VOLUME 16 NO. 6
November – December 1953

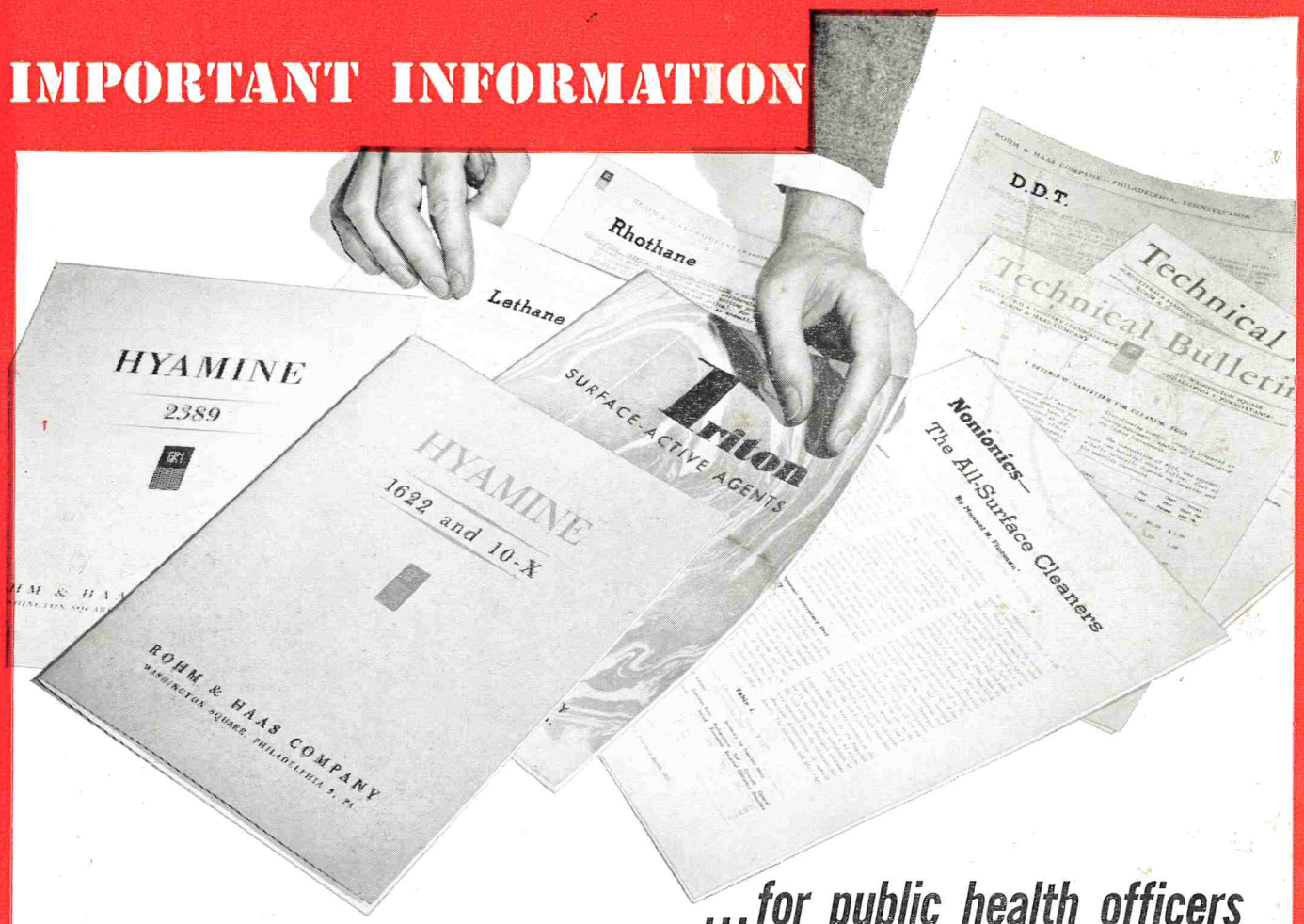
*Journal of*

# MILK and FOOD TECHNOLOGY

*Official Publication*

International Association of Milk and Food Sanitarians, Inc.

# IMPORTANT INFORMATION




## ...for public health officers

Rohm & Haas has much practical information that can help you in your work as a public health specialist. This information has been obtained in the laboratory and in the field during more than 25 years studying better methods, better tools for the control of insects and bacteria, and in developing sanitizing detergents. The products manufactured by the company—bactericides, synthetic detergents, insecticides—have been created to safeguard public health.

Rohm & Haas scientists have also developed many test procedures for accurately evaluating sanitary chemicals. The Peet-Grady test is a standard procedure for testing insecticides against house flies. The "Dynamic Detergency Test Method" measures hard surface detergency and is the latest Rohm & Haas method to gain widespread recognition for evaluating detergent compounds. The "Rubber Strip Test" for laboratory evaluation of dairy detergent sanitizers has been widely used since 1949.

Rohm & Haas shares with manufacturers, and technical and professional personnel in public health work, the knowledge it has gained from its various activities. For this purpose we publish practical and informative booklets which describe our products, explain where and how they can be used to maintain and safeguard sanitary conditions.

A postcard to our Philadelphia office will bring you a set of our latest bulletins and will place your name on our mailing list. You will then be able to keep up to date on what our scientists are doing to develop new products and formulations for the sanitary field.

**TRITON** *surface-active agents aid dirt and grease removal, speed wetting and rinsing.*

**HYAMINE** *is an odorless, effective quarternary ammonium bactericide which in "use" solutions is non-corrosive, non-irritating, and stable.*

**LETHANE** *in aerosol mist, fog or liquid spray formulas gives fast knockdown of insects on contact.*

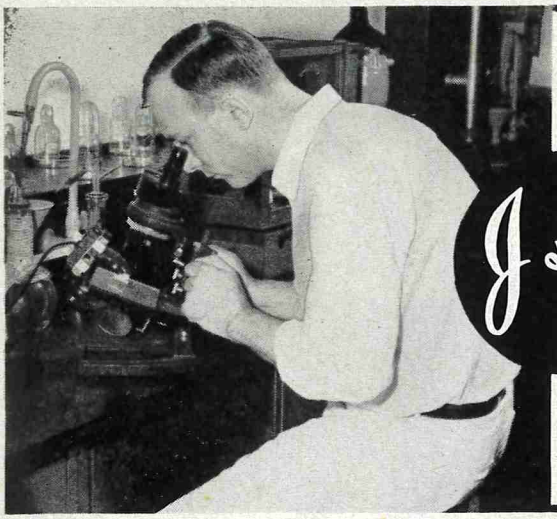
**DDT,** *for dependable concentrates for spraying and dusting.*

**RHOTHANE**—*an analog of DDT, controls mosquitoes and other insects, is safer to warm blooded animals.*



CHEMICALS FOR INDUSTRY

**ROHM & HAAS COMPANY**
**WASHINGTON SQUARE, PHILADELPHIA 5, PA.**
*Representatives in principal foreign countries*



# QUALITY WINS

Conclusive proof that milk producers all over the country are aware of Rapid-Flo FIBRE-BONDED Filter Disk Quality is provided in the results of a recent national dairy filter survey.

Replies received when 177,000 milk producers were asked what brand of filter disks they used show that Rapid-Flo is preferred two to one over the next three brands mentioned!

Quality control, research and continuous test-in-use programs assure the farmer of a safe and reliable filter disk, providing a **reliable Farm Sediment Check-Up.**

Now more than ever dairy farmers are interested in producing higher quality milk at lower costs. They know they can depend on Rapid-Flo superiority.


FILTER PRODUCTS
DIVISION

Johnson & Johnson

4949 West 65th Street
CHICAGO 38, ILLINOIS

# By choice of all 48 states - This Trademark

# appears on more any other trademark.

The Journal of Milk and Food Technology (including Milk and Food Sanitation) is issued bimonthly beginning with January number. Each volume comprises six numbers. Published by the International Association of Milk and Food Sanitarians, Inc., with executive offices of the Association at Ritz Building, 12½ East Broadway, P. O. Box 437, Shelbyville, Ind.

Entered as second class matter at the Post Office at Shelbyville, Ind., March 1952, under the Act of March 3, 1879.

EDITORIAL OFFICES: J. H. Shrader, Editor, 23 E. Elm Ave., Wollaston 70, Mass; H L. Thomasson, Managing Editor, P. O. Box 437, Shelbyville, Ind.

**Manuscripts:** Correspondence regarding manuscripts and other reading material should be addressed to the Editor, J. H. Shrader (address above).

Booklet entitled "JMFT Style-book" can be obtained from the Editor for the use of contributors of papers.


*Journal of*

# MILK and FOOD TECHNOLOGY

INCLUDING MILK AND FOOD SANITATION

*Official Publication*

International Association of Milk and Food Sanitarians, Inc.


Vol. 16 NOV. – DEC. No. 6


CONTENTS




**Business Matters:** Correspondence regarding business matters, advertising, subscriptions, orders for single copies, etc., should be addressed to H. L. Thomasson (address above).

**Subscription Rates:** One volume per year
Individual non-members, Governmental and Commercial Organization subscription, 1 yr. ..... $5.50
Public, Educational and Institutional Libraries, 1 yr. ..... $3.00
Single Copies ..... 1.00

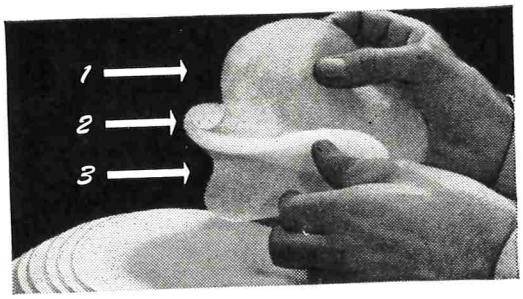
**Orders for Reprints:** All orders for reprints should be sent to the executive office of the Association, P. O. Box 437, Shelbyville, Ind.

**Membership Dues:** Membership in the **International Association of Milk and Food Sanitarians, Inc.,** is $5.00 per year, which includes annual subscription to the **Journal of Milk and Food Technology,** (including **Milk and Food Sanitation**). All correspondence regarding membership, remittances for dues, failure to receive copies of the **Journal,** changes of address, and other such matters should be addressed to the **Executive Secretary** of the Association, H. L. Thomasson, Box 437, Shelbyville, Indiana.

# PROTECT MILK QUALITY THREE WAYS
# SAVE MONEY, TIME AND LABOR

## WITH *Perfection* DUBL-CHEM-FACED MILK FILTER DISCS

# "Tripl-Filtring"®




1—THE TOP SURFACE *Filters*
2—THE CENTER AREA *Filters*
3—THE BOTTOM SURFACE *Filters*

Only DUBL-CHEM-FACED Filter Discs provide this "Tripl-Filtring" action . . . fast and thorough . . . at less cost . . . fewer filters required . . . dependable protection of milk quality is assured three ways!

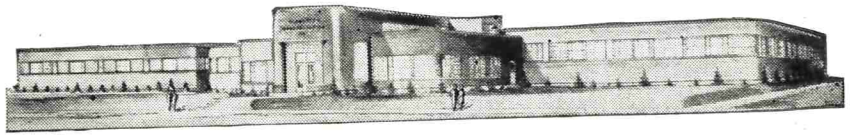
## NO OTHER FILTER DISCS CAN CLAIM TO FILTER MILK BETTER


Milk filters generally depend solely on a single thickness of filtering cotton to catch sediment as milk passes through. In DUBL-CHEM-FACED "Tripl-Filtring" construction, however, two important "extras" are provided, because in addition to the super-thick center area of specially carded cotton, the toughened TOP and BOTTOM surfaces both act as filters, too! Highest quality, low in cost, easy to use, popular with top grade milk producers . . . worthy of your endorsement.

***Write for samples***

**SCHWARTZ MANUFACTURING CO., Two Rivers, Wisconsin**

***Manufacturers of Perfection, Blue Streak, Elgrade, and DUBL-CHEM-FACED Filter Discs, Rolls, Bags and Tubes . . . Fray-Seal Cheese Bandages and Circles . . . and a complete line of cotton goods for the Dairy Industry.***



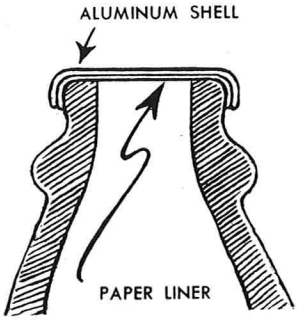
# The DACRO P-38 Cap

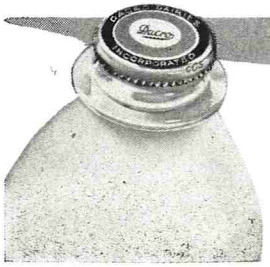
## is easy to remove and makes a perfect re-seal time after time

*Just a slight upward pressure with the thumbs, and the Dacro Aluminum Cap comes off. It does not crumple up when removed from the bottle, but holds its shape so that it can be snapped back on, over and over again.*

### Dacro seals not merely covers

*Dacro P-38 is different from all other milk caps. The hard aluminum, backed by a strong paper liner, makes an air-tight seal. There is no chance of the milk in the bottle being contaminated in any way, or its flavor being affected by foreign odors, particularly when kept in the refrigerator.*




**CROWN CORK & SEAL COMPANY**

***Dacro Division • Baltimore 3, Md.***

# Roccal® BRAND SANITIZING AGENT

## Measures up in every way as the quaternary of choice

**IN THE DAIRY INDUSTRY,** more than any other industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the dairy industry is offered a product that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germicide. In recommended dilutions, it is non-poisonous, non-irritating to the skin, virtually odorless and tasteless.

In the dairy, Roccal can be used for every sanitizing job. For tank trucks, weigh tanks, pasteurizers, separators, bottle filling and capping machines, to keep walls and floors sanitary.

Try Roccal for just one week and watch your bacteria counts go down . . . down . . . down! Write us for new booklet describing Roccal's uses in the dairy plant and on the producing farm.

**USES IN DAIRY INDUSTRY**

*To Sanitize:*

- MILKING MACHINES
- TEAT CUPS
- COOLING TANKS
- TANK TRUCKS
- MILK CANS
- WEIGH TANKS
- PASTEURIZERS
- SEPARATORS
- BOTTLE FILLING MACHINES and AS HAND and TEAT WASH

*In recommended dilutions Roccal is:*

- ☑ POTENT
- ☑ NON-POISONOUS
- ☑ TASTELESS
- ☑ ODORLESS
- ☑ STAINLESS
- ☑ NON-IRRITATING
- ☑ NON-CORROSIVE
- ☑ STABLE


**Insist on Genuine Roccal® BRAND SANITIZING AGENT**

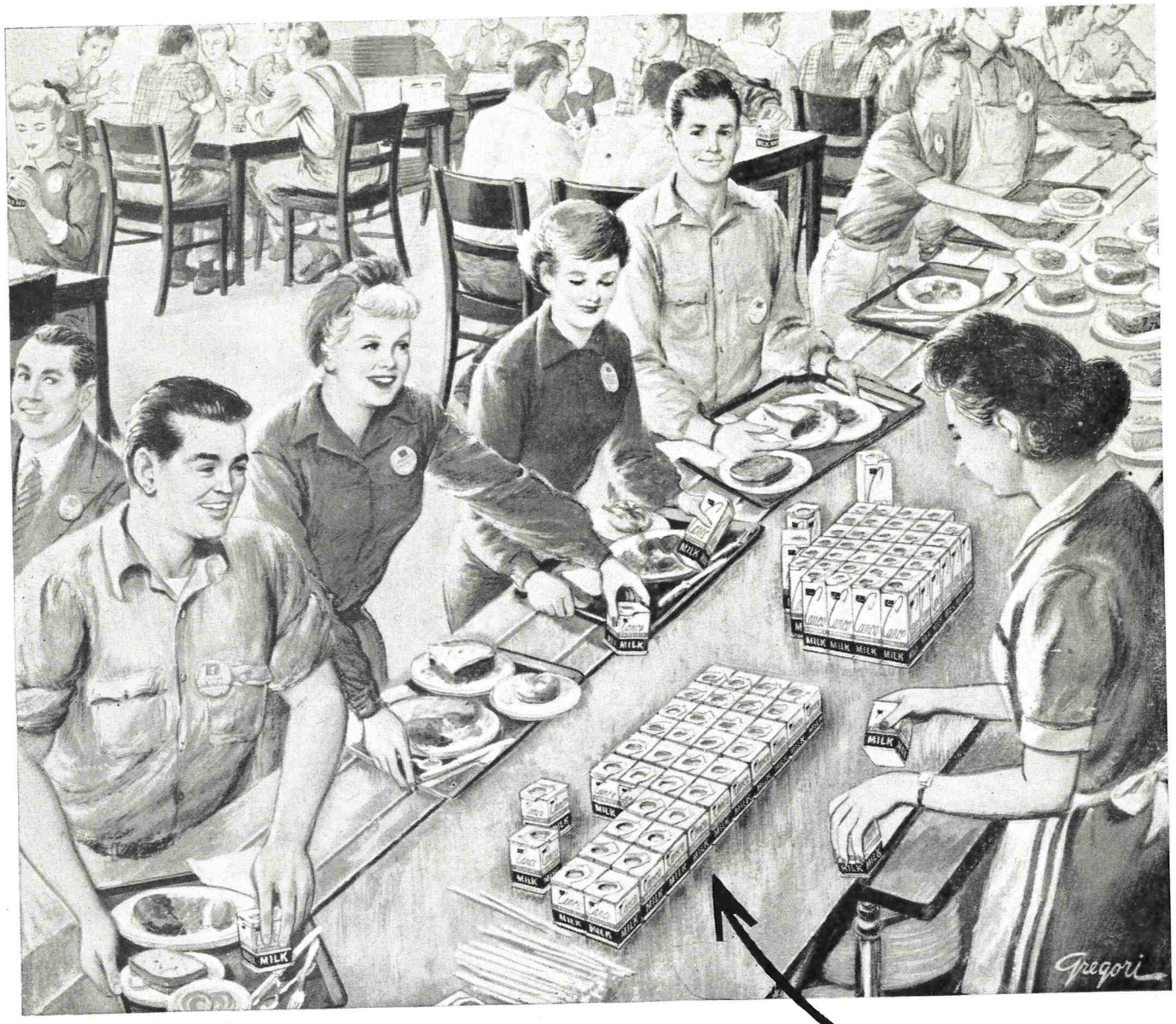
Offices in principal cities throughout the United States.

**Sterwin Chemicals INC.** 1450 Broadway, New York 18, N. Y.

SUBSIDIARY OF STERLING DRUG INC.

Distributed in the Dairy Field by Cherry-Burrell Corp. and other leading dairy supply houses.

**FORTIFY ALL YOUR MILK WITH DELTAXIN® THE PUREST KNOWN FORM OF VITAMIN $D_2$**



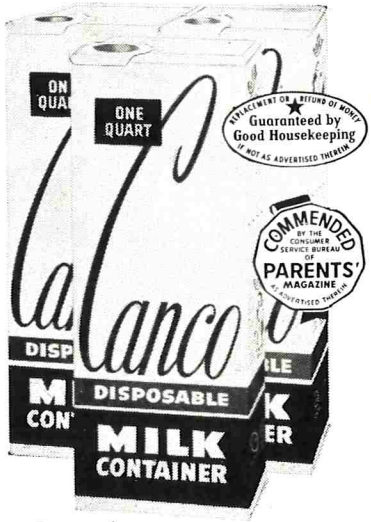

# It took teamwork to put them there!

**Almost everywhere** you look these days, you'll see milk being dispensed in its most convenient, sanitary form—in Canco paper milk containers.

At the beaches . . . in ball parks . . . on military posts . . . in offices and factories . . . these disposable containers are part of the picture.

And for this, public health officials deserve much of the credit. For they teamed up with Canco in the development of this container, recognizing the contribution it could make to better health.

**Today,** in towns and cities all across America, that promise is being fulfilled.




**Comes in**
**1-qt., 1-pt., ⅓-qt., ½-pt. sizes.**

## AMERICAN CAN COMPANY

New York • Chicago • San Francisco • Hamilton, Canada

# Editorial Notes

## "MY PEOPLE ARE DESTROYED FOR LACK OF KNOWLEDGE"

Yes, that is a verse in the Bible—the Old Testament at that! Here's the point.

The Commissioner of Health of the Madison (Wisconsin) Department of Health has just reported the work of the Health Department directly to the citizens through *a full-page newspaper advertisement.* It is a model of good publicity—action photographs, polio graphs, human interest scenes, health control operations. It is not technically abstruse. It is written in down-to-earth style. It tells the story of the preventive and corrective work of the Health Department—of course, only the high points, but illustrative and interesting and important.

It's about time that our public health work gets some good publicity. Usually, the only way that the public ever hears of the Health Department is in some odious situation, such as a quarantine or a death certificate or a budget. Ye gods, these are only a small part of the work of the health department. You readers of this article know it and this writer knows it, but the public doesn't.

The whole town is fully aware that it has a fire department—listen to those sirens (and once a year or so there is a fire parade with showy equipment and demonstrations). The school system—yes, look at those buildings, and note the meetings of the Parent Teacher Associations all over town, stimulated by the insistence of the householders' children that *their* folks attend. And the park system, and the water department, and the rest—all plainly visible to the citizen.

But how about the Health Department. It functions all the time—quietly, protectively, faithfully, but unheralded. It is thought about only when something goes wrong. Its greatest service is its function of keeping the situation safe and comfortable—and making possible a longer life for each of us. It is more intrinsically valuable than any other department of the municipality—yet, it is known the least.

Sanitarians work in fields that are mysterious to the layman. The latter is potentially vitally concerned with sanitation, but he doesn't know anything much about it. Most of the insanitary practices that we run into are not deliberately vicious; they are the results of ignorance of the factors involved. If the citizen did know more about it, he could help in many a situation. He ought to be able to help himself and help others. But usually, lack of knowledge stymies his good will. Think of all the latent power in a community potentially available to the over-worked, under-staffed, poorly paid health organization. "Public health is purchasable." (Why wouldn't ideas and experiences in this field be an excellent subject for a whole session at our annual meeting?)

*Hosea 4:6

Let's come down out of our ivory towers of professional aloofness. Let's think of "the public" as persons. Let's bring to them the knowledge that we know would help them. But, at the same time, let's do it readably, interestingly, informatively. Yes, it might pay to use trained talent.

Madison—good work.

J. H. Shrader

*Newsletter* of Conference of Public Health Veterinarians

There has just come to our desk a multigraphed edition of the *Newsletter,* issued by the Conference of Public Health Veterinarians. Their introductory announcement follows:

Volume 1, Number 1 July 1953

*THE PRESIDENT SPEAKS*

With this issue of the NEWSLETTER, the CONFERENCE is inaugurating the first of a series of bulletins to its members. Through their issuance, we expect to be able to bring to you news items and other information that will be of value for keeping abreast of current developments in the field of veterinary public health. The NEWSLETTER is *your* medium for exchanging experiences. Its ultimate success depends upon your ability to keep us posted on news about your job and your professional career.

It is gratifying to note the progress that our organization has made since its founding. Gradually, we are building our ranks and laying a firm foundation for establishing the public health veterinarian as an important member of the public health team.

L. R. Davenport, D.V.M.
*President*

It is a matter of gratification to see our veterinarian colleagues taking such a renewed interest in public health. They were pioneers in this work. The name of Dr. Theobald Smith will go down in the history of public health in this country with those of Dr. J. R. Mohler *et al.,* in the illustrious company of William Thompson Sedgewick, Dr. William H. Welch, Dr. W. H. Park, Dr. M. J. Rosenau, and others. However, about thirty or so years ago the technological, analytical, and nutritional aspects of milk control leaped into the forefront of public health practice. Veterinary emphasis faded into the background.

Now we are experiencing a recrudescence of veterinary interest. This is highly desirable. Whatever we do to milk, we cannot improve its quality over that which a healthy animal can produce. This latter is the province of the veterinarian. We commend the Public Health Service in giving organizational emphasis to this basic element in good food production. We applaud the initiative of the Conference. We cordially greet the *Newsletter* as a new useful addition to our current thinking and reporting.

J. H. Shrader

# PRACTICAL SANITARY ASPECTS OF PIPE LINE MILKING

D. M. Downing

**The production of milk with pipe line milking equipment is becoming more important daily. Every inspector should be thoroughly familiar with each unit and know the rules or regulations which apply. The unit must be installed properly and in such a manner that it can be examined by observation, feel, and swab or rinse tests. It must be installed to provide protection from both inside and outside contamination and must be constructed of a material that can be easily cleaned. A proper washing system is a must and no unit should be accepted without one.**

In 1950, Mr. Ghiggoile, Chief of the Bureau of Dairy Service, stated, "It is my feeling that regulatory officials, unless strictly prohibited by law, should look to the end results rather than stay with old practices, particularly if such developments are a decided advantage and accomplish results in a more practical and economical manner. We should take the position that our main concern is to have a properly cleansed and sterilized pipe line, regardless of the manner by which it is accomplished so long as public health and the quality of the product is not jeopardized."

This is what the Department officials have done, and in formulating the regulation all interested parties were contacted for their ideas, experiences, and opinions—a good system.

I believe the California regulations pertaining to installation and cleaning of pipe lines are practical, based on facts and practical dairy conditions, and designed to include practices in common usage insofar as they are consistent with good housekeeping and in the interest of public health.

The regulation which became effective on December 1, 1951, pertaining to pipe line installations was primarily intended for dairy farm operations. However, the principles of the system should be carried over into plants that desire to install permanent pipe lines.

When it became evident that a regulation was necessary for the control of pipe lines, we found all kinds of installations, some good and some very poor. Everyone agreed that some control was necessary, especially milk inspection departments, dairymen, and manufacturers.

One of the first items of importance in considering pipe lines is the *proper installation.* Most of the pipe lines that were in use at the time the regulation was adopted have been changed to meet the requirements. There is seldom any deviation from the regulations on new installations, and good cooperation is obtained from all concerned.

The sections of the regulation pertaining to the kind of metal permissible, grit finish, and milk pumps were taken from the 3A standards.

