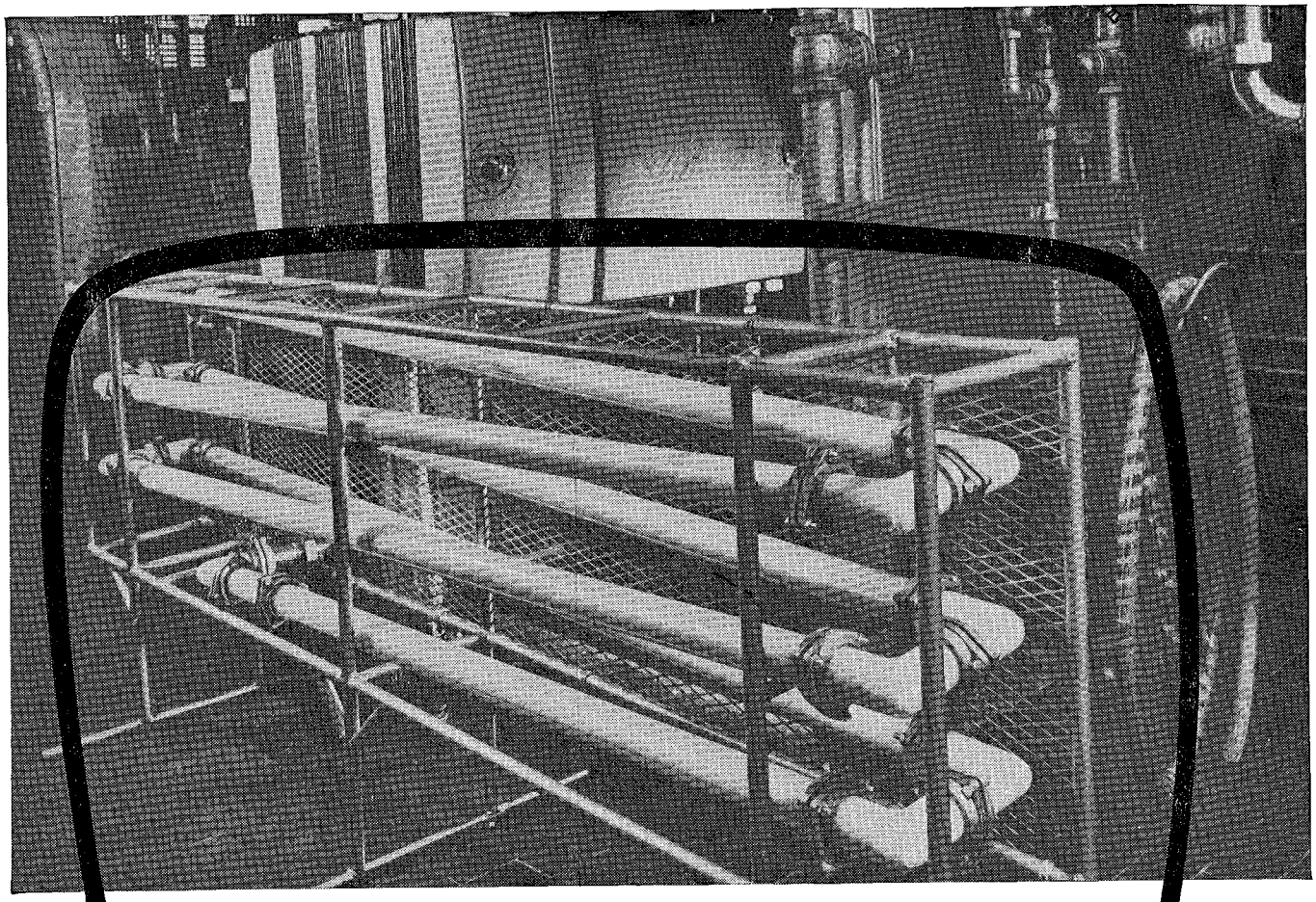
VOLUME 15 NO. 5
Sept. - Oct., 1952

Journal of

MILK and FOOD TECHNOLOGY

Official Publication

International Association of Milk and Food Sanitarians, Inc.



PYREX® brand Glass Holding Tubes quickly help you detect underholding

Here is an easy and inexpensive way to take the guesswork out of high-temperature, short-time pasteurization. Through the clear transparency of PYREX brand glass holding tubes, you *see* foaming as it occurs. Thus, you can correct the condition, eliminate underholding quickly. Glass tubes also help you to make timing adjustments positively.

As with all glass pipe, PYREX holding tubes can be cleaned rapidly *in place.* You can *see* that they are clean. Approved by milk sanitarians, PYREX holding tubes have proven exceptionally sanitary. Long-time tests at Cornell University show no bacterial build up and no positive coliform tests from PYREX pipe.

Made of nationally famous PYREX brand "Double-Tough" glass pipe, these holding tubes:

1. will not corrode (acid, alkaline and chlorine cleaning solutions won't eat away your lines);
2. are highly resistant to physical and thermal shock;
3. are easy to install and require virtually no maintenance other than *cleaning in place;*
4. are immediately available in sizes from 1½" to 4".

Contact *your* nearest Cherry-Burrell or Creamery Package office—or write Corning direct.

PYREX BRAND GLASS PIPE IS DISTRIBUTED BY CREAMERY PACKAGE MFG. COMPANY AND CHERRY-BURRELL CORPORATION

We'll see you at the Dairy Show in Chicago.

PYREX T.M. REG. U.S. PAT. OFF.

CORNING GLASS WORKS, CORNING, N.Y.

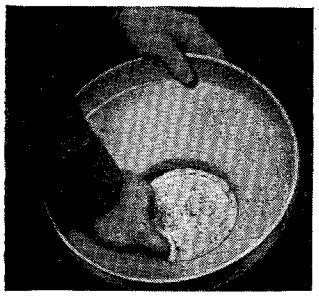
Corning means research in Glass

VISIT THE CORNING GLASS CENTER

A clean used filter disk is the BADGE of MERIT to every good milk producer...

THAT'S HOW THE *RAPID-FLO* FARM SEDIMENT CHECK-UP AIDS YOUR CAMPAIGN FOR QUALITY MILK PRODUCTION

With safer, more retentive Rapid-Flo Fibre-Bonded Filter Disks, your producers have a daily guide to quality milk production practices by following the simple steps in the Rapid-Flo Farm Sediment Check-Up.



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

2. When filter disk is dry, it should be examined closely. The producer can identify the sediment or extraneous matter to determine where it came from so as to prevent any more getting into the milk in the future.

Fieldmen and sanitarians find their jobs made easier in grading up milk, with the hearty cooperation of farmers, who can see for themselves just what is needed to eliminate causes of substandard milk.

Urge your producers to use safer, more reliable

RAPID-FLO

Trade Mark of Johnson & Johnson

Fiber-Bonded Filter Disks

in the handy, flat factory-sealed carton of 100's

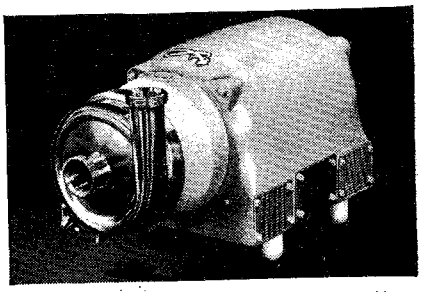
FILTER PRODUCTS DIVISION Johnson & Johnson
4949 WEST 65th STREET CHICAGO 38, ILLINOIS

WHEN YOUR BUSINESS IS IN *Good Taste . . .*

. . . why not let Cherry-Burrell help you keep it that way? With Cherry-Burrell sanitary pumps, tubing, valves and fittings handling your product, there's *no chance* to pick up undesirable flavors . . . *all the chance* in the world to protect your product's purity; your customers; your business.

CHECK CHERRY-BURRELL FOR SANITARY PUMPS

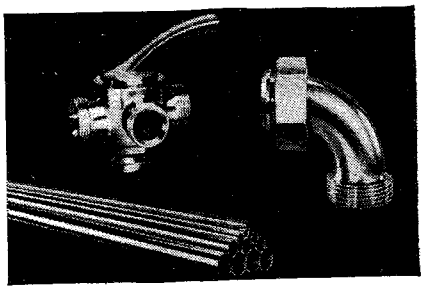
- Meet 3A Sanitary Standards
- Flexible design—discharge can be set at any angle
- Full suction and discharge size
- Easy to dismantle and clean
- Totally enclosed motors
- Removable sanitary rotary carbon Seal
- Available in portable models
- Blowout-proof gasketing



Flexflo Pump—*six sizes to 240 G.P.M.—Motor sizes—1/4 h.p. to 10 h.p.*

FOR SANITARY TUBING, VALVES AND FITTINGS

- Complete Line—Available in stainless steel or famous DiaMonD Metal (Nickel-Alloy)
- Maximum Interchangeability
- Designed to meet National 3A Standards for Sanitary Fittings



Ask your Cherry-Burrell Representative for complete information about sanitary stainless pumps, fittings and tubing. Or write your Cherry-Burrell Branch or Associate Distributor for free bulletins.

CHERRY-BURRELL CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

Equipment and Supplies for Industrial and Food Processing

FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES

OFFICERS

President, H. L. THOMASSON
Shelbyville, Ind.
President-Elect, H. J. BARNUM
Denver, Colo.
First Vice-President, J. D. FAULKNER
Washington, D. C.
Second Vice-President, I. E. PARKIN
State College, Pa.
Secretary-Treasurer, H. H. WILKOWSKE,
Gainesille, Fla.

Auditors: DR. W. H. HASKELL
Beloit, Wisc.
J. M. DOUGHTY
Santa Fe, N. Mex.

Board of Directors

H. L. THOMASSON — HAROLD BARNUM
JOHN FAULKNER — IVAN E. PARKIN
H. H. WILKOWSKE — K. G. WECKEL
MILTON R. FISHER

Publication Board

H. L. THOMASSON — J. H. SHRADER
H. H. WILKOWSKE

Editors

H. L. THOMASSON, *Managing Editor*
Box 286, Shelbyville, Ind.
DR. J. H. SHRADER, *Editor*
23 East Elm Ave., Wollaston 70, Mass.

Associate Editors

C. A. ABELE ..... Chicago, Ill.
F. W. BARBER ..... Oakdale, N. Y.
F. C. BASELT ..... New York, N. Y.
A. E. BERRY ..... Toronto, Canada
P. B. BROOKS ..... Montgomery, N. Y.
F. W. FABIAN ..... East Lansing, Mich.
C. R. FELLERS ..... Amherst, Mass.
A. W. FUCHS ..... Washington, D. C.
J. G. HARDENBERGH ..... Chicago, Ill.
R. W. HART ..... Kansas City, Mo.
M. D. HOWLETT ..... Los Angeles, Cal.
C. K. JOHNS ..... Ottawa, Canada
J. A. KEENAN ..... New York, N. Y.
M. E. MCDONALD .... Sacramento, Calif.
J. C. OLSON, JR., ... St. Paul, Minn.
E. H. PARFITT ..... Chicago, Ill.
G. W. PUTNAM ..... Chicago, Ill.
J. L. ROWLAND ..... Jefferson City, Mo.
W. D. TIEDEMAN ..... Ann Arbor, Mich.
K. G. WECKEL ..... Madison, Wisc.
G. H. WILSTER ..... Corvallis, Ore.

The Journal of Milk and Food Technology (including Milk and Food Sanitation) is issued bimonthly beginning with the 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 286, 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 286, 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.

Business Matters: Correspondence regarding business matters, advertising, subcriptions, 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 Copy 1.00

Orders for Reprints: All orders for reprints should be sent to the executive office of the Association, P. O. Box 286, 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 286, Shelbyville, Indiana.

Journal of

MILK and FOOD TECHNOLOGY

INCLUDING MILK AND FOOD SANITATION

Official Publication

International Association of Milk and Food Sanitarians, Inc.

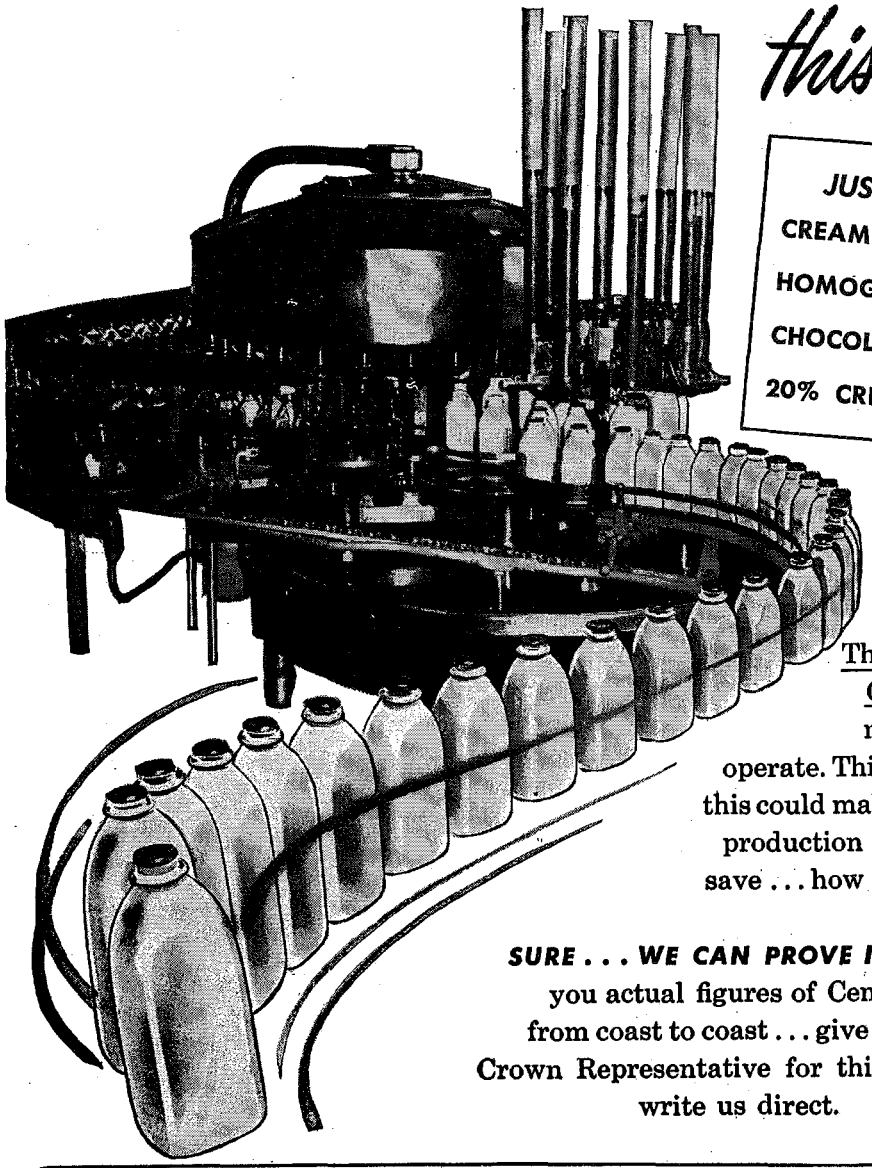
VO. 15 — SEPT.-OCT. — No. 5

CONTENTS

COPYRIGHT, 1952, INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS

Talk about *speed*...

this filler has it!



JUST LOOK AT THESE FIGURES:

CREAM LINE MILK	135 BPM
HOMOGENIZED MILK	130 BPM
CHOCOLATE MILK	125 BPM
20% CREAM	120 BPM

These are only rated capacities for Cemac 28. They are exceeded in many dairies . . . every day they operate. Think what a difference speeds like this could make in your plant . . . the balanced production you'd have . . . the time you'd save . . . how you could increase your profits.

SURE . . . WE CAN PROVE IT . . . we will be glad to show you actual figures of Cemac operating speeds in dairies from coast to coast . . . give you names of owners. Call your Crown Representative for this information, or if you prefer, write us direct.

Dependability, too! Look at Cemac from any angle . . . construction . . . dependability . . . efficiency . . . economy . . . you'll find this filler head and shoulders above the rest. Compare Cemac with any other filler . . . at any price. See it in actual operation . . . then make your own decisions.

CROWN CORK & SEAL COMPANY
Machine Sales Division • Baltimore 3, Md.

Cemac

VACUUM MILK FILLER

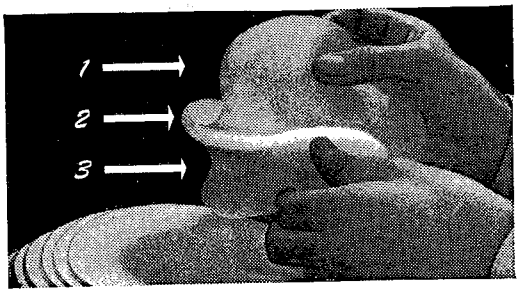
The Greatest Performer of them all

. . . AND REMEMBER, THE GREATEST COMBINATION OF THEM ALL IS CEMAC AND THE DACRO P-38 CAP!

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!

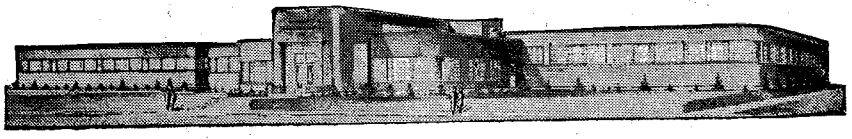
NO OTHER FILTER DISCS CAN CLAIM TO FILTER MILK BETTER

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.



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

NOW! SMALLER COMMUNITIES, TOO, CAN HAVE SEALRIGHT SANITARY PROTECTION

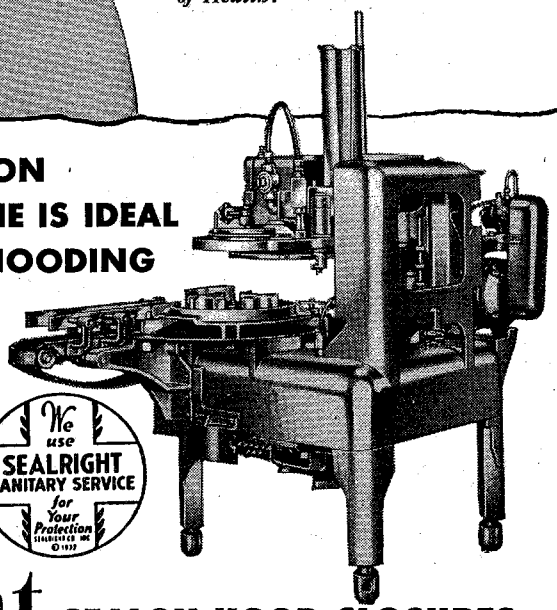
GOOD HEALTH IS EVERYBODY'S BUSINESS! All too often, smaller communities have been served by dairies which lack the most modern facilities for health protection.

TODAY THINGS ARE DIFFERENT! The new Single Head Sealon Applying Machine (shown below) has been expressly designed to give smaller communities the same milk protection found in the most progressive larger cities.

Because the SEALON HOOD protects the milk bottles' pouring surface all the way, *it has been found eminently acceptable to ALL Boards of Health!*

NEW SEALON APPLYING MACHINE IS IDEAL FOR SPECIALTY HOODING

Many dairies have found this machine particularly adaptable for specialty hooding. Famous Sealright Sanitary Protection is now possible for gallon milk containers, cottage cheese jars and even two-quart rectangular bottles.



We use SEALRIGHT SANITARY SERVICE for Your Protection

Sealright SEALON HOOD CLOSURES

SEALRIGHT CO., INC., Fulton, N. Y.; Kansas City, Kansas; Sealright Pacific Ltd., Los Angeles, Calif.; CANADIAN SEALRIGHT CO., LTD., Peterborough, Ontario, Canada.

DIISOBUTYL phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride monohydrate . . .

. . . simply the chemical name for

HYAMINE 1622

a quaternary ammonium germicide manufactured by Rohm & Haas Company. It is used by leading formulators to make sanitizing agents for the restaurant, dairy and other fields.

AN INVITATION—You will find it to your advantage, we believe, to become better acquainted with this company and its sanitary products. As a step in this direction, why not permit us to add your name to our mailing list? You will receive regularly our technical publications on the sanitizing applications of our products which are of interest to you.

Just send us your name and address, indicating the nature of your work and whether you have any special problems on which we might be of immediate assistance. If you are not already receiving our bi-monthly magazine, The Rohm & Haas Reporter, it will be sent to you as well.

