using an air and water cooled condenser required 1.1 kw-hr to cool 93 lbs. of water. The direct expansion tanks (F and H) with combination air and water cooled condensers required 0.7 kw-hr, and the air cooled direct expansion tank I required 1.1 kw-hr.

The current consumption for all tanks was less in the 38° F. cold room than in the 84° to 88° F. warm room. The reduction, as shown in Figure 5 and Table 2, varied from 16 to 50 percent. The air cooled condensers showed a greater reduction than the air and water cooled condensers. All condensers were cooled with air alone in the 38° F. room.

Over the range of cooling used in this study (57° F.) a can cooler would use, according to data of Nicholas *et al.* (1), about 2.1 kw-hr in the summer and 1.8 kw-hr in the winter per 100 lbs. of milk. In actual practice, the cooling range is less, tending to lower the power demand of can coolers. Still, the bulk cooler probably would require less power and would provide better cooling than the can cooler.

The somewhat higher current consumption of the ice bank type may be attributed, in part, to the following factors:

1. The compressors of A, B, and C, had air cooled condensers. They could not be expected to be as efficient as F and H when the ambient temperature was high since the latter two had water and air cooled condensers.

2. An extra motor is required for the water circulating pump.

3. The compressor of the ice bank tank operates periodically after the ice bank is rebuilt. The ambient temperature of the room affects the amount of this intermittent operation only slightly. At 38° to 40° F. the compressor operated nearly as much as at 84° to 88° F. After the ice bank was rebuilt the compressor operated from 20 to 40 percent of the time at either ambient temperature.

4. When the ice bank tank is empty during the day, the water pump, which is thermostatically controlled, keeps the milk tank liner at the shut-off temperature. For tanks A, B, and C, the pump cycled several times and operated for a total of 18 to 52 minutes during an eight hour period when the ambient room temperature was 84° to 88° F. In a direct expansion tank the compressor is turned off, and the empty tank is allowed to warm to room temperature.

Current consumption is only one part of the operating expense of a milk cooler. Other items are maintenance costs and the cost of pumping and disposing of water for water cooled condensers. Not much electricity is required to pump the condenser water when compared to the electricity required to operate the milk tank compressor. For operation during warm weather at a pumping rate of 500 gallons of water per kw-hr of electricity, the water pumping requirement would be about 0.05 kw-hr per 100 lbs. of milk.

Bulk milk handling is too new to permit establishment of a comparison of maintenance costs between direct expansion and ice bank bulk tanks over a long period of time. To date, both types appear to

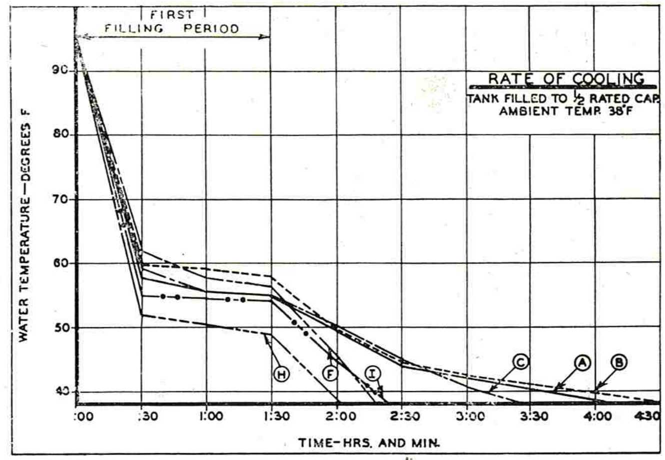

FIG. 3. Rate of cooling in tanks operated at an ambient temperature of 38° to 40° F. and when filled to one-half their rated capacity in one and one-half hours.

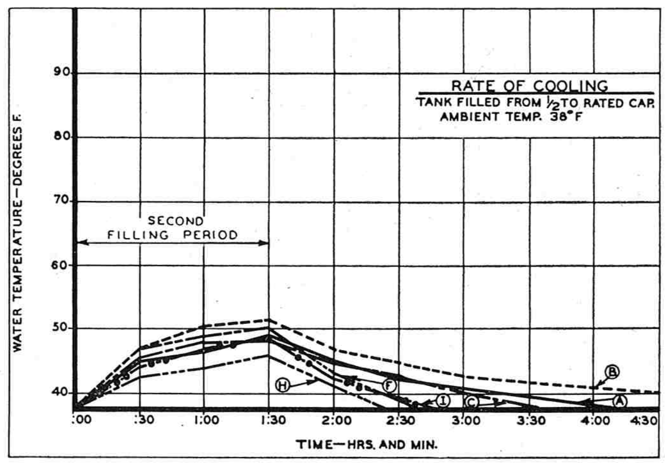

FIG. 4. Rate of cooling chart in tanks when operated at an ambient temperature of 38° to 40° F. and when filled from one-half full to their rated capacity in one and one-half hours.

TABLE 2 — AVERAGE POWER REQUIREMENTS FOR BULK TANKS IN LABORATORY STUDY

Type	84 to 88° F. Room Temperature			38° F. Room Temperature	
	Air cooled condenser	Air and water cooled condenser	Percent reduction using air and water	Air cooled condenser	Percent reduction at 38° F. compared to 86° F.
Direct expansion	1.1 kw-hr	0.7 kw-hr	36 percent	0.6 kw-hr	45 percent
Ice bank	1.3 kw-hr	1.1 kw-hr	15 percent	0.9 kw-hr	31 percent

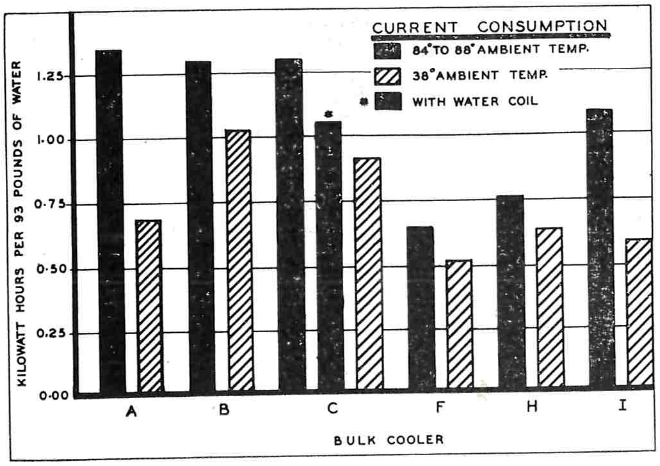

FIG. 5. Current consumption for cooling the equivalent of 100 lbs. of milk when the tank is used to its full rated capacity for everyday pick-up. The electricity requirement for over-night holding of the first milking is also included.

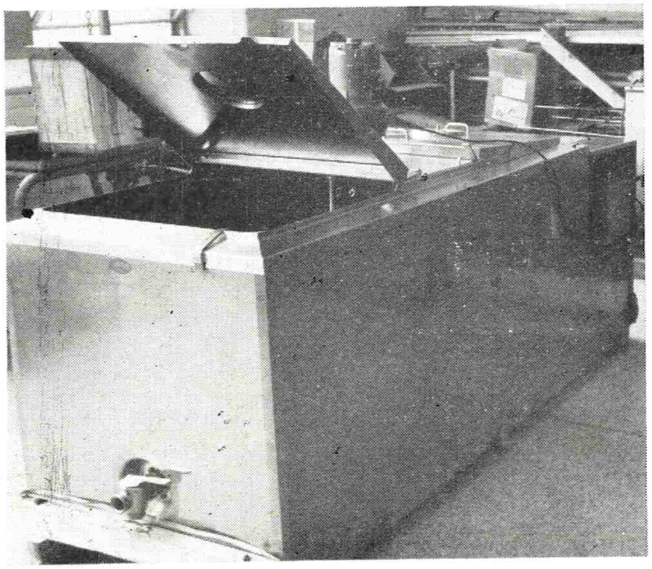

FIG. 6. An ice bank type farm tank. Two watt hour meters and a recording watt meter are shown on the table.

give satisfactory operation with reasonable maintenance costs.

The original and installation costs of a direct expansion bulk tank are higher than for an ice bank type tank of the same size. This difference in cost is more or less offset by the higher operating cost for current consumption of the ice bank tank. For each $100 reduction in tank cost for the ice bank tank, the annual saving would be only about $15. At a rate of 2.5 cents per kw-hr, this difference in original cost would pay for the higher current consumption of 0.5 kw-hr per 100 lbs. for cooling 120,000 lbs. of milk produced per year. On the basis of electric energy requirement alone, if a 200 gallon direct expansion tank used to two-thirds capacity daily, cooling about 4,000 cwt. of milk annually at a saving of 0.5 kw-hr per 100 lbs., and at a rate of 2.5 cents per kw-hr, the yearly saving would be about $50. If each $15 saving for electricity will pay for a $100 investment in the cooler, $333 more could be paid for a direct expansion tank with an air and water cooled condenser than for an ice bank tank of the same size with an air cooled condenser.