Inspection is important from any point of view and therefore everyone is concerned as to whether or not the system is properly washed and sanitized. We must have the equipment installed in a manner so we can examine it by observing, by feeling, and by swab or rinse testing.

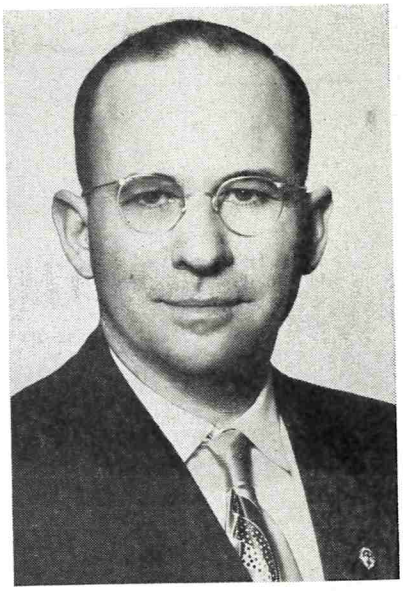
Milk should be protected from contamination and even adulteration by having all the equipment installed so that it can be completely drained. Any water or solution line should be disconnected; because even with leak protector valves the drip may be drawn into the milk line when the pump or vacuum is started.

Air entering the system may need special attention in some cases to protect the milk from dust and odors.

Flies, dust, and other contamination may enter the stall cocks and other openings if not protected during milking and when not in use. Often flies will get in the ends of stall cocks to feed on the drop of milk left there as the hose is moved from one cow to another. These openings should be automatically closed as the hose is removed.

Valves, fittings, unions, and pumps present a problem in proper washing by circulation. However, this can be minimized by the installation of proper equipment. In considering this problem we should determine whether the part in question can be easily cleaned, taken apart and inspected, and examined as of its practicality.

The only item in the regulation that seems to cause considerable disagreement is the thermometer—mainly the location. Some wish to install it on the wash tanks where the detergent solution is mixed, instead of on the discharge end of pipe. On the discharge end it serves a two-fold purpose, especially in long lines: first, in sterilizing with hot water, the proper point to install a thermometer is at the end of the line, because of cooling which takes place between the tank and the end of the line; second, the solubility of detergents or cleaning compounds varies greatly. We have noticed a deposit from some wetting agents when low temperatures are used and also a film when other washing compounds are used at high temperatures. Proper temperature is very important in washing solutions. I believe the best system in long pipe lines would be to have a thermometer on both the wash tank and on the end of the pipe line because of the different



D. M. Downing, Specialist in Milk and Milk Products, Bureau of Dairy Service, California Department of Agriculture. He graduated from the New Mexico College of Agriculture in 1928 with B. S. Degree, Major in Dairy Manufacturing. He has been with the California Department of Agriculture since 1928.

*Presented at 39th Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., Minneapolis, Minn. Sept. 18-20, 1952.

requirements of various washing compounds and the cooling which takes place in long lines.

There are several systems of cleaning the pipe line units, namely:

1. Using a centrifugal pump for circulating washing solutions.
2. The use of vacuum and pulsators.
3. The use of vacuum and gravity.
4. The use of a diaphram pump without circulation.
5. Disassembling and washing all equipment in the milkhouse.

In general, the actual cleaning of the pipeline system begins with a rinse, (until clear), using either tap water or, preferably, water near 110°F.

The circulation of detergent solution should then be for at least 15 to 20 minutes, being sure to maintain the recommended temperature for the particular product used. This should be rinsed with clear water before sanitizing solution is used.

Sanitizing may be accomplished with either chemicals or hot water.

The centrifugal pump should be large enough to discharge at least 25 gallons of solution per minute at the end of the line (1½" pipe).

Under the vacuum system of washing, a vacuum tank is installed several feet above and connected to the end of the milk line, and the other end of the line is placed in the wash tank. This permits drawing the solution by vacuum to a high point, and then as the tank fills near capacity a float cuts off the vacuum and admits air, causing the solution to return by gravity. This continues until the required time for washing, rinsing, and sanitizing takes place.

In the system where vacuum and pulsators both are used, a surging action is produced in the pipe-line, and the requirement of 25 gallons per minute does not apply.

The diaphram pump can also be used, which causes the solutions in the line to surge back and forth.

There are some pipe-line milkers that do not lend themselves to circulating, and must be disassembled for washing.

In California we have many individuals who install pipe-line milkers by converting the units that the dairymen have on hand. These people, as well as the regular milking machine companies, have done a good job. They are continually coming out with new ideas and inventions. For example, in nearly every different system manufactured or converted, there will be found a different kind of releaser or valve.

We have a few installations now where the releaser is eliminated by running the milk directly into a holding tank which is both a vacuum tank and a cooler. The cooling is accomplished by a cold wall. As the milk enters, it is distributed around the walls by a trough or pipe with holes properly spaced. The milk must be cooled to at least 50°F. To have a large tank under vacuum calls for much stronger construction than an ordinary holding tank, and thereby the initial cost is increased. However, it eliminates the cost of releaser, and the time and labor for cleaning the releaser after each milking.

California milking barns and milkhouses vary in size as does the number of cows milked. The barns hold from 2 to 660 cows at one time. In the Los Angeles area we have a dairy which consists of six strings of 30 cows, or 180 cows at one time using a pipe line milker. The barn is 96 feet wide by 90 feet in length. They milk from 840 to 900 cows and produce 4,300 gallons of milk daily, and have 1,000 feet of pipe line, three milk pumps, and three 1,000 gallon holding tanks to handle this milk.

One man milks cows for 8 to 8½ hours daily and takes care of from 75 to 90 cows each milking. The average number of cows per dairy in the Los Angeles area is 150.

I do not want to give the impression that all dairies in California are of this size. Throughout the remainder of the state the dairies usually vary from 30 to 100 cows per dairy.

Since dairying is the largest division of California agriculture, we have an excellent opportunity to study pipe-line milkers, and if our observations and experiences have been of any value, my trip has been justified.

### PIPE-LINE MILKING MACHINE INSTALLATIONS

480.5. All pipe-line milking machine installations must comply with the following conditions and must have a satisfactory circulating system for washing and sterilizing which has been approved by the Director; or such system must be disassembled, washed and sterilized after each time used, except that deviations from the minimum requirements and specifications may be made after approval in writing by the Director:

(a) All equipment having any surface in contact with the milk and all solution lines, wash tanks, fittings, vacuum lines from air separator to moisture trap shall be constructed of stainless steel, nickel alloy, heat resistant glass or equally corrosion-resistant material that is nontoxic and nonabsorbent.

(b) All milk contact surfaces shall be finished to an equivalent of not less than 120 grit finish, properly applied.

(c) The milk pipe-line system shall be installed in a manner to permit being disassembled for inspection.

(d) Sanitary milk pipes which are not washed in place shall be no longer than the washing and sterilizing facilities will accommodate.

(e) The entire milk line shall be installed so as to have a positive slope and be completely drained.

(f) The vacuum line from the air separator shall have a positive drain to a moisture trap.

(g) The vacuum line from the air separator shall not extend in a vertical position above the separator more than six inches including the elbow.

(h) The entire milk pipe line and solution pipe line shall be of the same inside diameter.

(i) No connecting valves are permitted between the milk line and the solution or water lines. Solution line and water lines must be disconnected from the milk line during milking period.

(j) All milk pumps and attachments shall be protected from possible contamination. If legs are used, they shall be smooth with rounded ends and no exposed threads. Legs made of hollow stock shall be sealed. On pumps with legs designed to be fixed to the floor, the minimum clearance between the lowest part of the base and the floor shall be four inches. Readily portable pumps not permanently attached may have leg heights of two inches. (Readily portable pumps are defined as those having a base area of not more than one square foot, or, in the case of motor mounted pumps, an area en-

compassed by the legs that does not exceed one square foot.) Bases when used shall be constructed without ribs or flanges and shall have a smooth top and bottom surface. Pumps which because of their size and type cannot be mounted on legs, shall be mounted on a base designed for grouting and sealing. All milk pumps and attachments must be a sufficient distance from walls to permit proper cleaning.

(k) When a dump tank is used in milking barn, it must be located in accordance with Article 481.5 (g) of the Administrative Code and must be kept covered except when milk is being poured. Milk on test days and strippings shall enter the milk pipe line through the dump tank. If dump tank is located next to the barn wall between milkhouse and barn, the barn wall must be at least six feet high.

(l) The wash tank shall be located in the wash room if the teat cup assembly is a part of the circulating system; if the pipe line in the milking barn is the only equipment to be washed and sterilized by circulation, then a covered wash tank is permissible in the passageway; any other method must be approved by the Director.

(m) A thermometer must be installed on the discharge end of the circulating system.

(n) Milk tanks, dump tanks, releasers, when located in passageway shall be constructed so as to protect milk from flies, dust and contamination.

(o) Ends of milk lines, stall cocks and other pipe-line openings subject to contamination shall be capped or otherwise protected.

(p) Sight glasses shall not be permitted on milk pipe lines installed after the effective date of this regulation when such lines are to be cleaned by circulating systems.

(q) The circulating pump shall be of a size sufficient to fill the pipe lines and cause enough turbulence to insure adequate cleaning and shall deliver not less than twenty-five gallons of solution per minute at discharge end of 1½ inch lines and corresponding volumes for other size pipes.

(r) Air line from moisture trap to milk releaser or air separator shall be washed and sterilized after each time used.

(s) The outside of milk pipe lines and equipment shall be kept clean.

(t) Vacuum pumps, motors, or any machinery that may emit oil, fumes, grease, odors, or any objectionable material shall not be located over or near milk equipment.

(u) Milk pipe lines connected by the so-called slip joint method with "O" ring gaskets shall be disassembled for cleaning.

(v) Any gasket used in milk lines must be of a type that will not interfere with proper cleaning by circulation.

---

## JOSEPH S. GAVIN—1891-1953

Joseph S. Gavin, 62, of 200 Stockbridge Ave., a bacteriologist, milk analyst and head of the Gavin Dairy Laboratory, at the Stockbridge Ave. address, died September 15 at Millard Fillmore Hospital. He had been ill about three weeks.

Born in Buffalo, Jan. 16, 1891, Mr. Gavin attended public school, Central High School and was graduated from Cornell University in 1915. An Army veteran of World War 1, he served in the Chemical Warfare Division in Washington. He was a city health inspector for about six years before he established the dairy laboratory more than 30 years ago. His firm analyzed milk for various milk dealers in and around Buffalo.

Mr. Gavin was a member of the American Dairy Science Association, the American Public Health Association, the International Association of Milk Sanitarians, the New York State Association of Milk Sanitarians, the American Rabbit and Cavy Breeders Association, and the Society of American Bacteriologists.

He also held membership in Buffalo Council 184, Knights of Columbus, Buffalo Assembly, Fourth Degree, K of C Cordova Caravan 26, Order of Alhambra, the Holy Name Society of St. James Church, Kensington Post 708, American Legion, and The Cornell Club of Buffalo.

Surviving are his wife, the former Margaret Sell, two sisters, Mrs. Catherine Kavanaugh and Sister Mary Stella of the Sisters of Mercy, stationed at St. Jerome's Hospital, Batavia, and two brothers, James M. and Edward L. Gavin.

---

## LETTER OF ACKNOWLEDGMENT OF CITATION

Grand Rapids 7, Michigan
1839 Union Blvd. S. E.
September 26, 1953

Dear Red:

Due to the extreme heat during the week of the meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS at Lansing, we left immediately afterwards for Beulah, Michigan, where we had been spending the summer. We arrived back home in Grand Rapids this week. We had a wonderful summer with an opportunity for relaxation which has helped my physical condition considerably.

When the announcement was made at the Association banquet that I was to receive the Annual Citation and Award, I was so emotionally affected (which disgustingly frequently happens the last few years, when occasions like this take place) that I fear I did a very unsatisfactory job of acceptance.

It was wonderful to receive this recognition and my family and I will always cherish the memories of this memorable occasion.

If it is possible I would appreciate having you as Executive-Secretary of the Association convey through the Journal to the recognition committee, the sponsoring corporations of the award, and the membership of the Association my sincere thanks and appreciation.

Sincerely,

E. F. Meyers

# A SURVEY ON THE DETECTION OF HORSEMEAT BY THE SEROLOGICAL PRECIPITIN TEST*

ALBERT WEINSTOCK
*Armour Research Foundation*
Chicago, Illinois

**A survey is presented on the use of the serological precipitin test for the detection of horse meat as an adulterant of beef. The results of a study on the application of the method of the analysis of cooked meats describe the limitations of the method, and emphasize the importance of knowing the history of processed meat products.**

The development of a simple reliable control method for the detection of horsemeat as an adulterant of beef is of interest to both regulatory officials and meat processors. Of the various methods reported in the literature, notably the glycogen test[2], hexabromide value[1, 4], linolenic acid content[3, 8], and the serological precipitin test[6], only the latter method has found acceptance as a simple control procedure.

The serological precipitin test as used for the detection of horsemeat is based upon the formation of precipitins in the blood stream of rabbits that have been inoculated with horse serum or tissue extract (antigen). When the serum containing these precipitins is brought into contact with horse antigen under proper dilution conditions, a precipitin ring forms at the interface of the two liquids. Although there are varying degrees of cross reactivity between closely related species which produce non-specific flocculations, this factor is not critical in the present determination. Species specificity exists to form clear-cut flocculations at much lower dilutions of horse antigen than is required to form the non-specific reactions.

Although the precipitin test as such has been recognized for over fifty years, it is known that various modifications of the basic procedure are employed by different laboratories[7, 11]. The technique described by Kaplan[6] for the detection of horsemeat as an adulterant of beef has been used as a basic method throughout this study. It is the object of this paper to serve a two-fold purpose, first, to adapt the method more readily to control testing, and second, to discuss the limitations of the precipitin test in the analysis of cooked meats.

*This investigation was supported by the Cudahy Packing Company, Omaha, Nebraska.

### PREPARATION OF ANTI-HORSE SERUM

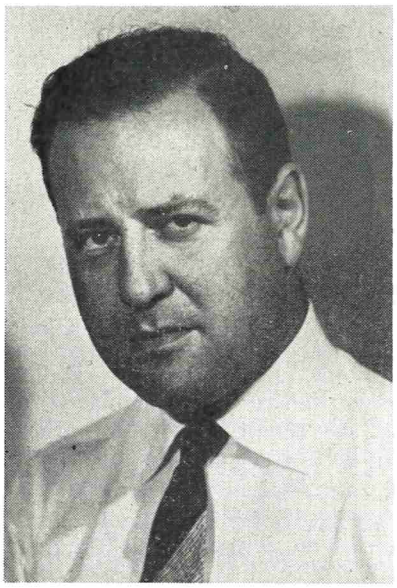
A deterrent factor in the acceptance of the serological precipitin test as a control measure is the time and manipulative effort required to prepare a potent and specific anti-horse serum. Kaplan employs the multiple injection technique wherein rabbits are inoculated intravenously through the marginal ear vein every fifth or sixth day with sterile horse serum or tissue extract until the precipitin content is at a maximum. Proom[10] and Jones[5] propose the use of a single intramuscular injection of alum-precipitated horse serum. Anti-horse serum prepared in our laboratory by both methods was checked against known mixtures of horsemeat. It was found that although the serum obtained by multiple injections of horse antigen is in general satisfactory, the single injection alum antigen technique produces an anti-horse serum of greater potency and specificity.

Inasmuch as the preparation of antiserum by the multiple injection method takes approximately six weeks, and the alum injection method approximately twenty days, and since some laboratories do not have facilities for the injection and bleeding of rabbits, the present availability of commercial anti-horse serum is of considerable interest. Tests conducted on the commercial serum showed it to be comparable in potency and specificity to the anti-horse serum prepared by the alum antigen technique. Commercial anti-horse serum can also be stored in a deep freeze cabinet indefinitely and used for control testing as required.

### EFFECT OF HEAT ON ANTIGEN

To elaborate further on the method under study, it was deemed desirable to investigate the limitations of the biological precipitin test in its application to cooked meats. It is generally understood that in the examination of cooked meat for adulteration, the basic need is for a test that will detect entirely denatured or partially denatured protein. Attempts have been made to produce an antiserum to heated horse flesh by immunizing rabbits with saline extracts of cooked meat[9, 10]. These attempts have not been successful. It, therefore, becomes apparent that in testing cooked meat for adulteration, by present test methods, misleading negative precipitin tests can be expected if the proteins of a commercial cooked meat product have been rendered insoluble to saline extraction.

In order to evaluate correctly the reliability of negative precipitin tests on cooked meats, it is necessary to know the conditions of processing. If the meat is cooked in an oven the problem is one of heat penetration. On the other hand if the meat is cooked in a water bath,



Mr. Albert Weinstock was born in Chicago, Illinois in 1919. He received a BS. degree in Chemistry from the University of Illinois, and a MS degree in Biochemistry from the Illinois Institute of Technology. Upon separation from the army in 1946 as an ordnance officer he worked as a chemist for the Corn Products Refining Company, and later for the Quartermaster Depot in Chicago. He is presently occupied as a research biochemist at the Armour Research Foundation of Illinois Institute of Technology. In this capacity he is concerned primarily with food research problems.

Mr. Weinstock is a member of Sigma XI, Phi Lambda Upsilon, and the American Chemical Society. He has previously published papers in Cereal Chemistry and in Agricultural and Food Chemistry.

denaturation occurs uniformly throughout the sample. Bearing this in mind, tests were carried out using normal anti-equine serum versus horse meat cooked under variable processing conditions.

### HEAT PENETRABILITY

10-g samples of ground horsemeat were placed into a 100°C air oven for different time intervals. The samples were then extracted with saline and treated with normal anti-equine serum. Table 1 shows that for this particular weight and size of sample, the ground meat can be heated in excess of 150 minutes at 100°C and still produce a positive precipitin ring. This is undoubtedly due to the presence of native protein left in the uncooked portion of the meat patty.

In the course of the experiment it was also observed that cooking in the 100°C air oven destroyed the reddish color of the ground horse meat and enhanced the subsequent filtration of the antigen extract. Further investigation showed that heating horse meat samples for 10 to 20 minutes in a 100°C air oven results in an antigen extract that filters rapidly through Whatman No. 42 filter paper to give a clear filtrate without impairing the effectiveness of the antigen extract for precipitin formation. This simple technique eliminates the need for using centrifugation, vacuum, filter aids, and other antigen extract steps described in the literature. It is suggested that this modification can be used to advantage in control testing of meats for adulteration.

### HEATING IN A WATER BATH

Precooked meat products such as sausages and frankfurters are generally processed by immersion in a 160°F to 165°F (71°C to 74°C) water bath until the center of the product attains a temperature of 153°F (67.2°C). The test method employed by Proom[10] was used to perform a series of tests in which ground horsemeat was shaped into sausage form, encased in cellophane bags, and immersed into constant temperature water baths for 30 minutes. The samples were then removed from their casings, extracted with saline, and filtered through Whatman No. 42 filter paper. As shown in table 2, sausages heated to 176°F (80°C) gave a positive precipitin ring.

TABLE 1—EFFECT OF HEATING IN A 100°C AIR OVEN

| Time of heating minutes | Precipitin reaction | Heating clear extract to boiling |
|---|---|---|
| 60 | (+++) | turbid |
| 90 | (+++) | turbid |
| 120 | (+++) | colloidal suspension |
| 150 | ( ++) | colloidal suspension |
| 180 | ( +) | faint colloidal suspension |
| 240 | ( −) | clear (no protein) |

Meat mixtures, as noted in table 3, were then cooked in a water bath at 158°F (70°C) for 30 minutes, extracted with saline, and the antigen extracts tested with commercial anti-horse serum. The results obtained point out that the serological precipitin test is applicable to the detection of horsemeat adulteration in mildly processed meat products.

TABLE 2—HEATING CELLOPHANE ENCASED SAUSAGES IN A WATER BATH

| Bath temperature | Heating time (minutes) | Precipitin reaction | Phosphomolybdic protein test on extract |
|---|---|---|---|
| 60 | 30 | (+++) | thick flocculent precipitate |
| 70 | 30 | (+++) | thick flocculent precipitate |
| 75 | 30 | ( ++) | flocculent precipitate |
| 80 | 30 | ( ++) | fine flocculent precipitate |
| 90 | 30 | ( −) | clear |
| 100 | 30 | ( −) | clear |
| unheated control | − | (+++) | thick flocculent precipitate |


### SUMMARY

The serological precipitin ring test for the detection of horsemeat as an adulterant of beef is discussed relative to its use as a simple reliable control method. Commercial anti-horse serum is suggested for use by laboratories lacking facilities for the injection and bleeding of rabbits. Emphasis is placed on knowing the processing history of a cooked meat product before considering a negative precipitin test for horsemeat as being reliable.



### ACKNOWLEDGMENTS

The author wishes to express his appreciation to Dr. G. H. Benham of Armour Research Foundation and Mr. W. F. Douglass of the Cudahy Packing Company for their interest and helpful suggestions.


TABLE 3—DETECTION OF HORSEMEAT IN MILDLY COOKED MEAT PRODUCTS

| Sample | Precipitin reaction |
|---|---|
| 90% salami + 10% horsemeat | ( ++) |
| 90% frankfurters + 10% horsemeat | ( ++) |
| 90% bologna + 10% horsemeat | ( ++) |
| 100% horsemeat | (+++) |
| 100% salami | ( −) |
| 100% frankfurter | ( −) |
| 100% bologna | ( −) |

REFERENCES

1. Crowell, G. K., *J. Assoc. Offic. Agr. Chemists* **27**, 449-51 (1944).
2. Edelmann, R., Mohler, Jr. and Eichhorn, A., *Textbook of Meat Hygiene*, 8 ed., (1943). Lea and Febiger, Phila.
3. Gupta, S. S. and Hilditch, T. P., *Biochem. J.* **48**, 1937 (1951).
4. Hynds, C. E., *J. Assoc. Offic. Agr. Chemists*, **34**, 355 (1951).
5. Jones, R. N., *The Sanitarian* **13**, 220 (1951).
6. Kaplan, E. and Buck, T. C., Jr. *J. Milk and Food Technol.* **14**, 66, (1951).
7. Kolmer, J. A. *Infection, Immunity and Biologic Therapy* 329 (1923) W. B. Saunders Co., Phila.
8. Mitchell, J. H. Jr., Kraybill, H. R. and Zscheile, F. P., *Ind. Eng. Chem. Anal. Ed.* **15**, 1 (1943).
9. Pigoury, L. *Compt. rend. soc. biol.* **137**, 60-222 (1943).
10. Proom, H. J., *Path. Back.* **55**, 419 (1943).
11. Tanner, F. W., *The Microbiology of Foods*, 2 ed., 902 (1944) Garrard Press, Ill.

## REPORT OF COMMITTEE ON FROZEN FOOD SANITATION*

This past year your Committee on Frozen Food Sanitation continued its investigations dealing with "Regulations Governing Sanitation of Roadside Stands Dispensing Frozen Desserts" and with "Regulations Governing Sanitation of Frozen Foods Other Than Ice Cream."

The 1952 report contained a survey made by O. A. Ghiggoile on conditions existing at these stands in the United States along with a summary of recommendations for sanitary control. S. R. Howe submitted a report with respect to Legislation in Canada Governing Sanitation of Roadside Stands Dispensing Frozen Desserts. Mr. Howe continued his Canadian survey during the past year and reports as follows:

"In the report submitted last year with respect to the above mentioned subject, observation was made that in the case of the larger cities of six provinces, the inspection and enforcement of legislation dealing with the sanitary control of roadside stands were under the control of municipal authorities. Hence, as a means toward securing more complete information, the appropriate officials in seven representative Canadian cities were approached, including those in the three largest cities, namely Montreal, Toronto and Vancouver. Replies received from the Medical Health Officers in Charge indicate the following:

1. (a) Six cities exercise definite sanitary control over the manufacture and sale of ice cream and related frozen products, as well as ice cream mix.

(b) One city has no regulations or by-laws for such enforcement and consequently exercises very little control.

2. In five cities the bacterial content, including coliform, of ice cream, ice cream mix and semi-frozen products is regularly and systematically checked. (The Federal Food and Drug Standard of not more than 100,000 bacteria per gramme is the basis of enforcement.)

3. Two cities furnish each counter freezer operator with definite written instructions with respect to the cleaning and sterilizing of equipment and utensils.

4. One city requires that all ice cream manufactured within its limits must be made from milk or cream produced by herds on farms which are under their inspection. This means that ice cream mix made at outside points cannot be purchased by firms operating within the city limits.

It was found that the Medical Health Officers of the seven cities recognize the need of continual supervision of sanitary conditions maintained by counter freezer operators, particularly those making and selling soft ice cream direct from their machines, such as "Dairy Queen" and similar products. Officers in our two largest cities are in the process of revising their present regulations in order to meet the present changes and modifications in the manufacture and sale of frozen desserts. Some are concerned as to the handling of "soft" ice cream left in machines at the close of business each day and one officer asked a somewhat pertinent question: "Should permission be granted for it to be hardened, kept overnight and then remelted and sold the next day?"

In many instances, machines are sold by agents or manufacturers without any instructions as to the proper care and procedure for cleansing, dismantling and sterilizing. The co-operation of firms concerned in such matters would be of advantage and assistance to all concerned.

Finally, several officers expressed the opinion that some responsible legislative body, such as a Federal Government, should establish a code of sanitary requirements covering the manufacture and sale of all frozen desserts, which could be adopted by a municipality or province as a basis for regular inspection and control.

In 1952 J. A. King reported on a survey of State Regulations Affecting Frozen Foods other than Ice Cream. In this survey he was unable to find references to commercial frozen food which would insure the consumer against thawing and refreezing and no references were made in regard to temperature, age or transportation requirements for commercial frozen food.

During the past year J. A. King and S. E. Smith have been surveying frozen food packers as to their feeling in regard to the suitability of present regulations. At the present time these results are not ready for reporting.

Any comments on this report and suggestions whereby our future activities may be made more effective will be welcomed by your committee

V. C. Stebnitz, *Chairman*

O. A. Ghiggoile

S. R. Howe

J. A. King

S. E. Smith

*Presented 40th Annual Meeting IAMFS., Inc., East Lansing, Mich., Sept. 1-3, 1953.