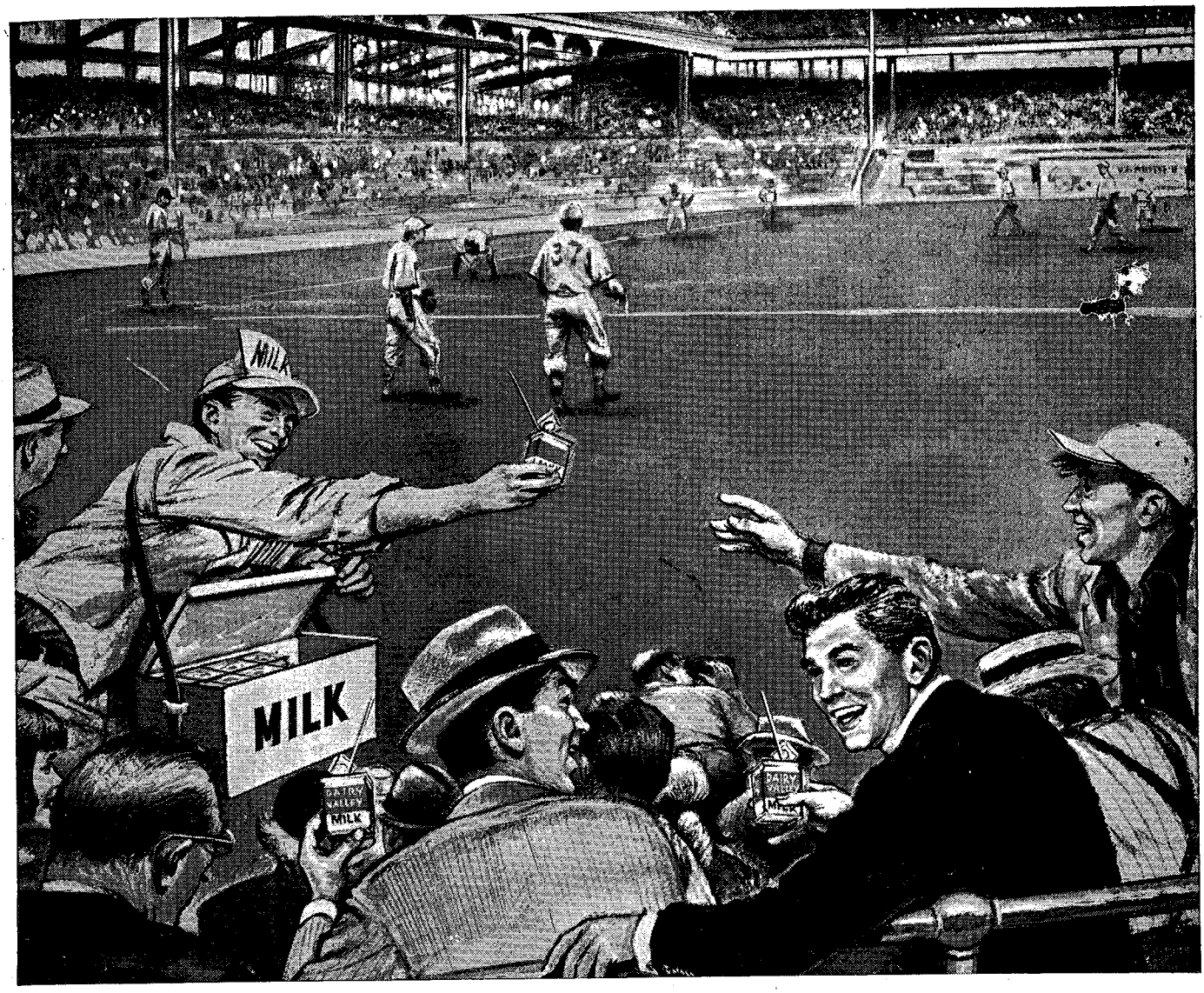
CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

HYAMINE *is a trade-mark Reg. U.S. Pat. Off. and in principal foreign countries.*



Today...a big hit everywhere!

Look around in ball parks . . . factories . . . offices . . . schools . . . military posts . . . and you'll find that milk is now available in its most convenient, sanitary form . . . in Canco disposable milk containers.

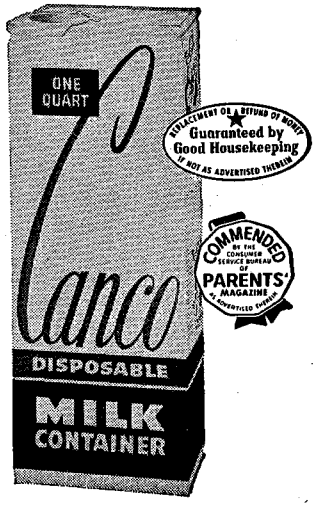
The credit for this advance belongs largely to public health officials who long ago recognized the single-service milk container as a step to better health.

The Canco container brings fresh, healthful milk where it could not be found before. Its design and manufacture meet the high standards of public health officials, and is regarded by Canco as one of its most significant achievements in making containers to help people live better.

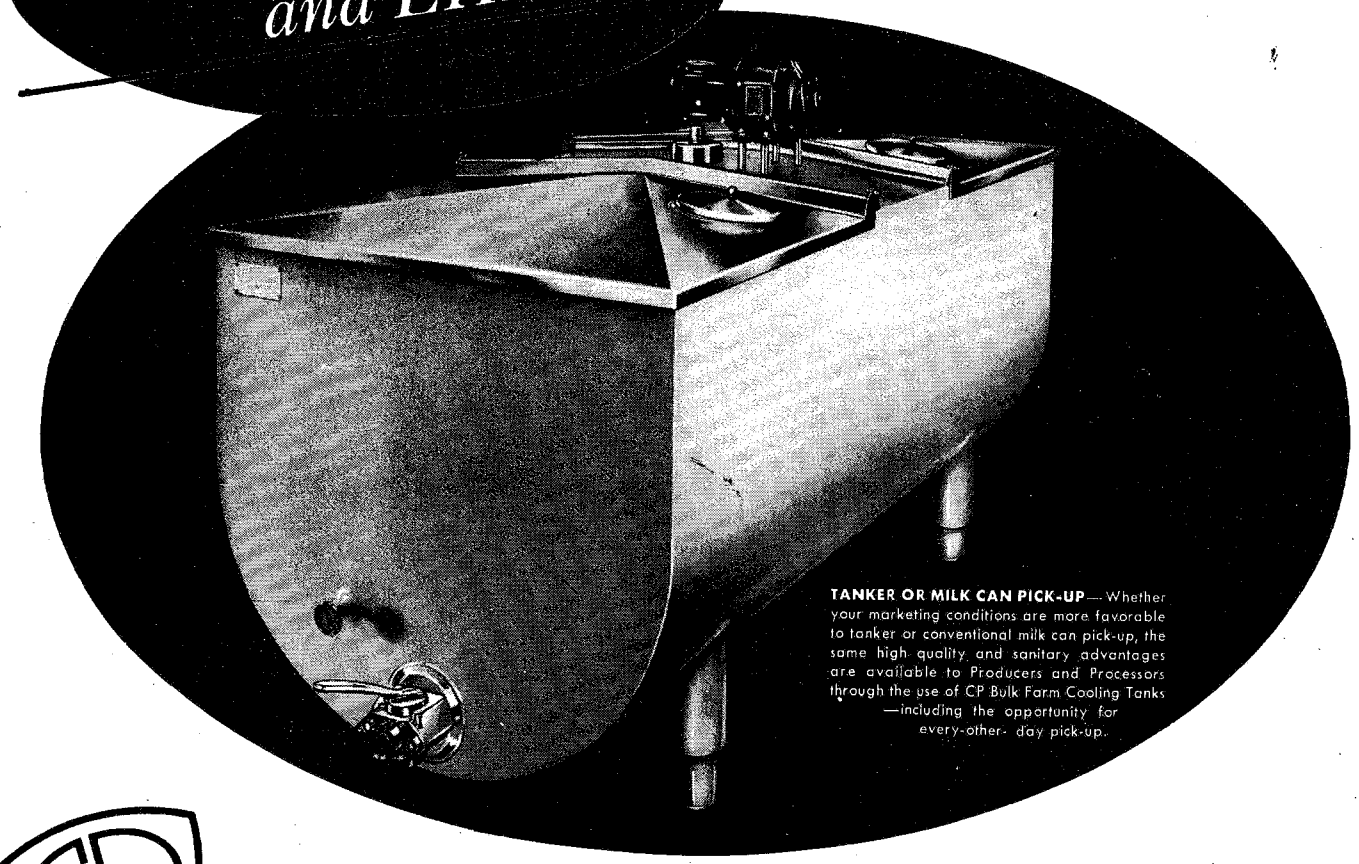
AMERICAN CAN CO.

CANCO

NEW YORK
CHICAGO
SAN FRANCISCO
HAMILTON, CANADA



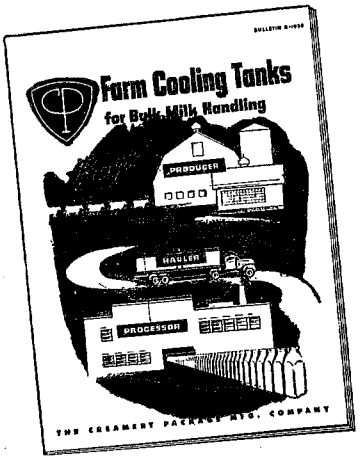
You'll Live with It and LIKE It... for a long, long time



TANKER OR MILK CAN PICK-UP—Whether your marketing conditions are more favorable to tanker or conventional milk can pick-up, the same high quality and sanitary advantages are available to Producers and Processors through the use of CP Bulk Farm Cooling Tanks —including the opportunity for every-other- day pick-up.

MILKEEPER FARM COOLING TANK

...built *better* to meet *your* needs best!



NEW BULLETIN tells all about bulk farm cooling and the various CP tanks that are available to fill your exact requirements. Write for your copy or ask your CP salesman.

When you buy a bulk farm cooling tank, you're investing in a labor-saver that you count upon to operate efficiently and *economically* for years and years. You can be sure that it will if you choose a CP MilKeeper Tank—built with *your* needs in mind, with *all* the features most important to you!

Long Life Construction—the result of the very special way CP builds its tanks . . . of fine workmanship, carefully selected materials and efficiency-engineering by the people who know and have been making stainless tanks and refrigeration for generations.

Peak Cooling Performance—Amply sized, built-in refrigerated surfaces drop milk temperature *fast* and hold it dependably. Your milk quality is safe—and *you're* safe against delayed pick-up or other emergencies.

Minutes-Faster Cleaning—Easily accessible interior is of highly polished, stainless steel, with smoothly rounded corners and welding that can't hold or catch particles. Rounded bottom drains completely. In a CP Tank you get—and get paid for—all the milk in the tank!

Before you buy *any* bulk farm cooling tank, ask your CP representative for the rest of the facts on CP MilKeeper Tanks. You'll be glad you did—for years to come!

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 • Waterloo, Iowa

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

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

Editorial Notes

PROFESSIONAL ATTAINMENT — THE ROAD

Much has been said about the desirability of professional status for sanitarians. Recently James McCoy, Director Local Health Administration, Indiana State Board of Health, has made a valuable contribution to thought on this subject. He plainly says what a lot of us need to know. Coming from the source it does it should have weight. We print pertinent excerpts from it:

"I do hope to say something that will instill job pride in each of you to the point where no one will be ashamed to say that he is the public sanitarian from any health department. I would also like to give you some assurance that the work you do and the contribution we make to the welfare of others is becoming more and more recognized as an important cog in the overall picture of public health.

"I mention the need for job pride and the moral encouragement of being recognized for the contributions we make to public health because many sanitarians evidently have observed that job classifications and pay rates are a little lower for the sanitarian than for other personnel in public health, and therefore has reason to doubt his recognition.

"Let us not forget that we have to prove our worth and value to public health before we can expect recognition and that's what we are doing at the present time. There is no doubt that the services performed by the present day sanitarian are contributing immensely in the achievement of public health objectives.

"Besides obtaining public health objectives, the sanitarian is providing tangible evidence that the health department is giving the community a service which cannot easily be shown by a great many other important health activities. The public can see with its own eyes the improvements obtained as a result of your work. This evidence of valuable service plus the manner in which you render it, is probably the most practical way to create favorable public opinion and support for the continued existence of the health department. As you know, the health department cannot grow and progress very far without the support of the public it serves.

"The sanitarians' deserved recognition is not a reality yet because of the reputation they inherited from their forefathers. It hasn't been too many years since the so-called sanitarian was a political ward-healer whose sole responsibility was to collect campaign funds for his party. His main source of income was what he could collect on the side. The manner in which he operated did very little good in obtaining public health improvement and also created unfavorable opinion and support from the public in general and the industry with which he dealt.

"We are at the present time, and will continue to be so for a long time, in the process of living down the stigma cast upon us by the old time sanitarian. I know of no better method to live down this undesired stigma than to continue with your work in the same efficient manner that you have exercised in the past few years, and at the same time keeping in mind a few of the following points.

1. Know that the educational approach is far more efficient in obtaining compliance with our recommendations than law enforcement . . . Keep searching for additional public health and economic reasons for each requirement of the rules and regulations. If these reasons are sound and you have the ability to sell them to your client, improvement will come gradually but surely.

2. Keep well-informed on the latest technical developments on all phases of your work. This includes the procedures which are necessary for the administration of your daily work, such as the approach to the industry, explanation for correction of defects noted at the time of inspection, writing of inspection reports, filing of office records, etc., as well as keeping informed about the latest developments in equipment. You can't win the confidence of the industry unless you know as much or more than the person you're dealing with. To be and keep well-informed, it is necessary for you to have available sanitarians' technical journals, trade journals related material, and newer texts in the general field of sanitation. Get them and read them. Set aside time, as a part of your routine daily work, to keep yourself informed.

It is important to attend and participate in sanitarian seminars.

3. Let the public know who you are, your responsibilities, and the progress of achievements from time to time. Inform the public as to how these achievements are contributing toward the building of a better and more desirable community. To do this you must take advantage of every opportunity to appear before civil groups, and to prepare newspaper articles and radio scripts which inform the public about your work. Perhaps one of the most efficient means of informing the public, (and which is seldom used) is through the public schools. Any school official would be very glad for you to appear before all their health classes to discuss your particular job. I know of no better way to obtain lasting public support.

"There are many sources from which you can get assistance in the administration of your publicity campaign. The State Board of Health, Purdue University, and food and milk organizations all have public speakers, movies, and exhibits which can be had for the asking.

"There is always one important thing to remember in publicizing your accomplishments. Always use the positive approach instead of the negative approach. It will be far more beneficial to publicize the number of gallons of Grade A milk which is on the market than to publicize the number of gallons of milk which it was necessary for you to condemn as a result of enforcement of your Grade A milk program. It's better to publicize the number of food establishments which are complying with the sanitary requirements than to publicize the number of establishments which were closed as a result of enforcement of your restaurant ordinance. If you teach the public to evaluate your accomplishments by the negative approach there will be a time when the milk or restaurant program reaches the peak of efficiency that there will be no accomplishments to report. But with the positive approach, the better the program the more accomplishments there will be to report.

"The public condemnation of one establishment of a particular type reflects criticism on all similar types of establishments and thereby creates undesirable reaction to the program by the industry concerned. Therefore, the positive approach will do a great deal toward obtaining industry support and cooperation in the administration of any program. You can't go very far on the program without the industry's backing.

'I am sure that if each and every one of you keep these things in mind and practice them, the deserved recognition will be forthcoming."

We applaud such a constructive approach. Every sanitarian can engage in such a constructive program. And we can begin right now. Let's go to it.

J. H. SHRADER

Dr. J. H. Shrader, Editor
Journal of Milk and Food Technology
Waterville, Vermont

August 19, 1952

Dear Dr. Shrader:

As an associate editor of the Journal of Milk and Food Technology interested in studies on the evaluation of pasteurization processes, I believe that an article in the May 1952 issue of the *American Journal of Public Health* deserves comment. The paper is entitled "Effect of Milk and Cream on the Thermal Inactivation of Human Poliomyelitis Virus" by Drs. Albert S. Kaplan and Joseph L. Melnick. It discusses the effect of standard industry pasteurization methods on viruses particularly that of human poliomyelitis.

One of the authors, Dr. Melnick, Associate Professor of Microbiology at Yale University Medical School, is a noted authority on poliomyelitis viruses. The authors were contacted concerning the paper and it was learned that the article is the result of several years investigation.

All in all the paper does much to clarify the problem of the inactivation of viruses by pasteurization treatment. It should set at rest any concern the industry may have had regarding the possible adequacy of the accepted minimum pasteurization treatments for milk, cream, and ice cream on human poliomyelitis virus. The articles points out that the destruction of this virus which had been added to milk, cream, and ice cream was accomplished by both the holding method (143°F for 30 minutes) and the high-temperature short-time method (160° F for 15 seconds).

The workers at Yale carried their experiments further on strains of poliomyelitis virus which had been adapted in the laboratory to cotton rats. The results were favorable in the case of the holding method for milk, cream, and ice cream and in the case of the high-temperature short-time method for milk.

Dr. Melnick stated that further tests are in progress to determine the minimum high-temperature short-time combinations which will result in the destruction of the adapted virus when added to cream or ice cream.

It should be pointed out that currently accepted industry practices for high-temperature short-time pasteurization of cream and ice cream are in *excess* of the time-temperature combinations used for milk. It also should be noted that poliomyelitis viruses have never been detected in milk or dairy products. The rodent-adapted viruses which showed increased resistance to heat *do not* occur in nature in the form in which they were used in these experiments, i.e. infected brains and spinal cords of cotton rats. In the past, 5 small outbreaks of poliomyelitis have been attributed to the consumption of *raw* milk contaminated with the virus but no outbreaks have ever been traced to properly pasteurized milk, cream, or ice cream.

It is encouraging to note the results of this study and to realize the protection accomplished by the pasteurization of milk, cream, and ice cream.

FRANKLIN W. BARBER,
Associate Editor
Journal of Milk & Food Technology

HARRY SCHARER

The untimely death of Harry Scharer on May 27, 1952 is a shock to all who knew him.

Harry Scharer had a flare for simplification, as shown by his tendency to make all tests as simple as possible for technicians, not only for the purposes of saving time and labor, but primarily for the purpose of eliminating error. Thus, by concentrating into a tablet form a test which might otherwise require a series of processes, he enabled technicians to make tests on milk and water by simple processes instead of lengthy complicated procedures.

His clear and searching analytical mind made him continue his studies for additional knowledge to add to his great store, a willingness to suspend judgment until all evidence was in and all the contingencies had been considered before making a decision as to whether a test or formula was correct.

One of the essentials of the scientific attitude of mind, such as Harry Scharer possessed, is integrity, endowed with an insistance on perfection in materials and tests and a persistent refusal to compromis with quality.

An example was his attitude toward the Scharer Phosphatase Test for Detection of Improper Pasteurization of Milk and Its Products. After Harry Scharer had developed this simplified method of making this test and had made tablets which were found acceptable for this purpose by health and food authorities throughout the country, he himself was not satisfied with the stability of the tablets and consequently worked on improving the tablets until they were completely stable. He found as a result of his own initiative and studies that the original buffer substrate tablets might develop small amounts of phenol on exposure to heat, sunlight or moisture and continued to make studies and experiments until he was able to stabilize the tablets. The substrate solution is, of course, less stable than the tablets and therefore should be refrigerated or preserved. He eventually succeeded in having prepared commercially a tablet practically phenol free (requiring no purification for the test), containing an almost negligible amount of Na_2HPO_4 and carefully controlled as to pH. He attained such purification that a 50% reduction in the concentration of the substrate was feasible.

Although numerous attempts were often made to have him endorse a particular chemical material, product or process, he made it a definite policy not to do so until and unless he personally subjected such material, process or product to his own careful analysis and tests. As a result, there are very rare instances of personal endorsement by him except as a member of a committee or of an official group set up to study methods or materials, such as the Applied Laboratory Methods Committee, of which he was a member.

It was because of his recognized integrity that the Scharer Phosphatase Test has been accepted as a standard for the examination of both milk and cream, not only by health authorities throughout the country, but also by the U. S. Army, U. S. Navy and U. S. Air Force procurement agencies who have written into their specifications the Scharer Phosphatase Test as their official test.

Harry Scharer will be remembered for his flare for simplification of testing procedures, his clear analytical thinking in scientific fields, and his high regard for integrity.

A. H. ROBERTSON

HAROLD S. ADAMS ACCEPTS ASSISTANT PROFESSORSHIP INDIANA UNIVERSITY DEPARTMENT OF PUBLIC HEALTH

Harold S. "Dick" Adams for the past five years, Director of Hotel and Resort Inspection, Minnesota State Department of Health, has accepted the position of Associate Professor, Indiana University Dept. of Public Health.

"Dick" assumed his duties on September 1, 1952. Entering Public Health work in 1930 with the Massachusetts State Department of Health he brings to his new work a background rich in experience in milk and food sanitation. He has served with the W. K. Kellog Foundation, Battle Creek, Michigan; Director of the Division of Food Sanitation, Flint, Michigan Department of Health; U. S. Public Health Service; Director of Bureau of Environmental Hygiene, Minneapolis, Minnesota; Associate Director of project for study of milk regulations and quality under auspices of the National Research Council. He is, also, the author of a text book, "Milk and Food Sanitation Practice" which was published in 1947. He is chairman of the Milk Sanitation Committee, A.P. H.A. member of the Sub-Committee on Food Supply of the National Research Council, Associate member, Conference State Sanitary Engineer and a member of International Association of Milk and Food Sanitarians, Inc.

"DOCTOR JONES" SAYS*

PAUL B. BROOKS, M. D.
Montgomery, New York

Two caterers, in two states, served two meals each. One, in California, a noonday lunch at two fraternity houses. The other, in Massachusetts, put on banquets for graduating classes at two different highschools. The net result: four foodborne outbreaks of a stomach and bowel disorder (gastroenteritis).

That's more evidence supporting two long established conclusions: two and two make four and people are responsible for most foodborne outbreaks. The stories're authetic. They're from two U. S. Public Health Service Weekly Commuicable Disease reports.

*New York State Department of Health, Albany, N. Y.

The California caterer and his helpers fed, all told, 51 fraternity brothers. From 30 to 60 hours later 49 of 'em were sick. The food suspected was tuna fish sandwiches but, apparently, none were left for laboratory examination. Examination of stool specimens from four food-handlers didn't prove anything.

In Massachusetts the caterer *et al* put on banquets, two weeks apart, for the seniors in the two different high schools. In was roast turkey, plus the usual "fixins", in both. Eighty-four were taken sick after the first one. It didn't say how long after. But they found *salmonella* in specimens from nine patients. The second outbreak: outside of having the same caterer and the same kind of dinner, the evidence was skimpy. The cases: it didn't say how many or how soon. Laboratory tests were negative.

Well, there's the evidence and here's Sherlock! We can rule out poisoning by staphylococcus toxin. That's already formed in the food and gets 'm inside of 3 to 5 hours. The California boys: it was 30 to 60 hours. That points to *infection*: the germs 'emselves getting to work in the body. In Massachusetts—the first outbreak—they found the germs: salmonella. The second one (same caterer and same food) it was, presumably, the same "bug". And it's the best bet in the California outbreaks.

Salmonella occur in discharges of people, household pets, and domestic fowls. How they got into these foods: that's anybody's guess. The preventative precautions, though, they aren't guesswork: thorough cooking, clean handling, refrigeration from cooking to serving. In terms of twos: let's keep two-two-twooting about 'em 'til they're observed.

U.S.P.H.S. WEEKLY COMMUNICABLE DISEASE SUMMARIES

Through the courtesy of the National Office of Vital Statistics, the writer has been receiving its weekly communicable disease summaries, starting with the week ending April 19. These include reports of outbreaks attributed to milk and other foods. The summary for each week covers reports *received* during that week.