TABLE 3 — WATER CONSUMPTION OF AIR AND WATER COOLED COMPRESSORS

Cooler	Condenser water per gallon cooled (gals.)	Max. head pressure (lbs.)	Condenser water temperature (° F.) In	Condenser water temperature (° F.) Out
C (with water coil)	1.3	22[a]	66	96
F	2.3	120	60	81
H	2.1	120	59	87

[a]Suction pressure

Water consumption of water and air cooled condensers

Table 3 gives information on the water consumption of the three tanks (C, F, and H) which had water and air cooled condensers. For this study the water valves were adjusted for the head or suction pressures recommended by the manufacturer. The quantity of condenser water consumed is inversely proportional to the head pressure and current consumption. Therefore, the water valve may be adjusted, within limits, to the amount of water available for condenser cooling. For example, in the warm

TABLE 4—COMPRESSOR OPERATION TIME FOR A 24 HOUR PERIOD FOR COOLING TWO EQUIVALENT MILKINGS AND FOR MAINTAINING THE CORRECT MILK TEMPERATURE DURING THE OVERNIGHT HOLDING PERIOD.

Cooler	Compressor operation during 24 hr. period at 84° to 88° F. Hours and minutes	Compressor operation during 24 hr. period at 38° F.[a] Hours and minutes
A	24:00+	15:13
B	22:32	20:50
C	21:16	19:06
C (with water coil)	17:18	....
F	5:18	4:42
H	4:42	4:25
I	7:33	5:01

[a]All condensers were operated with air cooling only.

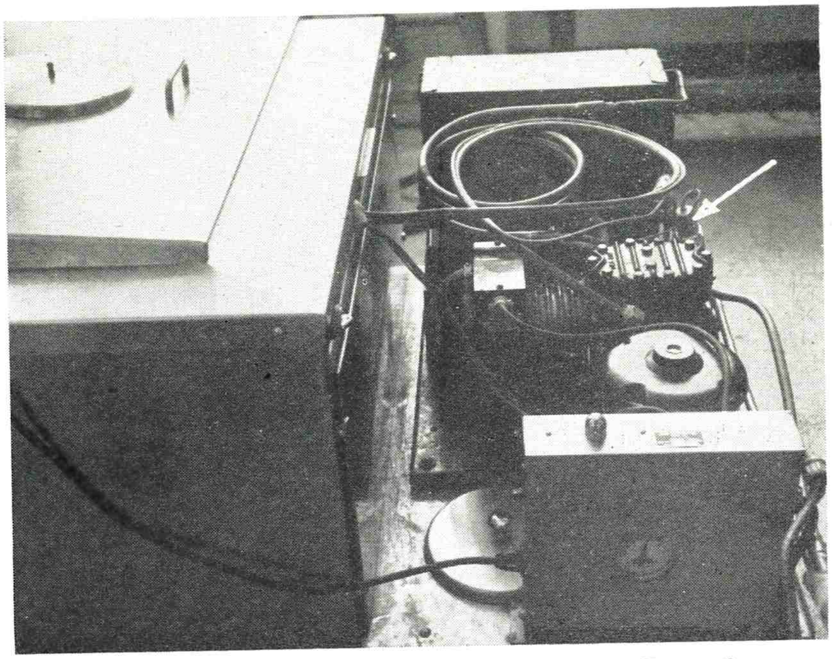

FIG. 7. The compressor of the tank shown in Figure 6. The arrow points to the water coil used in conjunction with the air cooled condenser.

room the water valve on tank F was set for a maximum head pressure of 120 lbs. The condenser consumed 2.3 gallons of water to every gallon cooled, and the current consumption was 0.64 kw-hr per 93 lbs. of water cooled. When the valve was adjusted for a head pressure of 105 lbs. the condenser consumed 6.1 gallons per gallon cooled, and the current consumption was reduced to 0.58 kw-hr. To conserve water the compressor may be operated with head pressures up to about 190 lbs. The energy consumption also will be higher. Higher head pressures may cause the compressor and compressor motor to work harder which will increase power requirements and may cause higher maintenance costs.

Compressor operation time during a 24-hour period

The period of operation of the compressor is important in determining the amount of peak load for the electric service and the distribution of heat from the condenser for milk house heating.

Table 4 gives the total operating time of the compressor during a 24 hour period. This period included the operation of the compressor to maintain both the ice bank and proper milk temperature during the holding period.

The operation period of the direct expansion compressor included the cooling period plus the operating time, as the compressor cycled during the holding period. The period was constant from day to day for a given set of conditions. The compressor operation period of the ice bank tank varied from day to day as much as two hours during a twelve hour period. However, the total operation time over a period of several days was about constant.

After the ice bank was rebuilt, the compressor of the ice bank cooler tended to operate intermittently and independently of room temperature. During the

TABLE 5 — DATA ON FIELD STUDY OF BULK TANKS

				Current Consumption		
				Summer		Winter
Tank No.	Type	Rated capacity (gals.)	Condenser cooling	With test procedure per 93 lbs. of water	Actual operation per 100 lbs. of milk	Actual operation per 100 lbs. of milk
D	Direct exp.	150	Air	1.31 kw-hr	1.30 kw-hr	1.10 kw-hr
E	Direct exp.	200	Water and air	0.60 kw-hr	0.64 kw-hr	0.60 kw-hr
G[a]	Direct exp.	200	Water and air	0.73 kw-hr	0.91 kw-hr	----------------

[a]Vacuum tank

holding period the compressors of the direct expansion tanks cycled once at a room temperature of 84° to 88° F., operating for 12 to 15 minutes. At 38° F. the compressor did not cycle.

The effect of bulk tank operation on milk house temperatures

The long operating period of the compressors on ice bank tanks (Table 4) tended to provide a rather uniform source of heat to help maintain satisfactory milk house temperatures during the winter months. During the summer the small air cooled compressor would offer less of a ventilation problem than a larger air cooled compressor running for a shorter period of time. A high ambient temperature would reduce the efficiency and cooling capacity of an air cooled compressor, but adequate ventilation and the use of water cooling, if the compressor is equipped for it, would relieve this condition.

During the winter, the large output of compressor heat from the direct expansion tank, over a short period of time, would tend to warm the milk house to a workable temperature when the milk utensils are washed. However, additional milk house heating may be required to prevent freezing between milkings.

Field study of three tanks.

The results of a study of three bulk tanks at the University farms are summarized in Table 5. The data were not collected under the rigidly controlled conditions of the laboratory study. The study was made to collect data on additional tanks as a check on the laboratory study.

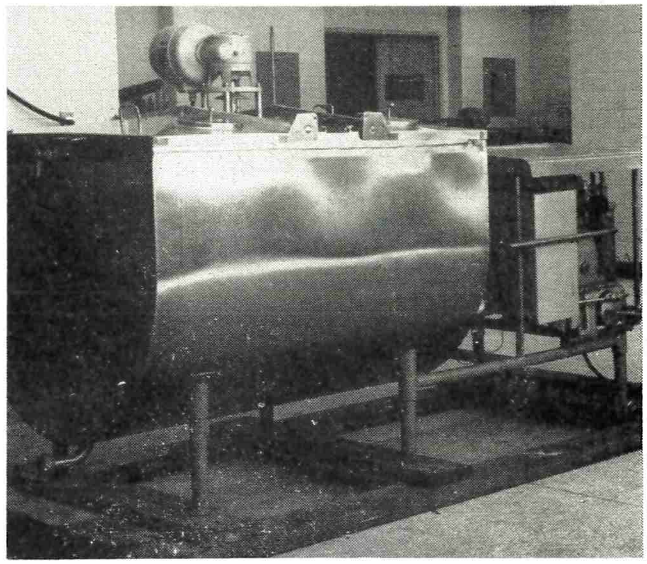

FIG. 8. A self-contained direct expansion type farm tank. A recording watt meter, a watt hour meter and a hygrothermograph are shown on the table.