# ECONOMICS OF FARM TANK AND BULK COLLECTION PROGRAM

C. B. A. Bryant
*Field Sales Manager, Filter Products Division— Johnson and Johnson*
Chicago, Illinois

**New developments in our national life must be governed by their utility, effectiveness, and economic feasibility. The recent introduction of the tank pick-up of milk at the farm is indicating economic advantage to producers, plant operators, and indicatively to consumers.**

All great advancements during their growth were governed, in addition to their service and their usefulness, by their economics, their worth, and their savings for the masses. In our American history, outstanding developments of articles of great service to our people accompanied the entrance of a new PRESIDENT to his role of office. These were:

First: A government stock issue of $80,000,000 by George Washington, to help pay for the Revolutionary War. Twenty-four brokers decided to meet daily in Wall Street, to establish a market. So began the New York Stock Exchange.

Second: Nature forgot to put RIVERS where business needed them, so by 1821, under President Monroe, Americans were busy digging canals. America was stretching out.

Third: "Fire Belching Demons" were chugging on U. S. rails in 1831. President Jackson's term saw the first train moved by locomotive. Townspeople gaped.

Fourth: "Number, please"—1875, President Grant's second term. People could not decide if Bell's telephone was a toy or a useful instrument. Today we have 47,400,000 telephones.

Fifth: "Sit in the DARK—In a crowd? NEVER." People were afraid to watch in 1905 early motion pictures—when Grover Cleveland was president. But inventors were not afraid to risk their money in this new venture.

Sixth: "Guaranteed to TRAVEL 15 MILES per HOUR." 1900—William McKinley is president. Only 8,000 brave men in the United States had registered automobiles. Now over 40,000,000 automobiles are registered and 1,6000,000 people have jobs in this industry.

We now add a Seventh: 1953—Dwight Eisenhower is our president. "The Bulk Farm Tank and Tank Truck Pick Up for Milk" is with us at the bottom perhaps for a momentous climb. Here is the wide opening up of another great, useful era. Economics is the driving force. Many leaders say it will be to the nation as great an advancement as these others herewith related. WHY? The value seems to be, first, to the quality of the product, and second, the economics are declared to be of equal value to the farmer and to the milk handler or processor. Perhaps first in its individual establishment to the farmer and then to the milk plant. It has been my observations that of the multitude of these present operations extending now into almost every dairy state, none have stood still nor gone backward; all seemingly are answering their newly raised problems and are going forward daily in their growth. The now established economic factors plus the learning by doing are surely the driving forces.

Neither I personally, nor to my knowledge does my company with whom I am employed, have one penny invested in the manufacture of or in the distribution of any farm tank. As a curious individual and an amateur color moving picture enthsiast I have visited well over 250 farms with farm bulk tanks in all sections of these United States and have filmed with color movies—edited and prepared for narration—these operations at some 26 different locations in 14 states. I have kept my ears open to hear, and my eyes open and alert to see.

Therefore my discourse on this subject must be not that of a doer but of a listener and a keen observer, rated above the average! Be at ease as to the purpose.

Early in life I well learned that all bills had to be paid. Where we feel it to be proper and a direct value to the system, a familiar product is introduced. Many very able persons who have actually installed and are operating these routes and milk plants are best qualified to give figures and details of the economics. They are all enthusiastically giving generously of their time to share their experiences with their brothers of our great industry. I must give you an over-all view. I literally take it from them—having gathered data as I circulated about our fine nation.

Born and reared on a Michigan farm, and educated in high school and junior college Mr. C. B. A. ("Bill") Bryant promoted power farming equipment, and sold the first Fordson tractor to a farmer in the United States. Entering employment by Johnson & Johnson, he became field sales manager of their Filter Products Division, introducing the use of a cotton filter disk at the farm level. He has written, published, and lectured extensively all over the United States.

### Economies to the Public

In the final analysis, this is the party which pays the bill. Quality of milk is perhaps more uniformly maintained, and in terms of flavor and palatability, made more desirable as a beverage and food. The leaders who are doing it say that in time the costs of production and handling may have a final price recognition to the consumer.

### Economies to the Producer

Here I quote from Mr. A. C. Fisher, General Ice Cream Corporation, Schenectady, N. Y., who was perhaps the first to establish this system some five years ago, outside of California and Florida at Hartford, Connecticut, for Bryant-Chapman with Mr. Emerson Sartain, who now is operating and en-

larging the routes. Consideration here is given for producers of 150 gallons to 600 gallons per day pick up. "At the present time the average investment for a tank of 200-gallon capacity is about $2,300 completely equipped and installed. On a 100-gallon tank we believe that this cost will be between $1,500 and $1,600. This is a substantial investment and obviously the larger the production the less amount per can that has to be invested. However, if we compare this investment with other pieces of equipment that are found on the average farm today, we definitely feel that a return on the investment in the tank is equal to or more than on the investment of a comparable amount in other labor-saving devices and, in addition, improves the quality of the farm's principal cash crop."

I further quote from Mr. Fisher—from *The Milk Dealer,* January 1953, On Economics: "Among the definite ones are the savings in butterfat, in volume (weights), and in can expense. They amounted to an estimated saving of 4 cents per hundredweight for volume, 4 cents per hundredweight for butterfat, and 2 cents per can expense, making a total saving to the producer of 10 cents per hundredweight plus any additional savings that could be passed on to the producer in the form of decreasing hauling rates which we fully expect can be a minimum of 5 cents per hundredweight, and probably a few cents more, depending upon the route and if and when every other day milk collection becomes the standardized practice."

Further on the farmer's side of economics, I quote from Mr. Charles A. Shuler, Saginaw Dairy field supervisor, Saginaw, Michigan, printed in the *Saginaw News,* Farm page, Dec. 17, 1952: "Present milk-handling methods are unsanitary, time consuming, and otherwise inefficient when compared with bulk handling methods, since the new method is a step toward streamlining the whole operation." "Milk tends to cling to the tin-lined 10-gallon cans now in use, but the stainless steel storage tank 'sheds' all the milk it contains and this results in a saving on waste. Where bulk tanks are in use they have saved 13 cents on each 100 pounds of milk taken from the cow. This means that if a farmer's cows produce 500 pounds of milk a day, his daily saving is 65 cents." He goes on to say: "It also makes it possible for the farmer to sell his milk before it leaves the farm because it is measured and tested for butterfat before it is hauled away. These tests are made under the farmer's eyes, as are also the sediment tests drawn, one pint from off the bottom of the tank. He does not have to trust the dairy's figures."

Now the question is asked—What about the small producer? I again quote from authorities. First, Mr. H. Clifford Goslee, Commissioner of Dairying, State of Connecticut, stated in a paper presented at the Dairy Plant Operators and Milk Distributors meeting, University of Vermont, Oct. 22 and 23, 1952, Will Bulk Tank Farm Pick Up Eliminate the 40-quart Can?: "A real attempt will be made to discuss the question from the position of the control official. . . . The answer is Yes, with qualifications . . . . The ultimate elimination of the 40-quart can will be dependent upon the degree of compliance with regulations, and increased profits (or saving in production costs) for the producer."

Now I return to Mr. A. C. Fisher on this subject and quote from same article as previously mentioned: "We expect to supply the one and two can producers, located in an area where tank pick-up is to become the rule rather than the exception, with stainless steel 40-quart cans which they will use in their regular can cooler as they have been doing at present. On the days of pick-up at the farm of their neighbor who owns a tank, they will transport their milk to that neighbor's milk house where it will be measured and sampled in the tank by the truck driver after picking up the tank's original contents. This plan could also be put into effect in the case of a producer situated so as to be inaccessible to the tank truck. This contemplated action has the tentative approval of our State Authorities in Connecticut, and may or may not be an answer for small producers. Only a trial will tell us."

On this farm level the filter medium in the milk strainer placed upon the opening for it in the cover of the bulk tank, or in the line—where the pipe-line system is used—becomes a most important part of the equipment. Every drop of milk in the bulk tank must be of the same high quality—free of sediment. Proper preparing of the cows for milking is a must. The used "fibre bonded" filter medium mounted indicated the thoroughness of the washing of the cows' teats and udders. When clean as it should be it is the dairyman's "Badge of Merit."

### ECONOMIES TO THE MILK ORGANIZATION

Now we turn to the economies of the milk organization. I again refer to Mr. A. C. Fisher's statements in the same article of earlier quotes. Many others have related their similar experiences but I have not seen them in print. "We do not believe that milk plants will make any substantial savings through this operation until all 40-quart cans are eliminated in the individual plant. Before this time and during dual operation, there will be some plant savings, however, in case it is currently necessary to cool incoming milk prior to its pasteurization; and also there will be some saving in out-of-pocket expense, particularly where the receiving of milk is presently done on an overtime basis."

I have heard officials of large milk organizations speak of the savings when complete turnover is ever experienced in cleaning and sterilizing needs, and the elimination of receiving room as now known. Mr. Fisher, to quote again, concludes: "From our four years of experience, however, we know that it is sound economically and from a quality standpoint, and we know that further refinements will further help to expand this type of operation."

In an article in *Southern Dairy Products Journal,* February 1953, Mr. A. A. McArthur, states on the Economics of the Bulk Farm Tank System for the Milk Plant: "Reduces the amount of refrigeration required at the plant due to the fact that milk is received cold and can be pumped direct to storage tanks. (No milk cans to buy, rent, or sell.) Plants having all farm tanks can eliminate the receiving room—its equipment its labor,

cleaning materials, and upkeep This can amount to from 8 to 20 cents per 100 pounds of milk received. The farm tanks seem to make the problem so much easier that in a large portion of the cases we find the producers increasing their herds, thus making the plant's procurement problems easier." I add here my own observations. Many of the 250 farms I have visited have young men personnel—many father and son combinations. It would seem this may be making the farm quite attractive for youth.

TREND TO TANK PICK-UP

We are finding many smaller milk companies quickly going 100 percent to this operation. We know of one at Reading, Penn., one at Lancaster, Ohio, one in Washington, D. C., one in Wisconsin, and one in Iowa. Another in Connecticut and Vermont. In Februarv, at a meeting we addressed, a milk operator at Wilmington, Delaware, announced that he sent notice to all of his producers that by June 1st, 1953, his way of receiving milk would be by farm tank truck pick-up and all producers would need to have a bulk farm tank.

A letter to me dated January 26, 1953, from my good friend J. M. Covert, Director of Milk and Dairy Inspection Division, Department of Health, Los Angeles, California: "The Los Angeles area is now 100 percent farm tank operation and the program is going nicely. . . New ideas are constantly being reviewed to improve this project."

The states of Washington, Oregon, Wisconsin, Maryland, Connecticut, and perhaps others have published regulations for farm bulk tanks. The 3A Standards Committee of our industry have given serious, thoughtful attention to the subject. The United States Department of Weights and Measures under date of February 20, 1953, has published a proposed tentative code for farm milk tanks.

Our Universities have published data relating to hauling costs and detailed costs in different specific instilations. To my notice has come work by Arthur H. Miller (February 6, 1953), Department of Agricultural Economics, University of Wisconsin: "Some Tables Relating to Milk Hauling Costs In Cans and in Bulk." There is also available a paper by Glen I. Nelson, Department of Agricultural Economics, titled: "Economic Aspects of Farm Tank Handling of Milk in Oregon" (February 1953) University of Oregon, Corvallis, Oregon.

So all of this goes merrily on, each day gaining momentum. As far back as a year ago, late in 1951, audiences listened as I presented (at their requests) this subject with my amateur color "Travelogue" films with the attitude this is interesting to know, but it will not happen here. Now they listen with hunger to see and know what their close neighbors may be doing.

---

## REPORT OF THE COMMITTEE ON MEMBERSHIP

The problem of stimulating membership in a specialized organization resolves to one of providing service to its membership and the development of consanguinity in the effort of its members. Mr. H. L. Thomasson, Executive Secretary, has successfully endeavored during the past year to bring this concept to the membership by visits to state organizations and reporting the human interests of our organization in the Journal.

It has been suggested by several members of this Committee that the services of our organization might be extended. The preparation and publication of a speaker's bureau which may be used by various organizations such as dairy technology societies and others, for the selection of speakers would be a decided help in furthering the aims of our organization. It is further suggested that subscriptions to the *Journal of Milk and Food Technology* be placed in agricultural high schools and colleges in the United States, Puerto Rico, Canada, and selected South American countries.

It is the observation of the Committee that our affiliate associations do not have a strong active membership organization, with a few exceptions noted. It is suggested that the Membership Committee of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS should establish a procedure for affiliate organizations to follow and to offer goals which may be met.

---

*Presented at the 40th Annual Meeting, INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., East Lansing, Mich., Sept. 1-3, 1953.

Our Committee member from Idaho reports that the sanitarians from his State have voted to form an affiliate of the I.A.M. & F.S. to be acted upon in final form at their meeting in December, 1953.

During the year a brochure was prepared by Mr. Thomasson and distributed in very limited quantities to the committee members. This leaflet set forth the aims of the organization and contained a membership blank. It has been well received.

The membership status of the organization as of July 29, 1953, is as follows:

| | |
|---|---|
| Paid up affiliate members | 2,821 |
| Paid up direct members | 721 |
| No. unpaid members | 0 |
| Total | 3,542 |

This represents an increase of over 300. During 1953, six organizations have become new affiliates, making a total of twenty-five affiliate organizations. These organizations are:

Dairy Sanitarians Association of the Del-Mar-Va Peninsula

Oregon Association of Milk Sanitarians

Kentucky Association of Milk and Food Sanitarians

Georgia Chapter of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS

Arizona Association of Milk and Food Sanitarians

Association of American Indian Sanitarians

H. E. Eagan, *Chairman*
J. E. Dolan
M. J. Doter
John H. Fritz
H. Clifford Goslee
C. J. Johns
James A. King
C. K. Luchterhand
Emil Mikolajcik
James M. Nakahara
Kenneth L. Pool
Darold W. Taylor
H. L. Templeton
L. O. Tucker
K. G. Weckel

# MILK and FOOD SANITATION

## Q FEVER AND ITS RELATION TO DAIRY PRODUCTS*

J. B. ENRIGHT[1], R. C. THOMAS[2] AND P. A. MULLETT[3]

Q fever is an infectious disease of man. It is found as an inapparent infection in animals. Cattle, sheep, and goats are found widely infected in nature and are probably the source of the organisms infecting man. These animals shed the organism in their milk which introduces it into the environment of man. It has been demonstrated that the rickettsiae of Q fever may survive present day pasteurization procedures.

This manuscript presents preliminary data of the survival of this organism when suspended in milk and subjected to various time-temperature combinations within the pasteurization range.

### HISTORY

Q fever is a rickettsial disease of man. The disease in man may be acute or chronic and induce either a mild or severe illness. The etiological agent, *Coxiella burnetii* (Derrick), is found rather widely distributed in nature where it causes inapparent infections in many species of animals[1]. Epidemiological observations have implicated cows, sheep, and goats as important sources of the organism infecting man [2, 3, 4, 5]. Investigation of outbreaks of Q fever in this country have not revealed arthropods as being important in the transmission of the causative agent from animals to man, neither has man to man nor man to animal transmission been demonstrated as significant in the life history of this organism.

In 1935, Derrick[6], investigating an outbreak of a febrile illness among packing house workers in Brisbane, Australia, recognized that it represented a disease not previously described. He named it Q fever, the "Q" standing for "query" because at that time the questions surrounding its etiology were still unanswered. Further investigation in Australia[7] proved that the etiological agent of this disease was a rickettsia and the name *Rickettsia burneti* was proposed.

Also in 1935, in the Nine Mile Creek area of Montana, Davis and Cox[8] isolated an infectious agent from the Rocky Mountain wood tick *Dermacentor andersoni*. This agent was identified as a rickettsia and named *Rickettsia diaporica*[9] because as the name suggests it is filterable. The disease in man caused by this organism was called Nine Mile Fever[10]. Subsequent investigations[11, 12] demonstrated that the causative agent of Nine Mile Fever and that of Q fever were the same.

The etiological agent of Q fever resembles other rickettsiae both morphologically and tinctorially. However, it differs from other members of the genus *Rickettsia* in these important ways: it is filtrable[8, 9], it produces no soluble antigen[13], it does not stimulate the formation of agglutinins of the "X" strains of *Bacillus proteus*[6, 14] and in addition, the rash observed in other rickettsial diseases is not seen in Q fever. For these reasons a new genus was proposed and the organism is now listed in Bergey's *Manual of Determinative Bacteriology*[15] as *Coxiella burnetii*, (Derrick).

Since these early investigations, Q fever has been reported from many different countries of the world[16]. Naturally occurring outbreaks of Q fever in the United States were first recognized in 1946. In Amarillo, Texas, in March 1946, 55 of 136 employees of three meat packing houses became ill of the disease[17]. In August of the same year another outbreak occurred in Chicago in which 33 of 81 men on the killing floor of a packing house contacted Q fever[18]. In 1947, Dr. Frank Young[19] demonstrated the disease to be present in Southern California, and shortly thereafter it was found to be endemic throughout of California[2, 3, 5, 20, 21]. Since this time, studies have revealed complement-fixing antibody in the sera of persons residing in Massachusetts, Minnesota, Oregon, and Texas[22] and in Pennsylvania[23]. Further elucidation of the geographical distribution of Q fever in the United States will emerge as interest and inquiry develop in various areas of the country.

Infected cows, sheep, and goats shed the organism in their milk[4, 24, 25] and, therefore, this represents one mode of transmission of the organism from animals to man. The importance of this method of transmission in the epidemiology of the disease needs much more clarification. Most epidemiologic investigations of outbreaks of Q fever have not revealed contaminated milk as being of primary importance in the spread of the disease; instead other routes of transmission have been suggested, such as the air-borne route or contact with contaminated meat, hides, hair, or wool[2, 3, 4, 5, 23, 26]. It remains for future study to determine exactly

Doctor John B. Enright is Chairman of the Department of Veterinary Public Health School of Veterinary Medicine, University of California, Davis, California. He received his Ph.D. degree from Stanford University in 1947. Later he was acting assistant chief of the Viral and Rickettsial Disease Laboratory California State Department of Public Health.

His work has been in the field of viral and rickettsial diseases more specifically poliomyelitis, encephalitis and Q fever.

---

* Presented before the Milk Section Meeting of the 39th Annual Convention of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. in Minneapolis, Minnesota, September 19, 1952.

1 Department of Veterinary Public Health, School of Veterinary Medicine, University of California, Davis, California.

2 U.S.P.H.S., Environmental Health Center, assigned to Q fever pasteurization study.

3 U.S.P.H.S., Communicable Disease Center, assigned to Q fever pasteurization study.

the role contaminated milk may play in other outbreaks of Q fever and in the sporadic cases of the disease, the total number of which probably far exceeds those occurring in recognized outbreaks. Nevertheless, since *C. burnetii* is found in the milk of naturally-infected cows, and since antibodies to the organism have been demonstrated in the sera of dairy cattle from at least 10 of 48 states[27], information on the effect of heat on these organisms is needed.

Early in the study of Q fever there were indications that *C. burnetii* was more resistant to heat and certain chemical agents than most other rickettsiae[26]. Huebner and the group investigating Q fever in southern California[28] found 3 of 32 samples of vat-pasteurized market milk and 1 of 4 speciments of vat-pasteurized market cream, when injected into guinea pigs, induced formation of complement-fixing antibody against *C. burnetii*. They also demonstrated that this rickettsia could be recovered from butter made from the unpasteurized milk of naturally-infected cows[29]. Lennette[30] and the group investigating Q fever in northern California found 1 of 35 samples of commercially vat-pasteurized milk and 2 of 42 speciments of HTST pasteurized milk showed serological evidence in guinea pigs of the presence of the rickettsia of Q fever. In addition, Lennette isolated the organism from one of the milk samples which had stimulated the production of antibodies in guinea pigs. Upon the basis of these findings, a cooperative study of the effect of pasteurization on the organism of Q fever in milk was undertaken by the United States Public Health Service*, the Dairy Industries Supply Association, and the School of Veterinary Medicine, University of California.

It was the consensus that the study should be conducted in three phases. First, a laboratory investigation of the thermal-resistance of *C. burnetii* when suspended in skim-milk, whole milk, and cream. Second, a study of the effects of commercial pasteurization upon this organism using commercial equipment*. Third, a survey of the efficiency of commercial pasteurization in eliminating viable organisms from the milk of plants receiving milk containing *C. burnetii*. It is the purpose of this paper to present certain information accumulated in this study to date.

## LABORATORY STUDIES

Time will not allow a description of the methods used except to refer briefly to certain problems arising when working with *C. burnetii* that are not encountered with the bacterial agents of disease. Foremost among these is the fact that laboratory animals infected with *C. burnetii* do not develop symptoms or lesions that might be used as criteria of infection. The appearance of specific complement-fixing antibody in inoculated guinea pigs, therefore, is usually used to indicate the experience of the experimental host with the etiological agent. Since it is the opinion of some investigators that dead *C. burnetii* may be immunogenic, it becomes necessary to make at least one sub-passage in guinea pigs to ascertain the viability of the organisms in the original inoculum.

Certain laboratory strains of *C. burnetii* have been adapted to growth in the yolk-sac of developing chick embryos. This provides another method of demonstrating the viability of this rickettsia. With the Henzerling strain, organisms may be demonstrated in smears of the yolk-sacs of the third serial egg passage. At the present time, because the Henzerling strain of *C. burnetii* is being used, the guinea pig method, the egg method, and a combination of the two are employed for the demonstration of viable rickettsiae. In this way correlation may be established between the indirect method, in which the appearance of antibody is used as a criterion of infection, and the direct microscopic demonstration of the growth of the rickettsiae in eggs. This is important because in future work with field strains of *C. burnetii*, only the indirect method can be used since field strains of the organism may not multiply in embryonating eggs immediately.

At the present time skim milk is being used as a diluent for the rickettsiae because it is known that *C. burnetii* survived quite well in this medium. Ten-fold dilutions of the rickettsiae in skim milk were made and each of these dilutions divided into aliquots. One series of these dilutions was stoppered and placed in the refrigerator and the other series heated in the water bath. The samples of milk to be heated were flame-sealed in thin-walled glass ampoules and placed in a test tube rack. The test tube rack was then submerged in a constant temperature water bath of large capacity and agitated during the entire period of observation.

Heat penetration curves were ascertained from the temperature records obtained in two additional thin-walled ampoules containing equal quantities of skim milk in which thermocouples were placed, both in the milk and in the air space above it. Readings of these thermocouples were recorded at twelve-second intervals. The heating up time when plotted on semi-logarithmic paper approximate a straight line.

Thus, the milk sample was heated to the required temperature in less than three minutes. At the end of the holding time the test tube rack containing the milk samples was placed in a cold water bath and chilled to temperatures below 50°F in approximately three minutes.

Subsequent to heating, the heated and unheated dilutions were each inoculated into guinea pigs and embryonating eggs. With the subpassages that were required, 96 guinea pigs and 288 embryonating eggs were necessary for each time-temperature trial. About three months are required to complete the examinations.

Information transmitted to this laboratory from other investigators [31, 32, 33] concerning the number of *C. burnetii* shed in the milk of infected cows shows that at no time have more rickettsiae been demonstrated than those found in 10,000 infectious guinea pig doses per ml. This information agrees with the findings of this laboratory. It may also be said, that this number of organisms is found in milk only for brief periods during lactation. Some

---

* Participated in the Communicable Disease Center, Atlanta; The Environmental Health Center, Cincinnati; and the Milk and Food Section, Division of Sanitation, Washington, D.C. The cooperation and assistance of the personnel of these stations is appreciated.

* The commercial equipment was made available by the cooperative effort of the Dairy Industries Supply Association. This courtesy is gratefully acknowledged and appreciated.

of the results of experiments in this laboratory, conducted under the conditions outlined above, are presented in table 1.

TABLE 1—SURVIVAL OF DIFFERENT CONCENTRATIONS OF *C. burnetii* IN STERILE SKIM MILK WHEN HEATED AT VARIOUS TEMPERATURES FOR 30 MINUTES.

| Conc. of *C. burnetii* in G. pig doses/ml. | Temp heated for 30 min | Survival of viable *C. burnetii** |
|---|---|---|
| 1,000 | 141 | 2/2 |
| | 142 | 1/3 |
| | 143 | 0/3 |
| 10,000 | 142 | 3/3 |
| | 143 | 1/3 |
| | 144 | 0/3 |
| 100,000 | 143 | 3/3 |
| | 144 | 0/3 |

*Numerator equals number of times survival was demonstrated. Denominator equals the number of trials.

The data presented in table 1 shows that when a milk sample contains 10,000 infectious guinea pig doses of *C. burnetii*, the maximum thus far demonstrated in the milk of infected cows, enough organisms may survive heating at 143°F for 30 minutes to infect guinea pigs and embryonating eggs. Table 1 also lists the results when 1,000 and 100,000 infectious guinea pig doses of the organism were used. It should be emphasized again that in these trials the organisms were diluted in sterile skim milk.

Experiments in which the organism is contained in whole raw milk heated at different temperatures for different lengths of time are not concluded. Therefore at the present moment it is impossible to predict whether or not whole raw milk will exert a protective effort on the organism when subjected to heat. Experiments using the High-Temperature-Short-Time method of pasteurizing milk have been started, but it will be some time before information regarding this technic will be available.

A note of caution should be included regarding the interpretation of data concerning the thermal resistance of the organism of Q fever unless information on the viability of the heated rickettsiae is included. An evaluation of experiments conducted in this laboratory[34] comparing four methods of demonstrating the presence of *C. burnetii* in heated milk specimens indicates that dead rickettsiae are capable of inducing complement-fixing antibody in first-passage guinea pigs.

## SUMMARY

In summary the following may be said: Most epidemiologic surveys have not incriminated milk in the transmission of *C. burnetii* from animals to man. Nevertheless, the organism of Q fever is shed in the milk of infected animals and therefore may come into contact with man. Cows infected with *C. burnetii*, while apparently not exhibiting symptoms of disease may have the organism in their milk in appreciable numbers.