Perusal of these summaries for 19 weeks reveals the impossibility of making, from the reports received by the Office, an annual summary sufficiently accurate to have statistical value. Many reports are incomplete and fragmentary, leaving important points in doubt. This does not, necessarily, reflect on reporting agencies. Some epidemiological authorities long ago discontinued the practice of routine, detailed investigation of all known food-borne outbreaks. It was felt that, the common causes already being known, effort might be better concentrated on elimination of causes. The summaries, nevertheless, give a valuable general picture of the situation over the country.

Reports were included from 19 states and one territory, Hawaii. The diseases encountered and the sources (where determined) followed about the usual patterns. Staphylococcus food poisoning and salmonella infections seemed to be running about neck and neck. The term salmonellosis is coming into more general use. Outstanding causes, as of old, are contamination of food, mainly by food handlers, plus delayed and inadequate refrigeration.

Of greatest importance are the relatively large number of outbreaks, some extensive, traced to "banquets" held in public eating places or put on by churches and other quasi-public groups and meals served in school and similar lunch rooms.

That the typhoid carrier is still in the running was demonstrated by two foodborne outbreaks traced to unsuspected carriers. One was in Colorado, the other — 20 or more cases — in a camp under the jurisdiction of New York City. The carrier, in the latter instance, was a Lithuanian woman who had been in a war-time concentration camp.

ROBERT E. MYTINGER

Robert E. Mytinger has joined the staff of the Public Health Committee of the Paper Cup and Container Institute, New York City, as Assistant to Mr. Calver, the Secretary of the Committee.

Mr. Mytinger has left active service in the Navy where he developed a program of training for food service personnel.

He is a graduate of the University of California with a degree of Master of Public Health, and is a member of the American Public Health Association, Royal Sanitary Institute, and Delta Omega.

REGULATORY ASPECTS OF PERMANENT MILKING MACHINE PIPE-LINE INSTALLATIONS

O. A. GHIGGOILE

Chief, Bureau of Dairy Service
California Department of Agriculture
Sacramento, California

In the past, we have discouraged "in-place" washing and sterilizing of permanent pipe-line milking machines. However, it is being successfully done, and the installation of such equipment is rapidly increasing in California.

Several problems have resulted from "in-place" washing and sterilizing of pipe-line milking machines which need to be controlled. With this object in view, regulations governing the installation and operation based upon an investigation of the problems are being adopted.

WHEN PERMANENT pipe lines were first discussed, regulatory officials—speaking for our own department—were somewhat skeptical and were inclined to discourage them since it was felt that they could not be maintained in a clean and sanitary manner.

It is natural for regulatory officials to be somewhat cautious when something new is presented representing a decided departure from long established practices. That is the position we had taken when the permanent pipe-line installation made its appearance. When we are confronted with a situation of this nature, many questions must be considered, such as: "Are public health problems involved? What effect will it have on the quality of the product? What effect would the change have on the dairy industry as a whole?"

If the answers to most of these questions are favorable, we will determine the extent and nature of the investigation needed to arrive at a proper conclusion.

The question of permanent pipe lines was presented as somewhat of a challenge. Our position denying their use was weak from a legal standpoint, because the law does not specifically state that pipe lines must be disassembled. The finger was pointed at long rubber hoses used for removing milk from tankers since we did not interfere with their use and the quality of the milk was not impaired.

A few plant operators were finally told that the department would not interfere with the use of a permanent pipe line on an experimental basis so long as satisfactory results were obtained. These lines have been in satisfactory use for several months, and even years in the case of one or two.

Recently, hearings were held on the matter of amending rules and regulations pertaining to the pouring and handling of milk in the milking barn proper. The California Administrative Code required milk to be removed from the barn immediately but permits the pouring of milk from a milking machine pail to other properly protected containers which are moved immediately to the milkhouse. The question involved the pouring of milk into a dump tank installed in the barn and immediately pumping the milk into the milkhouse. As the result of the evidence introduced at the hearings and of observations on the handling of milk in this manner, the regulation was changed, and now it is permissible to pour milk into a dump tank within the barn, provided all precautionary steps are taken.

After the dump tank question was settled, it was logical to ask, "Why not go a step further and permit the washing and sterilization of the milk lines in place?" Since permanent lines were successful in milk plants, there appeared to be no valid argument against permitting permanent pipe lines in dairy farm milkhouses.

O. A. Ghiggoile, Chief, Bureau of Dairy Service, Division of Animal Industry, California Department of Agriculture, was educated at the University of California, College of Agriculture, Davis.

He served with the United States Army during World War I and was employed by the Dairy Industry Division, College of Agriculture, University of California, Davis, from October 1, 1919, to July 15, 1923.

Joined the staff of the Bureau of Dairy Service, California Department of Agriculture, in July, 1923, serving in the capacities of Factory Inspector; Manufacturing Cheese Specialist; Federal-State Representative of the Federal-State Dairy and Poultry Products Grading Service, Bureau of Agricultural Economics at Los Angeles; Supervising Dairy Inspector, California Department of Agriculture; Assistant Chief, Bureau of Dairy Service; and now as Chief; a director in the California Cheese Association; Director of the California Dairy Council; and a charter member with life membership in the California Dairy Industry Association, a member of the committee on Milk Regulations and Ordinances, of the committee on Sanitary Procedures, and the committee on Frozen Foods Citations of the International Association of Milk and Food Sanitarians.

Following investigation and hearings, a new section was added to the California Administrative Code which provides that when the pipe line is washed and sterilized

in an assembled position, the line must be capable of being disassembled for inspection.

We now have many permanent pipe lines in milk plants and in milkhouses giving very satisfactory results.

Following a further study of pipe-line installations in operation by our staff and local health departments involved with particular reference to "in-place" cleaning and sterilizing, sectional meetings composed of control officials and others interested in the problem were held throughout the State. The following recommendations on the subject were adopted and are being established as a part of the Administrative Code:

All pipe-line milking machines installations must comply with the following conditions and must have a satisfactory circulating system for washing and sterilizing, approved by the Director or such system must be dissassembled, washed and sterilized after each time used:

1. ALL MILK PIPE-LINE AND SOLUTION-LINE FITTINGS AND VACUUM LINES FROM AIR SEPARATOR TO MOISTURE TRAP, AND WASH TANKS SHALL BE OF NON-CORROSIVE MATERIAL. (Pipes or tanks of corrosive material (i.e. black iron, galvanized iron, etc.) very readily rust and corrode from the detergent solutions used and leave these deposits in the milk lines. The cleaning compounds used vary greatly. They may be caustic solutions, wetting agents or acid cleaners. Stainless steel and glass sanitary lines have worked out very satisfactorily.)

2. ALL METAL HAVING ANY SURFACE IN CONTACT WITH THE MILK SHALL BE CONSTRUCTED OF DAIRY METAL CONSISTING OF STAINLESS STEEL, NICKEL ALLOY OR EQUALLY CORROSION RESISTANT MATERIAL THAT IS NON-TOXIC AND NON-ABSORBENT. (This is general practice in the dairy industry to preserve the quality and flavor of the milk.)

3. ALL MILK CONTACT SURFACES SHALL BE FINISHED TO AN EQUIVALENT OF NOT LESS THAN 120 GRIT FINISH, PROPERLY APPLIED. (This smoothness was found necessary to permit satisfactory cleaning. One hundred and twenty grit finish is a required 3-A standard finish.)

4. THE MILK PIPE LINE MUST BE CAPABLE OF BEING DISASSEMBLED FOR INSPECTION. (Visual inspection is also necessary to determine the effectiveness and efficiency of a cleaning system.)

5. SANITARY MILK PIPES SHALL BE NO LONGER THAN THE WASHING AND STERILIZING FACILITIES WILL ACCOMMODATE, WHEN MILK LINES ARE DISASSEMBLED, OR IF WASHED IN ASSEMBLED POSITION, THE LENGTH OF MILK PIPE DEPENDS ON TYPE OF STALL COCKS USED, WHETHER THEY CAN BE CLEANED, STERILIZED AND INSPECTED. (This permits necessary flexibility in the installation. It is rare for two installations to have all conditions exactly alike.)

6. THE ENTIRE MILK LINE IN THE BARN SHALL BE INSTALLED SO AS TO HAVE A POSITIVE DRAIN. (This permits free rinsing and draining. It also prevents water or a sanitizing solution from remaining in the line and mixing with the milk at the start of the milking operation.)

7. THE VACUUM LINE FROM THE AIR SEPARATOR SHALL HAVE A POSITIVE DRAIN TO A MOISTURE TRAP. (The warm air leaving the top of the separator via the vacuum line causes a considerable amount of condensation. Sloping of this line toward the moisture trap prevents this condensation from draining into the milk supply.)

8. THE VACUUM LINE FROM THE AIR SEPARATOR SHALL NOT EXTEND IN A VERTICAL POSITION ABOVE THE SEPARATOR. (Experiments have shown that even a short line in a vertical position above the air separator forms condensation on the inside which drips down into the milk supply. A six inch rise in a vertical position permits the installation of a standard sanitary ell and still holds the vertical rise to a minimum.)

9. THE ENTIRE MILK PIPE LINE AND SOLUTION PIPE LINE SHALL BE OF THE SAME DIAMETER. (This has been found necessary to obtain thorough cleaning of the lines.)

10. NO CONNECTING VALVES ARE PERMITTED BETWEEN THE SOLUTION AND MILK LINE. SOLUTION LINE MUST BE DISCONNECTED DURING MILKING PERIOD. (Valves used between the milk line and solution or water lines may leak or may not be fully closed. This condition cannot be observed while milking is in progress; and since the milk line in most all cases is under a vacuum, this leakage could be considerable.)

(Prohibiting valves necessitates breaking the connection and capping the milk line.)

11. ALL MILK PUMPS AND ATTACHMENTS, EXCEPT DUMP TANKS AND PUMPS ATTACHED TO DUMP TANKS LOCATED IN PASSAGE WAY SHALL BE ELEVATED AT LEAST 2 FEET OFF OF FLOOR. (This is necessary for general sanitation. Many pumps are installed in a permanent manner and cannot be moved for cleaning of the walls or floor. Since this is milk handling equipment, it must be protected from animals (i. e. dogs, cats) manure or urine splash from the cows, etc.)

12. WHEN A DUMP TANK IS USED, IT MUST BE LOCATED IN ACCORDANCE WITH 481.5 (g) OF THE ADMINISTRATIVE CODE AND MUST BE KEPT COVERED EXCEPT WHEN MILK IS BEING POURED. ALL MILK SUCH AS STRIPPINGS AND MILK ON TEST DAYS SHALL ENTER THE MILK LINE THROUGH THE DUMP TANK. (Barn dump tanks are defined and sanitary standards prescribed for in Section 481.5 (g) of the California Administrative Code. If the dump tank is in the alleyway next to the barn wall, this six-foot height requirement prevents possibility of contamination from cows adjacent to the wall.

13. 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 PASSAGE WAY: ANY OTHER METHOD MUST BE APPROVED BY THE DIRECTOR. (Teat cup assembly buckets, parts, etc., must be washed, sanitized and stored in the wash room, where adequate washing and sanitizing facilities are available and the equipment is protected against contamination (flies, dust, etc.)

(A cover on the solution tank, if located in the passageway, is necessary to protect the interior of the tank from flies, (insects, dust, etc., since this solution is pumped into the milk lines.)

14. A THERMOMETER MUST BE INSTALLED ON WASH TANKS AND WHEN HOT WATER IS USED FOR STERILIZING, A THERMOMETER MUST BE INSTALLED ON DISCHARGE END OF MILK LINE. (Temperature of the solution while circulating is a very important factor in proper cleaning of these lines. Since some systems have very long lines, the discharge end of the line is the point where the solution would be the coldest.)

15. MILK TANKS, DUMP TANKS, RELEASERS, WHEN LOCATED IN PASSAGEWAY, SHALL BE CONSTRUCTED SO AS TO PROTECT MILK FROM FLIES, DUST AND CONTAMINATION. (The passageway

and milk barns are not screened against flies.)

16. ENDS OF MILK LINE AND STALL COCKS SHALL BE CAPPED OR OTHERWISE PROTECTED, AFTER STERILIZATION. (These openings could be contaminated very easily by dust and flies. Flies will crawl inside these openings for shelter and could be drawn into the system when milking begins. Dust will collect on this equipment; if ends of milk lines and stall cocks are left open, it will settle on surfaces that come in direct contact with the milk.)

17. SIGHT GLASSES ON MILK LINES SHALL BE DISMANTLED FOR CEANING AFTER EACH TIME USED. (These will not satisfactorily clean themselves by the circulation method. Many types of these sight glasses will not withstand both vacuum and pressure; they are of no material aid to good milking.)

18. THE CIRCULATING PUMP SHALL BE OF A SIZE SUFFICIENT TO FILL THE PIPE LINES AND CAUSE ENOUGH TURBULENCE TO INSURE ADEQUATE CLEANING. (This volume was arrived at after many checks of various washing systems throughout the state; many systems circulate a much greater volume than required here. This volume was the lowest that would give sufficient turbulence for satisfactory cleaning.)

19. AIR LINE TO MILK RELEASER OR AIR SEPARATOR SHALL BE WASHED AND STERILIZED AFTER EACH TIME USED. (These air lines must be of a sanitary type as they come in direct contact with the air separator. Sometimes they contact the milk itself, should the air separator overfill.)

20. OUTSIDE OF MILK PIPE LINES AND EQUIPMENT SHALL BE KEPT CLEAN. (General sanitary practice of food handling equipment.)

21. VACUUM PUMPS, MOTORS OR ANY MACHINERY THAT MAY EMIT OIL, FUMES, GREASE, ODORS OR OTHER OBJECTIONABLE MATERIAL SHALL NOT BE LOCATED OVER OR NEAR MILK EQUIPMENT. (Motor shelves, brackets, etc., soon become dusty and greasy and may contaminate the product. In any case, they do not lend themselves to the types of cleaning that is necessary of milk handling equipment.)

(Some milking machine distributors have installed vacuum pumps directly over milk tanks. This permits oil, grease, dust, fumes, etc., to drip or settle on the milk tank and into the product if the tank is not properly covered.)

22. MILK PIPE LINES CONNECTED BY THE SO-CALLED SLIP JOINT METHOD WITH "O" RING GASKETS SHALL BE DISASSEMBLED FOR CLEANING. (The slip joint fitting using the "O" ring has deep crevices in each joint. This will not clean by the circulating system.)

23. ANY TYPE GASKET USED IN MILK LINES MUST NOT INTERFERE WITH PROPER CLEANING BY CIRCULATION. (Many gaskets, such as the standard fiber gasket, will extend into the inside area of the pipe causing a pocket or groove between the gasket and the pipe, this area will not clean by circulation. The inside diameter of the gasket and the pipe must be the same and the gasket must be perfectly centered to be satisfactorily cleaned by circulation.)

SYRACUSE EXTRANEOUS MATTER IN FOOD SCHOOL

The school for the detection of extraneous matter in foods was held with an attendance of ten students, representing rather diversified interests in the food field. Four food manufacturing companies, a municipal food and drug department, a container manufacturer, a foreign government and a national association dealing in part with food problems were represented.

The school covered in outline form the various methods of recovering extraneous materials from foods. Specimens of known materials were prepared for comparison purposes and practice was obtained in locating particals as unknowns. The history of the development of the methods and present day developments in the field were covered in lecture. Special attention was given to the examination of flour.

Another conference is scheduled for next January. Address inquiries to Dr. J. D. Wildman, Department of Plant Science, Syracuse University, Syracuse, N. Y.

DAIRY PLANT OPERATORS CONFERENCE TO FEATURE MILK TANK TRUCK PICKUP

A panel discussion on tank truck pickup of milk from dairy farms will be a feature of the 1952 Vermont Dairy Plant Operators and Milk Distributors Conference at the University of Vermont, October 22-23.

Moving pictures on the actual pickup operation will be shown, Alec Bradfield, associate professor of dairy manufacturers at the University of Vermont, announced today.

Other subjects on the program of the 31st annual conference are weigh pan sampling, cleaning and sanitation, production of quality cream, milk pricing and discussion of methods for measuring plant efficiency.

There will be two papers on new developments in the dairy industry. One will deal with equipment and the other on processes and products.

The two-day conference will close with the annual banquet on October 23.

COORDINATION OF HEALTH DEPARTMENT AND AGRICULTURE DEPARTMENT PROGRAMS*

PAUL W. SWISHER, *Commissioner*
Colorado Department of Agriculture, Denver 2, Colorado

The failure of agriculture production to keep up with our increase in population and foreign commitments can be attributed to several factors, one of which is the interference of government with its many restrictive laws and regulations. The Commissioner urges that regulatory agencies should pre-view their proposed enactments in cooperation with related governmental groups to ascertain whether or not the new measure will advance or hinder production.

IN DISCUSSING the question of coordination of health department and agriculture department programs, I view the problem primarily from the viewpoint of a producer and processor and secondly from the viewpoint of an administrator of the agricultural department. Having spent the greater part of my life in the first field and only a very short time in the second, I dare say that some of the statements may be biased and probably many of you will disagree with them. My statements are not directed at any department of health or division of that department, or any department of agriculture, but at the general overall problem – particularly not at Colorado's Health Department which has as fine a group of people I have ever worked with. They have been very cooperative.

America is confronted with a major job of food production. Not only to feed our own people but partially to feed the people of other nations. With all the new soil practices, modern machinery, development of new types of crops and livestock, uses of fertilizers, new insecticides, herbicides, fungicides, and many other new agricultural practices, agriculture production is not keeping up with our increase in population. There are many causes for this: To list a few, I might say the passing of the family type farm, the loss of our farm population, the decrease of our soil fertility, and contrary to the conception of the average consumer, the income from farming is not adequate to induce the farm boys and girls to remain on the farm or to induce very many city dwellers to move to the farm. Interference from the Federal Government, too many restrictive laws and regulations, and many other things have helped to bring about this situation.

It is the last of these I have mentioned that I would like to discuss with you today.

REGULATORY CONFUSION

Farmers resent regulations because of their native, inherited instincts of independence. However, in the last few years the public have developed new concepts in their expectations of service from state and federal governments. Let up keep in mind that nearly every law passed was requested by some group wishing a regulatory service. Consequently, when we draft a law, or write a regulation, we should consider the following:

(1) Will this be a service to the public? (2) Will it accomplish the intent of the law? (3) Is it fair and reasonable to the group being regulated? (4) What selling points should be used in enforcing the regulations? (5) Is it enforcible? (6) Is it flexible enough to allow the most protection to the public at the least cost and inconvenience to the producer or business man? (7) Is the regulation so written that it can be readily understood by all concerned?

In writing regulations pertaining to sanitation, involving agriculture products, the health and agriculture departments should work together.

The functions of both the health departments and agriculture departments are primarily in the educational and regulatory fields.

(a) The health department, along with many of their other functions, is concerned with the protection of life and health from contamination, either natural or artificial, of crops, livestock, and livestock products.

(b) The agriculture departments are primarily concerned with the economic problems of agriculture. They administer laws and regulations that, directly or indirectly, will increase production and income through marketing better quality and grades of livestock, livestock products and other farm crops; and also, furnish to the consumer a quality product that is free from contamination. In this field particularly we must go hand in hand with the health departments. Needless to say, any food or food product that is dangerous to health would sooner or later eliminate itself from markets, due to public opinion.

*Delivered at the 38th Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., Glenwood Springs, Col., Sept. 26-29, 1951.

The major problem has been, and is at the present time, centered around each department's jealousy of its prerogatives and its inability to do the job assigned them. Also, due to the fact that both operate in the same agricultural field and with the same agricultural products, there is always a question of interpretation of extent of jurisdiction. Another problem is the interpretation of sanitary regulations. What is sanitary and what is not? Not only is this determination a problem of the departments, but a problem of the individual in the field who makes the inspection.

The lack of cooperation between the health departments and agricultural departments has been very expensive and confusing to producers and processors of many agricultural products. In many cases the departments will have different sanitary rules and regulation, and in some cases, even different laws pertaining to the same commodity. We do not seem to be satisfied with this; we must keep changing these regulations every year or so, necessitating the continuous remodeling of plants so far as the processor is concerned and changing the method of handling the product so far as the producer is concerned.

We are clearly illustrating that we do not know what we want or where we are going, and the people we are supposed to be working for do not know what to expect next. This confusion, indecision and "dickering" is costing the producer and consumer vast sums of money unnecessarily.

The changing methods of production, the concentration of our people, and the methods of handling, of necessity, require sanitary laws and regulations. However, there must be a common-sense approach to these problems. This can be accomplished if the two departments will forget their petty jealousies, their "holier-than-thou" attitude, and strive for a congenial working relationship in their attempt to solve these problems.

This much for the problem that confronts us. Is there a solution to it? I think there is.

In Colorado we are attempting to get the Health Department and Agriculture Department together on the sanitary regulations and the interpretation of these regulations in all fields where we have joint services. Although we are a long way from getting the complete job done, we have made much progress. If those of us in the Agriculture Department continue to get the splendid cooperation from the Health Department we have had since we started to work on this problem, I am sure we will soon have the greater part of our differences solved.

SUGGESTED PROCEDURES

I would like to recommend to you a few procedures that, if followed, will go a long way toward solving the differences between the departments, and render the people of industry the services to which they are entitled, and at the same time give the consumer adequate protection. The first thing a department must recognize is that the other department is not like the "Long-horned Texas Steer — a horn here and a horn there and a lot of Bull in between". There must be an effort on the part of each department to understand the problems of the other, and recognize there is a difference in view point.

Regulations pertaining to sanitary standards of agriculture products should be written jointly. This is fundamental and very necessary. The departments may look at the problem in a different way. Further, it will tend toward more uniform interpretation of the regulations. Many of the conflicting ideas can be ironed out as the regulations are written, and regulations so written are more workable.

If the regulations are jointly written, then the licensing or administrative department must keep the other informed at all times, as to the administrative procedures; also the problems confronted in the administration. It is very necessary that representatives of the departments hold, occasionally, joint meetings to discuss the administration of any joint regulation, in order to make adjustments if necessary.