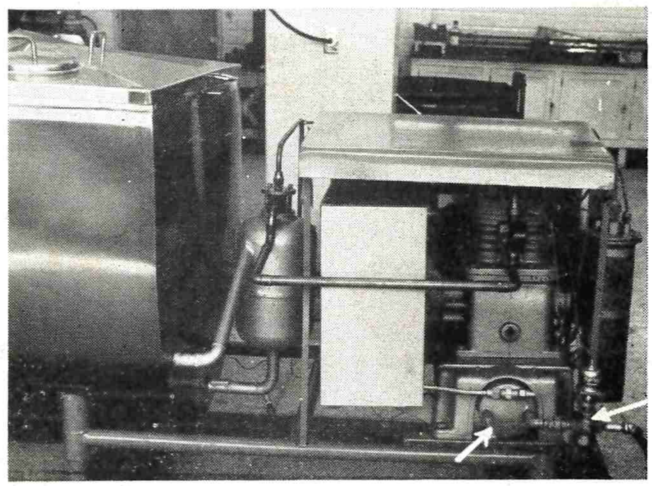

FIG. 9 The compressor of the tank in Figure 8. The arrows point to the condenser water connections and the adjustable water valve.

SUMMARY

A study was made of the cooling characteristics of some of the common types of farm bulk milk tanks being used in Wisconsin. The tanks were operated in both cold (38° to 40° F.) and warm (84° to 88° F.) ambient temperatures to simulate winter and summer conditions. Fall and spring seasons will fall between the two temperature ranges used for the tests.

Some of the results and conclusions of this study are:

1. There are appreciable differences in the cooling rates of different types and makes of refrigerated bulk milk tanks. In some tanks the compressor capacity or ice bank capacity was inadequate when compared to other tanks. Under-powered tanks were at a disadvantage when operated in the 84° to 88° F. range. Generally there was less difference in cooling rate between types than between different makes of the same type.

2. Some of the tanks actually cooled a little faster at the 84° to 88° F. ambient temperature range than at the 38° to 40° F. level. This was due to the fact that they were designed for optimum performance at, or near, the higher temperature level.

3. In the 84° to 88° F. range the cooling rate of a direct expansion tank is reduced when air alone is used for cooling the compressor. In this study the cooling period with an air cooling arrangement was 45 percent greater than with water and air cooled condensers in similar coolers. This indicates the importance of water cooling for condensers of direct

expansion tanks. Generally water cooling of the condenser of an ice bank tank does not affect its cooling rate.

4. Water cooling to supplement air cooling in the 84° to 88° F. range tends to decrease the amount of electric energy needed to cool milk. It also tends to help solve the acute milk house ventilation problem in warm weather. At this temperature range the direct expansion type used 1.1 kw-hr with an air cooled condenser and 0.7 kw-hr with an air and water cooled condenser, or a 36 percent reduction for the air and water cooled condenser. The ice bank type used 1.3 kw-hr per 100 lbs. of milk with an air cooled condenser and 1.1 kw-hr with a water coil on an air cooled condenser, or a 15 percent reduction for the water coil.

5. Less electrical energy was required to cool milk at the 38° to 40° F. ambient temperature. At this temperature the current consumption for cooling the equivalent of 100 lbs. milk, with air cooling of the condenser only, was as follows: The direct expansion type used 0.6 kw-hr at 38° to 40° F. ambient temperature, a reduction of 45 percent compared to its operation at 84° to 88° F. The ice bank type used 0.9 kw-hr at 38° to 40° F. ambient temperature, a reduction of 31 percent compared to its operation at 84° to 88° F.

6. The direct expansion tanks with air and water cooled condensers required 2.1 to 2.3 gallons of cooling water per gallon of milk cooled. The ice bank tank with a water coil required 1.3 gallons of water per gallon of milk cooled. The direct expansion tank had a lower current consumption, however, as shown in 4 above.

7. This study indicated that a two horsepower compressor with an air and water cooled condenser is large enough for a 200 gallon direct expansion tank. It is too small when the condenser is air cooled only.

For the ice bank type of tank a three-fourths horsepower compressor with an air cooled condenser is large enough for a 200 gallon tank but too small for a 250 gallon tank. Perhaps the three-fourths horsepower compressor on the 250 gallon tank would be large enough if water cooling of the condenser were used in warm weather.

8. The final choice of a cooler should be based on the following considerations: (a) discussion of power demand with the electric service representative; (b) purchase from a reliable dealer who can be depended upon to service the equipment; (c) price comparisons; (d) power cost comparisons; (e) comparisons of the coolers' reserve cooling capacity for hot weather operation (relative horsepower of compressor motors indicates refrigeration capacity); (f) viewpoint of the local regulatory agency; (g) the warranty covering the entire cooling unit; (h) assurance of a reasonably equal length of service life for each part; (i) availability of both water and air cooling to insure economical operation in hot weather; (j) suitability to winter operation in the 35° to 40° F. range; and (k) conformance with 3A standards.

REFERENCES

1. Nicholas, J. E., Cone, J. F. and Watrous, G. H., Jr. Comparative Performance of Side-Opening and Immersion Type Milk Coolers. Penn State College Progress Report No. 59. 1951.

2. 3A Standards for Bulk Milk Tanks. J. Milk and Food Technology., 16: 189-192. 1953.

WASHING AND SANITIZING THE COW'S UDDER

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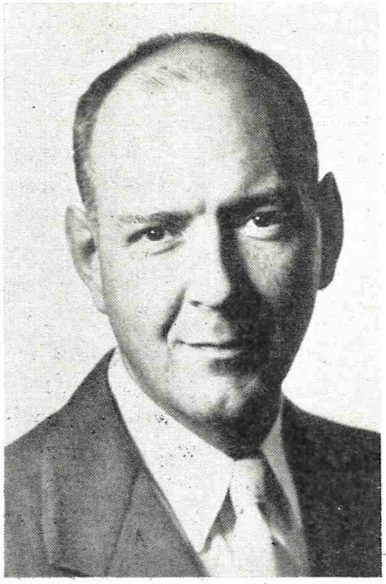
Liberal use of a plain water wash, preceding a bactericidal treatment is an effective means of sanitizing the cow's udder, preparatory to milking. Both hypochlorite and quaternary ammonium bactericides are aided by the plain water rinse. In this study hypochlorite reduced bacteria counts on teat surfaces and in the milk more satisfactorily than quaternary ammonium solution.



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An important part of a sanitary milk production procedure is cleaning and sanitizing the udder at milking time. The exterior of the udder is always contaminated with bacteria and because of its texture, it presents a much different sanitary problem than milk utensils. The skin of some animals including cows, exhibits a germicidal property, but this is ineffective against masses of soil which harbor and protect bacteria. Cleaning and sanitizing practices used on udders must necessarily be relatively mild. Even though clotted soil is not present, there always will be dust or contaminated water on the udder prior to the pre-milking preparation. An udder in satisfactory sanitary condition for milking is clipped close, has no physical soil adhering to it and is dry enough following the use of a sanitizer to avoid drip from the hands or into the cups of mechanical milkers. The term physical soil is used here in contrast to biological soil because it is quite unlikely that the wrinkled surface of the udder can be rendered completely free of bacteria, mold or yeast by any reasonable and practical method of sanitizing.

The specifications for producing Grade A milk according to the U. S. Public Health Service Milk Ordinance and Code (5) include, "the udders and teats of all milking cows shall be clean and wiped with an approved bactericidal solution at the time of milking" (item 17r., p. 73). Observation at many dairies of the procedures employed in preparing the udder for milking make it appear that the terms "clean" and "wiped with an approved germicide" are not interpreted as the Code intends them to be. In Appendix F, p. 186, the description of milk utensil sanitizing includes "an intermediate, plain water rinse must be provided between the wash and the bactericidal treatment". The plain water rinse is for removing as much as possible of the soil or any cleaning material residues, so that the bactericidal agent will have maximum effectiveness. A metal surface can be cleaned and sanitized more easily than the surface of the cow's udder. It should be clear then, that the surface of the udder and teats also should have "an intermediate plain water rinse", or if no detergent has been used, at least a water rinse to precede the use of a bactericidal agent. Since it is not practical to effect sterilization of the udder and teat surfaces, the bactericidal agent must be given every opportunity to act, and this means having a physically clean surface.

Some Previous Work

Hammer (3) has reviewed several reports pertaining to the reduction of bacteria in milk by various methods of udder washing. It is certain that the exterior of the udder is an important contributer of bacterial contamination.

Beck and Claydon (1) compared chlorine soaked paper towels, chlorine soaked flannel towels and dry hand cleaning of udders. They reported no significant differences in the bacteria counts of milk when cows were prepared for milking by these methods.

Kesler *et al.* (4) compared chlorine solutions, quaternary ammonium solutions and water as udder washes with soaked turkish towels. While the bacteria counts of milk produced by the three washing methods were not statistically significant, there were several instances in which the water wash gave counts lower than either of the two bactericides.

When seven cows were washed with the same 2 gallons of warm water, using one flannel cloth, and the teats then immersed to the base in sterile water or in 150 ppm chlorine water, Byers and Ewalt (2) observed that the immersion in the chlorine water effected a lower bacteria count in the rinse by 36.2 percent.