Surveys in the United States of commercially vat-pasteurized milk, in which vats without air-space heaters were used, have shown viable organisms present in 4 of 67 samples, although two of the four samples were phosphatase positive. A survey of HTST pasteurized milk demonstrated that 2 of 42 samples would induce the formation of complement-fixing antibody in 2 of 4 first passage guinea pigs.

The maximum number of *C. burnetii* demonstrated so far in the milk of infected cows is that contained in 10,000 infectious guinea pig doses per ml. It could be demonstrated in 1 of 3 trials, that when this number of organisms was suspended in skim milk and heated at 143°F for 30 minutes enough viable rickettsiae remained to infect guinea pigs and embryonating eggs. At the present time, no experimental data is available regarding the survival of the organism of Q fever when heated in whole milk.

Current information is wholly inadequate to allow evaluation of the efficiency in eliminating viable *C. burnetii* from milk by the HTST method of pasteurization as performed in the United States.

## BIBIOGRAPHY

1. Enright, John B. The Role of Animals in Q Fever. *Vet. Med.* **46**, 383 1951.

2. Beck, M. D., Bell, J. A., Shaw, E. W., and Huebner, R. J. Q Fever Studies in Southern California. II. An Epidemiologic Study of 300 cases. *Pub. Health Rep.* **64**, 41, (1949).

3. Bell, J. A., Beck, M. D., and Huebner, R. J. Epidemiologic Studies of Q Fever in Southern California. *J. Amer. Med. Assoc.* **142**, 868, (1950).

4. Lennette, E. H., Clark, W. H., and Dean, B. H. Sheep and Goats in the Epidemiology of Q Fever in Northern California. *Amer. J. Trop. Med.* **29**, 527 (1949).

5. Lennette, Edwin H., and Clark, William H. Observations on the Epidemiology of Q Fever in Northern California. *J. Amer. Med. Assoc.* **145**, 306, (1951).

6. Derrick, E. H., "Q" Fever a New Entity: Clinical Features, Diagnosis and Laboratory Investigation. *Med. J. Australia.* **2**, 281, (1937).

7. Derrick, E. H., *Rickettsia burneti*: The Cause of "Q" Fever. *Ibid.* **1**, 14, (1939).

8. Davis, Gordon E., and Cox, Herold R. A Filter-passing Infectious Agent Isolated from *D. andersoni*, Reactions in Animals and Filtration Experiments. *Pub. Health Rep.* **53**, 2259, (1938).

9. Cox, Herold R. Studies of a Filter-passing Infectious Agent Isolated from Ticks. V. Further Attempts at Cultivation in Cell-free Media. Suggested Classification. *Ibid.* **53**, 2277, (1938).

10. Dyer, R. E. A Filter-passing Infectious Agent Isolated from Ticks. IV. Human Infection. *Ibid...* **54**, 1229, (1939).

11. Bengtson, Ida A. Immunological Relationships Between the Rickettsia of Australian and American Q Fever. *Ibid.* **56**, 272 (1941).

12. Burnet, F. M., and Freeman, Mavis A Comparative Study of Rickettsial Strains from an Infection of Ticks in Montana (United States of America) and from Q Fever. *Med. J. Australia.* **2**, 887, (1939).

13. Topping, Norman H., and Shepard, Charles C. The Preparation of Antigens from Yolk-sacs Infected with Rickettsiae. *Pub. Health Rep.* **61**, 701, (1946).

14. Cox, Herold R. *Rickettsia diaporica* and America n Q Fever. *Amer. J. Trop. Med.* **20**, 463. (1940).

15. Bergey, D. H. *A Manual of Determinative Bacteriology*, ed. 6. Baltimore, The Williams Wilkins Co., 1948, pp 1092.

16. Parker, R. R., Bell, E. J., and Stoenner, H. G. Q Fever—A Brief Survey of the Problem. *J. Amer. Vet. Med. Assoc.* **114**, 55, (1949).

17. Topping, Norman H., Shepard, Charles C., and Irons J. V. Q Fever in the United States. I. Epidemiologic Studies of an Outbreak Among Stockhandlers and Slaughterhouse Workers. *J. Amer. Med. Assoc.* **133**, 813 (1947).

18. Shepard, Charles C. An Outbreak of Q Fever in a Chicago Packing House. *Amer. J. Hyg.* **46**, 185, (1947).

19. Young, F. W. Q Fever in Artesia, California. *Calif. Med.* **69**, 89, (1948).

20. Shepard, C. C., and Huebner, R.

J. Q Fever in Los Angeles County: Description of Some of Its Epidemiological Features. *Amer. J. Pub. Health.* **38**, 781, (1948).

21. Lennette, Edwin H., and Meiklejohn, [Gordon] Q Fever in Central and Northern California. *Calif. Med.* **69**, 197, (1948).

22. Strauss, Elias, and Sulkin, S. Edward. Q Fever: Complement-Fixing Antibodies with *C. burneti* Antigens in Various Geographic Areas and Occupational Groups in the United States. *Amer. J. Pub. Health.* **39**, 492, (1949).

23. Sigel, M. Michael, Scott, T. F. NcNair, and Henle, Werner. Q Fever in a Wool Processing Plant. *Ibid.* **40**, 524, (1950).

24. Huebner, R. J., Jellison, W. L., Beck, M. D., Parker, R. R., and Shepard, C. C. Q Fever Studies in Southern California. I. Recovery of *Rickettsia burneti* from Raw Milk. *Public Health Rep.* **63**, 214, (1948).

25. Jellison, W. L., Welsh, H. H., Elson, B. E., and Huebner, R. J. Q Fever Studies in Southern California. XI. Recovery of *Coxiella burneti* from Milk of Sheep. *Ibid.* **65**, 395, (1950).

26. Huebner, R. J., Report of an Outbreak of Q Fever at the National Institutes of Health. II. Epidemiological Features. *Amer. J. Pub. Health*, **37**, 431, (1947).

27. Shepard, Charles C. Q Fever: A Serological Survey of Bovine Serums in the United States. *Amer. J. Trop. Med.* **28**, 849, (1948).

28. Huebner, R. J., Jellison, W. L., Beck, M. D., and Wilcox, F. P. Q Fever Studies in Southern California. III. Effects of Pasteurization on Survival of C. *burneti* in Naturally Infected Milk. *Pub. Health Rep.* **64**, 499, (1949).

29. Jellison, W. L., Huebner, R. J., Beck, M. D., Parker, R. R., and Bell, E. J. Q Fever Studies in Southern California. VIII. Recovery of *Coxiella burneti* from Butter Made from Naturally Infected and Unpasteurized Milk. *Ibid.* **63**, 1712, (1948).

30. Lennette, Edwin H., Clark, William H., Abinanti, Margery M., Brunetti, Oscar and Covert, J. M. Q Fever Studies. VIII. The Effect of Pasteurization on *Coxiella burneti* in Naturally Infected Milk. *Amer. J. Hyg.* **55**, 246, (1952).

31. Stoenner, H. G., Personal Communication.

32. Huebner, R. J., and Luoto, L., Personal Communication.

33. Lennette, E. H., Personal Communication.

34. Enright, John B., Unpublished data.

---

## REPORT OF THE COMMITTEE ON COMUNICABLE DISEASE AFFECTING MAN

The Committee on Communicable Diseases Affecting Man in its 1952 Annual Report announced that it has undertaken the formulation for adoption by this Association of a manual of epidemiological procedures for the investigation of milk-borne and food-borne disease outbreaks. The principal objectives in preparing this manual were cited as follows:

1. To provide sanitarians with a procedure to guide them when confronted with milk-borne or food-borne disease outbreaks;
2. To stimulate an active interest on the part of all sanitarians in the epidemiological aspects of their programs; and
3. To improve reporting of such outbreaks in order that sufficient data will be available for use by local, state, and federal agencies and industry in milk and food sanitation program planning.

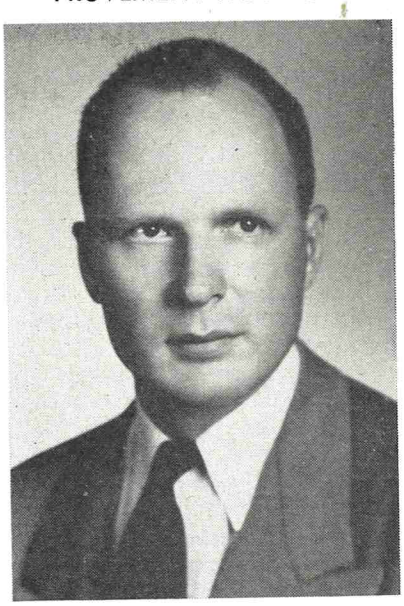
The Committee had planned to have completed the first working draft of the proposed procedure for presentation to the Executive Board of this Association for their review and comment at this 1953 Annual Meeting. However, the Committee regrets that the size of this project has prevented it from proceeding as rapidly as planned. As soon as the first working draft is completed, it will be submitted to the Executive Board for suggestions as to change with respect to format, technical content, proposed procedure for completion of the manual, etc. It will then be submitted to a number of the outstanding epidemiologists in the country and to those members of the Association who, because of their interest in and knowledge of the subject, might wish to contribute to the technical accuracy of this publication. The Committee urges those members of the Association who would wish to review the draft of this manual for the purpose of commenting on it, to so advise the Chairman, or any other member of the Committee.

The Committee hopes to be able to present this procedure in completed form to the Association in 1954 for adoption as its recommended procedure for the investigation of milk-borne and food-borne disease outbreaks.

R. J. Helvig, *Chairman*
L. E. Burney
Raymond Fagan
John H. Fritz
Stanley L. Hendricks
E. R. Price

*Presented at 40th Annual Meeting, INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. East Lansing, Mich. Sept. 1-3, 1953.

## RACE APPOINTED FIELD DIRECTOR OF DAIRY PRODUCTS IMPROVEMENT INSTITUTE



Appointment of Donald H. Race as Field Director of the Dairy Products Improvement Institute has been announced by W. A. Wentworth, president of the Institute. At the same time it was announced that the Institute's offices had been moved from Buffalo to a new location at 302 East State Street, Ithaca, New York.

Mr. Race's appointment, which was effective August 1, follows the recent announcement of the appointment of Dr. Arthur C. Dahlberg of Cornell University as Advisor to the Board of Directors of the Institute. Dr. Dahlberg will continue his present duties and activities as Professor of Dairy Industry at Cornell University, while serving in his advisory capacity with the Institute.

Mr. Race comes to his new position after two and a half years with the Pennsylvania Bureau of Milk Sanitation in Harrisburg. Prior to that he was associated with the Stephens Bros. Dairy in Carbondale, Pennsylvania.

He graduated in 1951 from Pennsylvania State College where he majored in dairy manufacturing. From 1942 to 1945 he was an aviator in the U. S. Navy.

The personal address of the retiring Managing Director is:

Carl W. Larson
731 West Ferry Street
Buffalo 22, New York

# SANITATION IN BULK FOOD VENDING*

W. L. MALLMANN, Ph.D.
*Department of Bacteriology and Public Health*
*Michigan State College, East Lansing, Michigan*

**The dispensing of food from vending machines is a new development in the food industry, and is increasing. They should be supervised by the health authorities as to construction and performance of the machine, the contamination of the foods before and during service, the perishability of the foods themselves, the need for a standard control ordinance, and control problems that must be faced.**

## FOOD CONTAMINATION

The most widespread outbreaks of disease occur where disease germs multiply in foods; however, serious illness or death may result where the food or the food container acts as a mechanical carrier-fomite. For example, the drinking glass or cup may be the means of conveying respiratory type disease from the infected to the non-infected individual where the cleaning and sanitizing of the utensil were neglected or the properly cleaned and sanitized utensil may have been finger-printed with disease germs from an infected or contammated food handler.

No matter how the food or its contained may have been contaminated, disease may result. A properly handled food or its container need not be contaminated. There is really no excuse for food poisoning because simple hygienic procedures are effective barriers. Salmonella and staphylococcus poisonings are the result of gross ignorance, disbelief, or misunderstanding on the part of the food handler. Every epidemic, every outbreak, every individual case of food-borne disease can be directly traced back to a food handler. The refrigerator, the dish-washing machine, or the utensil are no better than the operator who uses them.

Many years ago the bulk vending of food undoubtedly was responsible for many epidemics due to improper storage, improper packaging, and improper handling. With the advent of packaging in individual containers, for example, bottled milk, many of the avenues of contamination were effectively closed and a new era of food sanitation was established. No one questions the packaged article today, provided the food entering the package is of sanitary quality, the package processing is done properly under strictly sanitary conditions, and the shipping and handling of the product is in keeping with the perishableness of the product, for example, packaged fresh meat.

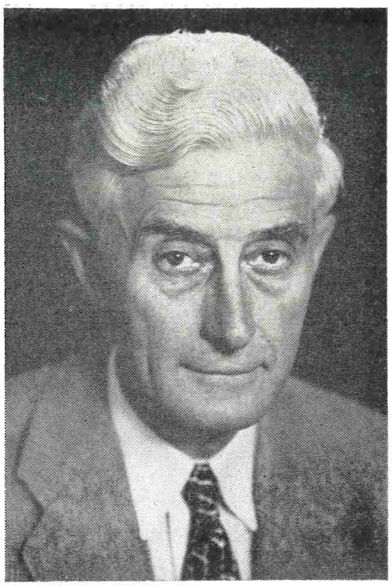
## MECHANICAL VENDING

Now, in keeping with rapid strides in the mechanization of our living, a new era in food dispensing has appeared, namely, the mechanical vending of bulk carbonated beverages, fruit juices, milk, coffee, hot chocolate, and soup. Thus a food service is now available to the public at locations where manually served foods would be impossible.

Suddenly we have these food services made available wherever people congregate: subway, railroad stations, street corners, and industrial plants and schools. The public likes this coin-vended service because of easy access, and as a result a new growing industry has developed. Most communities have seen this industry spring into existence before the health authorities had time to evaluate the public health hazards that may evolve. The health authority has found that he now has numerous miniature food establishments serving carbonated beverages, fruit drinks, milk, coffee, and hot chocolate without the constant supervision of human attendants; instead, a robot that is activated to serve food in a paper cup by the introduction of a coin, appears.

As long as the robot machine is supplied with the necessary ingredients, it obediently will serve. Human contamination of the food or its container has been eliminated as each portion is served, which is undoubtedly an advancement in sanitation. But on the other hand, if poor quality ingredients are placed in the machine, the robot does not distinguish between good and bad, so it may continue to serve as long as patrons are willing to deposit coins.

The health authorities in every community, aware of health hazards, want to know how these mechanical food establishments work, how they are made, what kind of products are vended, how they are protected against spoilage, and how the operator maintains the machines. He should know and he should take steps to protect the welfare of the public. If health hazards exist, assuming that all vending of foods in these machines is safe, the health authority should still require a registration of each machine in his territory. He should approve the site for each machine and he should carefully investigate each operator, evaluate his knowledge of food handling, and, where he is found lacking in knowledge of sanitary food handling, he should be trained either through schooling by the health agency or some other approved agency. The health authority should also be sure that the operator has the necessary equipment to service the machine prop-



Professor Walter LeRoy Mallmann received his B.S. in 1918 and his M.S. in 1924 from Michigan State College, and his Ph.D. at the University of Chicago in 1931. He became Assistant Professor of Bacteriology at Michigan State College in 1918, and has been Professor of Sanitary Bacteriology since 1940. He joined the Experiment Station in 1918 as Research Assistant and is now Research Professor. His professional associations are: A. A; Soc. Bact: Soc. Exp. Biol; Water Works Assoc.; Pub. Health Assoc.; Fed. Sewage Assoc.; Inst. Food Technol; Refrig. Warehouse Assoc.; Mich. Pub. Health Assoc.; Mich. **Acad.**

*Presented at 39th Annual Meeting of theINTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., Minneapolis Minn., Sept. 18-20, 1953.

erly both in the field and at the central distribution center. These would be the minimum requirements depending somewhat on the product dispensed irrespective of health hazard.

### PERISHABILITY OF PRODUCTS

The food product dispensed can be placed in three catagories as it pertains to perishability, namely, non - perishable, semi - perishable, and perishable products.

#### *Non-Perishable and Semi-Perishable*

Such products as candy bars, peanuts, popcorn, and gum can be classified as non-perishable provided the dispensing units are serviced at least once a week. The fact that a food is catalogued as non-perishable does not necessarily mean that no health hazard exists because such bulk products as popcorn and peanuts can be contaminated mechanically by shipping containers, hands of operators, and hand contamination by the consumer. The dispensers should be safeguarded mechanically against consumer contamination, and the operator should be taught proper handling and servicing procedures.

Products that can be classified as semi-perishable would be carbonated beverages and powdered food drinks (coffee, chocolate, soup). The term semi-perishable would mean products that will not readily spoil so that the operator may make additions to supplies in the machine over a period of a week or more without increasing the hazard of pathogenic bacteria or increase of spoilage organisms.

Carbonated beverage syrups may be placed in this category provided the syrups contain ingredients inhibitory to pathogenic and saprophytic microorganisms. For example, the nationally known fountain syrups carry pH values ranging from 1.8 to 3.7. Thus pH values range from a point of quick acting germicidal action (pH 1.8) to one of more gradual kill (pH 3.7)—in no instance will pathogens multiply. Most pathogenic organisms will be inhibited at pH values of 4.5-5. Molds may grow slowly within this range, and inasmuch as they will utilize the organic acids for food, multiplication may be increasingly rapid when the acid content is diminished. An empty, unwashed syrup tank may mold rapidly because the volume of acid present in the thin syrup layer on the container is small.

These syrups also carry sugar contents ranging from 47 to 65 percent. Such sugar contents exhibit high osmotic pressures making it very difficult for bacteria to exist and inhibiting growth of molds except in exposed sugar layers and then only in limited amount in the presence of oxygen.

The high sugar contents and low acidities, frequently coupled with 0.1 percent sodium benzoate, protect the syrups against the survival of pathogens and most saprophytic organisms with the possible exception of molds.

#### *Non-Perishable*

The dried products, coffee, soup, etc., could in a sense be classified as non-perishable; however, since they are introduced into water in a mixing bowl within the machine, a semi-perishable classification is justified.

The containers, service lines, and valves should be constructed of non-toxic, non-corrosive materials, and the equipment should be so designed that cleaning is facilitated. The parts should be easily disassembled or so constructed that flush washing can be used successfully. Although the public health hazard of syrup containers and lines is negligible, still a spoilage problem may occur where servicing is not properly performed, or where design prevents proper cleaning.

The water supplies of the carbonated beverage machines are those of the building supply. Thus the potability of the water will be the same as that from any other tap on the system. If filters or other devices are placed in the lines, the same precautions should be taken in the installation that would be required for the introduction of such devices in any water line.

If cooled water is stored in the machine, the storage tank should be so designed that replacement of water in the tank does not permit short circuiting. If the water becomes stagnant, bacterial reproduction occurs and off-tastes may be imparted to the drink.

#### *Perishable*

The third group of vended products can be classified as perishable. These products include milk, cream and fruit juices. Refrigeration becomes extremely important because these products are excellent media for many kinds of microorganisms, particularly saprophytic bacteria, yeasts, and molds. Fruit juices are particularly susceptible to those organisms that prefer a slightly acid medium for growth such as yeasts and molds. Both yeasts and molds will grow slowly at temperatures of 45-50°F. The writer observed that at a temperature of 38°F, yeasts grew very slowly whereas a rise of 4° to 42°F showed a surprising increase. The writer recommends that the maximum temperature for fruit juices should be 40°F.

The use of temperatures of 45-50°F, where a fruit juice was held for periods in excess of a week, yielded a product high in yeasts, and that was attractive to fruit flies that were drawn to the product as a result of the fermentation that was occurring.

Milk and cream carry bacterial florae familiar to all sanitarians. There is little need to point out that such pathogens as typhoid, paratyphoid, dysentery, bacilli, staphylococci, and many others find milk a desirable medium for multiplication. For this reason milk and cream must be surrounded with the same safeguards in the vending machine as those exercised for bottled milk. Milk and cream should be packaged at the dairy and the same precautions in cleaning and filling the large containers (5 and 10 gallon cans) should be exercised as those required for bottled milk. Post-pasteurization handling must be aseptic, and if manual filling is to be allowed, extreme care must be practiced.

If bulk vending of milk is to be adopted in place of bottled milk in our public eating establishments, the dairy supplying such milk should be urged to provide special cleaning, sanitizing, and filling equipment comparable to that used for bottled milk.

The writer can see no change in health hazard by the use of 5 or 10 gallon containers provided the container is protected in the manner comparable to that given a bottle of pint, quart, or gallon capacity, and the dispensing of the product is done in a sanitary manner.

Milk and cream should be stored in the vending machine at temperatures not to exceed 38°F.

The bacterial spectrum of milk and cream stored in the vending machine would be the same as that obtained in bottles stored at the same temperatures. The quality would be identical. The growth of psychrophilic bacteria would occur in the same manner so that storage periods within the machine should be the same as that for bottled products.

In the case of milk or cream, the vending tubes, valves, and spouts preferably should be single service or if of multiuse design they should be returned to the dairy with each can for cleaning and sanitizing. The vending equipment must be so designed that it is fully protected against contamination during shipment.

In the case of fruit juices, a product packaged at a central service station is preferred, for it would be possible to transfer the packaged material to another receptacle in the machine for dispensing. However, the receptacle in the machine should be cleaned at a central point and replacement made each time the machine is serviced. The health hazard from fruit juices would be much less than that from milk because the acid juices are not favorable media for the growth of pathogenic bacteria. Most pathogens as you likely know, prefer a medium with a neutral or slightly alkaline reaction. The juices are excellent media for molds and yeasts; hence precautions must be exercised to avoid introducing contamination initially, to protect the product by refrigeration in the machine, and replacement in the machine should be frequent.

### ORDINANCE NEEDED

There is a need for a model ordinance for the operation of coin vended food products so that the cities throughout the nation will have uniformity; hence avoiding the multiplicity of specifications that exist in present food ordinances that make it nearly impossible to design equipment that meets the requirements of the various communities.

Any model ordinance should be so planned that it covers all phases of mechanical vending that involves food products. The ordinance should preferably consist of three sections, namely: (1) perishable products, (2) semi-perishable products, and (3) non-perishable products. The design and management of the equipment for the various food products may be quite different. If design and management were planned for perishable products, hardships might be imposed in handling on the non-perishable or semi-perishable products that were not in keeping with health hazards and food quality.

### PROBLEMS TO BE ANSWERED

The vending machine is a relatively new development. It should be carefully examined for possible health hazards as well as a means of eliminating health hazards that now exist in our present manual means of food distribution. Each new development in the food industry generally aids in the elimination of some problems but sometimes creates others which may be greater than those already in existence.

Our prime objective as health workers, whether we are in regulatory work or at the research laboratory bench, is to lessen the incidence of disease. For this reason, we should examine the vending machine critically with the following questions in mind.

Does this device increase or decrease health hazards in vending food?

Where are the health hazards: in the food itself, the vending equipment, the management, or maintenance?

How important are these health hazards in relation to other health hazards in the community?

Is the health hazard one of progressive contamination (multiplication or disease organisms) in the food product or is it one static contamination?

What diseases could be spread by means of vending machines, considering the food vended?

Would the diseases be epidemic in nature or would only sporadic cases occur?

Has the product dispensed been a common source of disease under other methods of distribution?

If certain parts of the machine or operation practice are important health hazards, what steps should be taken to rectify the conditions?

Each health worker, who may be responsible for the supervision of vending machines, should acquaint himself with the literature on the vended products and the environmental conditions that affect the products beneficially or detrimentally. Most books on food technology and bacteriology will give the answers either in direct statements on the particular food in question or in basic data on the physical, chemical, and biological behavior of the products.

After a careful health hazard evaluation of the machine, food quality should be considered. Is the machine delivering a quality product? Is the source material satisfactory? Is the material properly stored and vended so that the consumer receives an acceptable product?

Food quality is indirectly the responsibility of the health worker because the intake of quality food may aid in the resistance of the individual toward disease. It is not the purpose of this paper to attempt to limit the boundaries of activity for the health worker but to call attention to the need of a careful evaluation, health and quality wise, in planning the acceptance or rejection of a new mode of food service. This type of analysis should be applied to every phase of health work so that the citizens of our nation will receive the best return from their investment.

---

## OREGON STATE COLLEGE, SHORT COURSE

The 43rd annual short course and convention of Oregon Dairy Industries will be held in Withycombe Hall, Oregon State College, February 15, 16, 17 and 18, 1954. The first two days will be devoted entirely to short course and the last two days to convention. A full program of technical lectures, demonstrations, and discussions of timely interest is being prepared. Dr. G. M. Trout, Professor of Dairy Industry, Michigan State College, has been secured as the principal out-of state speaker. Samples of dairy products for the contests held in connection with the convention must be sent to Corvallis during the first week in February. Entertainment features will include social hours, a men's smoker, a luncheon, and a banquet.

# REPORT OF APPLIED LABORATORY METHODS COMMITTEE INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, 1953*

## Changes in Standard Methods

The proposed changes in the 10th edition of *Standard Methods for the Examination of Dairy Products* have been indicated[1]. These include revised directions for sampling; tests for bacterial growth inhibition (e.g., penicillin) in milk; substitution of a swab method for determining sanitary condition of milk cans; sediment test standards for retail samples; only buffered distilled water for dilution blanks; a metal syringe for measuring 0.01 ml portions; micro slides with round instead of square 1 $cm^2$ areas, and approval of 3 staining procedures for the direct microscopic method; the Ring test for brucellosis infection; improved methods for reconstituting powdered milks; deletion of certain methods for determining phosphatase and substitution of new and improved procedures; clarification of procedures for determining phosphatase and substitution of new and improved procedures; clarification of procedures for determining thermoduric bacteria; and a number of other minor changes. Last, but probably of greatest interest, is the substitution of a milk-free plating medium for the present milk-containing medium.