In the drafting of new legislation, if the legislation, in any way, might involve the other department, directly or indirectly, then each should work on the legislation and support it together, thus eliminating the common occurrence of one fighting the legislation of the other department, which is the cause of much ill feeling between departments in the past. We should have more of the Quaker attitude. If he gets hit on one cheek, he turns the other, then says, "I have complied with the scriptures, now I will knock the tar out of thee." If there must be disagreement, keep it in the departments until worked out. Never in public.

At all times there must be an effort made in each department to eliminate the custom of criticizing members of the other departments, particularly to the public. Back passing is amateur and should not be tolerated. If you cannot say something good about the other department, then keep your mouth shut.

Much of our difficulties stem from our inspection service. To a large extent this is due to the human element that enters into the picture. The different interpretations that may be given to the regulation. Consequently, it is very necessary that adequate supervision be made of inspections by each department. If a regulation of the health department is to be administered by the agriculture department, then from time to time the health department must make joint inspections. What might suit the agriculture department might not be acceptable to the health department. In this way the program can be administered as it is intended

and will eliminate the "buck-passing" that usually exists.

Let's keep in mind that our duty is to serve and protect the citizens of the state and that to the average citizen a supervisor of the health department or a supervisor of the agriculture department is a representative of the state government. The public cannot understand or have patience with conflicting ideas or standards which the two departments may have.

Information that is released to the press has caused much unnecessary loss to agriculture in this state as well as others. I do not criticize the press for printing it, but there must be a closer working relationship between the departments in editing the news release. A news story that went out a few years ago, in regard to irrigation water used for irrigation of vegetables, along the south Platte River, almost put this state out of the vegetable-producing business. We dropped 1600 cars in one year. A news release last winter, in regard to turkeys, cost the turkey producers of this state a quarter of a million dollars. I could mention many more which, like these two cases, were later proven to be without adequate substantiating evidence to prove the news stories correct. These releases, however, were not made by the Colorado Health Department. I do not mean to insinuate that these stories should not be released, if true, but let's make sure they are before being released, as they are very expensive. This is becoming a greater problem each year as we develop new insecticides, fungicides, and other chemicals that are used in the production of agriculture products. Fact is, we are all becoming about as confused over this whole problem as the little boy that dropped his bubble gum in the chicken pen.

In most of the states we find in many of our large cities city health units which may have regulations pertaining to agricultural commodities. In cities where there is such a health unit it is advisable that not only the agriculture department but also the city health unit work together in writing up regulations which pertain to commodities regulated by the other division.

Such is the case of Colorado. The City of Denver has a very good health unit which has cooperated with us one hundred percent in working out joint inspections and regulations pertaining to agricultural products.

Agriculture and agricultural products either raw or processed have always been and will always remain one of the basic segments of the entire economic system. For the welfare of our nation we must have both commercial and sanitary regulations of our food products. Therefore, let both the health and agricultural departments' work shoulder to shoulder, cooperately, toward building and carrying out these necessary regulations in such a manner that our nation or any segment thereof will benefit to the highest degree.

ARIZONA DAIRY TECHNOLOGY SOCIETY

Recently an Arizona Dairy Technology Society was organized. The officers elected for 1952 are: President, George Miller, Borden Co., Phoenix; Vice-President, Jim Rutherford, Arden Farms, Phoenix; Secretary-Treasurer, Dr. J. Warren Stull, Dairy Husbandry Department, University of Arizona, Tusson; Recording Secretary, Henry Ware, Department of Public Health, Phoenix; and Sergeant-at-Arms, Harry Porterfield, Carnation Co., Phoenix.

At the regular monthly meeting held on May 5 in Phoenix, the guest speaker was Dr. P. H. Tracy, Professor of Dairy Technology, University of Illinois. Dr. Tracy's talk on "Some Recent Developments in Dairy Technology Research" was attended by about 100 members and guests.

PENNSYLVANIA SHORT COURSES IN DAIRY MANUFACTURING

1. Testing Milk, Cream, and Dairy Products

January 5 to 10, 1953

This course is designed for those who wish to become more proficient in testing dairy products, and for those who wish to take an examination for a license in weighing, sampling, and testing.

2. Ice Cream Course for Dairy Equipment and Supply Men

December 8 to 13, 1952

One-week training in the manufacture of ice cream for dairy equipment and supply men, exclusively, will be given. Topics handled in the one-week course will include, mainly, composition of ice cream, ingredients used, standardization of acidity, calculation, processing, flavoring, freezing, overrun, and hardening of ice cream, ices, and sherbets.

3. Ice Cream Course for Plant Men

January 12 to 24, 1953

This is the regular two-week course in ice cream making.

4. Market Milk and Milk Supervision

January 26 to February 7, 1953

This course is designed primarily to assist the industry in obtaining informed personnel who under stand the problems involved in the production, processing, distribution, and supervision of fluid milk and related products.

Details on these courses and on conferences at the School of Agriculture, The Pennsylvania State College, can be obtained by communicating with A. Leland Beam, Director of Short Courses, School of Agriculture, State College, Pa.

HOUSEHOLD SEWAGE DISPOSAL SYSTEMS*

T. W. BENDIXEN

Soil Scientist, Public Health Service, Environmental Health Center
Cincinnati, Ohio

A brief historical sketch of the development of household sewage disposal systems and a summary of studies that are being conducted at the Environmental Health Center, U. S. Public Health Service, in cooperation with the Housing and Home Finance Agency is presented. Primary emphasis in this paper is placed on the results of the studies on the soil absorption part of the system. Clues for estimating a soils moisture absorption characteristics are pointed out. Suggested improvements in percolation test procedures and the relationship of percolation rates to design system size are discussed.

THE INDIVIDUAL household sewage disposal system as we generally consider it and as we shall consider it today consists of two parts: a septic tank which serves as a settling, sludge digestion, and sludge storage tank, to prepare the sewage for final disposal; and a soil absorption system into which the sewage is finally disposed. The objective of the system is the safe and convenient disposal of the household wastes in a manner not hazardous to the health of the family or the community, and to do so without nuisance or esthetic damage.

HISTORICAL DEVELOPMENT

Individual household sewage disposal as a distinct process originated with the invention of the septic tank by John Louis Mouras in France in the early 1860's. He constructed a simple masonry tank in which sewage, kitchen wastes, and rain water were collected before being passed to a cesspool. Twelve years later the tank was opened and found to be almost free of solids. After a series of experiments to observe the phenonena occurring in the tank, he patented the invention on September 2, 1881.

In the United States the use of the household septic tank dates back to about 1883 when a two-chamber cylindrical tank was designed and put into use in Boston by Edward Philbrook. Since that time the use of the septic tank system has spread widely until today there are some four and a half million systems in use serving some 17,000,000 persons in the United States.

The historical background of the soil disposal part of the system is lacking. Apparently the present type of system has resulted from a gradual evolution of the privy to the cesspool to the seepage pit and finally to the trench type of soil absorption system as we know it today. The first recorded study[1,2] of soil absorption systems is that done by Henry Ryon in New York State in the 1920's.

Since November 1946, studies under the joint sponsorship of the Housing and Home Finance Agency and the Public Health Service has been conducted at the Environmental Health Center in Cincinnati in an attempt to develop more factual background for the design and operation of household sewage disposal systems. The first report[3] on these studies entitled, "Studies on Household Sewage Disposal Systems, Part I," was published in 1949. The second report[4] in the series, which contains an account of the first soil studies, was published in 1952. These reports are available from the Environmental Health Center, Cincinnati, Ohio, or from the U. S. Government Printing Office, Washington, D. C.

*Presented at the Annual Meeting of the Missouri Association of Milk and Food Sanitarians at Columbia, Missouri, April 23, 1952.

Graduate of the University of Arizona with B.S. in Agricultural Engineering, 1941. Soil Surveyor and Soil Scientist, Soil Conservation Service, U.S.D.A., 1941-1947; working primarily in research and development of methods for measuring soil permeability. Engineer-in-Charge. Geotechnical Research, College of Engineering, University of Maryland. 1947--49; primarily interested in electrical methods of soil drainage and soil stabilization. Soil Scientist, Environmental Health Center, U.S. Public Health Service, 1949-.....; research on household sewage disposal with particular emphasis on soil absorption systems.

PRESENT STUDIES

Since our studies have covered quite a broad field I will confine myself primarily to a discussion of the soils studies today. But first, I will give a brief summary of our tank studies to date.

A total of 300 household septic tanks were examined in nine areas of the country. In 170 of these systems the volume of household waste was judged from water consumption figures obtained from water meter records. In the 170

systems, water consumption values ranged from as low as eight gallons per capita per day to as high as 226 gallons per capita per day. The average winter water consumption was 39 gallons per capita per day, and the summer, 49 gallons per capita per day.

The smaller tanks examined tended to accumulate smaller volumes of scum and sludge and the larger tanks larger volumes, on the average. Tanks in the 125 to 175-gallon-per capita-liquid-capacity range, which would be about 500 gallons for four persons approximated the average accumulation for all tanks of all capacities. This trend serves as a rough yardstick of the effect of tank capacity on solids-removal efficiency; it indicates that the larger tanks are more efficient.

In laboratory studies, five full-size single compartment tanks all of approximately 500 gallons capacity, but of different shapes including rectangular, oval, rounded end, and horizontal and vertical cylinders, showed about equal performance. Multi-compartment tanks of comparable capacity showed better performances than single-compartment tanks.

Now coming to the soil studies, the all important criterion for the design of the soil-absorption system is the rate that any particular soil will absorb effluent. Just how important this factor may be can been seen from a comparison of the amount of water a soil is normally required to absorb and the amount we expect it to absorb under convential absorption field designs.

The average rainfall of the United States is in the magnitude of from 30 to 50 inches per year with extremes ranging from 6 to 150 inches. Part of this rainfall is lost in surface runoff and evaporation. The remainder, in the magnitude of 20 to 40 inches, with a maximum of possibly 100 inches, must be absorbed by the soil. As compared to these figures, the amount of water which is applied to and which must be absorbed by the soil of a disposal field, based on current design practice, ranges from 200 inches in the less absorbent soils to around 1,000 inches annually in the more porous soils. In extreme cases encountered in the field, amounts of over 2,000 inches were being applied. In other words, the soil of a disposal field is expected to absorb from 10 to 100 times more water than the same soil is required to absorb under normal rainfall conditions. This tremendous loading indicates that our problem is a major one from this viewpoint alone, without the complicating influence of soil clogging factors which we know exist under sewage or effluent dosing conditions.

SOIL ABSORPTION PROBLEM

The general problem as far as the disposal system is concerned is to determine the amount of soil absorption area or trench area to provide for any specific system. The answer to this problem depends in turn on a number of factors, such as the clogging characteristics of the effluents, the volume of effluent to be disposed of, the climate of the area, and most important, it depends upon the water-absorption characteristics of the specific soil being considered. Our first basic problem then is to devise ways or means to measure or estimate the water absorption characteristics of a soil.

I would like to point out here that this is also a problem which concerns many others besides those interested in sewage disposal. Agricultural workers have been interested and have worked on the problem for years, particularly in relation to irrigation and to soil drainage, and the problem is still a long way from solved. However, there have been methods and aids developed which are of great help. There is also published soil literature available in many areas from which considerable information about the absorption characteristics of the soils of specific areas can be obtained. Both the U. S. Department of Agriculture and the various State Agricultural Experiment Stations publish this type of information and it is usually available for the asking. Probably the most valuable sources of information are the soil survey reports. These reports generally cover an area about the size of a county. They consist of a detailed soils map and an accompanying description of each soil type. Unfortunately actual percolation-rate values are seldom given, but at least the general suitability of a soil for absorption fields may be interpreted from such reports. This type of information may be of particular value in planning the location of large housing areas.

ABSORPTION DETERMINATIVE PROPERTIES OF SOILS

Another means by which considerable information about water absorption characteristics may be obtained is by a close visual inspection of the soil. The value of such an inspection of course depends on being able to recognize pertinent details and clues, but this does not necessarily require a trained soils man. Anyone willing to do a little digging and looking can learn to recognize significant clues in short order. The main clues to look for are soil texture, soil structure and soil color.

Soil texture, or the relative proportion of sand, silt, and clay in the soil, is probably the most common clue. The size of the soil particles govern the size of the soil pores which in turn directly govern the amount and the rate of water absorption. The larger the soil particles the larger are the pores and the faster is the rate of absorption. Soil texture can be judged best by the feel of the soil when it is wetted and rubbed between the fingers. The lighter or sandier soils have a gritty feel; silt type soils have a floury feel; the heavier clay soils have a slick feel. However, the use of texture as a clue to ab-

sorption qualities has its limitations. It is mostly reliable in the sandy range of soils. In the heavier type soils, which contain appreciable amounts of silt or clay, we must look for additional clues, such as soil structure.

Soil structure may be described as the tendency for the individual textural particles of a soil, particularly the clay particles, to aggregate or group together and form secondary particles of larger size which are more or less stable to wetting and to physical breakdown. Such secondary particles, rather than the textural particles, then tend to govern the size and distribution of pores and in turn the absorption properties. Soil structure can be recognized easily by the manner in which a clod or lump of soil breaks apart. If a soil has a developed structure, a lump will break with very little force along well-defined cleavage planes and into units of uniform size and shape. On the other hand, if a soil has no structure, a lump will require considerable force to break it apart and when it breaks it will do so along irregular surfaces. Occurrence of structure in a soil is a good indication that the soil will have more favorable absorption characteristics than a similar soil without structure.

The final and one of the most important clues to soil-absorption characteristics is soil color. Relatively bright, uniform, reddish-brown to yellow colors throughout a soil profile indicate that there have been favorable oxidation conditions and that there has been free alternate movements of water and air in the soil. Such conditions favor desirable moisture absorption properties. At the other extreme, on the basis of color, are soils which are light gray throughout the top soil and dull drab and mottled in the subsoil. Such conditions indicate a lack of oxidation and a very restricted movement of air and water. These soils are quite likely to have unfavorable moisture absorption properties.

Again, as with the soil survey reports, visual inspection of a soil will aid only in appraising the general suitability of soils for absorption fields, and for design data it will still be necessary to turn to some sort of percolation test.

RYON MOISTURE ABSORPTION RATES

In the sewage disposal field, the work of Henry Ryon in the 1920's has provided a useful tool for estimating soil moisture absorption rates. Ryon developed and put into use a percolation test by which he measured the rate that a soil would absorb clear water. Then, from a study of systems which had failed after some twenty years of operation, he also developed an empirical relationship between this clear water rate and the rate that the soil could be expected to absorb septic tank effluent. It is this test and empirical relationship, or slight modifications thereof, upon which most of the tests and design specifications being used today are patterned. In this connection, from a review of specifications of control agencies, it appears that testing of water absorption capacity of the soil by a percolation test, and design of the system size on that basis, is not applied as widely as it should be.

The Ryon type test as generally involves digging a one-foot square hole to the anticipated depth of trench bottom, filling the hole with at least six inches of water and observing the time required for the water to seep away. Some modifications require that if the soil is dry the test be repeated, and some require that the rate of fall of the last inch of water be considered the percolation rate. In any event, specifications in general are loose, and there appears to be a wide latitude for improvement and standardization of the test.

MODIFICATIONS OF RYON TEST

As one of our major efforts in the soils studies at Cincinnati, we have examined the Ryon type test experimentally in a wide variety of soils. Percolation tests employing a four-inch auger hole, an eight-inch auger hole and a twelve-inch square dug hole were made in replicate in several different soils under varying soil moisture conditions. As a result of these studies we are suggesting the following improvements in percolation test procedure: (1) substitute a four-inch auger hole for the laboriously dug twelve-inch square hole; (2) saturate the soil more completely by a standard procedure; and (3) use the minimum observed percolation rate for design instead of the average or some initial rate.

The first improvement, the use of a four-inch auger hole, is justified since no significant differences were observed in the rates measured in the different-size holes in the same soils. There was as much variation between rates measured in replicates of the same-size holes as there was between the different-size holes. At first thought, the use of a small auger hole may appear to be a minor change, but it is a potentially important one from the viewpoint of the person who makes the test. The auger hole can be prepared with a fraction of the time and labor, and requires a fraction of the volume of water to make a test. For one filling of a test hole, the four-inch auger hole requires only one-twelfth the volume of water required for the twelve-inch hole. This saving of water alone can be quite a consideration in cases where water must be transported to the site.

The saving in time and labor and in water can be invested profitably in making replicate tests in an area. Due to soil variability, a single test is often useless in estimating the absorption characteristics of an area even as small as 100 foot square. Six tests spaced uniformly over such an area are needed to obtain a reliable estimate.

The second suggested modification, to saturate the soil more completely, is necessary in order to obtain consistent results regardless of the prior soil moisture conditions and regardless of the time of year that the test is made. Such saturation is desirable also in order to approximate soil conditions that will prevail in the absorption field. Anyone who has made a percolation test is familiar with the decrease in percolation that takes place during a test. The magnitude of this decrease and the length of time over which the decrease continues depends upon prior soil moisture conditions and upon the type of soil. The decrease will be more pronounced if the test is started in a dry soil and is likely to be more pronounced and will take place over a longer period of time in clay type soils. We have made a rather detailed study of this percolation rate decrease in several soil types in order to judge its practical importance.

Percolation tests were conducted at each site over a two-day period. On the first day, a test was made in a conventional Ryon test manner, and will be referred to as the dry run. The percolation test holes were then kept filled with water and soaked over night and the percolation test repeated on the second day. This test is referred to as the wet run.

The results of one such series of tests in a Rossmoyne soil exemplifies the importance of complete saturation. The site, if considered on the basis of the dry run, had a percolation rate of 44 minutes per inch and would be considered acceptable for an absorption field. Approximately 200 square feet of absorption area per bedroom would be required as judged by the Joint Committee on Rural Sanitation tables.[5] On the basis of the wet run the percolation rate was 66 minutes per inch which would make the site unacceptable.

The latter case agrees with the performance of systems operating in this soil type. Of several systems inspected in the vicinity, not one was considered as satisfactory by the home owners. One system, about five years old, inspected in detail, having approximately 300 square feet of absorption area and receiving toilet wastes only from one adult and two children, was found to be completely flooded and had serious surface seepage. Inspection of the system was made during August when conditions in general, high temperatures, high evapo-transpiration, etc., should have been most favorable for successful operation.

Improvement of the percolation test and thus securing slower rates immediately raises the question of the validity of using such rates for design of absorption fields on the basis of the present allowable loading-rate tables. The slower rates obtained by the modified test will of course require larger absorption areas than rates obtained by the older standard tests. Such a design will be on the safe side at least, so that for the time being all we can say is that the modified test rates can be safely used with present tables.

NEED FOR NEW TABLES

However, it would be desirable to develop new and additional percolation rate-allowable sewage loading rate tables for a number of reasons. First, of course, the relationship may be different when a more rigidly controlled test is used for measuring percolation rates. Secondly, the relationship may and probably does vary with different soil types. The empirical relationship given by Ryon was developed under the limited soil conditions occuring in New York; and furthermore, it was developed with a limited amount of data. An entirely different relationship may be more applicable under midwest soil conditions, for example, where the soils tend to be deeper. Thirdly, the relationship may vary with different sewage characteristics. Obviously, the Ryon relationship was developed under sewage characteristics prevailing at that time. With the increasing use of home-garbage-grinders, use of automatic washers, use of detergents to replace soaps, etc., the sewage characteristics may be somewhat different today.

The development of a new empirical relationship will entail a tremendous amount of field study which we are not in a position to do at present. But we are investigating some of the individual factors which may affect the relationship and which may allow us to modify it. One of the first and basic things we want to know is what are the specific characteristics of septic-tank effluent which may affect the relationship by causing soil clogging. Logically we may consider the causes of soil clogging in three categories: (1) physical clogging, (2) biological clogging, and (3) chemical clogging. Septic tank effluent is a physical, biological, and chemical complex, and may contribute towards all types of clogging.

FACTORS IN CLOGGING

The physical type of clogging is obvious; it may result from the physical plugging of the soil pores by the solid particles in the effluent.

Biological clogging, which is a common problem in agricultural water-spreading work, may result from plugging of pores by biological bodies and by-products, or it may result from the biologic activity destroying or altering the soil structure. Actually, from preliminary studies, it appears that biological activity does not cause soil clogging but instead it tends to reduce clogging that might be caused by other factors. Laboratory soil cores packed with a variety of soils and dosed with effluent over a three month period clogged in proportion to the amount of suspended solids in the effluents. After a few weeks of dosing, biologi-

cal activity appeared to take effect, and the rate of clogging was reduced. Also, studies involving the application of normal and of disinfected effluent to soil cores resulted in a more rapid rate of clogging by the disinfected effluent, confirming the observation that biological activity tended to reduce the rate of clogging. Apparently digestion of solid materials in the effluent takes place in the soil and results in a net decrease in the clogging effect of the effluent.

The third type of clogging, chemical clogging, is a common agricultural soils problem in the western part of our country, particularly under irrigation conditions. The classic example is the "black alkali" soils that develop in some areas as a result of irrigating with water high in sodium. For this reason water quality has to be carefully controlled. It is generally considered that waters containing 50 percent or more of the total cations (sodium, calcium, magnesium, and potassium) as sodium are potentially harmful to the water absorption characteristics of the soil. Even on sandy soils, waters of 85 percent sodium or higher are likely to make soils impermeable after prolonged use. There are some indications that potassium may have similar effects.

The chemical quality of effluent will tend to vary with the water supply so that the sodium problem may depend on the quality of water used. However, Wilcox[6] has reported that there is a tendency for salt concentrations of sewage treatment plant effluents (primarily from Imhoff tanks) to be at least twofold greater than those of the water supply, and further, that the concentration of sodium in many of the effluents was disproportionately high. On the basis of this information, it appears that the possibility of effluents causing sodium clogging may be a problem for general consideration.

STUDIES IN CHEMICAL CLOGGING

A laboratory study of sodium clogging has been attacked indirectly. Since it is the relative amount of sodium that is harmful, the percentage of sodium in effluents was controlled by increasing the concentration of calcium. With two of the four soil types included in the study, the addition of gypsum to the dosing effluent resulted in decreased clogging. In other words, the calcium-fortified-effluent-dosed cores maintained higher percolation rates over a period of several months of dosing than did the normal effluent dosed cores. The soil types showing this effect had a well-developed structure and were apparently dependent on the structure for favorable percolation conditions. With the calcium-fortified-effluent dosing, the structure was maintained; with normal-effluent dosing, there was a noticeable destruction of structure with the accompanying increased clogging. The soil types showing no difference in clogging with the different effluent dosings were single grained types having no apparent structure.