OBJECT OF STUDY

The purpose of this study was to determine the influence upon bacterial loads in freshly drawn milk and on teat surfaces, when bactericides were used alone, and when they followed a rinse of plain water, in udder washing procedures.

EXPERIMENTAL

The first part of the study was a comparison of standard plate counts of milk samples taken from the weigh bowls in a pipeline milker system, when the udders were either washed with water only, or were wiped with a one-foot square muslin cloth soaked in a 200 ppm hypochlorite solution. Following the water rinse, the udders were wiped with single service paper towels; following the chlorine wiping, the udders were wiped only with the wrung cloth. The water rinse was done with a hose that delivered one pint in 5 seconds. The amount needed to accomplish a visually clean udder varied from one to six pints. The average rinsing time was 14 seconds, and about three pints of water was the average amount used per udder. At the afternoon milking on alternate days the udders of Jersey and Holstein cows, all mastitis-free, were washed with water and chlorine until three samples of milk had been collected for each treatment. Prior to this, each cow's milk was sampled aseptically, two consecutive days, and plated. These counts on the milk of individual cows ranged from 100 to 2040 per ml., showing a median of 400 per ml.

The first series of tests was run during both wet and dry weather, about 3 months apart. The results are shown in Table 1.

TABLE 1—STANDARD PLATE COUNTS OF FRESHLY DRAWN MILK FROM WEIGH BOWL AFTER UDDERS WERE WASHED WITH WATER ONLY OR WIPED WITH CHLORINE ONLY. (AVERAGE OF THREE MILKINGS)

Standard plate count	Dry Weather (16 cows)		Wet Weather (21 cows)	
	Water	Chlorine	Water	Chlorine
Minimum	80	80	80	110
Maximum	5100	29,100	3500	7400
Average	885	4,590	875	1350
Median	430	550	830	840

The second part of the study was a comparison of the sanitizing effect of 5 methods of washing external teat surfaces. Five Jersey cows, all mastitis-free, having good uniformity of teat size and texture were prepared for milking by the following methods: (a) udder washed by hand with plain water from a hose until it appeared to be clean, using as much water as necessary and drying with paper towel, (b) washed as in (a), followed by wiping with a cloth soaked in 200 ppm hypochlorite solution and wiped dry with the wrung cloth, (c) washed as in (b), except with a 200 ppm quaternary ammonium compound, (d) wiped with 200 ppm hypochlorite solution soaked cloth without prior water wash, and (e) wiped with 200 ppm quaternary ammonium solution without prior water wash. Each of the five cows was prepared by each method five consecutive days. The right front teat was immersed to the base for 15 to 20 seconds in 100 ml. of sterile single strength tryptose broth contained in wide mouth jars. The exposed broth was plated in tryptone-glucose-extract agar within one hour after the udder washing treatment. The results are shown in Table 2.

RESULTS

The bacteria counts of weigh bowl milk samples shown in Table 1 indicate that in both dry and wet weather, washing the udders with water only and drying them with a separate paper towel, was a more satisfactory method than wiping them with a 200 ppm chlorine soaked cloth. Although a fresh cloth was used on each cow, there was apparently enough soil on the udder and teat surface to reduce the effectiveness of the chlorine. An average of three pints of wash water per udder was used. This seems to have physically removed many bacteria as well as the soil, whereas there was insufficient wetting, soil removal and bacterial destruction provided by the chlorine in the cloth.

TABLE 2 — BACTERIAL COUNTS SHOWING THE CONTAMINATION PER MILLILITER IN TRYPTOSE BROTH AFTER USE AS A RINSE ON ONE SANITIZED TEAT OF EACH OF FIVE COWS FOLLOWING VARIOUS METHODS OF SANITIZING.

	Bacterial counts[a] after sanitizing procedure[b]:					
Trial	A	B	C	D	E	All procedures
1	36,000	13,500	20,500	31,000	27,500	24,000
2	24,500	16,000	40,000	12,000	22,500	21,000
3	43,000	5,000	16,500	20,500	59,000	21,000
4	85,500	6,000	25,000	26,000	69,000	29,000
5	81,500	8,000	8,000	9,000	66,000	20,000
Average	48,000	8,500	19,500	17,500	44,000	

[a]Logarithmic averages to nearest 500.
[b]For description of procedure see text.

The usual interpretation of the correct method of udder sanitizing is method (d) as used in this study. Udders are not ordinarily washed with water prior to the wiping with a chlorine soaked cloth. Method (e) is essentially the same, but a quaternary ammonium soaked cloth is not permitted in some milk sheds. Table 2 shows that the sanitizing methods in order of desirability are (b), (d), (c), (e), and (a), there being little practical advantage of (d) over (c) or of (e) over (a). Methods (b) and (c) give the proper interpretation to "clean and wiped with an approved bactericidal solution". In this study, however, the chlorine solution was better than the quaternary solution as a sanitizer. The importance of first removing physical soil is illustrated by methods (b) and (c). There was no practical difference between the average bacterial counts obtained after use of all methods on the 5 cows individually (see last column of table 2).

In comparing the magnitude of the counts in Tables 1 and 2 it should be recognized that a much greater concentration of the bacteria resulted when the teat was rinsed in but 100 ml. of broth; as compared to the concentration of the bacteria in a sample from the complete milking after the washing treatment of all four teats.

It should not be assumed from this study that re-using the plain water pre-rinse is a substitute for pressured hose water that is wasted as it is used.

CONCLUSIONS

Bacteria counts of freshly drawn milk are lower if a comparatively large volume of plain water is used to rinse the udder, as compared to wiping the udder only with a hypochlorite soaked cloth.

The best of 5 methods of udder washing in this study was: a thorough rinse with plain water which was not re-used, followed by wiping with a cloth soaked with 200 ppm hypochlorite.

The teats of cows are sanitized more effectively when a water rinse precedes wiping with a bactericidal solution.

Following a plain water rinse, a cloth soaked in 200 ppm hypochlorite is more effective than one soaked in the same strength quaternary ammonium solution.

ACKNOWLEDGEMENT

The assistance of H. W. Haisler and L. L. Zaeske in sample collecting and plating is gratefully acknowledged.

REFERENCES

1. Beck, G. H. and Claydon, T. J. Relative Effectiveness of Paper Towels, Cloth Towels and Dry Bare Hands in Cleaning the Udder and in Stimulating Milk Let Down. J. Dairy Sci., **34**: 593-597. 1951.
2. Byers, J. H. and Ewalt, H. P. The Value of Chlorine in Producing Low Bacterial Count Milk. J. Dairy Sci., **26**: 277-281. 1943.
3. Hammer, B. W. *Dairy Bacteriology*. 3rd ed., pp. 146-156. John Wiley and Sons, Inc. New York. 1948.
4. Kesler, E. M., Watrous, G. H., Jr., Knodt, C. B. and Williams, P. S. The Value of Hypochlorite and Quarternary Ammonium Compounds When Used in Udder Washes. J. Dairy Sci., **31**: 179-182. 1948.
5. Milk Ordinance and Code. U. S. Public Health Service Pub. No. 229. 1953.

WORKING WITH REGULATORY GROUPS[1]

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Regulatory agencies play an important role in the dairy industry. One eminent dairy scientist was quoted in a recent issue of a popular magazine as stating, "Outside of drugs nothing is more regulated than milk". This would make milk the most regulated food product, a distinction which perhaps other food processors are quite willing to yield to the dairy industry.

Public Welfare A Common Bond

Extension service and regulatory agencies have a common bond in that both are concerned primarily with the welfare of the public. Only by working together can they achieve the utmost in behalf of the public. Such working relations require a correct understanding between extension specialists and regulatory officials of their respective responsibilities, problems and endeavors. Fortunately the major function of each is well defined; namely, public education and law enforcement.

While these two responsibilities are closely related, their application differs. The regulatory agent may wisely resort to education for accomplishment of enforcement, but extension may not wisely seek recourse in regulations for educational purposes. However, education promotes sound regulations, and regulatory officials generally welcome educational work in their field.

Joint Programs Desirable

Enforcement agents, with the power of penalty, usually are not accepted as educators by their audiences. Their statements are regarded more as oral mandates rather than recommendations. Their official status is not conducive to an audience without prejudice. Extension is not so handicapped. However, the extension specialist may ask why he should be concerned with such problems of regulatory authorities.

If we could envisage the dairy industry as it would be today, had it not been regulated, it would seem that the answer would be evident. Consideration of the role of dairy laws in promoting sanitation, wholesomeness, quality and composition control of dairy products discloses a close similarity between the objectives of regulatory and much of our extension work. This affords an excellent opportunity for the two agencies, and the dairy industry, to work together to their mutual benefit.