Certain wetting agents used in glassware-washing compounds have been found to require six or more successive rinsings in order to reduce their growth-inhibiting effects on Petri dishes or other glassware used in cultural methods. Laboratories should check bacteriological glassware for freedom from bacteriostatic detergent residuals by plating a series of milk dilutions in specially well rinsed, as well as normally rinsed and sterilized glassware, incubating, and noting any definite trend toward lower counts.

Because of marked differences in electrometric pH results when instruments are not operated correctly, directions have been included for determining the pH of plating agar. Temperature compensators do not permit correction when the meter is standardized at one temperature and the test solution is at a different temperature.

Federal specifications for cultured buttermilk require a coliform count not exceeding 10 per ml in more than 1 sample out of 4 consecutive samples tested, and the industry appears to have no difficulty in meeting this standard.

For coliform tests of frozen dairy foods, unmelted samples are preferred, undiluted portions were unsatisfactory, a 2-gram sample gave maximal count, and collaborators preferred solid media.

Directions are included for the detection of heated milk admixed with raw milk.

The importance of employing an incubation temperature which will enable the low temperature flora of eggs and egg products to develop colonies is being recognized. The 10th edition of Standard Methods will call for incubation of plates at 32°C instead of at 35°C. In addition, buffered distilled water has been found preferable to either saline or tap water as a diluent for frozen egg products[2].

## Milk Sanitation Tests

Special studies[3] using pure and mixed cultures at 37.5°C with the exception of two cultures, showed good agreement between the time of reduction of methylene blue and resazurin. The two exceptions were a group *B. streptococcus* which reduced methylene blue but failed to reduce resazurin during the 9-hour period of observation, and an unclassified *Streptococcus* growing at 45°C which reduced resazurin before methylene blue; the latter dye was found to retard the multiplication of the culture slightly.

The staphylococci, some micrococci, the *coli-aerogenes* strains, and some group D streptococci were active in dye reduction at 37.5°C while the achromobacteria, chromobacteria, Gram-positive rods, microbacteria and streptococci of groups B and E, and the two heterofermentative streptococci were inactive. Of group N the *Str. lactis* types were fairly active in dye reduction, while strains more closely related to *Str. cremoris* failed to reduce the dye.

In other studies it was noted that those using the methylene blue reduction test should take heed that DDT wettable powder has been found to precipitate the dye[4] in raw milk before the natural reducing system of the milk or reducing substances formed by microorganisms could affect the reduction of the dye.

A comparison of roll-tube and petri dish counts on raw milk was carried out[5] as a co-ordinated experiment at two centers, using standardized bulk medium and techniques. Statistical analyses showed that roll-tube counts were generally lower than the corresponding petri dish counts, but the difference varied considerably from milk to milk. The variation between replicate sub-samples was about the same for both methods. Experience and the results both indicate that roll-tubes were slightly more difficult to count than petri dishes.

A member of the committee (GWS) has been concerned with utilization of laboratory pasteurization counts as a tool for official control and presented a report at the 40th Annual Meeting[6].

A method was devised for determining the bacteriological condition of individual milking machine test-cup liners[7] in which the partial vacuum and pulsating action of the milking machine were utilized to surge sterile water up and down in the liners. Plate counts then made on the water resulted in much higher bacterial counts than a rinse-shake method. The use of wetting agents did not increase the counts obtained.

The application of molecular filter membranes to bacteriological analysis of water and of air has been reported by several. One member of the committee (FWB) has been concerned with its application to evaluation of the sanitation of dairy pipe lines cleaned "in place" and presented a report at the 40th Annual Meeting[8]. Other applications of the technique to dairy problems were suggested and a bibliography presented.

Investigations on milk pasteurization at high temperatures[9] disclosed that a temperature of 168.34°F with a holding time of 2.35 seconds in the Mallory small tube heat exchanger gave destruction of *M. freudenreichii* (MS 66) equivalent

*Presented at 40th Annual Meeting, International Association of Milk and Food Sanitarians, Inc., East Lansing, Mich., Sept. 1-3, 1953.

to laboratory pasteurization at 143°F for 30 minutes. A temperature of 169.7°F was necessary to reduce the activity of phosphatase to 4 gamma of phenol per milliliter. In terms of the data of North and Park, as interpreted by Dahlberg, on the thermal destruction of *Mycobacterium tuberculosis*, 169.7°F for 2.36 seconds yields the same total lethal effect as 161°F for 15 seconds, assuming zero heat-up and cooling time in both cases.

The trend toward centralized production with consequent longer transportation and storage before sale has increased interest in spoilage of foods, especially dairy products, by psychrophilic organisms. This has focused attention on water supplies and equipment as sources of such spoilage bacteria and has emphasized importance of sanitation methods designed for their control or removal, as indicated by one member (PRE) of the committee[10].

Investigations in England several years ago of the bacterial flora of farm water supplies showed that about 20 percent when pasteurized directly had thermoduric colony counts. A recent publication[11] reported that significantly higher thermoduric colony counts were obtained when 5 ml of water were laboratory pasteurized in 5 ml of sterile milk or 2 ml of water were pasteurized in 8 ml of sterile milk, than when 10 ml of water were directly pasteurized; 86 percent of the water samples had higher thermoduric counts after pasteurization in milk. Large differences were not common, only 19 percent of the ratios being over 5 and 5 percent over 10. Aerobic sporing rods were dominant in the thermoduric microflora irrespective of the method of pasteurization.

### TESTS FOR ANTIBIOTICS IN MILK

Last year's Report referred to the extensive studies conducted by Kosikowsky *et al.*[12] on bottled pasteurized milk in New York State. Starter activity tests showed inhibitory action in 8 percent of the 1800 samples tested, while disc assay tests for penicillin yielded positive results in 6 percent of the milks. A similar study on individual herd milks[13] in one area revealed over 6 percent of inhibitory milks, but only 1.4 percent were positive for penicillin. Other antibiotics, notably aureomycin, were suspected. In further studies[2] one milk showed only 10 percent starter activity. This came from a herd of 110 cows, 3 of which had been treated with aureomycin the previous day.

A disc assay test for aureomycin, using a strain of *B. cereus*, has been developed[14]. One worker[2] found it only sensitive to about 0.2 unit/ml instead of 0.05 unit as claimed. The same worker[15] reports that aureomycin is generally considerably more inhibitory than penicillin for mixed strain lactic starters, while dihydrostreptomycin is much less inhibitory in comparable concentrations.

Gogas and Bicknell[16] described a modified disc assay test for detecting penicillin in milk. By incubating poured plates for 2.5 hours and refrigerating before "spotting" with the discs, it was claimed that the test could be completed in a further 2 hours. This advantage could not be confirmed by one laboratory[2] where zones were detected sooner with the regular technique. Greater sensitivity was also found using 4 ml instead of the recommended 15 ml of medium per plate.

A simple procedure for the detection of antibiotics in milk was described by Moldavan[17]. Milk remaining blue after 3 hours incubation in the resazurin test is divided into 2 portions. To one, a few drops of starter are added; if it turns pink or white in 20 min, no inhibitory substance is present. If it stays blue, the second portion is boiled for 30 min, then cooled to 37°C. If on adding starter the milk remains blue on incubation, it contains an antibiotic or, less probably, a quaternary. This same test could be used where methylene blue is employed in place of resazurin.

The use of a modified phosphatase test to indicate the presence of antibiotics in raw milk was suggested by Stoltz and Hankinson[18]. However, the value of this method has been sharply questioned by Churchill *et al.*[19], who report no correlation between the amount of residual antibiotic and the phosphatase reaction. Scharer[20], however, recently referred to the greatly decreased sensitivity of his modified phosphatase method where milks contained sufficient antibiotic to interfere with the preparation of yoghurt cultures. Further work appears necessary to settle this question.

### SANITIZING AGENTS

Methods have been further developed[21] for determination of quaternary ammonium compounds in water and milk by titrating with a standard anionic surface active agent, using eosin as indicator. In comparing the relative merits of quaternaries and of hypochlorites for mastitis sanitation procedures, such as washing teat cups and udders, it was shown that both types of sanitizers[22] were about equally effective.

Studies[23] have shown fast-acting hypochlorites to be superior to quaternary ammonium (QAC) germicides for destruction of psychrophilic species commonly found on dairy equipment or in water supplies. Species of bacteria tested in the germicidal studies included *Pseudomonas fluorescens, Pseudomonas fragi, Pseudomonas viscosa,* and *Alcaligenes metalcaligenes.*

Increasing the pH of QACs may accelerate activity for some bacterial species. In other studies[24] exposure to QACs at low pH levels (pH 3.0 to 5.0) resulted in more rapid destruction than at higher pH levels. Germicidal activity of QAC detergent sanitizer preparations also was greater than that of the QAC alone. This was shown to be due to presence of polyphosphates such as tripolyphosphate and tetrasodium pyrophosphate, which in some instances increased QAC activity more than 20 times in absence of hard water salts. Organic chelating agents such as ethylene diamine tetra acetic acid exerted a similar effect. This property of inorganic and organic sequestering agent enabled them to overcome, at least in part, the inactivating effect of hard water salts on QAC action. Other detergent sanitizer ingredients such as carbonates, trisodium phosphate, and nonionic wetting agents had no effect on QAC activity.

Using *Escherichia coli* as test organism, three quaternary detergent-sanitizers and three constituent QAC's were evaluated[25]. QAC activity was reduced by low temperature and water hardness, the latter exerting the greater effect. Each detergent-sanitizer product was more effective than its constituent QAC component alone. Results by the glass slide method agreed well with those by the Weber and Black procedure.

The value of inorganic and or-

ganic chelating agents in enhancing the bactericidal efficiency of two representative QAC products was studied[26] using the Weber and Black method. Distilled water solutions of both compounds were greatly stimulated by the chelating agents, and these overcame in part the inactivating affect of hard water. Other studies[27] on the cause of the inhibition of quaternary ammonium compounds by hard water indicated that calcium and magnesium bicarbonates, especially the former, were chiefly responsible.

A new type of chlorine germicide is said to counteract film formation and to have the same order of germicidal activity as sodium hypochlorite[28].

In addition to chlorine, the germicidal properties of other halogens, including bromine and iodine, were investigated some years ago. Recently newer formulations of bromine and of iodine compounds have been prepared as sanitizing agents for food equipment purposes, and limited reports indicate they possess germicidal activity characteristic of halogen compounds[10].

It has been reported that a number of commercial products do not provide adequate margins of safety for disinfection of floor, wall, and fixed equipment surfaces where cleaning may be superficial as in ordinary janitorial services, home and farm sanitation programs, etc. To provide a more accurate index of disinfecting power under such conditions than is given by the phenol coefficient, use dilution confirmation tests were developed and collaborative data obtained[29].

Laboratory methods for determining anionic synthetic detergent concentrations have not seemed applicable to field use. A method of determining low concentrations of quaternary ammonium compounds that utilized the development of specific color reactions as a result of combination between brom phenol blue at acid pH and cationic compounds in an aqueous medium, suggested to Lewandowskii[30] an approach to a rapid and simple determination of anionic detergent concentrations by back-titration of the cationic-brom phenol blue combination. The method was applicable for several commonly used types of anionic synthetic detergents but not for soaps, and field use was indicated because of simplicity, clearly defined color reactions, and stability of color reactions at different pH levels in hard water, and in the presence of components or mixtures of cleaner formulations. The method is only qualitatively applicable in the presence of soaps.

### ADDED WATER IN MILK

A modified acetic serum method and readings being made on a Bausch and Lomb juice refractometer is being used as a screening test for watered milk[31]. The findings may be interpreted as (1) negative, the sample free from excess water (2) doubtful, and (3) positive, the sample containing a reportable amount of water. A freezing-point determination is recommended for all doubtful and positive readings in order to report percentage of water. It has been found[32] that an attachment for freezing point thermometer used in the cryoscopic apparatus produces better agreement of values in replicate determination by eliminating contact of the mercury bulb with the stirrer.

A novel technique for a screening test for water in milk has been presented in a Japanese patent[33]. Filter paper is immersed in Congo red, dried, cut into rectangular size, a solution of tartaric or citric acid containing sodium chloride is dropped at the center of the paper, dried, a drop of milk to be tested is placed at the center of the paper, and the length of the colored portion gives the water content added.

### BUTTERFAT TESTS

A modification of the Babcock method employing a quaternary ammonium compound has been proposed for testing homogenized milk[34, 35].

Data of interest to many has been presented[36] concerning centrifuge speeds and procedures, specific gravity, etc., regarding the Babcock tests.

Uniformity of samples with pressurized cream can be obtained by deep-freezing the contents, expelling the gas, removing the contents, and mixing in a Waring blender[37].

Various modified Babcock procedures and the Mojonnier method for ice cream have been compared for accuracy[38]. The method should be chosen that agrees closest with the Mojonnier method.

### BUTTERFAT SUBSTITUTION

A method based on differences in the triglyceride structure of substitute fats has been reported for detecting adulteration of butter[39]. A recent article[40] reports the use of ultraviolet spectrophotometry in detecting food product adulteration. Another method[41, 42] makes use of the fact that only butter contains butyric acid. Improvements have been made making the chromatographic butyric acid methods more useful for determining foreign fats in butter[43]. Fluorescence of fat has also been offered as a means of analysis[44]. Fractionation by partial solidification and filtration at successive temperatures with Reichert-Meissl determinations being made on fractions, have indicated positive identification of adulteration[45].

### PHOSPHATASE TESTS

Some batches of filter papers used for the phosphatase test have been found to contain enough reacting substance to give a false positive test[46]. The reacting substance was present in most other batches of filter papers tested, though not in sufficient quantity to give a reagent control reading above that permitted for the technique used.

Scharer's modified laboratory and field phosphatase test has been published posthumously[47]. The improved phosphatase test utilizing a sodium sesquicarbonate buffer, CQC rather than BQC, and a copper catalyst is said to offer considerable savings in time and a decided increase in sensitivity.

An acid phosphatase[48] is reported to be present in milk which is more heat resistant than the better known alkaline phosphatase. The acid phosphatase has an optimum pH range of from 3.5 to 4.0 and in contrast to alkaline phosphatase is said to concentrate more in the milk than in the cream.

In the application of the phosphatase test to cream, difficulties are encountered because of a definite regeneration of phosphatase in cream flash pasteurized[49]. Another study[50] reported that sour cream and cheese can be tested for phosphatase directly, but cottage cheese must be neutralized. The testing of moldy products should be made after removal of the mold layer since this may give a positive phosphatase test.

A method for detecting the admixture of raw and pasteurized

milk or milk heated to less than pasteurization times and temperatures has been developed[51]. The method is based upon the phosphatase test, assuming an average phosphatase activity of 2000 micrograms per ml for mixed herd milk.

### REGULATORY CONTROL OF FOODS

A modified Paschke method for determination of horsemeat in domestic meats has been reported[52]. The method depends on the observation that horsemeat fat contains a higher percentage of linolenic acid than other meats. A spectrophotometric method seems to be superior to the hexabromide method for the estimation of horse fat in an admixture of pork and beef fats[53]. This method allows the quantitative determination of linolenic acid in fats.

Serological methods to detect the substitution or adulteration of a food with another visually identical were discussed in a recent article[54]. Applications included substitution of horsemeat, pork, seafoods, and egg products.

### FOOD SPOILAGE INDICATORS

Many attempts have been made to use chemical tests to measure the changes associated with bacterial spoilage. Among the tests proposed as spoilage indicators are those for total volatile nitrogen, mono, di, and trimethyl amine, indole, hydrogen sulfide, volatile acids, oil acidity, steam volatile substances, and oxidizable substances in protein-free filtrates of aqueous extracts of meat, fish, and fat. None of the tests has proven of significant general usefulness to warrant their widespread adoption. The probable explanation is that a large number of microorganisms with different biochemical activities are involved in spoilage.

A recent method[55] depends upon the measurement of volatile reducing substances as an indicator of the state of preservation of either raw or canned fish. This method will detect any substance which is volatile in air and which will reduce or be oxidized by alkaline potassium permanganate. The volatile substances are aspirated in 40 minutes into the oxidizing agent using 5 ml of press juice from the sample to be examined.

A recent patent[56] makes use of elongated pointed, small diameter, wooden or plastic sticks, such as toothpicks, impregnated with a chemical indicator. Phenol red, circumin, and hematoxylin are suggested as the most suitable indicators which will indicate the presence of substituted amines due to putrefaction, a change in pH or reducing character of the spoiled foodstuff. The author suggests that where aldehyde, thio-compounds, proteoses, or mercaptans are formed, or oxidizing or reducing conditions ensue as a result of spoilage, other suitable color indicators may be used.

In another article freshness of marine fish and fish from brackish water is judged by determination of nitrogen bases, especially trimethylamine[57]. Data are given on the trimethyl-amine and total volatile nitrogen content of fresh and spoiled, herring, cod, and pike.

### FOOD SANITATION TESTS

One improvement suggested in the swab technique for testing the effectiveness of bactericidal treatment of eating utensils and food equipment, has been the use of so-called soluble cotton. For example[58], seventy-three comparative tests of dairy plants were made using swabs of ribbon gauze and calcium alginate wool, the latter being dissolved before plating in dilute sodium hexametaphosphate solution. The colony counts obtained with alginate swabs were in the great majority of cases much higher than those with gauze. When both types of swab were inoculated with known numbers of *Bact. coli,* the recovery was again much greater with alginate wool.

More recently another report[59] concluded that calcium alginate wool swabs were no more efficient or reliable than gauze or absorbent cotton wool swabs when tested on drinking glasses infected with known numbers of bacteria. The number of bacteria left on the glass after swabbing was determined by a modified roll tube method.

A microplating method described is reported to be relatively simple and inexpensive, eliminates eyestrain, and reduces calculations and time required[60]. A film prepared by mixing 0.05 ml of sample with 3 drops of plating medium on a microscope slide is incubated in a moist chamber for 10 hours and then stained; all the colonies that appear are counted under a binocular microscope using 10 X magnification. The stained slides may be filed for permanent records. Results obtained on several kinds of frozen vegetable products showed that the microplating method agrees favorably with standard plating procedure.

The effectiveness of buffered boric acid lactose broth was compared with standard lactose broth for isolation of *Escherichia coli* from citrus products, particularly frozen orange juices, by planting serial dilutions of orange juice in parallel for presumptive coliform tests[61]. Incubation was at the recommended temperature of 43°C for boric acid broth and 35°C for lactose broth, and positive presumptive tests were confirmed. Of 3,372 tubes of each medium, 20.3 percent of the boric acid tubes were positive presumptives, while 63.7 percent of the standard lactose broth tubes were positive presumptives. Isolations from the boric acid broth series showed 315 *E. coli,* 21 intermediates, 174 Aerobacter, and 37 citrate negative Aerobacter cultures. Isolations from the standard lactose broth series yielded 180 *E. coli,* 62 intermediates, 625 Aerobacter, and 23 citrate negative cultures. False positive presumptive tests occurred 137 times in boric acid broth and 1,247 times in lactose broth. Because of the larger number of *E. coli* cultures recovered when boric acid broth was used and the presence of fewer Aerobacter, intermediates, and false positives, it appears that the boric acid medium is superior to the standard broth for the purpose intended.

### ENTERIC INFECTIONS

A selective plating medium for the isolation and identification of the enterococcus group of streptococci was developed, based upon the ability of enterococci to utilize sodium citrate as an available carbon source, to convert ditetrazolium chloride to a blue diformazan, and to grow in the presence of 0.01 percent sodium azide. Results[62] showed that the selective plating medium can be used to isolate and estimate the numbers of enterococci in raw milk.

The Massachusetts Department of Public Health Diagnostic Laboratory isolates and identifies enteric pathogens in two days or less instead of the usual three or four days[63]. Biochemical reactions are

accelerated by making large inocula into only 0.3 ml of confirmatory media and incubation in a water bath allows reading results within a few hours.

In view of the significance attached to examinations for Salmonella, the Division of Microbiology of the Food and Drug Administration called attention to the possibility of false negatives resulting from the use of a medium customarily regarded as satisfactory[64]. They found marked deficiency in recovery of Salmonella from pure culture and from egg products when selenite broths were prepared from different types or batches of peptone, including commercial dehydrated media. The addition of cystine resulted in improved productivity in a deficient medium, and did not adversely affect one already satisfactory.

Many sporadic cases and outbreaks fail to yield organisms known to cause food poisoning, such as salmonella, staphylococci, paracoli, proteus, haemolytic streptococci, enterococci, or aerobic spore-bearing bacilli. An analysis of 2,431 outbreaks of food poisoning recorded for 1949 in England showed that in 36 percent no adequate cause was found. *Cl. welchii* has been suspected as a cause of food poisoning, but the occurrence of a particular type producing spores which would survive prolonged boiling was not recorded before 1949. The difficulties involved in anaerobic work and the fact that this type of *Cl. welchii* is non-haemolytic and not easy to pick out in the presence of other bacteria was suggested to explain why it has not received more attention in relation to food poisoning.

Outbreaks of mild food poisoning were investigated in which heat-resistant *Cl. welchii* appeared to be the causative organism. The strains of *Cl. welchii* concerned were only feebly toxigenic, and mild food poisoning was produced in volunteers by ingestion of cultures of heat-resistant *Cl. welchii* isolated from contaminated meat. Infection was almost invariably due to meat which was boiled, steamed, braised, stewed, or insufficiently roasted, allowed to cool slowly, and eaten the next day either cold or reheated.

A simple procedure for the location of enteric carriers by means of continuous sampling of sewage for a sufficient period has been reported to give consistently good results[66]. It was shown that when enteric organisms had been isolated, it was possible to trace the organism back to an individual household by systematic sampling from key manholes on the sewerage system in the area concerned. By a combination of a swab sampling method, modern cultural techniques, and phage typing, a survey for enteric organisms was made of the sewerage system of a town of about 10,000 inhabitants.

Two paratyphoid B carriers and one typhoid carrier were discovered by this method, and evidence was obtained of at least six other foci of paratyphoid infection in the town. Paratyphoid bacilli were repeatedly isolated from a river flowing through the town. The methods used might be applied to solving enteric outbreaks, to the control of food-handling establishments, and to epidemiological studies of other infections in which the causative organism gains access to sewage.

### SANITARY MILK CONTROL

Sanitarians and bacteriologists will find much interesting material in the recent National Research Council Publication 250 on *Sanitary Milk Control and its Relation to the Sanitary, Nutritive and Other Qualities of Milk.* A summary of this report was presented at the 40th Annual Meeting of this association[67].

Report of Applied Laboratory Methods Committee International Association of Milk and Food Sanitarians

Luther A. Black, *Chairman*
Franklin W. Barber
Paul R. Elliker
C. K. Johns
W. K. Moseley
George W. Shadwick, Jr.

#### REFERENCES

1. Robertson, A. H., *et al.* Standard Methods for the Examination of Dairy Products. Proposed Changes for the 10th Edition. *Am. J. Pub. Health,* **42**, 1131 (1952).

2. Johns, C. K., (Unpublished results, 1953).

3. Garvie, E. I., Rowlands, A., The Role of Micro-Organisms in Dye-Reduction and Keeping-Quality Tests. The Effect of Micro-Organisms when Added to Milk in Pure and Mixed Culture. *J. Dairy Res.,* **19**, 263-274 (1952).

4. Millian, S. J., Weiser, H. H., The Influence of DDT Wettable Powder on the Methylene Blue Reduction Test in Milk. *J. Milk and Food Tech.,* **16**, 4 (1953).

5. Clegg, L.F.L., Thomas, S. B., Cox, C. P. A Comparison of Roll-Tube and Petri Dish Colony Counts on Raw Milk. *Proc. Soc. Applied Bact.,* **14**, 171-183 (1951).

6. Gregarek, F. J., Shadwick, G. W. Acceptance of the Use of Pasteurized Laboratory Counts as a Tool for Official Control. (Presented at 40th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, East Lansing, Mich., September 2, 1953).

7. Claydon, T. J., Methods for Studying Factors that Influence the Sanitary Condition of Milking Machine Teat-Cup Liners. *J. Dairy Sci.,* **36**. 391-401 (1953).

8. Barber, F. W., Burke, C. P. and Fram, H., The Millipore Filter Technique in the Dairy Industry. (Presented at 40th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, East Lansing, Mich., September 1, 1953).

9. Tobias, J., Herreid, E. C., Ordal, Z. J., A Study of Milk Pasteurization at High Temperatures. *J. Dairy Sci.,* **36**, 356-362 (1953).

10. Elliker, P. R., Advances in Sanitation Bacteriology, *Modern Sanitation,* **6**, 53-57 (1953).

11. Thomas, B. F., Jenkins, E., Thomas S. B., A Note on the Thermoduric Bacterial Content of Farm Water Supplies. *Proc. Soc. Applied Bact.,* **14**, 205-207 (1951).

12. Kosikowsky, F. V., Henningson, R. W., and Silverman, G. J., The Incidence of Antibiotics, Sulfa Drugs and Quaternary Ammonium Compounds in the Fluid Milk Supply of New York State. *J. Dairy Sci.,* **35**, 533 (1952).

13. Johns, C. K., Substances in Herd Milks Inhibiting Acid Production. *Can. J. Agric. Sci.,* (In press).

14. Dornbush, A. C., Personal Communication 12-26-1952.

15. Johns, C. K. Variations in Sensitivity of Lactic Acid Streptococci to Antibiotics in Milk. *J. Dairy Sci.* (In press).

16. Gogas, W. and Bicknell, A. K., The Determination of Penicillin in Milk. *Milk Plant Mo.,* **42**, 26 (1953).

17. Moldavan, A., Decelage des Antibiotiques dans le Lait. *Quebec Laitier,* **10**, 24 (1951).

18. Stoltz, E. I. and Hankinson, D. J. A Test for the Detection of Antibiotics in Milk. *Am. Milk Rev.,* **12**, 12-60 (1950).

19. Churchill, E. S., Drury, A. R., Lewis, D. D., Frank, C. L. and Bryan, C. S., A Report on the Modified Phosphatase Method of Detecting Antibiotic Substances in Milk. *Milk Plant Mo.,* **40**, 28-31 (1951).