Another possible source of chemical type soil clogging, which has come to our attention through inquiries lies in the use of chemical-type septic-tank cleaning compounds. Advertisements indicate that some of these cleaners contain sodium hydroxide. Two brands of such cleaners, upon chemical analysis, calculated as sodium hydroxide, contained the equivalent of about 95 percent sodium hydroxide. Other cleaning compounds may contain potassium hydroxide.

Preliminary studies in which laboratory soil cores were dosed with effluents to which sodium hydroxide had been added have given dramatic results. The effluents with the highest concentrations of sodium hydroxide, which were well below the maximum which can be expected from a typical cleaning dose, caused an immediate destruction of the soil structure and an immediate clogging. After eight days of dosing, only a trace of effluent was able to percolate through the cores, whereas, the original percolation rates of the cores were 7 min./inch. Concentrations of sodium hydroxide as low at 0.05 percent caused serious clogging. Theoretical concentrations with recommended dosing may be as high as 0.6 percent. Similar results were noted with potassium hydroxide.

Still a third source of possible soil clogging due to chemical factors is through the discharge of water-softener regeneration brines to septic tanks. Dosage of soil cores with effluent from a tank receiving brine wastes from simulated softener regeneration in addition to the normal sewage showed no short-time clogging effects but there was some damage to soil structure. From a long-time viewpoint the damage to soil structure would probably result in increased soil clogging.

EFFECTS OF GROUND GARBAGE

Another factor which may affect the percolation rate-allowable sewage-loading relationship is the disposal of ground garbage to the system. One of our experimental tanks has had ground garbage added as well as the normal sewage, both to study the effect on tank operation and to provide effluent for soil studies. From this study and from recent field investigations it appears that the 50 percent increase in tank capacity recommended by the Joint Committee on Rural Sanitation for systems that will receive ground garbage is a reasonable precaution.

As far as the soils are concerned, there is evidence that septic tanks receiving ground garbage will require larger absorption fields. Dosing of sewage-garbage effluent to soil cores caused a more rapid rate of clogging than did the sewage-only effluent, both on an equal length of time dosing basis and an equal amount of suspended solids added basis. Based on the laboratory data, the additional area which would have been required for the cores receiving sewage-

garbage effluent to absorb equal volumes of effluent in the same time as the cores dosed with sewage-only effluent would be roughly 20 to 35 percent. Recent examination of systems in the field indicates that there are more solids carried over to the tile field under ground garbage conditions. From these indications it is my opinion that an increase of 50 percent in design absorption field size would be a reasonable precaution against failure due to inclusion of ground garbage.

EFFECT OF DETERGENTS

Still another question about which there is considerable interest and inquiry is the relative effect of detergents on the operation of septic tanks and disposal systems as compared to soaps. The replacement of the use of soaps by detergents may also be a factor that will affect the percolation rate-allowable sewage loading relationship.

Some effects of a few detergents on various phases of sewage treatment have been reported in the literature.[7] Among the principal effects noted was that increasing concentrations of the detergents up to the 100 ppm tested tends to reduce the efficiency of short-time settling. Increased amounts of both suspended solids and of grease were noted with increase in concentrations of detergents. However, as far as the effect on the soil absorption system is concerned, other factors may also be involved, such as the effect on soil physical properties or the effect on surface tension of the effluent. The overall effect of detergents on soil absorption systems cannot be simply deduced.

In exploratory studies at Cincinnati in which a detergent and a soap respectively were added to tank effluents, no differences in clogging tendencies other than those associated with differences in the amount of suspended solids were found. Similar studies using tap water suspensions of grease and soap, and grease and detergent did show differential clogging. There was an immediate tendency for the grease-soap suspensions to cause the greater clogging, and increasing quantities of grease in the soap suspensions caused slightly increased clogging. Recent experiments in which laundry waters from a home washer were applied to soil cores showed differences in clogging due to detergent or soap. The laundry waters did cause greater clogging than a septic tank effluent.

GENERAL CONSIDERATIONS

In closing, I should like to emphasize a few thoughts which should be kept in mind in dealing with household "septic tank systems." The first is that the septic tank is not a disposal system of itself, but is an important unit of a process in which the objective is the disposal of waste liquid into the ground. Soil, for waste disposal purposes, is a sensitive medium, not only sensitive to the heavy liquid loadings we usually place on it, but susceptible, also, to damage from abnormal changes in the waste being applied to it. We should keep this in mind, not only in considering septic tank design and operating factors, but also in connection with servicing procedures. The second thought is that while the development of factual information is of fundamental importance, it will fall short of its purpose of it is not applied effectively in the field: that is, incorporated into design, installation, operation, and servicing of each individual installation.

REFERENCES

1. Ryon, Henry. *Notes on the Design of Sewage Disposal Works with Special Reference to Small Installations.* Albany, New York (1928).

2. Federick, J. C. Solving Disposal Problems in Unsewered Areas. *Sewage Works Engineering,* **19**, No. 6 (1948).

3. Weibel, S. R., Straub, C. P., Thoman, J. R. *Studies on Household Sewage Disposal Systems,* Part I, 1949. Federal Security Agency, Public Health Service.

4. Bendixen, T. W., Berk, M., Sheehy, J. P., Weibel, S. R. *Studies on Household Sewage Disposal Systems,* Part II, 1950. Federal Security Agency, Public Health Service.

5. Individual Sewage Disposal Systems, Recommendations of the Joint Committee on Rural Sanitation. Reprint No. 2461 from the *Public Health Reports* (Revised 1947).

6. Wilcox, L. V. Agricultural Uses of Reclaimed Sewage Effluent. *Sewage Works Journal,* **20**, No. 1 (1948).

7. Rudolfs, W., Manganelli, R., Gellman, I. Effects of Certain Detergents on Sewage Treatment. *Ibid,* **20**, No. 1 (1948).

OKLAHOMA A & M CONFERENCE

The annual Oklahoma Dairy Industry Conference will be held at Oklahoma Agricultural and Mechanical College, October 15, 16, and 17, 1952. The conference will include discussions and demonstrations on the manufacture of various dairy products and on other problems relating to dairy manufacturing plants. Address inquiries to the Department of Dairying, Oklahoma A & M College, Stillwater, Oklahoma.

IMPORTANCE OF BACTERIOPHAGE AS A CAUSE OF SLOW STARTERS[1]

V. N. Smith[2], R. B. Parker, and P. R. Elliker

Oregon Agricultural Experiment Station, Corvallis, Oregon

Forty of 87 whey and product samples from 32 Oregon dairy plants were found to contain bacteriophage active against one or more of 18 single strain starters. In 23 cases of serious starter failure, 21 were traced to bacteriophage. In another study 65 of 99 samples were found to contain a heat labile material suggestive of bacteriophage. Results indicate that more emphasis should be placed on bacteriophage as a cause of starter failure in dairy plants.

Starter activity is dependent on a number of factors, most of which are under the control of the operator. The importance of maintaining proper time and temperature of incubation and daily transfer are well known. Another important factor, the milk employed for growing mother and bulk starter cultures, also can be controlled easily by use of milk reconstituted from high quality, low-heat, spray-dried, non-fat milk solids. Preliminary trials on a batch of non-fat milk solids will determine whether or not it satisfactorily grows the starter culture. If the reconstituted milk from the batch proves satisfactory, a uniform supply of starter milk is assured as long as powder for that batch is used.

It is more difficult, however, to maintain such uniformity in subsequent manufacturing steps in production of cultured milk products. A number of contaminating features that retard activity of lactic acid bacteria may be present in the plant or in the mixed milk entering the plant. These include: germicides such as the quaternary ammonium compounds, antibiotics, and bacteriophage. Although low concentrations of quaternary compounds in milk are able to inhibit acid production by starter bacteria, they are not considered an important cause of slow starters. Antibiotics in milk are derived from two sources. One is inhibitory agents such as "nicin" produced by some lactic streptococci growing in milk. The other results from udder injection for treatment of mastitis and may result in contamination of milk with one or more of such antibiotics as penicillin, aureomycin, terramycin, and streptomycin. Antibiotics entering milk through mastitis treatment have received a great deal of attention as a cause of starter failure in recent years. A number of workers have definitely established antibiotics to be responsible for some specific instances of slow starters.

During the past two years at least 23 serious cases of starter failure in Oregon dairy plants have been investigated. Most of the plants experiencing the starter difficulties suspected antibiotics in the milk to be responsible. In two instances there was some indirect evidence of antibiotic in the milk. However, in the remaining 21 cases analysis of defective starters or cultured milk products has established bacteriophage as the source of the slow acid production. Application of plant sanitation procedures for phage elimination and use of strains of lactic acid bacteria resistant to phages isolated from the plant invariably improved rate of acid production. As the significance of phage as a primary cause of starter failure became apparent, the investigations on control methods were expanded somewhat to establish the general prevalence of the problem in various dairy products produced throughout the state.

[1]Published at Technical Paper No. 729 with the approval of the Director of the Oregon Agricultural Experiment Station. Contribution of the Department of Bacteriology.

[2]Present address: Langlois Cheese Makers, Langlois, Oregon.

Mr. Smith's early boyhood was spent in North Platte, Nebraska. He served in the U. S. Army for three years during World War II with extensive service in the European Theater operations.

He attended Vanport College in 1947 and received a B.S. degree at Oregon State College in June, 1950. Following his B.S. degree, he continued at Oregon State College for further graduate study.

Mr. Smith is now employed as bacteriologist at Langlois Cheese Makers, Langlois, Oregon.

The data cited in this report were collected as part of a study on isolation of lactic phages and development of phage resistance in lactic streptococci.

Procedure

Eighteen single strains of *Streptococcus cremoris* and *Streptococcus lactis* were used for test cultures. They represented both stock culture strains as well as isolants from commonly used commercial cultures. Samples examined for bacteriophage were collected at random from 32 different plants and represented occasional mother and bulk starter cultures, whey from cheddar, cottage, and blue cheese plants, and cultured buttermilk. The samples were filtered through Selas candles and an excess of ster-

ile calcium carbonate added. Five tenths ml of filtered whey was then added to respective 10-ml quantities of sterile skim milk inoculated with the 18 different single strain cultures. Control tubes of each culture without filtrate also were prepared. Sterile resazurin solution was added for indicator before inoculation. The tubes were incubated at 30°C and examined for resazurin reduction at 6 hours and at about half-hour intervals thereafter. Definite prolongation of reduction time beyond that of the control suggested inhibition, and samples of inhibitory filtrate were subsequently heated at 100°C for 5 minutes. Bacteriophage, if present, was destroyed by the heating. The effect of the heated filtrate on the test cultures then was repeated to establish whether or not the inhibitory substance was heat labile. This step plus the fact that filtrates were diluted about 20 times by inoculating 0.5 ml into 10 ml of milk culture tended to minimize interference of results by antibiotics. When the inhibitory agent in any filtrates proved to be destroyed by the heating, some of the same sample of filtrate was transferred to a fresh sensitive culture which was incubated for 24 hours. Presence and concentration of any phage was determined by phagues and increasing concentrations of phage by successive passage. Attempts were made in questionable cases to build up titer by transfer of the inhibitory agent.

RESULTS

In one series of tests a total of 87 different random samples from 32 plants were examined for presence of inhibitory materials. Filtrates of 49 of the samples contained heat labile substance that inhibited one or more of the 18 single strain starter cultures. Inhibition in 40 of these representing 27 plants was definitely established as due to bacteriophage. The inhibitory materials in the other 9 samples were not identified, but it is significant that they constituted only a small proportion of the total number of samples showing inhibition. It is possible that some of these 9 samples also contained bacteriophage. Only one of the 87 filtrates contained an inhibitory substance that was not destroyed by boiling.

It was observed that certain strains of lactic streptococcus used in the test were more sensitive to bacteriophage attack than others. One stock culture was inhibited 31 times out of 87 samples and another 25 times. One strain isolated from a commercial culture was affected 10 times. Two strains were not inhibited in any of the tests. As expected, *S. lactis* strains were attacked less frequently than *S. cremoris*. Some purified races of bacteriophage isolated from filtrates were capable of attacking both *S. lactis* and *S. cremoris*.

Of all the samples examined inhibitory agents were observed in 30 of 56 of the buttermilk filtrates, 13 of 20 of the cottage cheese whey, and 7 of 11 filtrates of whey obtained from cheddar and blue cheese plants. Plant conditions of sanitation and methods of starter handling appeared more important than type of product in affecting incidence of bacteriophage.

In addition to the above samples 99 additional filtrates were prepared from various cheddar, blue, and cottage cheese, and buttermilk samples in another study. Of these a total of 65 were found to contain heat labile inhibitory agents. In view of previous observations that most of such heat sensitive agents appeared to be bacteriophage, it must be presumed that most of the 65 samples also owed their inhibitory effect to bacteriophage.

CONCLUSIONS

Although this survey is by no means complete and represents only a small area of the country, the results demonstrate the importance of bacteriophage as a cause of starter failure. In a majority of instances where addition of filtrates from cheddar, blue, and cottage cheese whey and cultured buttermilk caused inhibition of a selected group of single strain cultures, the agent responsible was established as bacteriophage. The evidence suggests that in many instances it might be appropriate to eliminate bacteriophage as the cause of pronounced lactic streptococcus starter failure before attributing responsibility to other agents.

ORANGE COUNTY (N. Y.) MILK SANITARIANS MEET

Eighty milk sanitarians and guests, from a wide area including the New York Metropolitian district, registered at the summer dinner meeting of the Orange County (N. Y.) Milk Sanitarians Association on June 11. They represented official agencies and the milk industry. The meeting was held at Little Britain Grange Hall, between Newburgh and Middletown, locally famous for its "all-you-can-eat" dinners.

Dr. W. A. Hagan, dean of Cornell University College of Veterinary Medicine, was the speaker. Dr. Hagan discussed prevention and control of animal diseases important to the industry and sanitarians. He gave particular attention to foot and mouth disease and anthrax, now threatening dairy cattle in some sections of this country. His own observations in Europe and Mexico were cited.

A communication from the New York State Association of Milk Sanitarians, inviting affiliation with that organization and, through it, with the International Association, was read. After discussion officers were delegated to attend a conference with a committee of the central group, reporting their recommendations to the members, by letter, in advance of the Fall Meeting.

A COMPARATIVE TEST WITH MILK STAINS*

P. H. H. GRAY

Department of Bacteriology
Macdonald College, Quebec, Canada

Tests were made to compare the relative value of four methods of straining milk films, for the enumeration of bacteria and body cells. The methods compared were those of Barber, Gray, Mallman, & Churchill, and one recommended by the A.P.H.A. (called herein the Standard). The author's method proved to give the more satisfactory films, in which blue-stained cells were easily seen against a pink background of milk solids, and to give significantly higher numbers of bacteria.

IN 1943[3] the author proposed a formula for a mixture of dyes in solution, for staining bacteria in in milk films. The note had, unfortunately, a misleading title assigned to it. No claim was made that the solution would be suitable for staining films of raw milks for the purpose of counting bacteria. Pressure of other work prevented further work being done on this until recently.

It was found that if the original formula were used but with one-fifth or one-sixth the amounts of the dyes, films could be adequately prepared without risk of overstaining, such as was reported by Levine and Black[4]. The present note represents the results of examining films prepared from seven milks, by the modified Newman-Lampert solution of Barber, (see ref. 2), that of Mallman and Churchill[5], the author's modified solution, and the alcoholic solution recommended in *Standard Methods for the Examination of Dairy Products*[1].

The author's "two-stain solution" was prepared as in the original formula, to provide a concentrated solution: methylene blue (C.I. No. 922; dye content 87.6%) 1 percent aqueous solution, and methyl hydrate in equal volumes; basic fuchsin (C.I. No. 676; dye content 88.8%) 1 percent aqueous solution and methyl hydrate in equal volumes; 50 ml of the former are mixed with 25 ml of the latter. This concentrated solution was diluted 1:5 or 1:6 with methyl hydrate for staining the films. Before the films were stained by this method, the slides were placed in a mixture of equal volumes of tetrachlorethane and methyl hydrate for one minute, drained, placed in methyl hydrate for 30 seconds, and drained; they were then placed in the staining solution for 30 seconds, then washed in a beaker of distilled water and dried.

Both raw and pasteurized milks were used. When preliminary tests showed that the numbers of bacteria were too low to make satisfactory films, the milks were incubated for some hours at 37°C. Two slides were prepared from each milk at each time. After the films were dry, two slides picked at random were used in each of the four staining methods. One hundred random fields were examined in each film.

An example of the results obtained from one sample of milk is given in table 1. It will be noted that the results given by the Mallman and Churchill stain are considerably lower than those given by the other three stains; this was confirmed in another test; it was, therefore, decided to replace the Mallman and Churchill stain with the author's 1:6 modification. The results for five other samples of milk are shown in table 2, in which the average counts from the four films are quoted for sums of the individual cells and the cells in clumps. It is evident that the author's modified staining solutions yielded higher numbers of bacterial cells than either the Standard method or Barber's method.

It should be noted that by statistical analysis for the significance of differences between paired variates, provided by the five milk samples as quoted in table 2, there is a significant difference between the numbers given by the Standard method and the author's 1:5 modification.

It has also been noted that the ratios of numbers of cells in clumps, to the numbers of clumps, were about the same in the Standard method and in the author's 1:5, the ratios being 5.3:1 and 5.8:1 respectively, while in Barber's method the ratio was 7.2:1.

A single-dip stain which provides a good contrast between the background and the stained cells should eliminate much eye strain in laboratories where the examination of milk films is a routine operation. The author's modified solutions yielded pink backgrounds with clearly defined blue cells; in-

*Contribution from the Faculty of Agriculture, McGill University, Macdonald College, Que., Canada. Journal Series No. 291.

TABLE 1

The average numbers of individual cells, clumps, and body cells in films from one sample of milk stained by four methods. (Numbers expressed as per ml of milk, 000's omitted).

Method	Individual cells	Clumps	Body cells
Standard	6,382	1,221	195
Barber	5,948	741	156
Gray 1:5	8,877	1,615	234
M. & C.	2,614	582	78

dividual cells in clumps were easily picked out. Ease of recognition should also result in much saving in time. The backgrounds in Barber's method were somewhat hazy, and required frequent re-adjustment of the microscope, though the contrast between cells and background was good. The Standard method gave blue backgrounds, and the cells were not so readily seen as in films prepared by the author's solutions.

The author is grateful to Mr. Ballem H. Matheson for having counted the cells and calculated the numbers of bacteria.

REFERENCES

1. American Public Health Association. *Standard Methods for the Examination of Dairy Products.* 9th edition. A.P.H.A. (1948).

2. Elliker, P. R. *Practical Dairy Bacteriology.* McGraw-Hill (1949) (Ref. to Barber's modification of the Newman-Lampert formula, p.99).

3. Gray, P. H. H. *J. Milk Technol.* **6,** 76 (1943).

4. Levine, B. S., and Black, L. A. *Amer. J. Public Health* **38,** 1210-1218 (1948).

5. Mallman, W. L. and Churchill, E. A. *U.S. Egg and Poultry Magazine.* **48,** 406 (1942).

TABLE 2

The average numbers of individual cells, plus cells in clumps, in five samples of milk. (Numbers expressed as per ml of milk, 000's omitted).

Method	No. of fields examined	Milk sample number					Average	Ratio to standard method
		3	4	5	6	7		
Standard	2,000	49	8,889	6,300	3,219	16,860	7,063	100
Barber	1,900	55	12,680	5,094	4,252	16,460	7,708	109
Gray 1:5	2,000	64	20,672	9,183	5,281	22,717	11,583	164
Gray 1:6	2,000	93	19,908	8,864	4,249	19,903	10,603	150

McKILLOP APPOINTED KLENZADE NATIONAL ACCOUNTS REPRESENTATIVE

John McKillop, for many years Chicago Office Manager of Klenzade Products, Inc., Products Division, has recently been promoted as National Accounts representative, with headquarters at Chicago. Mr. McKillop's long years of service with Klenzade and his broad background of experience in sanitation work ably fit him for his new duties. He will act as assistant to Mr. W. J. Dixon, Vice President of Klenzade in charge of the National Accounts Division.

INTERNATIONAL SANITARY REGULATIONS

In April 1952 the World Health Organization published its *International Sanitary Regulations* a volume of 443 pages, price $2.25 (available also in a French edition). It contains the text of the sanitary regulations as adopted by the Fourth World Health Assembly on May 25, 1951, representing 60 governments. Part I comprises the debates and reports of specials committees. Part II is devoted to the text of the International Sanitary Regulations, accompanied by an explanatory memorandum, a table of comparison with existing sanitary conventions, and an analytical index.

FOOD-BORNE DISEASES IN THE NAVY — A TRAINING PROGRAM FOR FOOD SERVICE PERSONNEL AS A PREVENTIVE MEASURE*

LIEUTENANT FRED E. STEWART, MSC, USN AND
LIEUTENANT JUNIOR GRADE ROBERT E. MYTINGER, MSC, USN

General Sanitation Section, Bureau of Medicine and Surgery
Department of the Navy, Washington, D. C.

From the need for intensive training in food sanitation in the Navy has evolved a program of in-service courses at various levels of Navy life and for various degrees of specialization of assignments, as well as of organized classes at civilian schools which Navy personnel may attend. The principle behind such training is the development of proper attitudes toward safe food handling rather than the rote memorizing of facts. Such "attitude-formation" methods are used for food-service workers, and training of professional scope for potential instructors. Visual aids and classroom discussion techniques are also used.

THE ANNOUNCED PURPOSE of this talk is to acquaint you with the food service employee training which we conduct in the Navy. To establish a foundation for such training, I must dwell upon the need for training and the problems out of which this need has arisen. Because of some controversial opinions which I shall state, I feel compelled to tell you a story of a squirrel law. Down where I come from in Alabama we have a squirrel law. Half of the people are for this law and half are against it. During a certain campaign speech made by an old friend of mine who was running for state senator, he asked if anyone in the audience had a question. One of the old farmers down in the front row stood up and said, "Yeah, how do you stand on this squirrel law?" My friend's supporters were scared to death because they knew he would say the wrong thing, but my friend replied simply, "Glad you asked me that question. I understand that half of my friends are for it and half are against it, and I want it definitely understood that I'm for my friends." I hope that when the discussions on the philosophy of our training in the Navy are over we will all still be friends even though we may have somewhat of a "squirrel law" here to discuss.