Extension, regulatory and industry personnel have successfully done this in Indiana for a long time. We know that such joint undertakings have been advantageous to both the consumer and the dairyman. It has also resulted in the nullification of impractical and outdated regulations and the attainment of legislation which is practical and needed.

Application of A Joint Program

An illustration of how the three groups have worked together is typified by our extension project on dairy products quality control. This is essentially a state-federal service project under the Agricultural Marketing Act. It was activated after an agreement was entered into between the University and an industry group. The initial objective of the project was standardization of grading milk and cream as received from farms for purchase by dairy plants.

Separate programs for the grading of milk and cream were drafted by a committee representing Extension Service, industry and the Dairy Division of the Indiana State Board of Health. The latter, while not a direct participant in the project, signified its approval of the programs by permitting a statement to that effect being incorporated therein. Participation of individual dairy plants was of course on a voluntary basis, and was contingent upon plant management signing a pledge of cooperation with respect to the program with the Purdue Dairy Department.

We put two direct workers on the project to work in the field with milk and cream graders at receiving points. Meetings were held monthly in four different areas of the State for milk plants. Dairy fieldmen largely represented the plants at these meetings, with some plant and procurement managers present. Also, a few sanitarians from health departments usually attended the meetings. Likewise, two meetings were held each month for butter manufacturers.

The milk meetings were preceded either by lunch or dinner which was helpful in getting good attendance. Ordinarily from 25 to 50 persons were present at each area meeting. The programs generally provided for a report by one of our field supervisors

[1]Presented at the North Central Dairy Extension Specialists Conference, May 16-17, 1955, Chicago, Illinois.

on his activities during the past month. Next we presented a summarization of the monthly quality reports which had been submitted to us by the plants. A guest speaker then discussed some topic related to quality or dairy farming. Regulatory officials frequently served as speakers on topics in their field of current concern to the dairy industry.

In 1952 the Indiana State Board of Health adopted new dairy regulations. Work done under the project described above disclosed to industry the need of these regulations and served as a guide in their formulation. They are commonly referred to as the Approved Graders Regulations.

A brief statement of the major provisions of the regulations should indicate the close relationship they have with the project. They prescribe new standards and definitions for milk and cream. Milk and cream graders must have State permits as approved graders. Milk and cream received for purchase from producers must be graded by such graders. The grader must reject for purchase milk and cream not meeting minimum standards, add a red food coloring to the product when it is rejected, and attach a tag to the container of the product indicating the reason for the rejection. Buyers of milk and cream are required to make prescribed quality tests, keep records of such tests and rejections of each producer's milk and cream, and submit monthly summary reports on the tests and rejections.

The foregoing provisions follow closely those of the milk and cream programs under our project. As a result, we now spend less time with individual graders and plants, but reach more graders through schools held at different points in the State. These schools are conducted jointly by the Health Department and Extension Service in cooperation with the dairy processors' trade association. Group instruction of graders permits us to devote more time to the quality of the final product and other phases of the project.

Regulatory groups likewise find it advantageous to work jointly with industry and extension personnel. This has been demonstrated in many ways. An illustration is the advisory committee to the Dairy Division of the Indiana State Board of Health. This committee was requested by the Board. It consists of 10 persons representing the various segments of the dairy industry and the Dairy Department of Purdue University. The committee is frequently called upon by the Board in the consideration of new legislative proposals and in regard to the administration of existing laws.

Additional instances could be cited where Extension Service in Indiana has experienced gratification in working with regulatory groups and vice versa. Such experiences are not confined to any one State; for the value of such working relationships has been demonstrated in many other states.

A noteworthy aid to our work resulting from joint programs undertaken by Extension Service, trade and regulatory groups are the auxiliary groups that are brought into action for advancement of our projects. One of these groups is the dairy fieldmen. Through their attendance at our area milk meetings they have been informed on current dairy issues which they have effectively transmitted to milk producers. The possibility of reaching several hundred producers a day in this manner is within reason. We are grateful for this aid from dairy fieldmen.

SUMMARY

Our experience indicates that the following suggestions are helpful in working with regulatory groups:

1. Analyse each project for phases which may be a basis for cooperation with a regulatory group.

2. Seek the advice of each group involved, also its participation, if the scope of the issue under consideration is broad enough to justify such aid.

3. Accept and utilize such advice or cooperation to the fullest extent justifiable.

4. Keep the groups informed on significant developments, progress being made, and benefits resulting from the project.

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Vice-Chairman, Joe Lewis ....Longview
Secretary, Henry C. Williams........Dallas
Section Council:
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Two years; Lige M. Fox..Big Springs
One year; D. H. Evans ....Austin

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South Dakota Association of Sanitarians

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Washington Milk Sanitarians Association

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Pres.-Elect, C. R. Mike O'Connor .... Bellingham
Sec.-Treas., George Andrews, Room 125 Ferry Terminal, Pier 52, Seattle 4, Washington.

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Vice-Pres., and Pres.-Elect
Robert M. Keown ....Elkhorn
Sec. Treas., L. Wayne Brown, 421 Chemistry Bldg., Univ. of Wisconsin, Madison, Wisconsin.
Directors
Burdette L. Fisher ....Kiel
James T. Judd ....Shawano

NEWS AND EVENTS

SUMMARY OF ASSOCIATION BUSINESS AND EXECUTIVE BOARD PROCEEDINGS OF 42ND ANNUAL MEETING

This is a report of the Association general business sessions and the activities of the Executive Board held during the 42nd annual meeting of IAMFS in the Bon Air Hotel, October 2-6, 1955 in Augusta, Georgia. Several items mentioned briefly herein will be published subsequently in detail in the Journal of Milk and Food Technology.

Presidential Address. Presented by I. E. Parkin under the title of "Communications" which was very well received.

Nominating Committee. The president appointed David Cleveland, Oklahoma, C. A. Abele, Illinois, C. K. Johns, Canada, John Sheuring, Georgia, Richard Parry, Rhode Island, Harold Heiskell, California and Cameron S. Adams, Washington, Chairman.

Nominations. President, H. S. Adams; President-Elect, Paul Corash; First Vice-President, William Hoskisson and J. C. Flake; Second Vice-President, H. C. Goslee and H. B. Robinson; Secretary-Treasurer, H. H. Wilkowske. No additional nominations were made from the floor.

Election of Officers. Upon motions duly made, seconded and carried, Messrs. Adams, Corash and Wilkowske were elected to the respective offices shown above. Since H. S. Adams and Paul Corash were advancing to offices other than those to which they normally would advance in accordance with Constitutional provisions due to the resignation during the year by President-elect Van Nortwick, this election was held to confirm their previous appointments by President Parkin. Secret ballot voting took place for the other two offices with W. A. Hickey, Louis Smith and C. F. Hanger as tellers. Those elected were William Hoskisson (Utah) and Harold Robinson (Washington, D. C.) as First Vice-President and Second Vice-President, respectively.

Committee Reports. The following committee reports were made by chairmen of committees or by alternates as indicated and were accepted for publication, except as indicated.

Committee on Sanitary Procedure, C. A. Abele.

Committee on Food Equipment, W. V. Hickey.

Committee on Dairy Farm Methods, Chester Bletch.

Committee on Applied Laboratory Methods, C. K. Johns.

Committee on Communicable Diseases Affecting Man, R. J. Helvig. The "Booklet" contained in the report will be used on a limited field trial basis before final publishing.

Committee on Education and Professional Development, H. S. Adams.

Committee on Frozen Food, Frank Fisher. This report was referred to the Committee on Ordinances and Regulations for further study and approval.

Committee on Resolutions, H. J. Barnum. The resolutions were (1) Thanks to the speakers, (2) Thanks to the sponsors of the Sanitarians Award, (3) Thanks to host Georgia Chapter, (4) Antibiotics in Milk, (5) Memorial, and (6) Commemoration of Food and Drug.

Committee on Membership, Harold Wainess for Hugh Templeton.

Committee on Baking Industry Equipment, W. R. McClean for V. T. Foley.

Committee on Ordinances and Regulations, W. A. Hoskisson.

Model Registration Law. The report of the Committee on Education and Professional Development included a current revision of the Model Registration Law. The Executive Board and the Association approved that this model law be made available to serve as a guide to those Affiliated Associations who wish to use it in promulgating an act for introduction into the legislature of their respective states.

Scholarship Plan. The report of the Committee on Education and Professional Development included a recommendation to instruct the Executive Board to appropriate from the treasury a sum in the amount of $350.00 for the establishment of the first undergraduate scholarship. It was further provided that Affiliated Associations may voluntarily contribute additional moneys to the Scholarship Fund annually in such amounts as they desire which will be used for additional Scholarships as funds received permit.