20. Scharer, H., Scharer Modified Phosphatase Methods. *J. Milk & Food Tech.,* **16**, 86 (1953).

21. Furlong, T. E., and Elliker P. R., An Improved Method of Determining Concentration of Quaternary Ammonium Compounds in Water Solution and in Milk. *J. Dairy Sci.,* **36**, 225 (1953).

22. Elliker, P. R., Quaternaries and Hypochlorites in Mastitis Sanitation. *J. Milk and Food Tech.,* **16**, 22 (1953).

Continued on Page 277

# REPORT OF THE COMMITTEE ON PROFESSIONAL DEVELOPMENT*

## Introduction

In April, 1948, the Association created a Committee on the Professional Status of Sanitarians. This Committee functioned effectively and submitted several reports on its activities. An excellent committee report was published in the January-February, 1949, issue of the Journal in which a definition of a Sanitarian was proposed, educational qualifications were reviewed, salary ranges given, and the functions of milk and food sanitarians evaluated on the basis of duties and responsibilities. Your present Committee has benefitted from this earlier and highly commendable work.

In 1952 the Committee title was changed from Professional Status to Professional Development and the Committee membership greatly enlarged. As is readily recognized, enlargement has the advantage of a broader viewpoint, but also has the disadvantage of a certain unwieldiness and a subsequent reduction in the rapidity with which decisions can be made.

## Sanitarian Defined

During the current year, this Committee has attempted to take positive action on a number of matters involving professional development. Among the first is that involving a definition of a *Sanitarian.* A number of definitions has been suggested by one group or another, but your Committee has not been in entire accord with them. It is our conviction that an inclusive definition must be formulated that will serve at least three purposes; first, be acceptable to the sanitarian himself; second, be useful in defining duties and guiding the employing agency; and third, express to the public in clear and concise language the area of professional responsibility in which the worker is engaged. We propose, therefore, the following definition for a sanitarian. "A Sanitarian is a person trained or experienced in sanitary science who is actively engaged in the promotion and protection of the public health through the application of technical knowledge and administrative ability to formulate and execute methods and procedures to control those factors of the environment which influence the health, safety and welfare of man."

It will be noted that this definition is not confined to the field of milk and food sanitation. It is recognized that while the large majority in this Association are specifically engaged in milk and food control programs, there is an ever increasing group whose activities involve all phases of environmental control such as general sanitation, insect and rodent control, housing and industrial sanitation. We believe the definition proposed is sufficiently broad to include all persons engaged in the several phases of sanitation whether they be with an official agency or in industry.

It is your Committee's proposal that this definition, if accepted by this Association, be forwarded to the sub-committee on the qualifications of sanitarians of the Committee on Professional Education of the American Public Health Association so it may be considered by that organization with a view toward adoption. It is most desirable that all agencies interested in the professional development of public health personnel find a common meeting ground and strive toward uniformity. It is obvious that a satisfactory definition is one of the fundamental steps toward such an objective.

## Educational Qualifications

After the definition of a Sanitarian, the pertinent matter of qualifications logically follows. This involves education, experience, and personal characteristics and attributes.

The Committee is of the opinion that graduation from a college or university of recognized standing is essential to the attainment of professional development and professional recognition. The Committee does not, however, feel that it can categorically specify an exact area of academic training. The work of the sanitarian is broad, and education in one or more specialties may equip him to function effectively in different areas of environmental control. It is generally conceded that academic courses in the chemical, physical, biological, and social sciences are highly desirable since the practice of environmental sanitation requires an understanding of the basic principles of these sciences and their practical application. We believe it is a foregone conclusion that success in the field of environmental sanitation will be attainable with more certainty when the sanitarian has been trained to utilize the scientific approach and to resolve problems by scientific deduction. We believe further that the man with a scientific background is better able to cope with new situations and to apply new technological advances in his work than is true of a man without such a background.

Your Committee believes it is now in a better position to take this position on educational qualifications than was true a decade ago. At the present time there are some fifteen colleges and universities in the United States which offer a curriculum that is especially geared for training in sanitary science. These curricula have been developed to achieve two things: first, to furnish undergraduate training in the basic sciences as a preparatory background, and second, to give the student specialized training in the field of sanitation and public health. It must not, however, be assumed that a course in sanitary science *per se* is the only source of recruitment for men choosing a career in environmental sanitation. Major work in such other sciences as biology, bacteriology, chemistry, dairy science, engineering, food technology, and veterinary medicine serve to give an excellent background for the sanitarian. It is the considered judgment of this Committee that work in a scientific field demands scientific preparation and that any statement on educational qualifications must take cognizance of such fact.

## Experience in Official Work

We come next to the matter of experience. As the Committee views it, experience must be considered in two categories at least. First, experience directly in the field of environmental sanitation and associated most frequently with an official agency, and second, experience of a related nature in some

*Presented at the 40th Annual Meeting, of The International Association of Milk and Food Sanitarians, East Lansing, Mich., Sept. 1-3, 1953.

phase of environmental control, but not directly associated with official work. In the latter case, very valuable experience could be gained by an individual engaged in sanitary or quality control work in the dairy of food industry, but he would not have had the close official agency contact which would come about by being employed in a department of health. In view of this type of division, we feel that persons having administrative responsibility involving program operation and supervisory duties should be selected from those who have had direct official agency experience. The selection of a sanitarian to hold a position of administrative responsibility should be made from candidates who have proven their capabilities through creditable performance in a subordinate capacity while on the staff of an official agency. Further expansion and explanation of this point may be pertinent.

As viewed by this Committee, official agency work encompasses certain elements that are generally broader in scope than is true in industry and commerce. One of the outstanding differences is public scrutiny. As a public servant in the employ of an official agency, the sanitarian is accountable to the public for his functions and responsibilities. His viewpoint must of necessity be broader in terms of many divergent elements that may affect public health. His responsibilities are community wide and he is guided by laws and regulations which give him police powers. He works as a member of a team dedicated to public health promotion and protection, and he must learn to operate as a member of such team and not alone as an individual. If he is alert and if he can view the protection of the public health as an important and basic function of government, he will acquire skills of judgment and decision that can best be acquired through actual work with an official agency.

With this premise in mind, the Committee feels that for positions of administrative responsibility in an official agency, at least three years' experience of that type should be required. Persons with related experience outside of the official agency should surely look forward to an opportunity to assume supervisory positions after three years of actual official agency experience. The Committee has devoted considerable thought to this subject of experience because it is a matter difficult to appraise with finality. Many people come into official work through a number of channels, but generally their experience has been quite specialized. Attaining a broadness of viewpoint which is such a critical requisite in official work leads the Committee to make this recommendation on experience.

### PERSONAL ATTRIBUTES

The final point to be considered involving the qualifications of a sanitarian is that of personal characteristics and attributes. Much has been said and written on the matter of personal relations. It is obvious to anyone who is observant that a man must not only know his field of endeavor but he must have personal characteristics that develop the confidence of others in his ability. He must be able to get along well with his associates and with those with whom he deals. It is of no credit to a man to be a good fellow and not get anything done, but it is a real credit to a man to be a good fellow and yet lead and guide others in effective production and progress. These characteristics are quite intangible, and this Committee will not try to lay down hard and fast rules, but it does emphasize that a sanitarian should not be selected for a responsible position if his record of personal relations has been poor.

### CLASSIFICATION FOR SANITARIANS

The next issue this Committee has attempted to resolve is that relating to grades or classifications for sanitarians. The majority of the Committee are of the opinion that these are not only needed but desirable. The earlier Committee on Professional Status explored this matter, and in a previous report showed that state personnel boards and merit systems had generally adopted a classification plan. This is logical because in practically all types of work, classification has been used for years. Classification also serves to stimulate men in lower classes to aspire to positions of greater responsibility. Attainment of positions of higher grade must be based on merit, demonstrated ability to assume responsibility, and experience. Promotions should be based upon written examinations, oral interviews, and upon an appraisal of the candidate's personal characteristics and success through demonstrated leadership.

Grades such as the following are suggested:

1. *Chief Sanitarian*—A person who has charge of a bureau, section, or a division of sanitation embracing a number of phases of environmental control. Such a person might serve as the director of a division of food and milk control, or of food and general sanitation. He would have supervision of a group of subordinates and would plan, direct, and guide their activities.

2. *Supervising Sanitarian*—Such a person would be subordinate to the chief sanitarian but would have immediate charge of a particular segment of the overall sanitation program. He might be in charge of a subordinate group in food or milk sanitation, in housing inspection, or general sanitation.

3. *Sanitarian* — Such a person would have in a city, for example, responsibility for a given geographic area. He would have responsibility for all sanitation problems in his area, but would call upon the supervising sanitarian for assistance in special problems and difficult cases.

4. *Assistant Sanitarian*—Such a person would have rather restricted duties. He might be delegated to collect milk, food, or water samples, and work with others in the investigation of routine matters. In this group would be the apprentice or trainee type of personnel.

### LEGISLATION FOR REGISTRATION

The next issue which this Committee explored was that relating to what position should be taken in the matter of legislation requiring the registration of sanitarians. At the present time there are registration laws in the States of California, Washington, Oregon, Oklahoma, and Utah. New Jersey has a law requiring the licensing of health officers but this is not in quite the same category as is true in the other five states previously named.

Preliminary to reporting the Committee's decision on this subject, it should be pointed out that registration or licensing acts for other professions such as medicine,

law, and engineering have been established basically to protect the public from those who might represent themselves as being proficient in a given profession and yet who do not possess adequate prerequisite training. It is true that the doctor or lawyer does derive certain individual benefits from mandatory licensing, but the fundamental concept was not individual protection, but public protection. Over the years the attainment of professional status through legal means has stimulated concomitantly a more rigid discipline of academic training and experience. Registration or licensing is the culmination of such training, and demonstrates the fulfillment of it and the acknowledgment of all concerned that the individual is prepared to practice his chosen profession. This Committee is of the opinion that this important feature has been overlooked by those who advocate the registration of sanitarians through legislation.

While the Committee is not unalterably opposed to registration and taken an open-minded view of it, the Committee feels that this has been used as a means to an end, rather than an end in itself. In the Committee's judgment, registration should be used to demonstrate professional proficiency and professional attainment based upon definite high level qualifications and demonstrated ability. It should never be used as a device to insure the recipient of job security nor to protect mediocrity. Registration may have a function in professional development, but it should not be placed ahead of more important factors. Like other professions, we must establish the ground work of professional qualifications and demonstrated professional attainment before taking a step that involves the enactment of a law by legislative action.

### CONCLUSION

There are a number of important considerations involved in the professional development of any group, but one of the most important is the necessity for a positive stand by an organization or association whose basic objective is high level performance. The goals outlined in this report are attainable, but will be realized only through concerted effort by all who desire professional advancement and recognition. We still see appointments made on the basis of political expediency, but in many cases the appointing authority has never been enlightened concerning the responsibilities of the position, and the recipient, because of lack of training or experience, does not realize the public health and technical responsibilities involved. The work of this Committee will be of little value unless the results of its deliberations are disseminated to persons and agencies who are in a position to make appointments from lists of qualified sanitarians.

Finally, it appears self-evident that your Committee has a continuing task before it. It is realized that many other facets of professional development and promotion must be explored.

H. S. ADAMS, *Chairman*
W. Howard Brown (Florida Ass'n)
J. H. Burkett (Iowa Ass'n)
C. F. Hanger (Virginia Ass'n)
Dave Jones (Washington Ass'n)
Harry Lindquist (Massachusetts Ass'n)
D. B. Morton (Illinois Ass'n)
Harper Orth (Oklahoma Ass'n)
Harold B. Robinson (New York Ass'n)
George White (Indiana Ass'n)

---

## REPORT OF APPLIED LABORATORY COMMITTEE

Continued from Page 274

23. Parker, R. B., Coldwell, A. L. and Elliker, P. R., Psychrophilic Bacteria—A Sanitation Problem. *J. Milk and Food Tech.*, **16**, 136-139,152 (1953).

24. Elliker, P. R., Personal communication 8-21-1953.

25. Humphreys, T. W., and Johns, C. K., Bacteriological Evaluation of Quaternary Ammonium Compounds Alone and in Detergent Formulations. *J. Milk and Food Tech.*, **16**, 186 (1953).

26. MacGregor, D. R., and Elliker, P. R., Effect of Chelating Agents on the Bactericidal Activity of Quaternary Ammonium Compounds. *Bact. Proc.*, 13, (1953).

27. Chambers, C. W., Weber, G. R., and Bryant, A. R., Effect of Calcium and Magnesium Bicarbonate on the Bactericidal Efficiency of Quaternary Ammonium Compounds. *Bact. Proc.*, 13, (1953).

28. Bacon, L. R., Sotier, A. L., and Roth, A. A., Field Experience with Antibac. A New Type of Chlorine Sanitizer. *J. Milk and Food Tech.*,**16**, 61 (1953).

29. Stuart, L. S., Ortenzio, L. F., and Friedl, J. L., Use-Dilution Confirmation Tests for Results Obtained by Phenol Coefficient Methods. *J. Assoc. Official Agric. Chem.*, **36**, 466-479 (1953).

30. Lewandowski, T., Anionic Detergents. *Soap and Sanitary Chem.*, **29**, 49-52 (1953).

31. Vandiviere, H. M., Brooks, W. H., and Sunkes, E. J., The Juice Refractometer as a Rapid Screen for Excess Water in Milk. *Pub. Health Lab.*, **10**, 97 (1952).

32. Krienke, W. A., Improved Technique Make Cryoscopic Values Reliable. *J. Dairy Sci.*, **36**, 567 (1953).

33. Tsuneyoshi, Y., *et al*, Determination of Water in Milk. *Japan.* 1096, March 28, 1952. C. A., **47**, 6068d (1953).

34. Wildasin, H. L., and Anderson, E. O., A Modified Babcock Test for Homogenized Milk Using Cationic Detergents. *Conn. (Storrs) Agric. Exp. Sta. Bul.* 287 (1952).

35. Wildasin, H. L., Anderson, E. O., and Watts, D. E., A Modification of the Babcock Test Employing a Quaternary Ammonium Compound. *J. Dairy Sci.*, **36**, 87 (1953).

36. Heinemann, B., A Study of Certain Techniques Used in Testing Milk by the Babcock Test. *Ibid.*, **36**, 450, (1953).

37. Cunningham, C. G., Preparation of Sample of Pressurized Cream. *J. Assoc. Official Agric. Chem.*, **36**, 128 (1953).

38. Meiser, J. A., Lucas, P. S., Modified Babcock Procedures for Testing Ice Cream Mix. *Can. Dairy Ice Cream J.*, **31**, 39, 74. (1952).

39. Bhalerao, V., and Kummerow, F. A., A New Method for the Detection of Substituted Fats in Dairy Products. *J. Dairy Sci.*, **36**, 567, (1953).

40. Morris, R. J., MacPhee, R. D., and Randall, E. L., Ultraviolet Spectrophotometry in Detection of Food-product Substitutes. *Anal. Chem.*, **24**, 1396, (1953).

41. Keeney, M., Chromatographic Determination of Butyric Acid and the Detection of Milk Fat Adulteration. *Maryland Agric. Exp. Sta. Misc. Publ.* 153. (1953).

42. Keeney, M., Chromatographic Determination of Butyric Acid and the Detection of Milk Fat Adulteration. *Ice Cream Trade J.*, **49**, 30, 106 (1953).

43. Harper, W. J., and Armstrong, T. V., A Rapid Chromatographic Method for the Detection of Foreign Fats in Dairy Products. *J. Dairy Sci.*, **36**, 566 (1953).

44. Chilson, W. H., and Sommer, H. H., Detection of Foreign Fats in Dairy Products. *Ibid.*, **36**, 566, (1953).

45. Krienke, W. A., Fractionation by Selection Solidification as an Aid in Detecting Butterfat Adulteration. *Ibid.*, **36**, 567, (1953).

Continued on Page 279

# ANNUAL REPORT OF THE COMMITTEE ON SANITARY PROCEDURE 1953*

The activity of the Committee on Sanitary Procedure, since the last meeting of this Association, has been quite routine. Tentative sanitary standards for selected types of equipment were submitted for study, a joint meeting was held, 3-A Sanitary Standards were formulated and published in the Journal. There remains only the formality of listing the published 3-A Sanitary Standards in this Annual Report of the Committee.

## Committee Action

Only one joint meeting of the several collaborating committees has been held since the Committee's 1952 Annual Report was presented —that at Hershey, Pennsylvania, December 4-6, 1952; several joint-subcommittee meetings, in Chicago, were subsequently necessary to clarify and polish the sanitary standards formulated under extreme pressure for time during the Hershey joint meeting.

The 3-A Sanitary Standards published since the 1952 Annual Meeting include:

1. 3-A Sanitary Standards for Return Tubular Heat-Exchangers for use with milk and milk products—November-December, 1952, number of the Journal.
2. 3-A Suggested Method for the Installation and Cleaning of Cleaned-In-Place Sanitary Milk Pipe Lines for Use in Milk and Milk Products Plants —March-April, 1953, number of the Journal.
3. 3-A Sanitary Standards for Farm Holding and for Cooling Tanks — July-August, 1953, number of the Journal.

Your Committee was unwilling, because of the state of flux in the attitude of regulatory sanitarians with respect to the cleaning of piping in position and because of the relatively short period of experience with this practice, to crystallize accepted and then current practice (nine months ago), into a relatively inflexible standard procedure. It, therefore, insisted that the best experience be presented as a 3-A Suggested Method. This action may have set a precedent.

It will, no doubt, be recognized and conceded that it is more difficult to segregate or impose the necessary sanitary an dotherwise desirable features of a newly developed device or a recently inaugurated practice, than it is to do so with respect to a familiar device or a practice long in use. Your Committee is not composed of supermen, who can assuredly foresee the detailed form of equipment modifications and equipment auxiliary devices, and anticipate them in provisions of sanitary standards. Consequently, it is to be expected that there will be requests for amendment of both the suggested method for the Installation and Cleaning of C.I.P. Pipe Lines and the Sanitary Standards for Farm Tanks. Fortunately, the preambles of all 3-A Sanitary Standards permit and provide the mechanism for their amendment. Amendments will probably be considered at the next joint meeting.

Another precedent was set in the format of the 3-A Suggested Method for the Installation and Cleaning of C.I.P. Pipe Lines, in that it includes an Appendix, in which the cleaning procedure is outlined. It is quite obvious that the installer of piping to be cleaned in position, and who provides the essential solution tank, pump, connecting and by-pass piping, etc., has fulfilled his obligation when they and their installation conform to the 3-A Sanitary Standards. The cleaning and sanitizing practice is the function and responsibility of others. Furthermore, cleaning and sanitizing materials and procedures are seldom static, as the C.I.P. development itself so forcibly demonstrates. Hence, the inclusion of the cleaning and disinfecting procedures in an Appendix, which may be considered auxiliary to the Installation Standard.

This precedent was followed in the format of the 3-A Sanitary Standards for Farm Tanks. Volumetric determination of tank content must conform to practice, and to device specifications of Bureau of Weights and Measures—federal and state, or both. The only device currently (nine months ago) in use, and approved by weights and measures authorities, was the measuring rod. This method of determining the content of milk cans was abandoned more than a generation ago, primarily because of the sanitary hazard. Your Committee could not, consistently, include in Sanitary Standards the construction specifications and installation standards for a device the use of which departs so patently from the ideal of sanitary practice. Nevertheless, it was imperative that the specifications for measuring rods be made a part of these Sanitary Standards, if the manufacturers and users of the tanks were to be exempted from frequent official checking of their measurement practice and volume data. Inclusion of such specifications in an Appendix appeared to be the only means of meeting this dilemma.

It is to be hoped that equally reliable, but more ideally sanitary devices for the determination of tank content, approved by the weights and measures authorities, will be developed, and that their installation on tanks will not significantly add to their cost—so that sanitary standards pertaining to such devices need no longer be presented in an Appendix.

## Affiliate Participation

Readers of the 1952 Annual Report of this Committee will recall that it announced a policy of inviting representatives of Affiliate Associations to attend the preliminary meetings of the Committee at joint-meetings. It is gratifying to be able to report that the Connecticut, Florida, and New York Associations sent representatives to the December 4 Hershey meeting, and all remained through the joint-meeting. The twenty-five Affiliate Associations have been invited to send representatives to a meeting of the Committee which is to be held, following the barbecue, this evening. The next joint-meeting will be held late in October, 1953.

The tentative sanitary standards then to be considered include:

Farm installation of C.I.P. pipe lines

Farm milk transportation tanks

Bulk milk dispensers

Installation and operation of HT-

*Presented at the 40th Annual Meeting, International Association of Milk and Food Sanitarians, Inc., East Lansing, Mich., Sept. 1-3, 1953.

ST pasteurizers
Batch pasteurizers
Milking machines
Amendments and revisions of 3-A Sanitary Standards

### 3-A SYMBOL

Regarding the use of the 3-A symbol, for which the Association obtained registration in 1952:

A knowledge of the history of this symbol is essential to a full understanding of the situation.

In preparation of the brochure about 3-A Sanitary Standards, and the organization of committees engaged in their formulation, for distribution at the 1946 Dairy Industry Exposition in Atlantic City, a symbol was developed by the Committee which prepared the brochure. Some years prior, efforts had been made to develop a suitable symbol, but the designs submitted did not appeal to the selection committee. The symbol used on the 1946 brochure was so applicable and appropriate that the Executive Board decided to apply for a copyright, so as to reserve this design to Association use, if that were eventually desired. As reported last year, registration of the 3-A symbol, as a trademark, was obtained in August, 1952.

It had frequently been suggested during the quest for registration of the symbol that it might be applied to equipment to indicate its conformance to 3-A Sanitary Standards. And, with ownership of the symbol vested in the Association, it was not difficult to envision other benefits, such as would accrue to the Association treasury from fees for authorizations for use of the symbol, or royalties. The Committee is obliged to report that a development from the 3-A symbol ownership, so favorable to the Association, is not in early prospect.

That, briefly, is the history of the 3-A symbol to date.

There are a number of explanations for the apparent absence of enthusiasm in some quarters in regard to the proposal that each piece of conforming equipment be identified by an applied 3-A symbol.

First, of course, is the voluntary nature of (a) the collaboration between sanitarians, users, and manufacturers, and (b) conformance of 3-A Sanitary Standards. If this relationship is to be maintained, use of the symbol must also remain voluntary. This means that application of the symbol may not be compelled.

Second, authorization of the use of the symbol automatically imposes upon the Association the responsibility for maintaining, without question, its significance.

A careful examination of the subject leads to the conclusion that rigid control of the use of the symbol, solely by the Association, would entail activities and personnel which it is not in position to devote to such a project; and which, in any event, while voluntary use of the symbol is in the developing stage, would be only partially financed by authorization fees or royalties fixed at a reasonable level.

Third—and this probably accounts for the current situation—there are no grounds for dissatisfaction with the manner in which the 3-A Sanitary Standards program is currently proceeding and operating. The texts of the sixteen sanitary standards which have been published must be sufficiently specific to enable manufacturers to conform to them, because there have been few reported instances of non-conformance by equipment claimed to be 3-A. It is also apparent that sanitarians understand and properly interpret these sixteen sanitary standards, and are able to determine whether equipment conforms to them.

There is a forth reason—the logic of which must be recognized. The registration of the 3-A symbol pertains only to its use on equipment classed by the U. S. Patent Office as Receptacles; i.e., storage tanks, weigh-cans and receiving tanks, automotive transportation tanks, and farm tanks, for which sanitary standards thus far have been developed. Manufacturers of milk piping and fittings, pumps, homogenizers, electric motors, heat-exchangers—and the numerous types of equipment for which sanitary standards have not yet been developed, or even contemplated—do not regard favorably the advantage which fabricators of receptacles would currently have, were the use of the symbol to be authorized. This objection can be eliminated only by obtaining registration of the 3-A symbol for other classes of equipment.

In spite of the inertia with respect to the organized use of the 3-A symbol encountered to date, your Committee, nevertheless, urges that the Association initiate discussions of the steps necessary to formalize application for, and authorization of, use of the symbol, so as to be prepared for early action in event interest in such use of the symbol is manifested by some one or more manufacturers of equipment.

The current status of the 3-A symbol has been presented in this detail in order that the membership of the Association may also be fully aware of the problems involved in its use by fabricators, and may exercise forebearance with the apparent inertia or sluggishness of the Committee.

When this report was presented, the committee was unaware of the progress which had been made in the Technical Committee of DISA in minimizing the difficulties above enumerated, and in developing a tentative organization for administration and use of the 3A symbol. It is expected that an announcement of the nature of such an organization can be made in the next Annual Report of this committee, or sooner.

C. A. Abele, *Chairman*
H. E. Bremer
Paul Corash
Milton R. Fisher
Mark D. Howlett, Jr.
James A. Meany
I. E. Parkin
Ivan Van Nortwick
H. L. Thomasson
Harold Wainess
C. W. Weber

---

## APPLIED LAB. COMM.

Continued from Page 277

46. Cook, G. T., and Hughes, K. E. A., Filter Papers and the Phosphatase Test. *Monthly Bul. of Ministry of Health and Pub. Health Lab. Service*, 11, 254-258, (1952).

47. Scharer, H., Scharer Modified Phosphatase Methods. *J. Milk and Food Tech.*, 16, 86 (1953).

48. Hakansson, E. B., and Sjostrom, G., Acid Phosphatase of Milk. *Svenska Mejeritidningen* 44. 15-17, (1952). *C.A.* 46, 10238a (1952).

49. Ritter, W., The Application of the Phosphatase Test in Dairy Laboratories. *Milchwissenshaft* 7, 301, (1952). *C.A.*, 47, 1304b (1953).

50. Simskaya, A. M., Phosphatase Method of Control of Pasteurization in Sour Cream, Cottage Cheese, and Cheese. *Gigiena i Sanit.*, 5, 34, (1952). *C.A.*, 46 9223e (1952).