As you know, the term "diarrhea" is not the name of a disease but rather describes a group of symptons which may be due to many causes. There is little doubt that the incidence of diarrheal diseases among military groups had a profound influence on early warfare and most certainly on the progress of civilization. At the beginning of the 20th century rates for diarrheal diseases had been considerably reduced and a definite downward trend established. In figure 1, it appears that the reduction in diarrheal disease rates slowed down considerably about 1913.

FOOD INFECTION

The important factor here is that a considerable portion of these diseases remaining which held the rates to their 1913 level are of the food-borne group. Historically, we we can see that since 1861 distilled water has been used aboard ships and since 1892 the use of filtered water ashore has been commonplace. Chlorinated water had its beginning in 1908. All these factors are largely responsible for the decrease in diarrheal diseases from the period 1892 to 1913 as indicated in figure 1. Why then since the purification of drinking water was essentially an accomplished fact as far as the Navy was concerned in 1913 did the diarrheal diseases continue at a rate of between 10 to 21 per 1,000 strength? Obviously causes other than polluted water must be sought.

*Presented at the 38th Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., Glenwood Springs, Colorado, September 26-28, 1951.

**The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Lt. Stewart, an Alabaman by birth, joined the Navy in 1927 and served about 16 years in enlisted status and nine years as a commissioned officer. His in-service training has included work at the Basic and Advanced Hospital Corps School and the Navy Medical School in clinical laboratory techniques. He has also had special training in military government and public health, respectively, at Princeton University and Delamar Institute of Public Health, Columbia University. He has had special training in Public Health work at the University of California. He has served as personnel officer at Portsmouth Naval Hospital; in military government and public health on Okinawa during the war, as sanitation officer at NAS San Diego; and as head of the General Sanitation Section, Preventive Medicine Division, Bureau of Medicine and Surgery of the Department of the Navy.

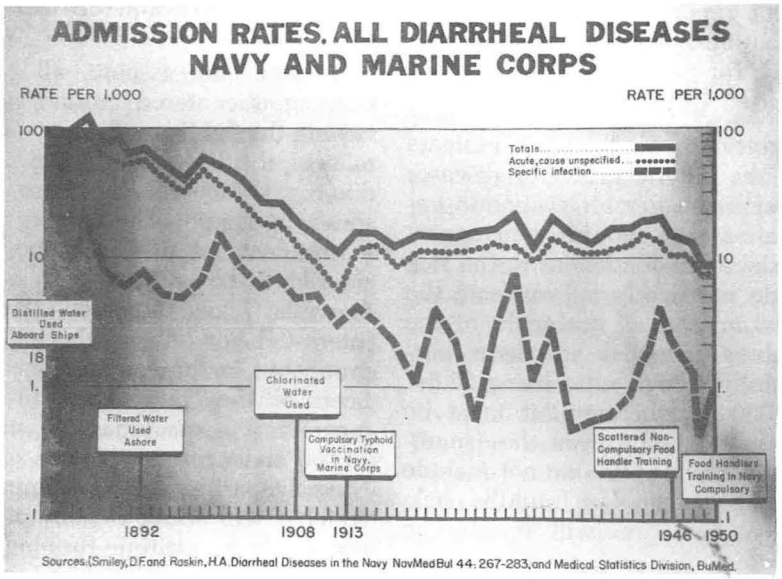


FIGURE 1

Among these causes we may include the eating of food contaminated with organisms of the typhoid, dysentery or Salmonella groups or with any of the classic food poisoning organisms. A graph of typhoid incidence in the Navy is a most revealing thing for it shows that prior to 1913 typhoid infections accounted for an exceedingly large portion of the diarrheas. In 1913 with the advent of typhoid vaccination in the Navy the rates for this disease fell off and have remained at a negligible figure.[1]

The urgent need of a specific means of immunization against dysentery is quite obvious. From the current dysentery rates it is obvious that many ships of our fleet are well seeded with dysentery organisms, in many cases this organism being *Shigella flexner III*. Many serious outbreaks in which the *Shigella III* organism has either been confirmed or highly suspected have been reported recently, involving from ten percent to as much as seventy percent of a crew. The obvious result of a heavy carrier population may be seen in such cases where a generalized attack among crew members of a ship will subside until major complement changes are made. These replacements are usually susceptible individuals and when they come in contact with the pre-existing carrier group another round or explosive outbreak of the infection should be expected and usually occurs. There are many modes of transmission, as we all know, including among the most important such vehicles as food, water and common objects.

As a matter of interest I might mention that a vaccine against the *Shigella flexner III* organisms has been developed and is currently being used in the Pacific Fleet in ships of the battle and carrier class. Replacements to these ships and all other such ships which join the Pacific Fleet are being vaccinated so that spread of dysentery among newly arriving populations may be controlled in view of the serious results arising from the disability of large percentages of a ship's complement.

FOOD POISONING

Increased emphasis has been put on several phases of sanitation and hygiene. In trying to define the problem areas and the need for sanitation training I have dwelled primarily on the dysentery group of diseases. We must not forget food poisoning. The status of food poisoning incidence has changed little. In a recent two-month period there were 1,400 cases of food poisoning reported. These cases occuring in seventeen isolated outbreaks. The seriousness of these outbreaks cannot be over-emphasized. Here are two examples that will emphasize this point.

Some time ago on the West Coast two combat teams of marines were formed for a sham battle. The plan was for these two groups to go into the "boon-docks" for a few days and for one team to defend an important objective and for the other team to attack it. The commanding officer of the defensive team had been in such war games before and was quite sure that the general attack would be launched against him at dawn of the next day. All preparations were completed. He even decreed that his men should have a good pre-dawn breakfast, and accordingly ordered that hash should be prepared the night before and kept warm for an early serving. The attack came well after the sun was in the sky and as the attackers approached from the east under perfect tactical conditions, they met almost no opposition. They took the objective with ease. As they approached the objective they beheld a sorry sight. The defensive force including all of the more senior officers were prostrate, vomiting, and having abdominal cramps and diarrhea. The judges of the sham battle maneuvers awarded the victory to the attackers. They should have awarded it to staphylococcus enterotoxin which caused the defeat. How many victories that could be charged to the staphylococcus occurred in the jungles and on the atolls of the South Pacific during World War II we will never know.

The second example involves a four-motored plane which very fortunately landed safely on an island in the middle Pacific. The pilot, co-pilots and navigator were all sick with salmonellosis, fever, diar-

[1]Smiley, D. F. and Raskin, H. A., "Diarrheal Diseases in the Navy", NavMedBul 44: 267-283.

rhea, nausea and vomiting. Turkey sandwiches eaten on Guam the day before were suspected. The incubation period of about 18 hours had enabled the plane and its group to take off from Guam and Kwajalein before they became severely ill high over the Pacific. A functioning automatic pilot plus perserverance on the part of the sick individuals pulled them through.

I can cite a third example, that of one of our smaller ships operating on the East Coast. Though not food poisoning, this will emphasize the seriousness of all diarrheal disease outbreaks. When all but three of the ship's complement became ill simultaneously with diarrhea, the ship ran aground. This explosive outbreak was traced to highly polluted water of undetermined etiology due to lack of proper back-flow protection.

The fact has been clearly demonstrated in the foregoing accounts of outbreaks that by their very nature, enteric diseases such as food poisoning and dysentery are hazardous to military units and threaten the success of military operations. I mentioned the fact that over a recent two-month period 1,400 cases of food poisoning had been reported. The Navy requires that all food poisoning outbreaks be recorded and when five or more cases occur, they must be reported by dispatch and followed by a complete epidemiological report. At times the number affected is small and few or none require admission to the sick list so that the medical officer fails to recognize the significance of the outbreak. More often than not the causative organism or suspected food is not reported, or if reported, substantiation is not given.

In many cases the numbers involved in an outbreak may be given as rough estimates, such as 25 percent of a ship's complement or one-half of the personnel eating the noon meal. Such figures obviously cannot be reduced to statistical values, thus actual admissions as reported in monthly statistical reports fail to record the vast number of such cases incapacitated for several hours but not admitted to the sick list.

Table 1 and figure 2 indicate that the enteric group of diseases are of much greater economic importance than would seem apparent since the admissions to the sick list do not nearly approximate the actual number of outbreaks or the numbers involved in these outbreaks, the high ratio being 23.6:1 in 1950. Furthermore, it must be remembered that even those numbers in such reports do not include personnel who are mildly sick. These numbers will never be known.

TRAINING EMPHASIS

We can see by this point the need for intensive training in food sanitation in the Navy. Although I am going to give you a few details about the existing program, more important I hope to convey to you the newer philosophy in preventive medicine training, specifically in food service personnel training as it is visualized to be conducted by our Bureau. This modern trend in educational technique which we call "attitude development" is aimed at the basic roots of man's behavior and applies to military and civilian employees alike.

As you may assume, all Navy training is centered around maintaining the fighting efficiency of the man of the fleet. By saying this I don't wish to exclude those persons who support the fighting man of the fleet, for they must be considered to be as important as the one who mans the guns. We are interested not only in the enlisted group but in the commissioned officers of the Navy. Even further, our work encompasses nearly 10,000 civilian food workers of the Navy Department. The training of which I will speak is both professional and attitude-forming in scope. The professional training is aimed at the potential instructor group and the attitude-forming aimed at the food worker group. The food workers' training is built about a framework of "attitude-development".

Anatole France one said, "Let our teaching be full of ideas. Hitherto it has been stuffed only with facts". We are trying to unstuff our training program and to pass on ideas for "attitude-development".

John Ruskin said, if I may quote once more, that "education does not mean teaching people to know what they do not know. It means

COMPARATIVE REPORTING OF FOOD-BORNE OUTBREAKS

Prepared by MEDICAL STATISTICS DIVISION, BuMed	COLUMN 1 As reported in special quarterly sanitary or epidemiology reports		COLUMN 2 As reported on NavMed. Form F		COLUMN 3 Reporting Ratio	
	No. Outbreaks	No. Cases	No. Cases	Rate per 1,000	Reported as stricken in report of outbreak	Reported on sick list Form F
1946	11	500	1292	0.97	1 :	2.6
1947	34	5000	262	0.44	19 :	1
1948	21	1500	247	0.44	5.7 :	1
1949	20	1458	143	0.27	10.2 :	1
1950	40	2644	112	0.21	23.6 :	1
Totals	126	11,002	2,055			

TABLE 1

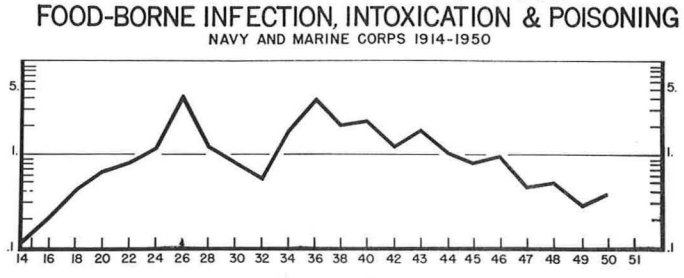


FIGURE 2

teaching them to behave as they do not behave".

Research has found, you and I have found in discussions with others that by and large, people are aware of the basic principles of good environmental sanitation and personal hygiene in many cases. These principles are contrary to the early teaching to which people have been exposed through family, school and associates, and yet these people recognize such principles. They know *what* to do; yet they do not *behave* in the proper manner. Their behavior in this case is dictated by past experience and attitudes which have been formed from the time of their birth until you and I see them in training groups. Attitudes are powerful animals. It is our attitude toward personal hygiene which dictates whether we brush our teeth after each meal, whether we do it before breakfast or after breakfast; it is our attitude toward our work which dictates whether we do a complete job, and so on. Generally, where attitudes are concerned we have found – at least if we gave them a chance to discuss the problem– that a large number of food service workers would realize that they know the right thing to do but are prevented from doing that right thing by their blind attitude which, unknown to them, prevents logical thinking.

It is our aim in the "attitude-development" phase of preventive medicine training to change attitudes from improper to proper. This change of attitudes is based solely on the information which is inherent in the brain of each individual in our training program. How can this best be done? Our experience indicates that the group discussion meeting is the best and most readily available tool for all instructors in the field. Our concept of group discussion does not include the overbearing or impatient instructor who is the informant to the group and merely suggests a principle and then asks the group to "parrot" back answers, but rather the true group leader (and these people can be developed from raw material) who simply suggests an area of discussion and as obvious and basic principles are developed, brings them out into the open so that everyone can see them, analyze them, and appreciate their value. In some cases we have found that it is necessary to supply resource material. A good series of visual aids have been used as resource material, not with intent in mind to *teach* but rather to *suggest* to the mind of each individual discussion possibilities. For the more advanced audience we use textbooks and other reference material which is understandable to them and to which they can refer as problems arise in their minds. Generally, the instructor tries not to answer these problems as they arise but suggests ways and means by which the student himself can find his answers.

Most of this work to date in developing this improved training technique has been devoted to organizing basic or advanced training schools. From the time a Navy man first enters the Service and attends a recruit training camp, he is given food sanitation instruction. At present, four hours of classroom discussion, as opposed to lecture, are given to all recruits in recruit training commands. This group, my friends, represents a tremendous number of responsible individuals thinking about food sanitation.

To tell you a bit about our food sanitation program for recruits I would say that we have omitted "facts" from the instruction. When a recruit leaves the four hours of instruction, unless he asks a specific question and finds the answer, he doesn't know the required rinse temperature in good dishwashing operation; he doesn't know the temperature below which a haemolytic strain of streptococcus will grow; he doesn't even know which foods should be refrigerated and which should not. He does know, however, and we have proven this with tests and retests, that clean hands, a clean body, and careful, clean personal practices in preparing, handling, or serving food is important to his own health and that of his shipmates; and he does know that each dishwashing machine is different in operation and that when on the job he can get instruction as to proper temperatures and times of washing; and he knows that the cooks in the galley are specialists in food service and that they have information pertaining to the right foods to keep cold and those to throw away. In experimental groups with this type of training we have developed new attitudes in this field toward which the recruit has never given much thought because he has never made himself realize the importance of good food sanitation. An evaluation of this type training is being made by actual observation on the job.

Leaving the recruit level, we next progress to the commissary school. This type school is classed as a Class "A" training school. To be sure, these are the people who will actually cook and bake and physically prepare the food for the Navy. Preceding their professional training in cooking techniques, their attitudes are further developed in the proper personal and sanitary practices that make for excellent food service, and this, once developed, is followed by technical information on times and temperatures, germs and equipment. Technical information is much better understood and longer retained when a sound and healthy attitude toward the general field of sanitation is present. Eleven hours are utilized to train and develop the proper attitudes toward food sanitation in these students in the commissary school.

A final step and one in which further progress is now being made in the food sanitation in-service training program, the center of our current "attitude development" program, lies in the training for professional food workers in the Navy. These people may be civilian employees or Navy cooks and bakers or master-at-arms in the galleys and sculleries.

This program began in January of 1949 at which time the Secretary of the Navy directed that a basic six-hour course be given all food service personnel in the Naval establishment. The Surgeon General of the Navy then issued a circular letter which gave details of this in-service training program. The training is given on a continual district-wide basis under the supervision of the naval district preventive medicine officer and/or the director of training in each naval district. First, all supervisory personnel and instructors were given the appropriate training. This training ranged from a minimum eight hours required up to one week's training of from four to six hours per day.

Then the basic training course for all food service workers was given by these trained instructors. During 1950, 14,353 personnel have been trained out of a total of 20,850 of food personnel. This mandatory program did not include fleet units* however, one school was set up in each naval district to be run on a continual basis. These schools are available to the men of the fleet. Fleet commanders then took the initiative and required the training program to be extended to activities afloat, and where naval district training courses are not available the ship's medical department personnel give the required courses.

I am very pleased to announce at this point that the sister services, the Army and the Air Force, now require that all food service personnel receive a minimum of eight hours training in food sanitation and an eight-hour refresher course to be given each year.

A word at this point on the source of Navy instructors who organize and conduct these courses of which I have spoken would be appropriate. By and large, the instructors represent two groups of naval personnel and one group of civilians. Officers of the Medical Service Corps and of the Hospital Corps and enlisted men of the Hospital Corps especially trained in sanitation are the most commonly found instructors in this program. Additional civilian professional instructors from the Works Improvement Program are used to some degree. The Navy instructors may be trained in any one of several types of schools.

The Medical Department sponsors both the basic and the advanced Hospital Corps School. In the basic Hospital Corps School, also a Class "A" school, potential hospital corpsmen attending receive 32 hours in classroom instruction in preventive medicine subjects with emphasis on food sanitation. These hospital corpsmen may well be the sanitation workers of the future and are often called upon to conduct in-service training programs in the Navy. The advanced Hospital Corps School is for chiefs and first class petty officers who will serve on ships and stations independent of a medical officer. These men are given 14 hours of training in environmental sanitation and preventive medicine with emphasis on teaching food sanitation.

The Medical Department also conducts a specialty course called, "The Environmental Sanitation Technician Course" for Chief and First Class Petty Officers. This course is currently given at the Naval Hospital in Oakland, California. The five-month curriculum includes such subjects as: public health administration, vital statistics, epidemiology, rodent and insect control, general sanitation, and communicable disease control. Each student receives an excellent short course in instructor-training with emphasis on teaching food sanitation. As with most professional courses it includes not only classroom work but actual field experience and observation, and classes in food sanitation are actually taught by these students. Their record to this date has been magnificent. In fact, the Environmental Sanitation School at Oakland is now recognized work whereby the students may obtain college credits towards a degree which they may later seek. At the beginning of the Korean Campaign a total of 39 EST's were available. Since that time 4 additional men have been trained. We are now producing 20 well-trained men each two and one-half months. However, it is planned to extend the course to nine months as soon as the emergency situation permits. The individuals now in this school, when graduated, are eligible provided they meet other requirements to take the examination for sanitarian registration in the State of California.

Medical Department instructors for these food sanitation courses may be further trained in an institution of higher education. Each year a specially selected group of commissioned and warrant officers of the Hospital Corps and officers of the Medical Service Corps have an opportunity to attend a one semester short course at the University of California in Berkeley to further develop their professional knowledge and aptitudes in the environmental sanitation field. This course is similar in scope to the sanitarians' short course as given by the same university. It is felt by the Bureau of Medicine and Surgery that such men, although few in number, should be treated as competent professional specialists, and the record of their work to date is the record of advancement in the general sanitation phases of the Bureau's activity. This group supervises the food sanitation training program in all naval district activities in the capacity of assistants to the District Medical Officers for Preventive Medicine. The Naval School of Hospital Administration at the National Naval Medical Center is including a section on the administrative activities involved in serving a safe nutritional ration. Although not directly connected with the food service training program I might mention that all young medical officers upon entering the Navy and attending the Naval Medical School for indoctrination are given certain phases of the preventive medicine program in or-

*Shipboard training now mandatory.

der to make them aware of the problems existing in this field and to give them the foundation for participation in the preventive medicine program of the activity and cooperation with the local health department personnel whereever they may be assigned. This group also receives special training in conducting food sanitation programs. In addition, a newly established six-month course for epidemiologists at the Naval Medical School has just begun, and the outlook for the future is bright. The medical officers who attend this course should be competent to direct an effective preventive medicine program in the field.

It would be amiss not to mention the six Epidemic Disease Control Units which we have within the continental limits of the United States and in the 14th Naval District and two Fleet Epidemic Disease Control Units in the Pacific area. These Units provide excellent laboratory service devoted to preventing communicable disease outbreaks. They are equipped to handle routine examinations of milk and milk products and water testing. The personnel in these Units are especially trained to conduct food sanitation programs.

IMPROVED GUIDE

We are not entirely satisfied with our training program as it is presently being conducted. In my few remaining minutes I will endeavor to outline how we hope to stimulate and improve our in-service training program. The U. S. Public Health Service in cooperation with the Bureau of Medicine and Surgery has prepared a new "Instructor's Guide—Sanitary Food Service" which presents an entire course in food sanitation based on the group discussion technique; this course is based on research findings. It differs considerably from the interim edition of "Instructor's Guide — Sanitary Food Service" which was a pamphlet as you will remember. It differs considerably from the rough work copy which many of you received and on which you have offered many excellent comments. The new book will number in excess of 150 pages and, I think, will prove of valuable assistance to all of us engaged in food sanitation training. Galley proofs of this manual have been reviewed and returned to the Government Printing Office. The new manual should be available during the latter part of January. When it is released it is planned that a team consisting of U. S. Public Health Service, Navy, and possibly representatives of the Army and Air Force will visit approximately twelve central locations throughout the United States and demonstrate the use of this new teaching technique. It is planned to invite representatives from each regional public health area, each state and large city within the twelve principal areas to be visited. It is hoped that, as a result of this traveling team, food sanitation training can be stimulated to a new high throughout the country and result in a considerable reduction in extra-cantonment health hazards to those in military service during this emergency period.*

In closing I would like to tell you a little about our dreams and plans for the future. It has been said that in the world of the future we'll need guns of smaller and men of larger calibre. As regards the guns, I'll leave that subject to those who plan such things. We feel, however, that the men of the future—and those are the men that we are working with now—will develop into better and more useful members of society as a result of the training which we are now giving and which we plan. Concerning the enlisted Navy man you have seen as the story has unfolded here that he is hit with various phases of food sanitation training as he enters the Navy. He is accosted again in specialty schools and again on active duty when out of school. It is our premise that every Navy man at one time or another in his career will be responsible in some way or another in some phase of food service. Each man in the Navy must have an awareness of the health problems involved in that part of his activity and plans include expansion of all such training to reach increasing numbers of personnel.

In a nutshell that is our future plan—to expand and expand and eventually have a "'junior-junior" food sanitarian incorporate in every man in the Navy. We hope further that we can indoctrinate every civilian employed by the Navy Department to be constantly aware of those factors in his environment which affect his health and well-being.