Executive-Secretary Report. H. L. Thomasson gave his report which as usual was well received and which showed that IAMFS is continuing to grow and prosper. During the year he attended nineteen meetings including many with Affiliate Associations. Rhode Island and South Carolina associations affiliated with IAMFS during the past year. In addition to the time spent on Association business, "Red" Thomasson also manages the business aspects of the Journal, which include many time consuming tasks and the important work of securing sufficient advertising to keep the Journal on a financially sound operating basis.

Financial Report. This report is published separately for the information of the membership and shows IAMFS to be on a financially sound basis.

Need for Funds. This matter was discussed by the Executive Board and various committee chairman. There is need for travel funds for certain committee functions which could be made more effective by greater participation of its members which is hampered by lack of funds. Other worthwhile activities could be considered if more funds were available. In the future there may be sufficient demands for increased Association participation in worthwhile activities. This will necessitate investigating ways and means of obtaining additional income.

Door Prizes. It has been suggested that door prizes at the annual meeting be limited to half of the affiliated associations each year so that any one association would only give a prize every other year. This seems necessary for both saving of time and expense.

Meeting Site for 1957. After due consideration of all invitations received by mail and in person, the meeting site selected for 1957 is to be Louisville, Kentucky. The Kentucky Association of Milk and Food Sanitarians, through President Mr. H. L. DeLozier, has pledged the necessary support and work to put on an outstanding meeting. The central location of Louisville, Kentucky should result in a record attendance.

"Washington State in 1956." These were the welcome banners displayed at the annual meeting and shows that the Washington Milk Sanitarians Association who will be hosts of the next annual meeting are already working on the plans for the meeting to be held in Seattle, Washington early in September when the northwest weather is at its best. Mr. Cameron Adams, who is in charge of local arrangements for the Seattle meeting, was on hand to extend a special invitation for all members to attend this meeting.

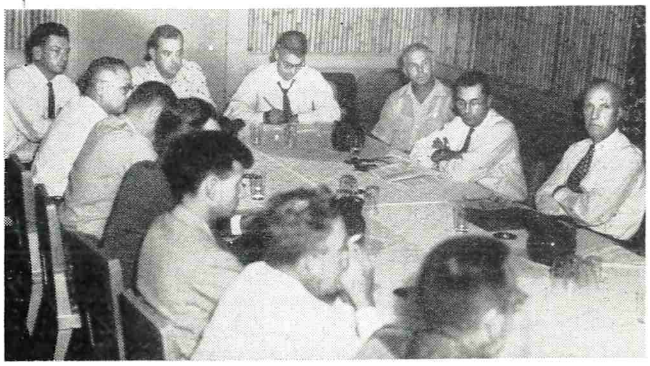
Joint Council. Mr. Thomasson and President Harold Adams will be IAMFS representatives to an exploratory meeting to be held in Kansas City in November with representatives of NAS and APHA to determine whether a need exists for a joint council to work on mutual problems. A Recruitment Brochure prepared jointly is an example of what might be accomplished.

Research and Development. Informal meetings have thrown light on an area needing further study. Dr. Fred Basselt has agreed to prepare a prospectus and Harold Barnum has agreed to act as *ad hoc* chairman of a tentative Committee on Research and Development. The precise objectives have not been established but in general the main work would be coordinating problems in the field which may be solved through research.

Journal Report. Dr. J. C. Olson, Jr. reported on problems and progress relative to the Journal of Milk and Food Technology. In the past twelve monthly issues, 64 manuscripts were published, three were rejected and three were not returned when major revisions were requested. Members are urged to encourage authors to submit papers for publication. Eleven committee reports were published during the year. An analysis of articles showed 28 papers on Milk, 12 papers on Food and the remainder of miscellaneous nature were submitted during the past ten months. New changes and accomplishments during the year reflect the work and activity of the Editor, as follows: Instructions to contributors revised, Instructions to reviewers revised, Helpful information column sarted, Pipeline Chatter column started, and a double column format established which now is in use.

Thanks. The Association is deeply grateful to the Georgia Chapter for the splendid southern hospitality and the efficiently handled local arrangements under the leadership of Chairman J. P. Gibbs. Also, we especially wish to thank Dr. John J. Sheuring for his untiring efforts and capable leadership in organizing the local arrangements which made the 42nd annual meeting in Augusta, Georgia an outstanding success.

H. H. WILKOWSKE, *Sec.-Treas.*



IAMFS COUNCIL OF AFFILIATES MEETS

A meeting of the Council of Affiliates of International Association of Milk and Food Sanitarians occurred during the regular 42nd Annual Meeting of IAMFS October 4-6 in Augusta, Georgia. Presiding at the head of the table are Harold S. Adams, newly elected president of IAMFS; John D. Faulkner, a past president; and Howard Wilkowske, Secretary-Treasurer,

LOCAL HEALTH DEPARTMENTS HONORED WITH SAMUEL J. CRUMBINE AWARDS

Two health departments from opposite sides of the country were honored on November 15 in Kansas City, Mo., with the first annual national awards in memory of Dr. Samuel J. Crumbine, pioneer Kansas state public health officer. The awards, established by the Public Health Committee of the Paper Cup and Container Institute, and the only ones now made on a nationwide basis to local health departments, were presented to the New York City Health Department and the Cowlitz-Wahkiakum District Health Department of the State of Washington at the annual meeting of the American Public Health Association. Nearly 1,150 local health departments were eligible to compete.

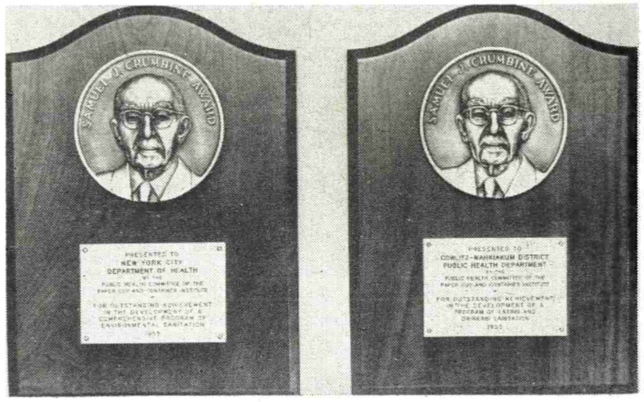
New York's Department of Health, under the direction of Dr. Leona Baumgartner, took top honors for "outstanding achievement in the development of a comprehensive program of enviromental sanitation." For this, the awards jury gave special consideration to newly developed activities of a pioneering nature which supplemented a well-rounded municipal program.

The Cowlitz-Wahkiakum department, headed by Dr. Donald Champaign, won recognition for "outstanding achievement in the development of a program of eating and drinking sanitation." This award took particular recognition of programs arousing specific public participation in an effort to obtain better sanitation for foods and beverages.

The winning departments received plaques bearing a bronze medal and an inscribed plate, and members of the departments instrumental in carrying out the winning program received individual medals, reproducing the medal appearing on the plaque. Homer N. Calver, Secretary of the Public Health Committee Paper Cup, and Container Institute, made the presentations at a luncheon of the Health Officers Section of the A. P. H. A. on Tuesday, November 15.

Dr. Roscoe C. Kandle, Deputy Commissioner, New York City Department of Health, received the departmental plaque on behalf of Dr. Leona Baumgartner, Commissioner, who was in India at the time of the Convention. Dr. Donald Champaign, Commissioner of the Cowlitz-Wahkiakum District Health Department, personally accepted the award for his department's campaign.

In addition, each commissioner received a personal medal reproducing in miniature the medallion on the plaque. Jerome Trichter of the New York Department and Roy Rosson of the Cowlitz-Wahkiakum unit were also awarded medals for their parts in carrying on the prize-winning programs in their respective departments.



These plaques are the first annual Samuel J. Crumbine awards to local public health departments. New York City won plaque at left for outstanding achievement in the development of a comprehensive program of environmental sanitation with special emphasis on programs of a pioneering nature. The Cowlitz-Wahkiakum District received plaque at right for outstanding achievement in the development of a program of eating and drinking sanitation involving a high degree of public participation. The head of each department and the person within the department directly in charge of the winning program, also received personal medals reproducing those on the plaques in miniature.

Almost any local health department might consider itself eligible for consideration for the award for development of a comprehensive program of environmental sanitation won this year by New York City, according to Mr. Calver, in view of the fact that programs were judged in terms of the resources available to the department. In this award the stipulation that challenged the contestants was the provision that "newly developed activities of a pioneering nature" should be considered in judging the well rounded program.

New York met this test well, according to the panel of judges.