51. McFarren, E. F., and Black, L. A., Detection of Heated Milk. *Standard Methods for Examination of Dairy Products* 10th ed., 312-314, Amer. Public

Continued Page 281

# Association News

## AFFILIATES OF
## International Association of Milk and Food Sanitarians

### AMERICAN INDIAN SANITARIANS ASSOCIATION

*Pres.*, Joseph Medina, Bernallilo, N. M.
*1st. Vice Pres.*, Richard Teboe, ..... ..... Fort Yates, N. D.
*2nd. Vice-Pres.*, Willis Titla,....Bylas, Ariz.
*Sec.-Treas.*, Frank C. Estes, ..... Lower Brule, S. D.
*Auditors*:
Mike Ford, ..... Gallup, N. M.
Louis Zimmerman ..... Rosebud, S.D.

### APPROVED INSPECTORS ASSOCIATION OF SOUTHEAST PENNSYLVANIA

*Pres.*, Dr. Roy F. Davenport..Philadelphia
*Vice-Pres.*, William Snyder ..... Lebanon
*Sec.*, Clarence M. Moss, 612 S. 24th St., Philadelphia 46, Pa.
*Treas.*, Robert H. Keen .....Lancaster
*Ch. Exec. Comm.*, Dr. C. W. Livak, York

### ARIZONA ASSOCIATION OF MILK AND FOOD SANITARIANS

*Pres.*, George W. Marks ..... Phoenix
*Pres.-Elect*, Claude C. Cox, Cave Creek
*Sec.-Treas.*, O. V. Cooper, 4103 N. 20th St., Phoenix.
*Executive Board Members*:
Lane C. Hanson ..... Phoenix
M. A. Lang ..... Kingman

### ASSOCIATED ILLINOIS MILK SANITARIANS

*Pres.*, Dr. H. C. Wiley ..... Chicago
*Pres. Elect.*, Harold B. Richie.....Chicago
*1st Vice-Pres.*, Dr. L. E. Booth....Chicago
*2nd. Vice-Pres.*, Al M. Frankovich ..Joliet
*Sec.-Treas.* P. E. Riley, 1800 W. Fillmore St., Chicago, Ill.
*Sergeant-At-Arms*, Harry Cohen....Chicago
*Auditors*
Dr. Richard S. Guthrie .....DeKalb
L. C. Peckham ..... Chicago

### CALIFORNIA ASSOCIATION OF DAIRY AND MILK SANITARIANS

*Pres.* William Whitton ..... Los Angeles
*1st. Vice-Pres.* Don A. Cordray Santa Rosa
*2nd. Vice-Pres*, Saul Gavurin, Los Angeles
*Sec.-Treas*, E. R. Eichner, State Agriculture Building, Embarcadero & Mission Sts., San Francisco 5, Calif.
*Auditors*
A. O. Kircher ..... Fresno
R. R. Perkins ..... Los Angeles

### CONNECTICUT ASSOCIATION OF DAIRY AND MILK SANITARIANS

*Pres.*, Alfred H. Jackson ..... Elmwood
*Vice-Pres.*, Friend Lee Mickle, .. Hartford
*Secretary*, H. Clifford Goslee, 356 Palm St., Hartford, Conn.
*Treas.*, Curtis W. Chaffe ..... Hartford

### DAIRY SANITARIANS ASSOCIATION OF THE DEL-MAR-VA PENINSULA

*Pres.*, M. T. Harrison ..... Lewes, Del.
*Vice-Pres.*, Wilmer Ulsh ..... Ridgely, Md.
*Sec.* William Baumgart, 622 East Division St., Dover, Del.
*Treas.*, Steve Racz ..... Goldsboro, Md.

### DAIRY SANITARIANS ASSOCIATION, OF NORTH CENTRAL PENNSYLVANIA

*Pres.* James G. Eck ....South Williamsport
*Vice-Pres.*, Galen Furry .....Martinsburg
*Treas.*, Earl F. Hack ..... Mexico
*Sec.*, C. D. Herbster, Selinsgrove,, Pa.
*Executive Committee*:
Dr. S. M. Ross ..... Williamsport
I. E. Parkin ..... State College
G. C. Kern ..... Milton
Harry T. Daddario ..... New Berlin

### FLORIDA ASSOCIATION OF MILK SANITARIANS

*Pres.*, L. L. Chaffee ..... St. Petersburg
*Vice-Pres.*, C. O. Stoy ..... Miami
*Sec.-Treas.*, H. H. Wilkowske, Assistant Professor of Dairy Manufactures, U. of Florida, Gainesville, Fla.
*Past Pres.*, R. R. Hood ..... Pensacola
*Directors*:
W. H. Brown ..... Jacksonville
R. D. Lundy ..... Moore Haven
Sam Noles ..... Jacksonville
J. D. Robinson ..... Plant City
H. H. Rothe ..... Gainesville

### GEORGIA CHAPTER OF THE INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC.

*Pres.*, James P. Gibbs ..... Atlanta
*Vice-Pres.*, P. L. Musick, ..... Athens
*Sec.-Treas.*, Dr. John J. Sheuring, Dairy Dept., U. of Ga., Athens, Ga.

### KENTUCKY ASSOCIATION OF MILK AND FOOD SANITARIANS

*Pres.*, T. R. Freeman ..... Lexington
*Vice-Pres.*, H. L. DeLozier .... Louisville
*Sec.-Treas.*, H. B. Morrison, Dairy Section, U. of Kentucky, Lexington, Ky.

### INDIANA ASSOCIATION OF MILK AND FOOD SANITARIANS

*Pres.*, Russell Cunningham ..... LaPorte
*Pres.-Elect*, John Schlege ..... Indianapolis
*1st. Vice-Pres.*, William Geller, Ft. Wayne
*2nd. Vice-Pres.*, Edmund H. Stoy ..... New Albany
*Sec.*, Karl K. Jones, 1330 W. Michigan St., Indianapolis
*Treas.*, Harold S. Adams ..... Indianapolis
*Auditors*:
Sam Elder ..... Evansville
Fred Willis ..... West Lafayette

### IOWA ASSOCIATION OF MILK SANITARIANS

*Pres.*, James Evers ..... Cedar Rapids
*Vice-Pres.*, Ray A. Belknap ....Des Moines
*Sec.-Treas.*, F. W. Kreamer, State Dept. of Health, Des Moines, Iowa.

### KANSAS ASSOCIATION OF MILK SANITARIANS

*Pres.* Grove Gilliland ..... Dodge City
*1st Vice-Pres.*, Frank Kelley ..... Parsons
*2nd Vice-Pres.*, John Mullinix ..... Kansas City
*Sec.-Treas.*, Ivan Van Nortwick 1237 Tenn. St., Lawrence, Kansas
*Auditors*:
Kenneth Ticknor ..... Topeka
Leslie Forward ..... Wichita

### MICHIGAN ASSOCIATION OF SANITARIANS

*Pres.*, Winfred L. Ettesvold, Grand Rapids
*1st Vice-Pres.*, Clifford Bracy .....Lansing
*2nd Vice-Pres.*, Jerald Peters ..... Sault Ste Marie
*Sec.-Treas.*, Robert Lyons, 303 Bailey St., East Lansing, Mich.
*Directors*
*Past Pres.*, Lyle Littlefield
Rupert Spaulding — Grey Turney
C. V. Roose — Dale Brooks

### MINNESOTA MILK SANITARIANS ASSOCIATION

*Pres.* Thomas Stibal ..... Hutchinson
*Vice-Pres.* C. H. Holcombe ..... St. Paul
*Sec.-Treas.* J. C. Olson, Jr., Department of Dairy Husbandry, University of Minnesota, St. Paul, Minnesota.
*Board of Directors*:
Henry Healy — Floyd Thompson
Carl Mattson — Owen Owens
Ruben Koivisto — Leonard Sinton

### MISSOURI ASSOCIATION OF MILK AND FOOD SANITARIANS

*Pres.* George Bauers ..... Springfield
*Vice-Pres.* John H. Fritz ....Kansas City
*Sec.-Treas.*, J. L. Rowland, 7905 Bellview St., Kansas City, Mo.

### NEW YORK STATE ASSOCIATION OF MILK SANITARIANS

*Pres.*, Henry W. Lehmkuhl .... Rochester
*Vice-Pres.*, Paul Corash ....New York City
*Sec.-Treas.*, C. W. Webber, 18 Dove St., Albany 6, N. Y.

MEMBERS OF THE BOARD

Fred Uetz ..... New York City
George H. Hopson, D.V.M...Poughkeepsie
Prof. James C. White ..... Ithaca
Mr. Claud Woodward, Past President

### OKLAHOMA ASSOCIATION OF MILK AND FOOD SANITARIANS

*Pres.*, R. L. Howell ..... Tahlequah
*1st. Vice-Pres.*, Berl I. Poe ..... Muskogee
*2nd. Vice-Pres.*, T. T. Potter ..... Okemah
*3rd. Vice-Pres.*, N. W. Amadon .... Tulsa
*Sec.-Treas.*, Tim Green, 206 New County Building, Oklahoma City 2, Okla.

### OREGON ASSOCIATION OF MILK SANITARIANS

*Pres.*, C. C. Deal ..... Portland
*Sec.-Treas.*, Lawrence J. Christensen 1313 S.E. 12th St., Portland 14, Oregon

### ROCKY MOUNTAIN ASSOCIATION OF MILK AND FOOD SANITARIANS

(Colorado, New Mexico, Utah, Wyoming, Nebraska, Montana)
*Pres.*, James M. Doughty, Jr. ..... Santa Fe, New Mexico
*President-Elect.*, Eugene Tuttle ..... Ogden, Utah
*1st Vice-Pres.* Ray Iiams Sheridan, Wyo.
*2nd Vice-Pres.* Dr. W. A. Hoskisson ..... Salt Lake City, Utah
*Sec.-Treas.*, Peter Stevenson, Rocky Mountain Training Center, 3298

South Holly, Denver 20. Colorado

*Auditors*:
Hugh Templeton ..... Omaha, Neb.
Thomas McMasters
.....Helena, Montana

SOUTH DAKOTA ASSOCIATION OF SANITARIANS

*Pres.*, Fred Hansen ..... Sioux Falls
*Vice-Pres.*, Ira Dehaai ..... Spearfish
*Sec.-Treas.*, J. F. Tinker, State Dept of Health, Pierre, So. Dakota
*Executive Board*:
*Past Pres.* Don Wilson .....Mitchell
*Elec. Member*, Chas. Halloran,
.....Pierre,

VIRGINIA ASSOCIATION OF MILK AND FOOD SANITARIANS

*Pres.*, E. R. House, ..... Norfolk
*1st Vice-Pres* J. F. Tolley .....Abingdon
*2nd Vice-Pres.*, W. P. Whitmore
..... Woodstock
*Sec.-Treas.*, A. A. Pais
*Sec.-Treas.*, A. A. Pais, State Health Dept.
*Auditors*:
L. E. Brubaker ..... Chester
E. Lee Everett ..... Suffolk

WASHINGTON STATE MILK SANITARIANS ASSOCIATION

*Pres.*, M. L. Strommer ..... Olympia
*Vice-Pres.*, Robin C. Wilson ..... Seattle
*Sec.-Treas.*, George Andrews, 1626 Smith Tower, Seattle 4, Wash.

WISCONSIN MILK SANITARIANS ASSOCIATION

*Pres.* Chester L. Anderson ..Oconomowoc
*Vice-Pres.*, J. A. Keenan, Jr. ....Madison
*Sec.-Treas.*, L. Wayne Brown, 421 Chemistry Bldg., U. of Wisc., Madison 6, Wis.
*Director* (1953-54) Philip C. Newman
..... Beaver Dam
*Director* (1953) Herman H. Platte
..... Madison & New London

## APPLIED LAB. COMM.

Continued from Page 279

Health Assoc., New York (1953).
52. Crouse, R. H., and Leffler, I. D., Detection of Horsemeat in Meat Products by a Modified Paschke Method. *Food Res.*, 18, 253-260 (1953).
53. Dugan, L. R., and Petheram, M. A Study of the Determination of Horse Fat in the Presence of Pork and Beef Fats. *J. Assoc. Official Agric. Chem.*, 36, 767 (1953).
54. Oswald, E. J., Serological Methods in the Regulatory Control of Foods. *Ibid.*, 36, 107-111, (1953).
55. Farbier, L., A Comparison of Various Methods for the Determination of Spoilage in Fish. *Food Tech.*, 6, 319 (1952).
56. Hand, W. C., Seafood Spoilage Indicator, U. S. Patent 2,626,855, (January 27, 1953).
57. Johnson, F., Determination of Nitrogen Bases, Especially Trimethylamine in Meat of Fish According to Conway and Byrne's Method. *VI Nord Veterinarmotet* 197, (1951). *C.A.* 47, 5575c (1953).
58. Tredinnick, J. E., and Tucker, J., The Use of Calcium Alginate Wool for Swabbing Dairy Equipment. *Proc. Soc. Applied Bact.*, 14, 85-88 (1951).
59. Barnes, J. M., The Removal of Bacteria from Glass Surfaces with Calcium Alginate, Gauze and Absorbent Cotton Wool Swabs. *Ibid.* 15, 34-40 (1952).
60. Estabrooks, R. G., and Bollen, W. B., Microplating and Counting Techniques for Bacteria in Food Products. *Food Tech.*, 7, 105-108 (1953).
61. Wolford, E. R., Comparison of Boric Acid and Lactose Broths for the Isolation of *Escherichia coli* from Citrus Products. *Bact. Proc.* 24-25 (1953).
62. Reinbold, G. W., Swern, M., Hussong, R. V., A Plating Medium for the Isolation and Enumeration of Enterococci. *J. Dairy Sci.*, 36, 1-6, (1953).

## MEETING OF 3A SANITARY STANDARDS COMMITTEE

Over 45 members of the 3A Sanitary Standards Committee spent October 19, 20, and 21 at the Georgian Hotel in Evanston, Illinois developing sanitary standards for nine pieces of dairy equipment. Because of the importance of this activity the committee members came from as far away as Los Angeles, California, New York City, and Washington, D. C.

The 3A Sanitary Standards program is a joint voluntary effort on the part of the Dairy Industry Committee, working with the Milk and Food Branch of the U.S. Public Health Service and the Committee on Sanitary Procedure of the International Association of Milk and Food Sanitarians, in the development of 3A Sanitary Standards for dairy equipment. To date seventeen standards have been developed.

The 3A Standard for a piece of equipment is not developed without considerable research and discussion. An example of the time and effort that is put into the development of a standard is shown by the can washer standard. This proposed standard was first discussed in March, 1947. The proposed standard has gone through nine revisions.

Another piece of equipment which has been under consideration is milking machines. A proposed standard was first developed for milking machines in May, 1946. At the Evanston meeting the industry and regulatory authorities, working with manufacturers of these pieces of equipment, were optimistic that full agreement can be reached early in 1954.

During the time in which a standard is being developed, fabricators of can washers and milking machines, being cognizant of this activity, have significantly improved the sanitary design of their equipment. Thus the entire dairy industry has had the benefit of these activities even though a standard has not been agreed upon.

3A Sanitary Standards are not static. They are kept constantly up-to-date. As an example, the 3A Sanitary Standard for Farm Holding and/or Cooling Tanks which was completed early in 1953 and published in the July-August, 1953 issue of the *Journal of Milk and Food Technology* was reviewed at Evanston in light of the questions that have been raised by sanitarians in the field, and by users and fabricators.

To keep pace, amendments were prepared for the 3A Standard for Automotive Milk Transportation Tanks, which was published in the January-February, 1950 issue of the *Journal of Milk and Food Technology*, to include the farm bulk milk pick-up tank.

The Standard for Inlet and Outlet Leak Protector Plug Valves for Batch Pasteurizers which was instigated two years ago was brought into near final form. The publishing of this standard and its acceptance by the industry should do much to assure phosphatase negative samples due to improper design or use of leak protector plug valves.

Other pieces of equipment on which revisions were prepared were non-coil type batch pasteurizers and milk and milk products evaporators.

A progress report was made on the activities of the task group for the development of standards for bulk milk dispensers. The survey that has been conducted has indicated that a 3A Standard is desired for this piece of equipment by sanitarians and the manufacturers of bulk milk dispensers.

The stature of the 3A Standards is such that they are recognized by the U. S. Public Health Service in the new edition of the Standard Milk Ordinance and Code, and it was reported at the Evanston meeting that several states and cities were adopting the procedure of accepting by regulation equipment which meets 3A Standards.

Continued on Page 291

# NEW YORK STATE MILK SANITARIANS MEE T IN SYRACUSE FOR 30th ANNUAL MEETING

More than 750 leaders in the dairy industry met in Syracuse on September 21-23 to attend the 30th Annual Conference of the New York State Association of Milk Sanitarians and the First Joint Dairy Industry Conference of Cornell University. The program follows:

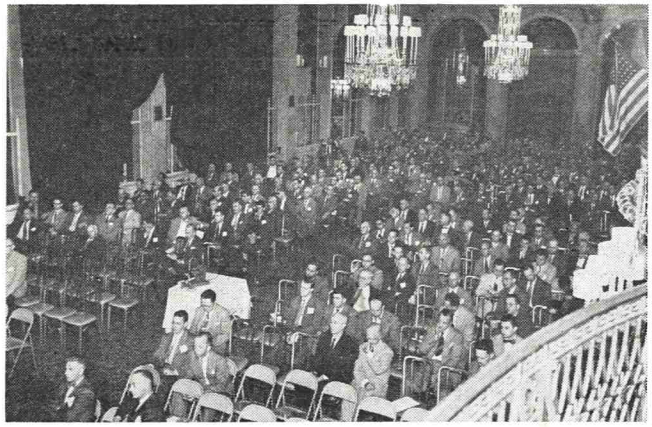
Henry W. Lehmkuhl, President of the New York State Association of Milk Sanitarians opening the First Joint Conference of the New York State Association of Milk Sanitarians and Dairy Industry Conference held at Syracuse, New York, September 21-23.

A. C. Dahlberg, Department of Dairy Industry, Cornell University.

Hollis S. Ingraham, M. D., New York State Deputy Health Commissioner.

D. B. Rogers of General Milk Products, Ltd. Dunfries, Scotland.

H. S. Adams of the Indiana University Medical Center.



Annual Joint Meeting of New York State Association of Milk Sanitarians and the Dairy Industry Conference in session at Syracuse, New York, September 21-23.

A panel of dairy technology experts participating in the Question and Answer Period at the Joint Meeting of the New York State Milk Sanitarians and Cornell University Dairy Conference at Syracuse, New York, September 21-23.
Reading left to right: James A. Stlbird, New York State Department of Health; Paul Corash, New York City Department of Health; Henry W. Lohmkuhl, Moderator, Milk Plant Specialties Corporation; W. W. Parks, Borden Farm Products Company; A. C. Dahlberg, Cornell University; Kenneth F. Foe, New York State Department of Agriculture and Markets; O. L. Brown, Shoffield Farms Company, Inc.

Tribute was paid to Clarence W. Weber, Associate Milk Sanitarian, for his recent Citation by the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS for distinguished service to that organization.

Paul Corash, of the New York City Department of Health, was elected President of the Association, and Fred E. Uetz of the Pioneer Ice Cream Division of the Borden Company, President-elect. Clarence W. Weber of the State Health Department was re-elected Secretary-Treasurer, and William O. Skinner, Chief Milk Sanitarian of the Westchester County Department of Health, was elected the new member of the Executive Committee for a three-year term.

N. V. Moore, D.V.M., Assistant Commissioner, New York State Department of Agriculture and Markets.

O. Sussman, D.V.M., Chief, Bureau of Veterinary Public Health, New Jersey State Department of Health.

James A. Stalbird, Chief, Milk and Restaurant Sanitation Section, New York State Department of Health.

W. I. Myers, Dean of the College of Agriculture, Cornell University.

H. F. Judkins, Director, National Dairy Products Corporation, Inc.

*Notice to All Members of the IAMFS.*

The proposed revision of the Constitution and By-Laws of the IAMFS, which was published in the July-August 1953 issue of the *Journal of Milk and Food Technology,* was considered at the Annual Meeting held in East Lansing Michigan, September, 1953. After due deliberation, this 1953 Revision was adopted, with some modifications, additions and deletions.

In accordance with the Constitution and By-Laws, this is to notify you that the 1953 Revision, in entirety, is printed in the November-December, 1953 issue of the *Journal of Milk and Food Technology* and that you are entitled to register your vote in writing for or against adoption of this 1953 Revision. A two thirds affirmative vote of those members who register their votes is necessary before the revision is adopted.

President J. H. Faulkner has appointed John Schlegel and Carl Jones, Indiana State Board of Health, as tellers.

The results of this balloting will be published in the March-April, 1954 issue of the Journal.

Sincerely yours,

H. H. Wilkowske,
Secretary-Treasurer

# CONSTITUTION AND BY-LAWS

## International Association of Milk and Food Sanitarians, Inc .

### CONSTITUTION

### ARTICLE I.

#### Association

There is hereby created the International Association of Milk and Food Sanitarians, Inc., not for pecuniary purposes, which shall hereinafter be referred to as the Association.

### ARTICLE II.

#### Objectives

The objectives of the Association shall be to:

1. Develop uniform and proper methods of supervision and inspection of dairy farms, milk and milk products plants, and food-handling establishments, including restaurants, warehouses, and transportation equipment;

2. Develop uniform and proper methods for the examination of milk, milk products, and other foods;

3. Encourage improvement in sanitary methods of production of milk and related food products;

4. Encourage the development of equipment and supplies to improve the sanitary handling of dairy and food products;

5. Assist members in their technical work and development;

6. Co-operate with other professional groups in advancing the public health through improved milk and food-handling technology;

7. Disseminate information concerning sanitary milk and food-handling technology and administration through its official publication and/or by other means.

### ARTICLE III.

#### Membership

Section 1. There shall be two classes of membership in this Association: Members and Honorary Members.

Section 2. The qualifications of the several classes of members, the dues of each, the manner of their election to membership, and their respective rights and privileges shall be prescribed in the By-Laws, except as otherwise provided in this Constitution.

## ARTICLE IV

### OFFICERS, EXECUTIVE BOARD AND COUNCIL

Section 1. The officers of this Association shall be a President, a President-Elect, a First Vice-President, a Second Vice-President, and a Secretary-Treasurer, who shall hold these offices for one year or until their successors are elected or appointed as provided in Section 2. At the termination of each Annual Meeting the President-Elect, First Vice-President, and Second Vice-President shall automatically succeed into the offices of President, President-Elect, and First Vice-President, respectively. A Second Vice-President and Secretary-Treasurer shall be elected by majority ballot at the Annual Meeting of the Association.

Section 2. The Executive Board shall consist of the President of the Association, the President-Elect, the two Vice-Presidents, the Secretary-Treasurer, and the immediate two Past-Presidents. The Executive Board shall direct the affairs of the Association. A majority of the Executive Board shall be composed at all times of members who are officially connected with Federal, State, County, or Municipal Government or with an educational institution. If the status of any member of the Executive Board changes after election, or during his term of office, or after protem appointment as provided in Article II, Section 5, paragraph F of the By-Laws, so that a majority of members officially connected as stated herein, is not maintained in the Executive Board, then such member shall be deemed ineligible without prejudice for his office and such office shall be declared vacant.

Section 3. The Council shall consist of the President, President-Elect, Secretary-Treasurer, the immediate two Past-Presidents of the Association, and the Secretary from each Affiliate Association. The immediate Past-President of the Association shall be Chairman of the Council. The Secretary-Treasurer of the Association shall be the Secretary of the Council. The Council shall cause to be kept a record of its proceedings and shall at the Annual Meeting then in session submit a report of the Executive Board.

Section 4. It shall be the duty of the Council to recommend to the Executive Board programs or activities for the Association; provided, that no recommendation of the Council is binding upon the Executive Board.

## ARTICLE V.

### AFFILIATE ASSOCIATIONS

Section 1. Members of this Association residing in the same geographical area, and also functioning organizations of milk and food sanitarians or closely related groups whose objectives are consonant with those of this Association, may apply for a Charter as an Affiliate Association under conditions stipulated in the By-Laws.

Section 2. Each Affiliate Association shall have one representative on the Council. The representative shall be the Secretary of the Affiliate Association. An alternate representative on the Council may be certified by the Affiliate Association to serve in the absence of the Secretary.

## ARTICLE VI.

### MEETINGS

Section 1. Each year when possible, the Association shall hold an annual meeting, and such other meetings as the Executive Board deems necessary.

Section 2. In all meetings of the Association, a quorum shall consist of at least twenty-five members.

Section 3. In case there is no quorum present to transact necessary business, the Executive Board is authorized to act for the best interests of the Association, and the elective officers will continue in office until their successors are duly elected.

## ARTICLE VII.

### AMENDMENTS

Section 1. Any member may propose amendments by submitting them in writing to the Secretary-Treasurer at least 60 days before the date of the next announced meeting, and the Secretary-Treasurer shall promptly notify all members that the proposed amendments will be open for discussion at that meeting. Such proposed amendments, upon a majority affirmative vote of the members present shall be, within 90 days, submitted to the entire membership of the Association by the Secretary-Treasurer. All members voting on such amendments shall, within 60 days after issuance of such notification, register their vote in writing with the Secretary-Treasurer on blanks furnished by the Association. These ballots shall be opened, recorded and filed, and the results shall be reported by the Executive Board to the membership of the Association. If the proposed amendments are passed by a two-thirds affirmative vote of those members who register their votes with the Secretary-Treasurer, they shall become a part of the Constitution from the date of such report and notice by the Executive Board.

## ARTICLE VIII.

### BY-LAWS

Section 1. The parliamentary procedure of the Association shall be governed by By-Laws adopted by majority vote of voting members in attendance at a duly called meeting of the Association.

## BY-LAWS

## ARTICLE I.

### MEMBERSHIP AND DUES

Section 1. The membership of this Association shall be composed of any persons who are interested in the objectives of this Association and those engaged in milk or food inspection, or the laboratory control of, or the administration of any such function, or engaged in research or educational work relating to any aforesaid function.

Section 2. The annual membership dues payable to the Association, January first of each calendar year, shall be five dollars ($5.00) for each member paying dues directly to the Association, and three dollars ($3.00) for each member paying dues through an affiliate Association.