The Navy is aware of and operates under the definition of health as given by Dr. C. E. A. Winslow. It goes somewhat like this: "True health is that state of positive health which results in physical, emotional, and social well-being and not merely in the absence of disease or infirmity." Operating under that principle and endeavoring to teach people to behave as they do not behave, the Navy is trying to do its share in the building of that ultimate state of world-wide positive health so that man throughout his life may enjoy good health.

---

*The proposed tour did take place during the spring and early summer of 1952, with a total of 974 personnel, representing all of the Armed Forces and many civilian agencies, in attendance. The meetings were held at 12 military installations in the United States, two in Europe, and one in North Africa. In addition to stimulating wide interest in new techniques of education for the prevention of food-borne disease, the tour established the nucleus for the birth of a nationwide civilian-military coordinated effort toward better and longer lasting training in food sanitation for both food workers and the general public.

THE 3-A SYMBOL REGISTERED

CORRESPONDENCE and records in the files of the writer indicate that the concept of an identifying mark to distinguish dairy equipment which complies with 3-A Sanitary Standards developed almost simultaneously with the concept of sanitary standards. Although the manner in which such an identifying mark could or would be used was quite nebulous, a number of designs of suggested symbols were submitted.

The subject of a symbol remained in the discussion stage until the Fall of 1946 when a symbol in which the sense of three A's was inherent, appeared several times in a brochure describing the organization and objectives of the joint-committees on sanitary standards for dairy equipment. This brochure was prepared by the Sanitary Standards Subcommittee of the Dairy Industry Committee, and distributed at the 1946 Dairy Industries Exposition.

This symbol, it will be recalled, consisted of a capital letter A, on the lower half of which was superimposed the numeral 3. Its meaning, in connection with allusions to 3-A Sanitary Standards, was so readily perceptible that the Executive Board decided to initiate steps to acquire legal rights over the use of this symbol.

This procedure for acquiring registration for such a symbol was then explored through a firm of trade-mark attorneys. It was learned that devices and equipment, on which trade marks are to appear, are classified into a number of categories. The Sanitary Standards for Storage Tanks for Milk and Milk Products were the first completed, adopted, and published. Storage tanks are classified by the Trade Mark Operations of the U. S. Patent Office at Class 2 Receptacles. It also was learned that a trade mark or symbol must have been in use on equipment of the classification in which registration is sought, which had been transported across State lines. The discouraging information that the initial and every subsequent filing by attorneys of an application for registration would cost the Association a fee of $100, dampened for a time the enthusiasm for registration of the symbol.

Following the presentation of the Annual Report of the Committee on Sanitary Procedure, at the 1949 Annual Meeting, in Columbus, it was learned that application for registration of the symbol might be made by the Association, without the aid of an attorney, for a fee of $25. The prescribed form of the application and procedure were ascertained, arrangements made for use of the symbol in interstate traffic, drawings of the symbol prepared, and an application filed during the Summer of 1950. This was officially acknowledged on November 29, 1950.

Due to failure precisely to conform to all technicalities, due to the time required to obtain waivers from the holders of registrations of symbols which coincided too closely with the one for which the Association sought registration, and because of confusion as to the official classification of weigh cans and automotive transportation tanks, acceptance of the application and final action on registration of the symbol were delayed until May 9, 1952. Three successive Association presidents signed the initial and succeeding amended applications.

The officially recognized symbol has been published in the Trade Mark Section of the *Official Gazette* of the U. S. Patent Office, of May 27, 1952. Its use is authorized on Receptacles, which, as respects dairy equipment, includes: storage tanks, weigh cans, receiving tanks, and automotive tanks, covering which sanitary standards have been adopted and published; and farm bulk milk storage and/or cooling tanks, sanitary standards for which are at this writing still under consideration. The published announcement in the *Official Gazette* appears below:

Ser. No. 607,082. International Association of Milk and Food Sanitarians, Orange, N. J., and Rochester, N. Y. Filed Nov. 29, 1950. CERTIFICATION MARK.

For Dairy Products Storage Tanks, Milk Weigh Cans, Milk Receiving Tanks, and Milk and Milk Products Tanks for Attachment to Automotive Transportation Vehicles.

Claims use since Mar. 2, 1949.

It now has become necessary to formulate controls over the unauthorized use of this symbol, in a misleading manner or connection. It may be anticipated that the continuation of the degree of collaboration between the agencies concerned, which has achieved the dozen or more sanitary standards thus far adopted, will also perfect practical controls over the use of the symbol.

C. A. ABELE, *Chairman*
Committee on Sanitary Procedure

MILK and FOOD SANITATION

FOOD SANITARIANS ARE CRUCIAL CD WORKERS

HOMER N. CALVER

Secretary Public Health Committee, Paper Cup and Container Institute

Food salvage, sanitary control of milk, meat, and perishable foods, clean mass feeding methods including use of disposable paper cups and containers, and care of water supply, are among the multiple problems that would confront sanitarians in case an American community should be bombed. The role of the sanitarian in civil defense was one of the topics discussed at the Combined Conference on Administrative and Scientific Problems of Food Aspects of Civil Defense held in London during December.

IF BOMBS should fall on this country, one of the first problems in the hours after the disaster would be to salvage as much damaged foodstuffs as possible. Correct salvage techniques, promptly applied, can prevent enormous food losses, while careful detection of dangerous contamination can forestall widespread health disorders that might result if damaged food was unwittingly used.

Food sanitation problems that would confront a stricken community in time of war, were among the topics discussed at the Combined Conference on Administrative and Scientific Problems of Food Aspects of Civil Defense held in London during December. Meeting under auspices of the British Ministry of Food, the Conference brought together American, British, and Canadian representatives from a wide variety of fields concerned with feeding, food supply, public health, and sanitation, as well as civil defense officials from the three participating countries. The United States delegation of twenty-five included representatives from the American Red Cross, the Federal Security Agency, the Departments of Agriculture and Defense, the Nutrition Foundation, the National Academy of Sciences, the New York State Civil Defense Commission, and the FCDA, as well as members of several industries. Paul B. Murphy, Food Constultant of FCDA, was Acting Chairman of the American delegation.

British delegates' reports on their own salvage operations stressed speed. The most successful results, they said, were obtained when salvage work was started as soon as possible, especially with water-damaged goods.

FOOD SALVAGE

Cases of food damage, that at first glance seemed hopeless, many times yielded substantial quantities of food fit for human consumption or food which could be reconditioned, after careful salvage work. About 75 percent of the food discarded after the first air-raids on Britain could have been saved, in fact, by salvage methods later used.

For instance, from a grocery store at Trafford Park, Manchester, at first reported a total loss, 480 tons of bacon and meat were saved for human consumption or manufacturing purposes out of a total of 1,000 tons.

In Glasgow, after a period of raids, 750 tons of butter, bacon, poultry, and eggs were reported a total loss, but within a week over 500 tons of food had been recovered.

In a Bristol granary, 8500 tons of wheat were in a building totally destroyed. This burned for many days, and vast quantities of water were poured on the smouldering mass. It appeared that nothing at all could be recovered. Even two months later fires continued to break out spontaneously and each time a new opening was made into the mass, fresh fires started up. The whole business was like a "steaming porridge with a sour smell," the British report said. But by dint of perseverance and care, 6000 tons of grain were ultimately recovered.

British reports seem to indicate that the effects of blast may not be so destructive to food as often appears at first appraisal and that patient handling can restore much of what is damaged.

And actually, even in an atomic war, the principal damage to food is likely to result from fire and blast. Nor is it essentially different from what accompanies major blast and fire disasters in peacetime.

Homer N. Calver, former executive secretary of the American Public Health Association and former editor of the APHA Journal, is a member of numerous technical and honorary organizations in the public health fields, an honorary fellow of the Royal Sanitary Institute of Great Britain, and a member of the Society of American Bacteriologists. He organized and is now chairman of the Public Health Committee of the Paper Cup and Container Institute which studies sanitation problems, provides material for training food handlers, and sponsors a monthly magazine, *Health Officers' News Digest*, which Mr. Calver edits. Mr. Calver attended the London Conference on Administrative and Scientific Problems of the Food Aspects of Civil Defense as a special advisor to the Federal Civil Defense Administration.

SALVAGE PROCEDURE

A paper of particular interest on this subject was contributed by Winton B. Rankin, of the U. S. Food and Drug Administration, who outlined some technical bases for examining and salvaging food supplies damaged by fire, blast, and water. Examples of methods that might be applied to several broad classes of foods, according to Mr. Rankin's paper, follow:

"Perishable products probably will deteriorate beyond salvage if located near a major disaster. If salvable they should be cleaned as thoroughly as possible and cooked promptly to destroy harmful bacteria.

"Semi-perishable materials such as dried fruits deteriorate rapidly when they are moistened. If molding or decomposition has not set in when salvage is possible, damaged containers should be earmarked for prompt consumption; sterilization is required if the foods are polluted.

"The surface of the flour cakes when it is moistened. Some water-damaged flour may be salvaged by removing the uncaked material from inside bags or bins. Bulk lots of grains swell and form a solid mass; large quantities which have not been wet may be salvaged from inside elevators which have been subjected to heavy water damage.

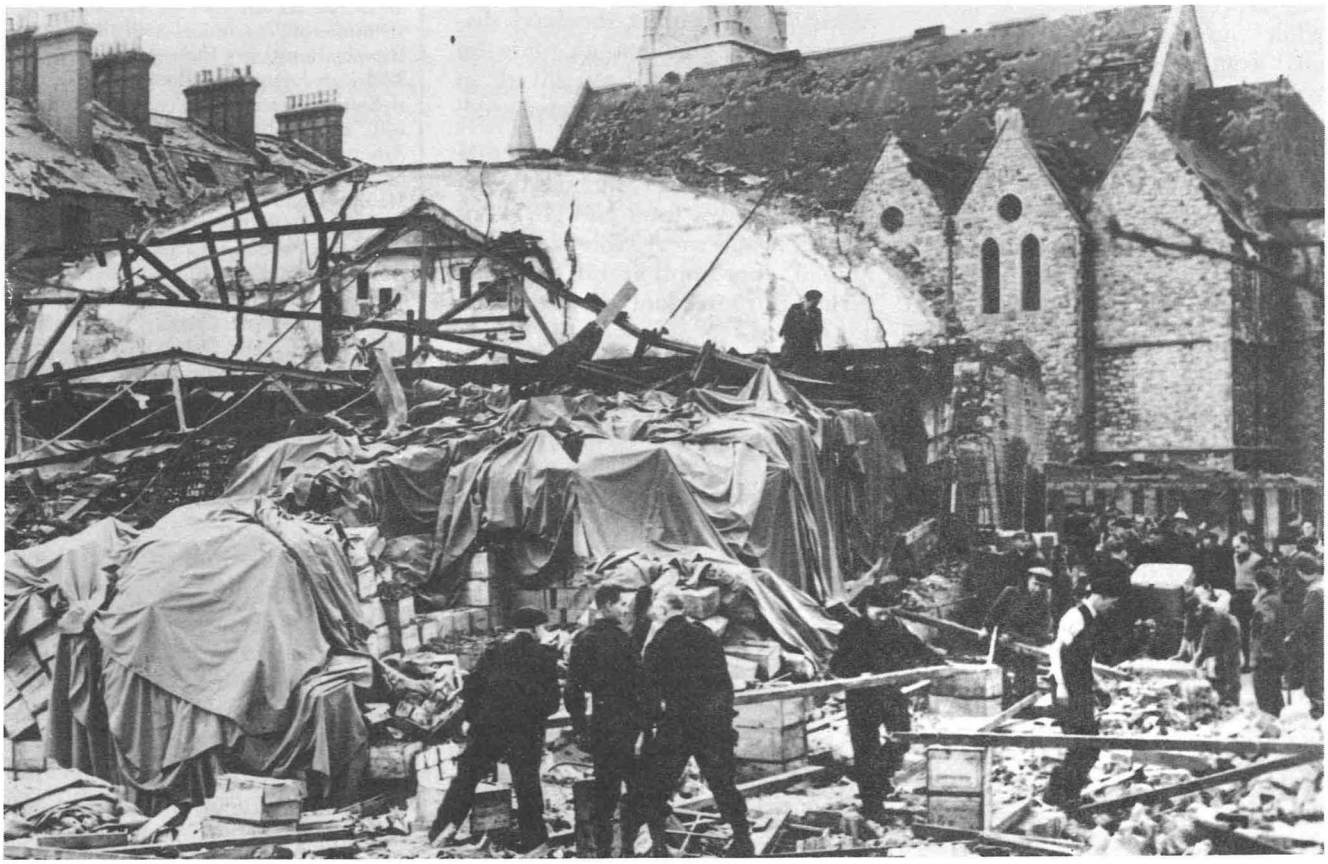
"Any food may be exposed to poisonous materials scattered about the storage area by blast. Often insecticides and foods are stored in the same warehouses leading to the possibility of mass poisoning from the scattering of the poisons over foods.

"Hermetically sealed cans may be ruptured by blast; they should be examined carefully for sprung seams which will permit spoilage. Decomposition resulting from damaged cans should be apparent in 7 to 10 days; adequate salvage will then be possible. Cold weather may retard the appearance of swells or leakers.

"Hermetically sealed cans which are heated and cool slowly may develop spoilage from thermophilic organisms. This will become evident as cans swell and explode. This decomposition ordinarily is not progressive; good cans may be sorted from bad after the containers with active thermophiles have swelled.

"Hermetically sealed cans exposed to pollution from water or other sources, should be sterilized before release to the public. The cans may rust and develop pinholes before salvage is possible. If not, they should be used promptly after release because of the danger of pinholing.

"Glass jars with screw caps, cans with friction-top lids, and similar containers without hermetic seals, and hermetically sealed jars with



An example of successful British food salvage operations during World War II was the case of this building in which 650 tons of miscellaneous foodstuffs were stored. It was completely demolished in the bombing and everything inside seemed a total loss. Six weeks of careful work resulted in recovery of 636 tons of food.

anchor or crown-type closures are difficult to salvage following contamination with polluted water or other filth. Pathogenic bacteria lodge under the caps or beneath rubber gaskets and may be introduced into the food when the container is opened. Foods in such containers should be sterilized before consumption.

"Foods in cardboard cartons, paper wrappers, and similar containers may be contaminated with toxic bacteria or poisons through breaks in the packages. Water damage to this type of package calls for adequate sterilization of the contents before use, if salvage is possible.

"If transportation and manufacturing facilities are available, large stocks of some foods, sugar for example, may be salvaged by refining even though they are heavily contaminated."

Radiation damage, according to latest thought, is likely to be slight and temporary, except at the center of an atomic blast where everything would be destroyed and no salvage problem would exist anyway. Extent and duration will depend on whether the bomb explodes in the air, on the ground or under water; on the direction of the wind and other factors. Foods which have been covered or enclosed are not likely to be dangerously affected for a long period by radio-active particles, although care must be taken in opening containers which have been exposed to see that contents are not contaminated by particles still on the container's exterior.

The question of the level of radioactivity in water and food that can be permitted under emergency conditions following an atomic blast or other nuclear explosion, was considered in a paper contributed jointly by Gordon E. McCallum, John D. Faulkner, and Stephen E. Koelz, all of the U. S. Public Health Service.

They advise that on the basis of present knowledge, eating of any food which has been radioactively contaminated is probably a risk and should be avoided. Therefore, no foods which have been exposed to either radioactive or chemical contamination should be eaten until they have been monitored and released for use by the proper authority. Similarly, food equipment exposed to either form of contamination must be thoroughly decontaminated before use.

SPECIAL SALVAGE METHODS

For salvage of typical foods exposed to fire, blast, or radiation, table 1, presented in the paper by Mr. Rankin, appears to be of sufficent interest for quoting here, as follows:

TABLE 1

Technical Problems Associated With Salvage of Typical Foods

Kind of food or package	Possible salvage procedure in case of		
	Contamination with radioactivity	Blast and fire damage	Water damage (pollution)
Fresh fruits and vegetables, fish, poultry.	Remove outside portions of lot containing most radioactivity. If remaining contamination less than emergency tolerance, release interior portions. Washing of fruits and vegetables may be of value.	Look for contamination with poisons. If carriers of pathogens present, sterilize before using.	Wash to remove surface contamination. Cook to kill bacteria.
Dried fruits and vegetables. Flour and grains. Bulk sugar stocks.	As above (except that washing is not feasible).	As above.	Prompt sterilization and use of fruits and vegetables. Remove flour and grain which is not caked. Cook before using. Re-refine sugar.
Cardboard and paper containers.	As for flour, above. Removal of dust by brushing. Remove outer wrappers.	As above.	If salvage attempted, sterilize food in water-damaged containers before it is consumed.
Sugar (Bulk Stocks)	As for flour, above.	As above.	Re-refine.
Canned Foods			
Hermetically sealed cans.	Wash outside of container with detergent, or remove radioactivity by brushing. Interior portions of stacks may be relatively free of radioactivity.	Look for and destroy cans with ruptured seams or closures. Look for spoilage from thermophilic organisms - remove abnormal cans.	Sterilize surfaces of cans. Watch for pinholing of metal. Use damaged stocks promptly.
Containers with screw caps, friction type lids, etc.	As above. Test contents before releasing for use.	As above.	Difficult to remove contamination from beneath or around closure. Sterilize foods before using.

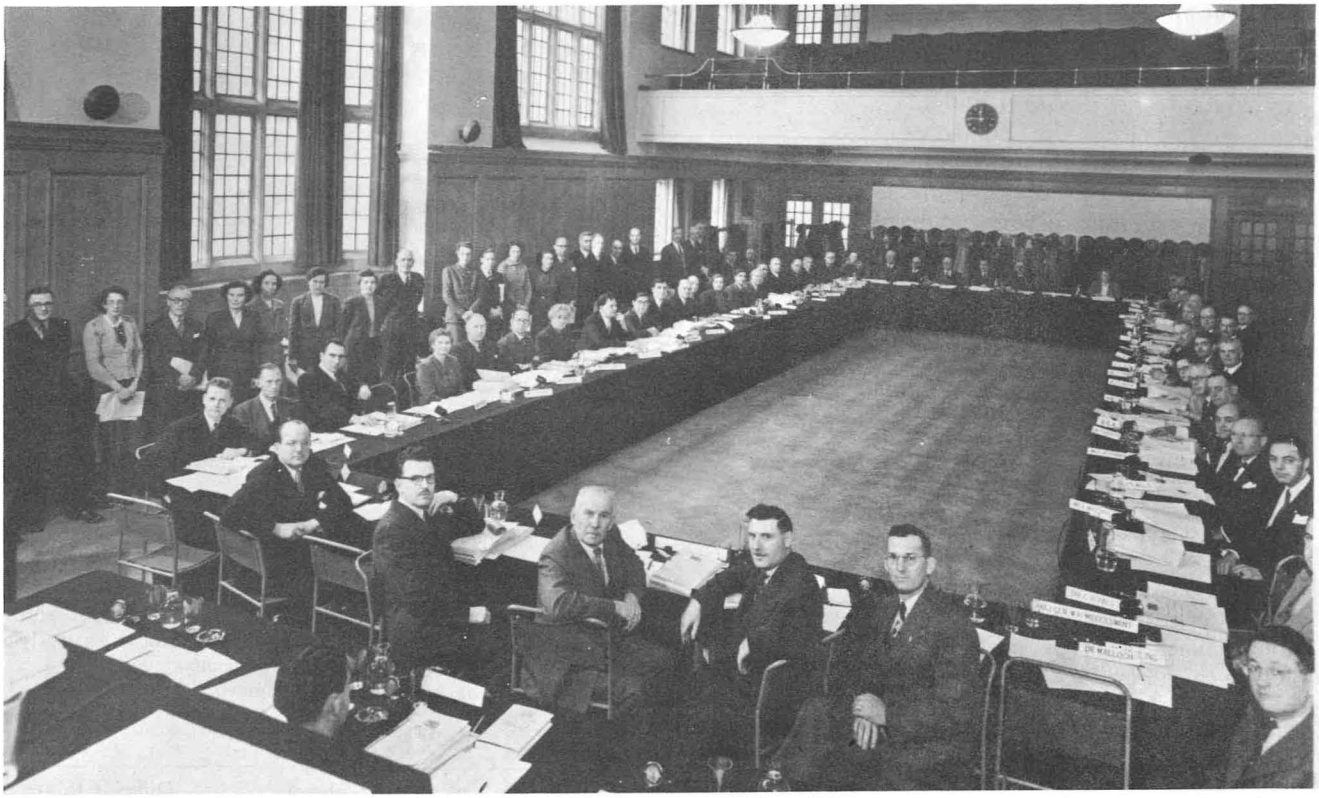
OTHER PROBLEMS

Salvage, of course, will not be the only problems that will face sanitarians after an enemy attack. The vast and diffused operation involved in feeding thousands of homeless people will afford alarming possibilities for outbreaks of food poisoning and for spread of food-borne disease unless preparation and service of food is carefully managed.

Emergency feeding will probably have to be carried on under difficulties that will include lack of water, electricity, or gas for a day or for weeks. If water supply is destroyed or water is contaminated, the job of keeping food containers and food service utensils clean will become a nightmare. Water would have to be trucked in and conserved for drinking purposes only. To help save water and at the same time provide sanitary service, paper utensils would become standard for food and drink service. British delegates praised the value of these utensils from their experience with them at Conventry during the last war, although British paper shortages prevented their widespread use. Conference delegates were interested to learn of the stockpiling of 25,000,0000 paper items in 20 presumptive target areas of the United States by the paper cup and container industry for just such emergency use. These supplies, stored in warehouses outside the immediate urban areas, would take care of initial needs in these areas.

The sanitary control of fluid milk products will become another public health problem after a disaster. Pre-attack arrangements for alternative storage, pasteurization, and distribution facilities should be provided as part of civil defense planning. Also important to foresee would be emergency sanitation control measures that would go into effect immediately after a disaster. These should approximate normal standards of sanitation as nearly as possible, it was emphasized, and return to normal standards should be made at the earliest moment.

Sanitary controls of food will be easier, of course, if pre-attack CD training of regular and of volunteer food workers stresses basic principles of sanitary food handling. These principles are well known to any public health department and include such things as personal cleanliness, the invariable use of clean food containers, the proper storage of food, and careful use of separate refuse containers. Food handlers should be told procedures to follow if lack of electricity causes a break-down in refrigeration and cold storage. Perishable goods would have to be put to immediate use, to avoid spoilage, while canned and staple goods would be saved for later menus.