The world's largest city has a well developed and long-standing program of sanitary control in all the major areas of enviromental sanitation sharing responsiblity – as most large city departments do – with other municipal agencies or the state health department for many phases of this part of its operation.

In addition, New York conducts two important and significant programs with community groups. To meet the serious problem of gas poisonings and deaths resulting from the use of unvented space heaters in residences, the New York department evolved a co-operative program involving local utility companies, gas appliance manufacturers, municipal, state and federal agencies, maintenance workers and community and civic organizations. For example, the department developed educational materials on the subject and distributed them through the Board of Education and civic organizations, printing the material in several foreign languages to reach New York's multi-lingual public. Another innovation on this program was the establishment of special regulations on heating equipment and of procedures for reporting suspected trouble. To back this program, an emergency investigating squad was set up and put on duty for calls around the clock.

Deaths from carbon monoxide poisoning, which had averaged 244 per year in the City from 1940-49, dropped to 107 in 1954.

The New York Department is also very active in the inspection of food handling operations. To broaden its own efforts it has encouraged large-scale operators such as wholesale markets and restaurant chains to assume the responsibility for their own sanitary inspections. The Department assists in training industry-employed inspectors and relies on these men to cover their companies with the Department coming back into the picture only if the industry inspectors appear to be getting poor results.

In the view of the judges, New York's most unusual pioneering program is its effort to perfect a scientific method of tracing food poisoning directly back to the food handler causing the outbreak. In its own sanitary bacteriological laboratory, the New York Department is perfecting a method of typing the staphylococci present in infected food through the use of a phage, which will offer a much faster and surer method of stopping trouble and eliminating future outbreaks than present methods.

If a generalization can be made from contest entries about the country's nearly 1,200 local health departments, it is that they seem to be consistently faced with the problem of extending their reach. As indicated above, the New York City Department, serving 8 million citizens, has felt it necessary continually to work with other groups to get their big job done. Departments in less heavily populated areas testify unanimously to the need they feel to stretch available funds in the same way.

Cowlitz-Wahkiakum is a fine example of a relatively small department that faced this problem unblinkingly – and did something about it.

As in many other parts of the country, Dr. Champaign's department saw their responsibilities multiply in 1954 as 35 new restaurants were opened, industrial cafeterias were enlarged, and new school buildings, new school cafeterias, new swimming pools, new motels and new trailer camps were built. To make their problem worse, the department wanted to see that food preparation and other service were not merely adequate but pleasant.

Besides doing direct, on-the-ground work, Dr. Champaign's unit worked with and through four other principal groups.

1. The culinary union in the country was inspired to set up a permanent school for restaurant and cafeteria personnel. This school will give new workers training not only in food sanitation but in many other aspects of food service.

2. The local brewery association with the Department's encouragement organized a licensed beverage workshop, again for training younger workers. Supplementing this training, the Department carried out inspections in cooperation with the liquor board inspector and the entire local industry was organized in the area's two principal cities to promote high standards of sanitation and sound public relations.

3. The schools, too, were assisted with school lunch workshops, and the Department cooperates closely with school administrations in inspecting present facilities and reviewing all new plans for future installations.

4. Since non-professional food workers can also on occasion be a problem the Department held meetings on sanitation and emergency feeding with members of the County Extension office and the Civil Defense and Red Cross agencies in the area. After working with the combined groups, the Department helped each individual organization to tailor a program to fit its own needs and responsibilities.

These programs, though requiring some Health Department follow up from time to time, all have the advantage, in the opinion of the judges, of yielding increasing dividends as time passes.

The awards are made in memory of Dr. Samuel J. Crumbine who died last year at the age of 91. One of Kansas' outstanding public health leaders, he carried on campaigns for 60 years for practices that have become an accepted part in the lives of all Americans. Instrumental in crusades against the germ-carrying roller towel, the common drinking cup, and the housefly, he jarred the public with such slogans as "Swat the fly", "Don't spit on the sidewalk," and "Sleep with your windows open."

The jury for this year's awards were Dr. Daniel Bergsma, Commissioner of Health, N. J. State Health Department; Dr. Granville Larrimore, Deputy Commissioner of Health, N. Y. State Health Department; Walter S. Mangold, Assoc. Professor, University of California; Miss Nell McKeever (representing Dr. Mayhew Derryberry, Chief Division of Public Health

Education, U. S. Public Health Service); Dwight Metzler, Chief Engineer, Kansas State Board of Health; Mrs. Lucy R. Milligan, Health Chairman, General Federation of Woman's Clubs.

NEW YORK STATE ASSOCIATION OF MILK SANITARIANS EXECUTIVE COMMITTEE 1955-1956

Reading from left to right: Dr. George H. Hopson, President Elect; Dr. James C. White, President; Dr. Robert W. Metzger, Fred E. Uetz, Past President; C. W. Weber, Secretary-Treasurer; William O. Skinner and Paul Corash, Past President. Absent when picture was taken: Walter Grunge.

NEW YORK STATE ASSOCIATION HOLDS ANNUAL MEETING

The New York State Association of Milk Sanitarians held their Thirty-Second Annual Conference jointly with the Dairy Industry Conference of Cornell University on September 19–21, 1955 at Rochester, New York. They are finding it more and more difficult to select a meeting place adequate to handle the large attendance which this year exceeded six hundred members and guests.

A number of outstanding technical and professional papers and all committee reports presented at the Conference will be published in a book size annual report. Copies of the published report will be sent gratis to the secretary of each affiliate of the International Association of Milk and Food Sanitarians, Inc. and copies may be obtained for a nominal sum by all interested parties.

Dr. James C. White, Professor of Dairying, Cornell University, President-Elect, assumed the Presidency and will serve in that capacity until the next annual meeting. Other officers of the Association are: Dr. George H. Hopson, (President-Elect), The De Laval Separator Company, Poughkeepsie, New York; C. W. Weber (Secretary-Treasurer), N. Y. State Department of Health, 18 Dove Street, Albany 10, New York; Fred E. Uetz, (Past President), Pioneer Ice Cream Div., The Borden Company, 551 Waverly Avenue, Brooklyn 38, New York; William O. Skinner, Westchester County Health Department, White Plains, New York; Doctor Robert W. Metzger, Dairymen's League Cooperative Association, Inc., 400 Park Street, Syracuse 8, New York; and Walter H. Grunge, New York City Department of Health, 125 Worth Street, New York, executive officers.

Henry W. Lehmkuhl, a Past President, was honored with the first annual Emmet R. Gauhn Award for service and leadership on behalf of the Association. Mr. Gauhn was one of the founders of the Association and served as the first President for four years. Mr. Gauhn had an outstanding career as Chief of the Rochester Milk and Food Section, Commissioner of the Rochester Welfare Department and Chairman of the New York State Youth Commission. His foresight and leadership was a stimulant to all who had the good fortune to know him.

A COOPERATIVE HEALTH PROGRAM[1]

BY W. W. BAUER, B. S., M. D.

Director of Health Education, American Medical Association and Editor, TODAY'S HEALTH

Your movement in the cooperative establishment of standards for dairy equipment interests me very greatly because it is so closely parallel to a project in which I have been greatly interested for many years.

Your movement interests me because in the early 1920's, as epidemiologist in the city of Milwaukee and as Health Commissioner of Racine, Wisconsin, I was closely allied to milk sanitation, learning from Dr. Stanley Pilgrim of the Milwaukee Health Department and later administering a milk sanitation program for the city of Racine. I can remember when veterinarians endeavoring to test dairy herds for tuberculosis were met by farmers with shotguns and pitch forks determined not to cooperate in the cerification program. I can remember the days when milk was delivered as it still is in Germany, by dipping out of 40 lb. cans into open vessels and, of course, unpasteurized. Today we have the safest and best, as well as the most abundant, milk supply in the world. This is a major factor in the reduction of our infant mortality and the control of communicable diseases. No longer are milk-spread epidemics common as they were in the early days of my public health experience.

Parallel to your program is the improvement in the health of the school-aged child brought about through a cooperative program closely parallel to yours and involving primarily the medical profession, representing the practicing physician, the public health official group, and the educators. Medicine and education have worked together through a Joint Committee of the National Education Association and

[1]Read at the Annual Meeting of the 3A Sanitary Standards for Dairy Equipment, Georgian Hotel, Evanston, Illinois, November 8, 1955.

the American Medical Association since 1911, dealing with the problem areas indicated by the name of the Committee, "Health Problems in Education." Since 1945 the American Medical Association has had two professional men, a physician and an educator, working exclusively with educational and public health agencies in the development of school health policies acceptable to all groups, and through the Parent-Teacher Associations to the homes, where lies the primary responsibility for child health.