Section 3. Honorary Members:

A. The Honorary Membership shall be composed of persons who, on account of their substantial contributions to the objects of this Association, have been nominated by the Executive Board and elected by the members to this class of membership.

B. Honorary Members shall not be required to pay dues, shall not be entitled to vote, or to hold office, but may attend the meetings of the Association and be accorded the privilege of the floor.

Section 4. Any person desiring membership in this Association will submit his application on a form supplied by the Secretary-Treasurer and endorsed by a member. The Membership Committee, by majority vote, will determine eligibility and acceptability as member.

Section 5. Any person having once become a member may continue membership in the Association so long as the annual membership dues are paid, except insofar as provided in Section 6 of this Article. Any member who shall fail to pay annual dues within three months after first notification by Secretary-Treasurer that said dues are payable shall be placed on the inactive list. Any such member may be reinstated within 90 days thereafter, by the Membership Committee upon notification by the Secretary-Treasurer that the dues in arrears have been paid. Any member who is delinquent in dues for one year will be dropped from membership, and can be reinstated only by filing reinstatement application in due form and accompanied by the annual membership dues for that year.

Section 6. A member of the Association may be expelled for due cause upon recommendation of the Executive Board after opportunity for hearing by the Board, and a majority vote of the members at any Annual Meeting. Any member so expelled shall have refunded such pro rata part of his membership dues as may not be covered by his term of membership.

Section 7. Each paid-up member of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., in good standing, shall receive at no extra cost, the regular issues of the Official Publication of the Association and such other publications as the Executive Board may direct for the year in which his dues are paid.

Section 8. A. The Secretary-Treasurer of the Association shall collect annual membership dues of five dollars for each member paying directly to the Association, and three dollars from the Secretary-Treasurer of each Affiliate Association for each member paying membership dues through an Affiliate Association as provided in Article I, Section 2 of these By-Laws.

B. Members of the Association who pay local dues as members of one or more Affiliate Associations will pay Annual Membership Dues only once to the Association through an Affiliate Association, and shall receive only one annual subscription to the Journal so long as dues are paid to the Association.

## ARTICLE II.

### DUTIES OF OFFICERS, EXECUTIVE BOARD, AND COUNCIL

Section 1. The President shall preside at all meetings of the Association and the Executive Board. He shall appoint all committees unless otherwise directed by vote of the Association or by the Constitution and By-Laws, and perform such other duties as usually devolve upon the presiding officer or are required of him by the Constitution and By-Laws.

Section 2. The President-Elect shall perform the duties of the President in the latter's absence, shall succeed the President when the latter's term will expire, and shall be Chairman of the Program Committee which will be responsible for planning the program for the Annual Meeting.

Section 3. The Vice-Presidents, in order of their elected office, shall perform the duties of the President and President-Elect in their respective absence, and shall serve on the Program Committee.

Section 4. The duties of the Secretary-Treasurer will be: A. The Secretary-Treasurer shall record the proceedings of the Association. He shall keep a list of members, and collect all moneys due the Association, giving his receipt therefor. He shall record the amount of each payment, with the name and address of the person so paying. He shall faithfully care for all moneys entrusted to his keeping, paying out the same only with the approval of the President, and taking a receipt therefor. He shall, immediately after his election to office, file with the President of the Association a bond in the sum of five thousand dollars, the expense of which shall be borne by the Association. He shall, at the Annual Meeting, make a detailed statement of the financial condition of the Association.

B. Any of the prescribed duties of the Secretary-Treasurer may be delegated to an Executive Secretary to be appointed by the President upon approval by the Executive Board. He will hold office until the Executive Board authorizes the President to appoint a successor, but the status of the incumbent will be that of an employee of the Association who will not relieve the elected Secretary-Treasurer of the latter's responsibility to the Association.

C. The Secretary-Treasurer will serve as a member of the Membership, Program, and Publications standing committees.

D. He will be responsible for assembling and transmitting to the Editors of the publications of the Association all papers, addresses, and other matter worthy of publication as soon as possible after the Annual Meeting, and keep currently listed with the publications management the names and addresses of all members of the Association and Affiliate Associations entitled to receive the publications.

E. He will record and keep accurate minutes of the proceedings of all meetings of the Association, Executive Board, and the Council, and prepare and keep them for permanent reference, to issue notices of all meetings, to conduct correspondence appertaining to the affairs of the Association, and perform duties incident to the office and such as the Executive Board may authorize.

Section 5. The full management of the affairs of the Association shall be in the hands of the Executive Board, as provided in the Constitution. The duties of the Executive Board shall be:

A. To direct the administrative work of the Association including all matters connected with its publication, its standardization work, its collaboration with other groups and institutions, and its professional development;

B. To act as trustee of Association property;

C. To recommend names for Honorary membership;

D. To fix the time and place for the Annual Meeting;

E. To act for and in behalf of the Association in any administration, financial, legislative, educational, or other capacity as the Association may direct, or act on its own initiative between meetings and report such action at the next Annual Meeting;

F. To authorize the President to make pro tem appointments to fill any vacancy that may occur among the officers between meetings of the Association, whether the vacancy is caused by resignation, death, inability, or other cause of inactivity, in the interest of the Association;

G. To revoke membership, for cause, by two-thirds vote of all votes cast, but in no case will membership be revoked without giving the member written notice of reasons for the contemplated action at least one month before action is taken and opportunity be given for a hearing in person and/or in writing;

H. To employ personnel, as the situation demands, and fix their compensation and duties;

I. To execute the policies of the Association and report to the Association at its Annual Meeting any action taken that was not specifically authorized;

J. The amount of the registration fee for the Annual Meeting shall be fixed annually by the Executive Board and shall be used for defraying the expenses of the Annual Meeting;

K. To authorize the issuance or revocation of a Charter to an Affiliate Association.

Section 6. The duties of the Council shall be:

A. To act as an advisory body to the Executive Board;

B. To serve as the means for the interchange of ideas and recommendations on programs, activities, and procedures among and between the Affiliate Associations and the Executive Board;

C. To aid in putting into effect policies and programs authorized by the Association and by the Executive Board;

D. To convey to the respective Affiliate Associations information on the activities of the Association;

E. To make a report of its activities to the Executive Board at the Annual Meeting;

F. The immediate Past-President shall preside at all meetings of the Council. He shall appoint all committees unless otherwise directed by vote of the Council, and perform such other duties as usually devolve upon the presiding officer or are required of him by the Constitution and By-Laws.

## ARTICLE III.

### AFFILIATE ASSOCIATIONS

Section 1. The conditions for authorizing the issuance of a Charter to an Affiliate Association are as follows:

A. When a regional group of members of this Association want to form an Affiliate Association, a group of at least ten members of this Association will sign the application and forward it to the Secretary-Treasurer of this Association, accompanied with a list in duplicate of the names of the members of this Association suggested by the applicants for allocation to the Affiliate Association and also a definition of the area desired to be covered;

B. When an already-existing organization wants to become an Affiliate Association the Secretary or other duly authorized officer of the applicant organization will make written request for affiliation status, giving the name of the organization, a copy of the Constitution and By-Laws, an attested copy of the minutes authorizing said application, the names and addresses of its officers, the number of members, a statement as to the area now covered, and also the area that it desires to embrace.

Section 2. Upon affirmative majority vote of the number of votes cast, by the Executive Board, the Secretary-Treasurer of this Association will notify the responsible officer of the applicant organization concerning the action taken. Upon receipt of any further information requested by the Secretary-Treasurer and receipt of remittances to cover the amount of the membership dues, as per provisions in the By-Laws, Article I, Section 2 and Section 8, he will execute a Charter to the Affiliate Association in form and substance as approved by the Executive Board. After the granting of the Charter by this Association, the Secretary of the Affiliate Association or other duly authorized officer shall submit the names and addresses of each member, dues, and other official business to the Secretary-Treasurer of this Association as may be required in keeping with the Constitution and By-Laws.

Section 3. Any Affiliate Association may use the expression "Affiliated with the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC." or an equivalent legend that is approved by the Executive Board.

Section 4. An Affiliate Association Charter may be revoked by the Executive Board upon recommendation by the Council on two-thirds vote of the total number of votes cast by the Council, after due and reasonable notice has been given in writing at least three months before such intention and a reasonable opportunity is given for a hearing, for the following causes:

A. When the affairs of the Affiliate Association are not conducted consonant with the Constitution and By-Laws of this Association, or

B. When the Affiliate Association has ceased to function for two years.

Section 5. Each Affiliate Association shall have one representative on the Council. The representative shall be the Secretary of the Affiliate Association. An alterate representative on the Council may be certified by the Affiliate Association to serve in the absence of the Secretary.

## ARTICLE IV.

### COMMITTEES

Section 1. Standing committees of this Association shall consist of the following: Program, Membership, and Publications.

A. The Program Committee shall consist of the President-Elect, Chairman, the two Vice-Presidents, and the Secretary-Treasurer.

B. The Membership Committee shall consist of a Chairman appointed by the President, the First Vice-President, and the Secretary-Treasurer.

C. The Committee on Publication will consist of the Editors of the Association publications and the Secretary-Treasurer of this Association, who will report all matters appertaining to the publications of the Executive Board at least once every year, and whenever so requested by the Executive Board. This Committee will handle all editorial and business matters concerned in publishing the *Journal of Milk and Food Technology*, with the approval of the Executive Board. The Editors will be appointed by the President with the approval of the Executive Board.

Section 2. The President, at each Annual Meeting,will appoint a Nominating Committee of seven members, other than officers of the Association. This committee will submit to the Association at the Annual Meeting the name of at least one nominee for each elective office in the Association. These names, together with any other nominations duly made on the floor at the Annual Meeting, shall be voted upon. If there are more than two nominees for any office and non receives a majority of all the votes cast, the candidate receiving the lowest count on the first ballot will be eliminated from the second ballot, and this procedure will be followed until a majority vote is reached.

Section 3. Other special committees and regular continuing committees may be authorized by the Executive Board or by the President for special work or assignment. The need for continuation of such committees shall be subject to annual review of the Executive Board. All appointments to continuing committees shall be made by the President-Elect prior to the Annual Meeting.

Section 4. The terms of office of all members shall expire at the end of the Annual Meeting next following their appointment, except as provided in Section 1, Paragraphs A, B, and C, above.

## ARTICLE V.

### MEETINGS

Section 1. The Annual Meeting of the Association shall be held at such time and place as shall be designated by the Executive Board. Twenty-five of the members registered at the Annual Meeting shall constitute a quorum for transaction of business.

Section 2. Special meetings of the Association may be called by the Executive Board, of which due notice shall be given to the members by the Secretary-Treasurer.

Section 3. The Executive Board and the Council will meet at the Annual Meeting and at such other times as the members, by majority vote of all votes cast, shall deem desirable. For all meetings of the Association other than Annual Meetings, reasonable notice will be sent to each member by the Secretary-Treasurer. In each case, a quorum shall consist of a majority of the respective membership. However, any subject may be handled by mail vote in which event, majority of the votes cast will constitute official action.

Section 4. *Robert's Rules of Order* shall govern the procedures at all meetings. Voting by proxy shall not be permitted.

## ARTICLE VI.

### PUBLICATIONS

Section 1. All publications of the Association will be issued under the direction of the Executive Board, but any Affiliate Association may publish its own material if it assumes full responsibility therefor and obligates the Association in no way.

Section 2. *The Journal of Milk and Food Technology*, will be the official organ of the Association. The Editors will be appointed by the President, subject to approval by the Executive Board, and they will be responsible to the Executive Board for the satisfactory administration of the Journal affairs. The Journal will be the property of the Association who will own the copyrights to the Journal and all articles published therein. The Editors will serve at the pleasure of the Executive Board.

Section 3. Any other publications of the Association will be produced and handled as the Executive Board will direct.

## ARTICLE VII.

### AMENDMENTS

Section 1. Any member may propose amendments to these By-Laws by submitting them in writing to the Secretary-Treasurer at least 45 days before the date of the next announced meeting, and the Secretary-Treasurer shall promptly notify all members that the proposed amendments will be open for discussion at the meeting. These By-Laws may be amended by a majority affirmative vote of the members present.

## AUTHORS



## TITLES

## APPLIED LAB. COMM.

Continued from Page 281

63. MacCready, R. A., and Holmes, M. B., A Time-Saving Method for the Identification of the Enteric Pathogens. *Am. J. Pub. Health*, 43, 285-288 (1953).

64. North, W. R., and Bartram, M. T., The Efficiency of Selenite Broth of Different Compositions in the Isolation of *Salmonella*. *Applied Microbiology*, 1, 130-134 (1953).

65. Hobbs, B. C., Smith, M. E., Oakley, C. L., Warrack, G .H., and Cruickshank, J. C., *Clostridium welchii* Food Poisoning. *J. Hygiene*, 51, 75-101 (1953).

66. Moore, B., Perry, E. L. and Chard, S. T., A Survey by the Sewage Swab Method of Latent Enteric Infection in an Urban Area. *J. Hygiene*, 50, 137-156, (1952).

67. Adams, H. S., The National Research Council's Report on a Study of Milk Regulations and Sanitary Milk Control. (Presented at 40th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, East Lansing, Michigan, September 3, 1953).

## Classified Advertisement

WANTED: Director:-Bureau of Sanitation, for combined city-county health department serving a population unit of approximately 200,000, with responsibility for planning and direction of environmental sanitation program. Minimum educational requirements, B. S. in sanitary science, public health, engineering, or in physical, chemical, biological sciences, plus M.P.H. degree or equivalent. 10 to 15 years public health experience preferred, 7 years minimum. Retirement system, annual vacation and sick leave. Salary open. Apply, giving complete information as to training and experience, and statement as to beginning salary expected, plus references to: Director, Lansing-Ingham County Health Department, 207 City Hall, Lansing, Michigan.

## Now—A coffee with dietary advantages

Coffee has not always been particularly kind to the digestion, and it can be a problem in the case of patients on certain special diets.

But today coffee in its most modern form—Borden's Instant Coffee—is better tolerated by delicate stomachs.

It's less likely to cause digestive upset and is suitable for many of those patients on special diets.

Why?

Because the coffee oils usually responsible for rancidity, off-flavor, and consequent digestive disturbance have been eliminated from Borden's Instant Coffee. In addition, it has a low sodium content, no added carbohydrates, and it's low in calories.

The combining of these advantages with the rich full body and flavor of finest coffee is a result of Borden's special low-temperature vacuum-drying process, more costly but more satisfactory than the commonly employed spray-drying method.

This process, which makes Borden's Instant Coffee so fine a product, was developed out of Borden's experience in dehydrating perishable foods—experience that has yielded such products as Starlac (non-fat dry milk), Bremil (powdered infant food), and Klim (powdered whole milk).

Manufacturers and distributors of BORDEN'S Instant Coffee
STARLAC non-fat dry milk • BORDEN'S Evaporated Milk
Fresh Milk • Ice Cream • Cheese
BREMIL powdered infant food • MULL-SOY hypoallergenic food
BIOLAC infant food • DRYCO infant food •
KLIM powdered whole milk

The *Borden* Company
350 Madison Avenue, New York 17, N. Y.

## INDEX TO ADVERTISERS

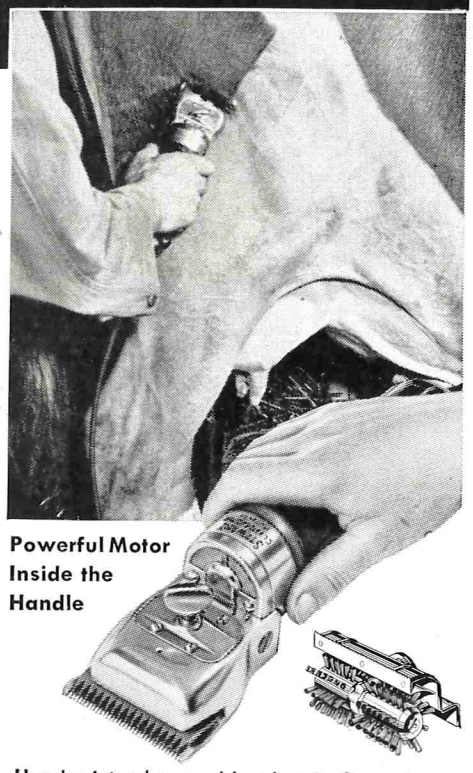
# COW CLIPPING TIME IS HERE

## Emphasize Regular Clipping as the first step in producing quality milk

Sunbeam
# STEWART
ELECTRIC
# CLIPMASTER

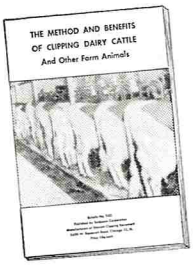
When cows are stabled, good sanitary practice calls for a regular clipping program. Clipped cows are easier to keep clean. Clean cows mean less sediment and a lower bacteria count. Milk with a lower bacteria content is more desirable.

Leading health authorities say: "A regular clipping program means more wholesome milk. It is an essential step in the production of quality dairy products." Emphasize the advantages of regular clipping. It reduces sediment, lowers bacteria, avoids contamination and increases profits from production of cleaner, higher quality milk.



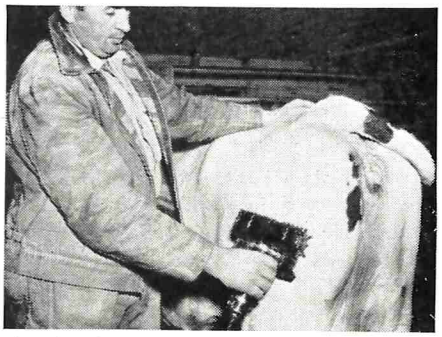
**Powerful Motor Inside the Handle**

Handy, interchangeable electric Grooming Brush head fits Clipmaster.




## *Free!*

Bulletin 100—"The Method and Benefits of Clipping Dairy Cattle and Other Farm Animals." This handy manual illustrates the 5 simple steps in clipping dairy cattle that can be easily learned by everyone. Contains no advertising. Send for your free copy.



An electric grooming brush saves time and does a more thorough job of cleaning than hand brushing.

**Sunbeam CORPORATION** (formerly Chicago Flexible Shaft Co.) **Dept. 142,**
**5600 West Roosevelt Road, Chicago 50, Illinois**

---

PROCEEDINGS OF THE SOCIETY FOR

# APPLIED BACTERIOLOGY

*Joint Editors*: S. E. JACOBS, D.Sc., AND L. F. L. CLEGG, PH.D.

*Contents of Vol.* 14, *No.* 2

GENERAL PAPERS




One Volume of two numbers is published annually.
Price to non-members: 35/-per Vol.,20/-per No.

*Publications Manager*: T. E. BASHFORD, Research Dept., Metal Box Co., Ltd., Kendal Avenue, Westfields Road, London, W.3.

BRADLEY & SON, LTD., THE CROWN PRESS, READING, ENGLAND

# Notice

## Attractive Membership Lapel Button and Decal

## Now Available

*Convolution — Blue . . . . Circle & Bar — Silver . . . . Field — Blue*
*Letter "S" — White . . . . Lettering — Blue*


ACTUAL SIZE

No. . . . . 3 1/4" Decals @ 25c each =$. . . . . .

No. . . . . Lapel Buttons @ $1.00 each = $. . . . . .

**International Association of Milk & Food Sanitarians, Inc.**
**Box 437, Shelbyville, Indiana**

---

# Notice

Announcing student Membership Rate of $3.00 per year which includes Journal of Milk and Food Technology.

Name .....
Please print

Address .....

.....

College or University ..... Dept. .....

Under-Graduate Class .....

*Application for Membership*

## INTERNATIONAL ASSOCIATION OF MILK & FOOD SANITARIANS, Inc.

*Box 437, Shelbyville, Indiana*

Name ..... Date .....

Please Print

Address ..... ☐ New

..... ☐ Renewal

Business Affiliation ..... ☐ Re-instatement

Annual Dues $5.00 ☐ Check ☐ Cash

(Membership Includes Subscription to Journal of Milk & Food Technology.)

(Please Print)

Recommended by .....

---

*Subscription Order*

Box 437
Shelbyville, Ind.

## JOURNAL OF MILK & FOOD TECHNOLOGY

Name ..... Date .....

Please Print

Address ..... ☐ New

..... ☐ Renewal

Educational & Institutional Libraries (Annually) $3.00. Individual Subscription (Annually) $5.50.

☐ Check ☐ Cash

(Please Print)

---

I. A. M. F. S. & J. M. F. T.
Box 437, Shelbyville, Ind.

*Change of Address*

**FROM**

Name ..... Date .....

Please Print

Address .....

**TO**

Name .....

Please Print

Address .....

(Please Print)

---

I. A. M. F. S. & J. M. F. T.
Box 437, Shelbyville, Ind.

*Order for 3A Standards*

Name ..... Date .....

Please Print

Address .....

( ) Complete Set @ $1.75 = ..... ( ) Complete set bound (durable cover) @ $3.50 = .....

*Order for Reprints of Articles*

Amt. ..... Title .....

Schedule of prices for reprints F. O. B. Shelbyville, Indiana

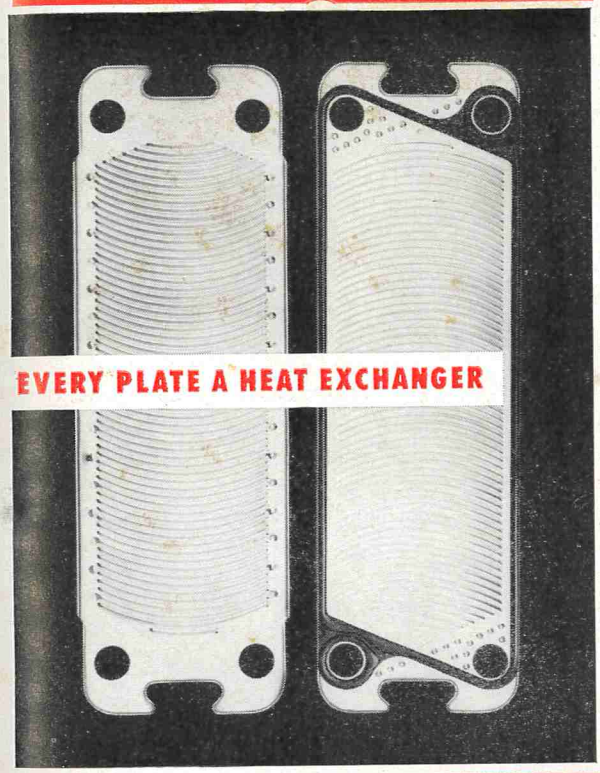
| | 1 Page | 2 Pages | 3 & 4 Pages | 6 & 8 Pages | 12 P. | Cover |
|---|---|---|---|---|---|---|
| 100 or less | $ 8.50 | $15.00 | $21.00 | $30.00 | $50.00 | $21.67 |
| Add'l. 100's | 1.60 | 1.60 | 3.00 | 4.20 | 7.00 | 3.37 |

*Announcing the New*

# CRESCENT

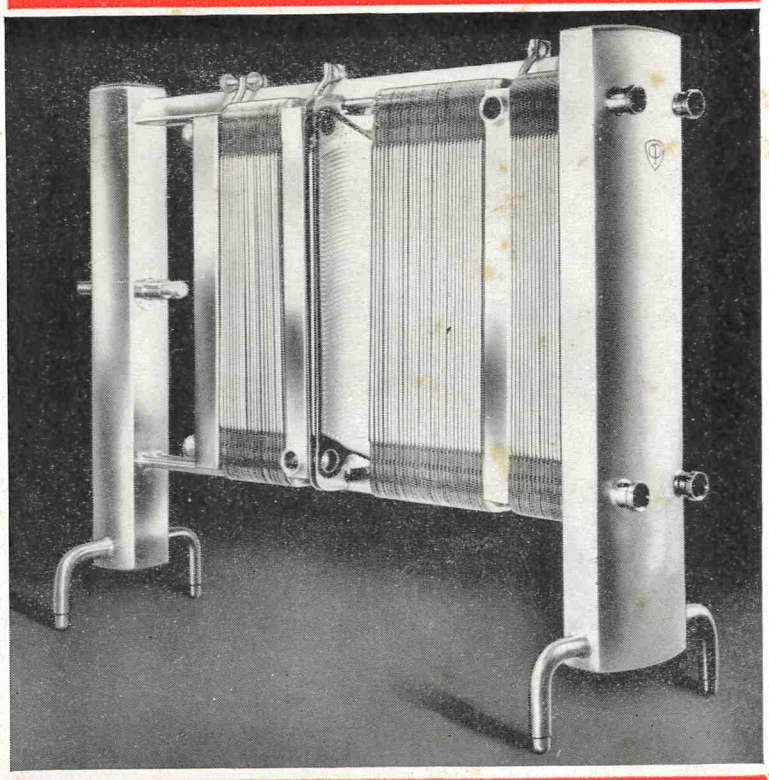
**PLATE A HEAT EXCHANGER**

**NEW CRESCENT CORRUGATED PLATE**



**EVERY PLATE A HEAT EXCHANGER**

**MEDIUM TO LARGEST CAPACITIES**



**NEW HEAVY DUTY PRESS OF PROVEN DESIGN**

- **Years Ahead in Design and Performance**
- **More Surface Yet Fewer Gaskets**
- **Does More Work Yet Takes Less Maintenance**

*Get the Crescent Story*

**THE *Creamery Package* MFG. COMPANY**

GENERAL AND EXPORT OFFICES: 1243 West Washington Blvd., Chicago 7, Illinois

Atlanta • Boston • Buffalo • Chicago • Dallas • Denver • Houston • Kansas City, Mo.
Los Angeles • Minneapolis • Nashville • New York • Omaha • Philadelphia • Portland, Ore.
St. Louis • Salt Lake City • San Francisco • Seattle • Toledo, Ohio • Waterloo, Ia.

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD.
267 King St., West, Toronto 2, Ontario

THE CREAMERY PACKAGE MFG. CO., LTD.
Mill Green Road, Mitcham Junction, Surrey, England

*We Want the* **CRESCENT STORY**

TO: THE CREAMERY PACKAGE MFG. COMPANY
1243 West Washington Blvd., Chicago 7, Illinois

NAME _____

FIRM NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____