There have been five National Conferences on Physicians and Schools through which there has grown up an understanding and a spirit of friendship, mutual forbearance, and teamwork between the practicing physician, the public health official, and the educator.

Out of these conferences the influence has spread to the state level where similar conferences have been held and from there to the grass roots in the county where children go to school. Cooperative policies and standards established at the national level by inter-professional agreement have found smoother sailing at state and local levels because members of all professions concerned knew that they had been represented in the deliberations out of which such standards have grown. Basic changes in philosophy and tremendous advances in technology have occurred to the great advantage to the child of school age. The parallelism between our project and yours is so striking that I felt it could not help be of interest to you.

DAIRY INDUSTRIAL SUPPLIERS, EQUIPPERS TO MEET MARCH 1-2

AT HOTEL COMMODORE, NEW YORK

The 37th Annual Meeting of Dairy Industries Supply Association will be held March 1-2, 1956, at the Hotel Commodore in New York, N. Y.

Dairy Industries Supply Association is comprised of more than 400 firms which supply or equip the dairy processing industries, and a large number of firms are expected to be represented at the meeting.

An Annual Meeting Committee, composed of executives of member firms with offices in the New York area, has already designed a program aimed at meeting the needs of time-conscious businessmen.

Among the features programmed by the committee are:

- the traditional lottery for display locations at the 1956 Dairy Industries Exposition
- two luncheons and an annual banquet, all three with speakers of topflight importance
- election of six men to DISA's 18-man Board of Directors for three year terms
- a review of association policy in regard to staging of Dairy Industries Expositions and other matters.

Heading DISA's Annual Meeting Committee is Vincent Rabuffo of the Ice Cream Trade Journal. Serving with him are John C. Davis, American Seal-Kap Corporation; R. O. Davison, Kelco Company; Norman Myrick, Urner-Barry Company, and V. K. Shuttleworth, American Can Company.

RESEARCHERS REPORT ON IMMUNITY TO DISEASE THROUGH DRINKING MILK

"Protective Milk" might be another major step forward in man's never-ending struggle to conquer disease. In what may be one of the most important medical advances in history, a new principle for controlling diseases caused by bacteria or viruses has been developed.

Two University of Minnesota researchers announced today the results of their almost 10 years of study which have lead to their "protective principle in milk," and they are convinced that their new principle will immunize human beings against such diseases as streptococcal infections, measles, smallpox, diphtheria, tuberculosis and others. They also believe their "protective principle" will apply not only to diseases caused by viruses and bacteria but also to those which result from certain molds and fungi, pollen and dust.

William E. Petersen, Ph. D., in Minnesota's Institute of Agriculture Dairy Husbandry Department, and Berry Campbell, Ph. D., in the university medical school anatomy department, are the men who have developed the new theory of immunizing men and animals against a wide range of diseases. A report on their work was published in the November issue of Journal-Lancet, official publication of several midwest state medical societies.

The experimental work has proceeded to the point where a pilot herd of cows is now being established to test on a larger scale the conclusions reached thus far. The American Dairy Association, which conducts a farmer-financed program of research, public relations, advertising and merchandising, is providing the funds to carry out the present stages of the testing.

In their experiments, which began in 1946 in the form of fundamental research to study the antibody and gamma globulin production in the cow's udder, the two men have injected vaccines for disease-causing viruses and bacteria into the udders of cows and have learned that the cows will manufacture large quantities of antibodies to the injected material. Vaccinating the cows, in other words, would make it unnesessary to vaccinate human beings who consume the stipulated amount of protective milk. Passive immunity would be maintained in the person drinking the milk as long as he continued to consume it.

The production of immunity factors in the cow's milk does not alter the composition of the milk or make it unnatural or abnormal milk in any way, the research men state. No disease producing organisms are introduced into the milk.

Various processing techniques have been tested on the protective milk. Drs. Petersen and Campbell report that the milk can be pasteurized and dried without destroying the immunity factors. Through these techniques, they say, it will be possible to provide protective milk to the public without any changes in current bottling, manufacturing and distribution practices of the dairy industry.

While pointing out that a tremendous amount of additional research work must be done before protective milk would be available to the public, Drs. Petersen and Cambell say, "it is possible to expect that through the proper development and distribution of protective milk whole populations may be protected from disease."

The two men believe also, on the basis of their research to this time that it will be possible to immunize against poliomyelitis through the drinking of their protective milk. Some of the greatest destroyers of children in America today could be prevented, the research specialists say, through immunity against the various streptococcal infections which are the forerunners of rheumatic fever.

Drs. Petersen and Campbell report that they have proved it is possible for the human being of any age to absorb from their protective milk the antibodies which fight disease. Heretofore, it had been generally believed that such absorption from the digestive system into the bloodstream was impossible except during the first several days after birth. In their experiments the researchers and their graduate students have consumed milk from their vaccinated cows and, through blood tests, have established that the immunity factors built up after drinking the protective milk.

If the protective principle in milk research proves itself under the next stages of the experiment, with a pilot herd of cows and a larger test group of human beings, it will then become possible to plan to provide the protective milk to the public.

The successful conclusion of the current research would not only possible elimination of many diseases among human beings but also among animals such as hogs, chickens and other cattle. Livestock and poultry farmers at the present time suffer losses that total many millions of dollars annually as a result of animal and poultry diseases.

It is estimated, for example, that 20 percent of all calves born alive die within the first few weeks of life, principally from infectious organisms against which antibodies may be developed. Drs. Petersen and Campbell state that, by use of their principle, calves may be fed milk from cows vaccinated under their protective principle, thus providing immunity for the calves in their early weeks of life.

While they are fully confident of the ultimate success of their experimental work, Drs. Petersen and Campbell caution the public to remember that considerable work remains to be done before the protective milk principle will be made available for public use. Every effort is being made to speed the necessary additional research work.

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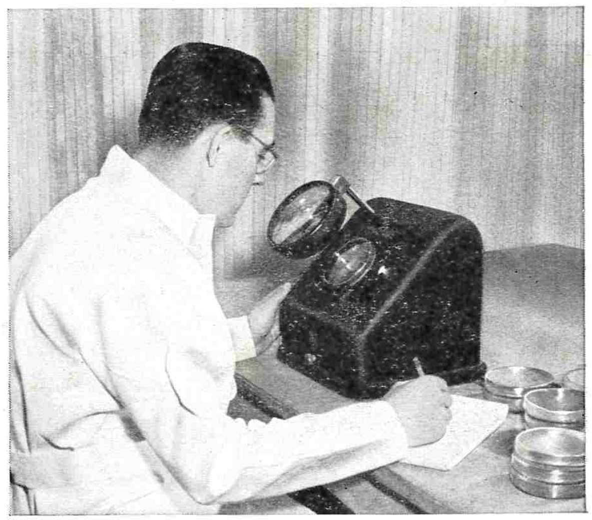
On Guard . . . *to bring milk to the public at its best!*

#5 OF A SERIES

America's milk supply is protected by the world's highest standards of sanitation as it travels on its long journey from the grazing field to the home. Much of this milk reaches its destination in Canco containers. Here is the fifth of a series which outlines in brief the story of Canco containers and the role they play in bringing milk to the public at its best.

Frequent rinse tests in accordance with standard methods for the examination of dairy products are made at Canco factories to keep a continuing check on compliance with the Public Health Code. Photo shows Canco technician transferring rinse solution from containers to sterile Petri dishes.



After incubation for 48 hours in the Petri dishes, the rinse solution is ready for inspection. In the photograph above, a Canco technician is shown using the Quebec colony counter to take note of the number of incubated bacterial colonies, if any, in each dish. The findings are described below.

■ Bacteriological and sanitary control takes precedence over every other consideration in the manufacture and use of Canco fibre milk containers. For the American Can Company seeks to do more than merely meet allowable tolerances. Thus, rinse tests prove that better than 96% of Canco containers are completely sterile. The remaining containers yield only two to four bacteria each—less than four-tenths of one percentum of the tolerance!

CANCO

Fibre Milk Container Department

AMERICAN CAN COMPANY

100 Park Avenue, New York 17, N. Y.

MILKSTONE...

RESULT OF SIN

All of us are constantly battling the sin of carelessness that results in milkstone, waterstone and contaminated milking equipment.

We sincerely believe that "one keep-clean is better than ten make-cleans," whether you're talking about eggy breakfast dishes, bucket milking machines or a 400-ft. pipeline milker.

That's why Surge Dealers and Servicemen repeatedly urge prompt rinsing and washing to avoid the sin of milkstone.

Babson Bros. Co. will be glad to supply you with a quantity of this helpful pamphlet for distribution to dairymen in your area.

Write to:

Surge

BABSON BROS. CO.
2843 W. 19th Street, Chicago, Illinois

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