Plenary sessions of the Combined Conference on Administrative and Scientific Problems of Food Aspects of Civil Defense met in Westminister House in the same room in which the House of Commons met after it was bombed out of its quarters in World War II. The Conference, which was held in London from November 26 until December 12, brought together delegates from the United States, Great Britain and Canada.

FOOD HANDLER TRAINING EVALUATION STUDIES IN CALIFORNIA*

RALPH L. TARBETT, B.C.E., R. S.**

Bureau of Sanitary Engineering, State Department of Health
Berkeley, California

The California Conference of Local Health Officers at a 1950 meeting requested the State Health Department to make a study of the effect of food handler training in a restaurant sanitation program. The Conference had previously gone on record as favoring education and inspection as desirable parts of a food sanitation program.

This request, coupled with the questions passed by several sanitation directors of local health departments, "Will food handler training schools substantially improve sanitation in our restaurants?" caused the State Department of Public Health to enter upon these studies.

Previous to the start of these studies, institutes on promoting and conducting food handler training programs had been held throughout the State. Guides which outlined the food handler courses had been distributed and widely accepted by local departments interested in food handler training.

Consultants from the A.P.H.A., U.S. P.H.S., University of California School of Public Health, and Department of Public Health planned the methods, forms, and technique to be used in making this study.

Field surveys of restaurants would be used as a base for measurements, State restaurant inspection personnel were used on the survey team.

Each restaurant is given a numerical grade based on 100: 37 points for physical plant and 63 points for operational items. A rating is given the community using the U.S.P.H.S. method of scoring.

Several types of communities were surveyed: (1) Those not having and not anticipating a food handler training program, (2) those not having, but developing a food handler training program, and (3) those having had a stable program for several years. This is developing a picture of the various types of communities.

It is impossible to draw positive conclusions as to the value of food handler training on the basis of our studies up to the present time. However, it does appear, from the information thus far accumulated in a number of communities in the State of California, that food handler training does pay substantial dividends. These dividends appear to be in improved restaurant sanitation, better working relations between the restaurant industry and the local health department, and an increased public interest in and support for the program.

Much of the criticism thrown at Health Departments regarding Food Sanitation is the lack of uniformity in recommended practices and legal interpretations of laws.

These studies, we believe, in addition to measuring the value of food handler training courses, are also tending to standardize practices and legal interpretations and develop closer relationships between the State and local health departments.

THE TRAINING of restaurant personnel by health departments in sanitary handling of food and equipment has been going on for something over ten years. This training has varied from one hour once a year, consisting principally of lecture, to eight or nine hours consisting of lecture or discussion coupled with a wide variety of visual aids.

Many of us who have worked with such training have seen and felt the benefits derived from this training. No one to our knowledge has ever attempted actually to measure the effects brought about by such a training program.

Directors of sanitation in every health department have, almost without exception, been confronted with the following questions:

(1) Will food handler training schools substantially improve food sanitation practices in restaurants and food establishments in the community?

(2) Will the improvement in sanitation brought about by food handler training be commensurate with the energies expended, and the cost of putting on this training program?

Born Pittsburgh, Pa. 1911.

Wife (Virginia) and two daughters.

Attended University of Maryland (1931-33) and George Washington University (1935-43) received Degree of Bachelor of Civil Engineering.

1935 to 1942 held positions with Engineering Department and Health Department of the District of Columbia and the U. S. Public Health Service.

1942 to 1947 Public Health Engineer Director of Division of Sanitation, Montgomery County, Maryland, and Captain, Sanitary Corps U. S. Army with service in Pacific during World War II, Awarded Bronze Star Medal for service in combat.

1947 joined staff of California State Department of Public Health to work on Restaurant and Recreation Sanitation Program.

* This paper is from the Division of Environmental Sanitation, California State Department of Public Health, Berkeley. Presented at the 38th Annual Meeting, International Association of Milk and Food Sanitarians, Inc., Glenwood Springs, Col., Sept. 26-28, 1951.

** Associate Sanitary Engineer.

The lack of an answer to these questions has caused some health officers and directors of sanitation to delay establishment of food-handler training programs. The directors of sanitation who have gone ahead and put on food-handler training schools have, in most cases, felt the program was well worth the time and energy, and that the dividends paid in better restaurant sanitation were high. Some directors have felt that such programs would pay dividends, but were skeptical of the value as compared to the cost.

The California Conference of Local Health Officers, in 1949, went on record as favoring a revocable permit system in conjunction with food-handler education and supervision as the most desirable method of promoting restaurant sanitation. The California Conference of Local Health Officers is unique in that is was established by law for the purpose of consulting with, and advising the Director and State Department of Public Health on policies dealing with its relations to the local health departments. Needless to say, the Conference exercises a fairly strong influence on the policy of the State Health Department. As a result of this resolution by the Conference, five two-day institutes for promoting, developing, and conducting food-handler training classes were held throughout the State. Those invited to attend these institutes were one sanitarian and one health educator from each local health department. The sanitarians attending the institutes were those who would be in charge of the local program. During the course of these institutes, the question came up as to whether or not food-handler training would pay dividends.

At the 1950 meeting, the Conference of Local Health Offiecrs requested the State Health Department to make a study to determine the effectiveness of food-handler training schools in actually improving restaurant sanitation conditions.

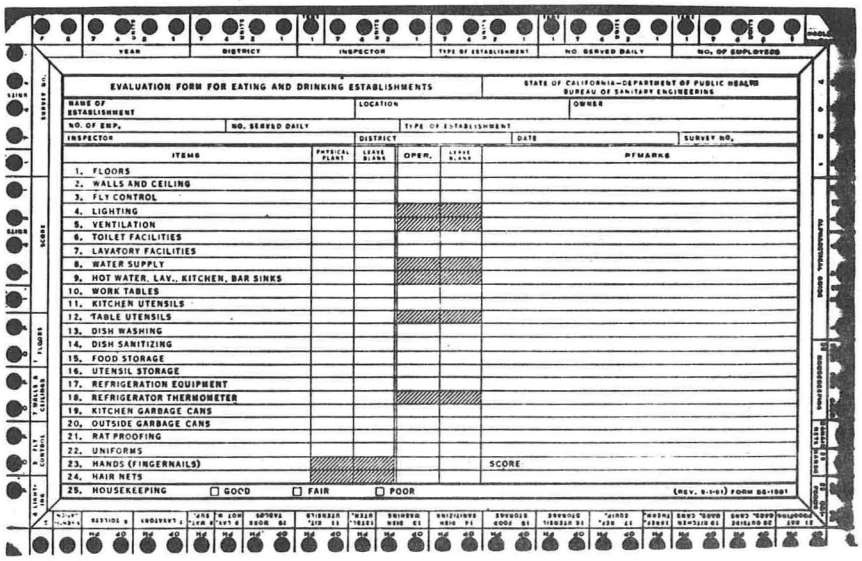
At this time, several local health departments in California were seriously considering comprehensive food-handler training programs. One community had passed a compulsory food-handler training law, and another had set up a Food Sanitation Advisory Committee. This committee was made up of representatives of Labor, Management and Education, and was set up to advise the local health department in developing a training program.

Several local health departments were asked if they would cooperate by allowing the State Health Department to use their communities as study grounds. Four local departments immediately volunteered to cooperate in this study.

The big problem which then confronted us was the development of tools and procedures to measure the effect of food-handler training programs in a community. As you can undoubtedly visualize, there were many and varied problems, inconsistencies, and variables which had to be taken into consideration. The problem of food-handler training course uniformity was minimized in that personnel from local departments, whose area would be studied, had attended the above mentioned institutes, and all departments had planned courses patterned after the one outlined in a guide distributed by the State Health Department earily in 1950. We were very fortunate at that time to have available for consultation in Berkeley, a field research representative of the American Public Health Association, active personnel in the School of Public Health at the University of California who were interested in this subject, and also a very active and capable Food Consultant of the U. S. Public Health Service from the District Office in San Francisco.

It was decided at a meeting with representatives of these several agencies that the best way to measure food handler training would be through an actual field survey of restaurant conditions prior to putting on food handler training schools and at yearly intervals thereafter. It was also felt by the group that State sanitarians working in the field of food sanitation were best fitted for making such a survey, and it would be advisable that the restaurants visited in the first survey be revisited in the succeeding years' surveys by the same sanitarian.

The survey form presented in figure 1 was developed and is at present being used. Along with the survey form, the field surveyors are given a guide to compliance as


EVALUATION FORM FOR EATING AND DRINKING ESTABLISHMENTS

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC HEALTH
BUREAU OF SANITARY ENGINEERING

NAME OF ESTABLISHMENT | LOCATION | OWNER

NO. OF EMP. | NO. SERVED DAILY | TYPE OF ESTABLISHMENT

INSPECTOR | DISTRICT | DATE | SURVEY NO.

ITEMS	PHYSICAL PLANT	LEAKS & RUST	OPER.	LEAKS & RUST	REMARKS
1. FLOORS					
2. WALLS AND CEILING					
3. FLY CONTROL					
4. LIGHTING					
5. VENTILATION					
6. TOILET FACILITIES					
7. LAVATORY FACILITIES					
8. WATER SUPPLY					
9. HOT WATER, LAV., KITCHEN, BAR SINKS					
10. WORK TABLES					
11. KITCHEN UTENSILS					
12. TABLE UTENSILS					
13. DISH WASHING					
14. DISH SANITIZING					
15. FOOD STORAGE					
16. UTENSIL STORAGE					
17. REFRIGERATION EQUIPMENT					
18. REFRIGERATOR THERMOMETER					
19. KITCHEN GARBAGE CANS					
20. OUTSIDE GARBAGE CANS					
21. RAT PROOFING					
22. UNIFORMS					
23. HANDS (FINGERNAILS)					SCORE
24. HAIR NETS					
25. HOUSEKEEPING	☐ GOOD	☐ FAIR	☐ POOR		(REV. 9-1-51) FORM DB-1001

FIG. 1

an aid in marking these field survey forms. The sanitation items to be investigated in the restaurants were broken down into physical plant and operation, and it was decided that the weight given to the operational items should be much more than that given to physical plant items. Operational items are given a total of 63 points and physical plant 37 points for a total of 100 points. The weight of rating of items on this form does not differ greatly from those listed in the U. S. Public Health Service Community evaluation form. Slight differences were felt necessary in order to maintain compatibility with California law and practices. The Public Health Service method of figuring a community sanitary rating was used in order that we might compare the rating given to a community one year with that given to the same community the next year. A sample of this method is shown in figure 2.

The selection of the sample did not seem to present any particular problem at the time because of the fact that we planned to go into a series of restaurants in a City or County one year, and then to go back to the same ones next year; thus, any selected group of restauants might be used. The sanitary rating of restaurants surveyed in a commmunity is not intended to be used in comparing restaurants of one community with those in another, but is intended to compare the restaurants in one community with the same restaurants of that community in the succeeding years. To compare restaurants of one community with those of another, a representative sample would be necessary, and we made no attempt to pick such a sample. However, in all cases, the samples would be of large magnitude.

As the study progressed, more health departments became interested in our activities and requested that we survey their communities. Many of these were more interested in having an unbiased appraisal of the conditions in their restaurants than in the food handler training study. Among those departments requesting surveys were two in which food handler training schools were well established.

After studying one comunity with food handler training, it was felt that the study would be materially strengthened if communities having different types of programs could be surveyed. The following types were selected.

(1) Those not having a food handler training program and not anticipating having such a program;

(2) Those not having had a program in the past, but in the process of developing one;

(3) Those having had a stable program for several years.

The thought was that the improvement due to inspection program alone could be compared with the improvement due to inspection plus food handler training. It was felt that the studies in communities having established food handler training programs would give an indication as to what might be expected in other communities after food handler training programs were established.

During 1950, four cities were surveyed. In Fresno, Long Beach, and Sacramento, approximately 30 percent of the restaurants in each city was surveyed. In Santa Barbara, a smaller city, approximately 85 percent of the restaurants were surveyed. To date, in 1951, surveys have been made in the cities of Modesto, Albany, and San Bernardino, and in the counties of Alameda, San Bernardino, and Riverside. Re-surveys have been made in the cities of Fresno, Long Beach, and Santa Barbara.

In figure 3 the curves shown are typical of those communities not having had food-handler training, and also of those communities studied in which food-handler training programs have been well established. It will be noted from these curves that a much larger percent of the restaurants fall above the grade of 80 in areas where food handler training programs have been in effect, than in those areas having no food handler training programs. Figure 4 shows the curves before food handler training for the cities of Fresno and Long Beach, and also the curves after one year of food handler training. A point of interest in passing may be that Fresno and Long Beach after the one year program did not show the favorable curve which was indicated in the Modesto and San Bernardino City curves. This may be accounted for

$$\frac{\text{Individual Restaurant Score} \times \text{Number Meals Served Daily (NSD)}}{100} = \text{Public Health Significance Figure (PHSF)}$$

$$\frac{\text{Sum of PHSF}}{\text{Sum of NSD}} \times 100 = \text{Community Rating}$$

FIG. 2 — Method of Computing Community Ratings

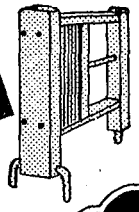
Protect YOUR HIGH TEMPERATURE EQUIPMENT

HTST PASTEURIZERS

VACUUM PANS

HOT WELLS

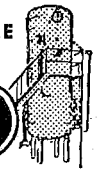
TUBULAR HEATERS

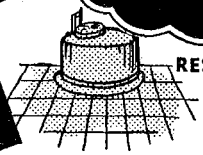


REMOVES BAKED-ON DEPOSITS

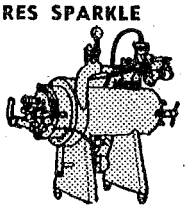
DISSOLVES LIME

KLENZADE





RESTORES SPARKLE



QUICK GENTLE EFFICIENT

Better KLENZADE CLEANING METHODS

Klenzade products, Flash-Klenz, Flash-Kleen and Brite-Klenz, all specially developed for these tough cleaning jobs, keep high temperature equipment *sparkling* clean.

Complete methods and procedures have been scientifically worked out for each high temperature cleaning job. All are being practiced successfully in the field.

Stop harsh methods. . . . It costs no more to protect quality and equipment investment with Klenzade products and methods of cleaning high temperature equipment.

KLENZADE PRODUCTS, INC.

BELOIT, WISCONSIN

STOP HARSH METHODS *Get the Facts!*

Klenzade Products, Inc.
Beloit, Wisconsin

Please send complete details on Klenzade High Temperature Equipment Cleaning Methods for:

☐ HTST Pasteurizers ☐ Vacuum Pans
☐ Hot Wells ☐ Tubular Heaters

Name .....
Company .....
Street .....
City..... Zone..... State.....

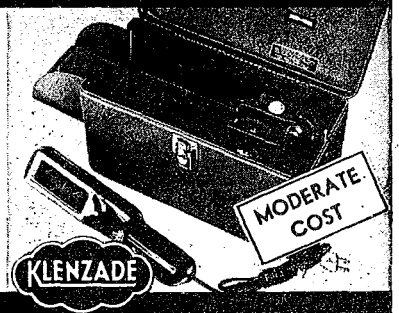
INDEX TO ADVERTISERS

MINERALIGHT *Ultra-Violet Light*

FOR DETECTING MILKSTONE, FATS AND OTHER SOILS

For Sanitarians, Field Men and Inspectors

Mineralight is a compact portable long wave ultra-violet light which causes fluorescence in milkstone, fats, and other soils not readily seen by the eye. Used like a flashlight. Operates 110 V-AC or batteries. Adapter available for 110 V-DC Carrying case optional, but necessary for battery operation. Moderate cost Valuable aid to any size plant. Indispensable in improving sanitary standards. Write for literature



KLENZADE PRODUCTS, INC., BELOIT, WIS.

A BUZZ SAW HAS ITS PLACE ...BUT NOT IN PUMPING MILK

Dairy engineers are quick to acknowledge that there are many applications in dairy pumping which require a positive displacement type pump for satisfactory results. One of these is in pumping against pressure, where separators or clarifiers are involved.

Waukesha pumps overcome high pressure through positive displacement, not high speed. There's no aeration, churning or agitation which can be so damaging to the quality of your product . . . slippage and recirculation just doesn't happen with the positive displacement principle.

For high head pumping in the dairy industry, Waukesha pumps assure proper transmission of your product, regardless of its viscosity. Protecting your product is the most important part of your entire processing operation.

Write for advice and details on the use of Waukesha Slow Speed Sanitary pumps for this purpose in your plant.

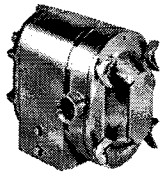
Visit Waukesha Booth D-57
Dairy Industries Exposition

use Waukesha

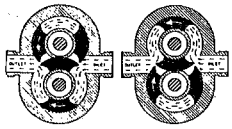
POSITIVE DISPLACEMENT SLOW SPEED SANITARY PUMPS FOR HIGH HEAD PRESSURE TO PROTECT YOUR PRODUCT

Check these Exclusive Features...

FASTER CLEANING — Streamlined design, plus simple disassembly — saves clean-up time and labor.



LONGER SERVICE-LIFE— Fewer working parts mean longer trouble-free service.



CORROSION-RESISTANT METAL — All product contact parts are of Sanitary "Waukesha Metal" or Stainless Steel.

WAUKESHA FOUNDRY CO.
WAUKESHA, WISCONSIN

Waukesha 100% SANITARY PUMPS
Dependable Product of a Responsible Manufacturer

Milk Sanitation
STANDARD RECORD FORMS

As recommended by the Division of Dairy Products, Indiana State Board of Health.

PRICE LIST - STOCK FORMS — Shipments made same day orders are received — LARGER QUANTITY Prices and Imprinting costs on application — SPECIAL PURPOSE Forms printed. Send copy and specifications for suggestions and estimates.

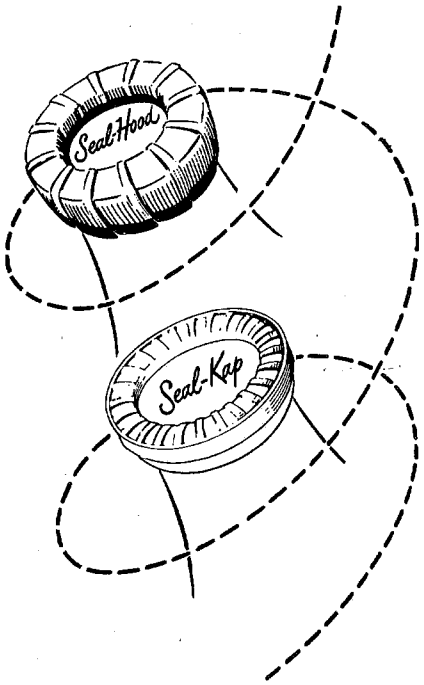
Save Money — Buy Stock Forms

23120—Office Form - Dairy Farm Record, Inspection Record on Back, 8 x 10 on Buff Index, per 100 **$4.00.** per 1000	**$30.00**
23121—Field Form - Dairy Farm Record with Inspection Record on Back, 5 x 8 on Salmon Index, per 100 **$2.00;** per 1000	**15.00**
23122—Grade A Permit (Raw Milk for Pasteurization), on Grey Safety, 8½ x 5½, per 100	**2.00**
23123—Grade A Permit (To Operate Milk Plant), on Green Safety, 8½ x 5½, per 100	**2.00**
23124—Plant Sanitarian's Reprt with Farm Report on Back, 11 x 8½, on 20 lb. white bond, per 100 **$1.00;** per 1000	**9.00**
23125—Pasteurization Plant Enforcement, Inspection Record on Back, 8 x 10, on Buff Index, per 100 **$4.00;** per 1000	**30.00**
23126—Pasteurization Plant Enforcement, printed both sides, 8 x 10 on Buff Index, per 100 **$4.00;** per 1000	**30.00**
23127—Tests of Pasteurization Equipment. etc., both sides, 16 x 5½ on blue Index, per 100	**6.00**
23128—Condemned Tags, Bright Red, per 100	**2.00**
23129—Clean or Repair Tags, Yellow, per 100	**2.00**
23130—Producers Permit - Plant Copy, 3x5 on Buff Index, per 100 **$1.00;** 1000	**7.50**

TIPPECANOE PRESS INC., SHELBYVILLE, IND.

Printers — Lithographers — Stationers

last drop protection



...either way!

● Seal-Hood and Seal-Kap closures provide far more than old-fashioned dairy-to-doorstep protection. Each keeps milk free from contamination and odors long after delivery—in fact, down to the last drop in the bottle.

With Seal-Hood, the capper *never touches* the top of the bottle. No wires, forks or tools needed to open. And Seal-Hoods snap snugly back on as often as required.

Seal-Kap, the original "twist-off ... snap-on" closure, combines seal and cap in one simple unit. Even when the bottle is tilted, Seal-Kap prevents leakage.

Thousands of prominent dairies are using Seal-Hood and Seal-Kap closures to completely safeguard their milk and milk products. These dairymen, too, welcome the one-operation economy each closure provides.

AMERICAN SEAL-KAP CORP.
11-05 44th DRIVE, LONG ISLAND CITY 1, N.Y.

"how DIVERSEY 5-2 method solved my can washing problem PERMANENTLY!"

"I was one of those dairy plant managers who believed my can washing problem could be solved by using just ONE cleaning compound. Like a lot of you, we switched can washing compounds recently. Everything ran smoothly for about five weeks, but then the old problem of human error and negligence was with us again. It took a Diversey D-Man to clear up my thinking once and for all!"

"Here's the way I look at it now. My business is producing dairy products . . . not washing milk cans! Any of my time that is spent 'nurse-maiding' a can washing operation is money 'down-the-drain'! Yet, I must be sure that our patrons get clean, undamaged cans, every day . . . year around! I have to be sure also that I don't waste money and time on milkstone removal! I know that I have to take into account the human element in my can washing operation. I know that my man can't be right 100% of the time, and I can't afford to gamble! Experience has taught me that in my case no ONE cleaner can do the whole job!"

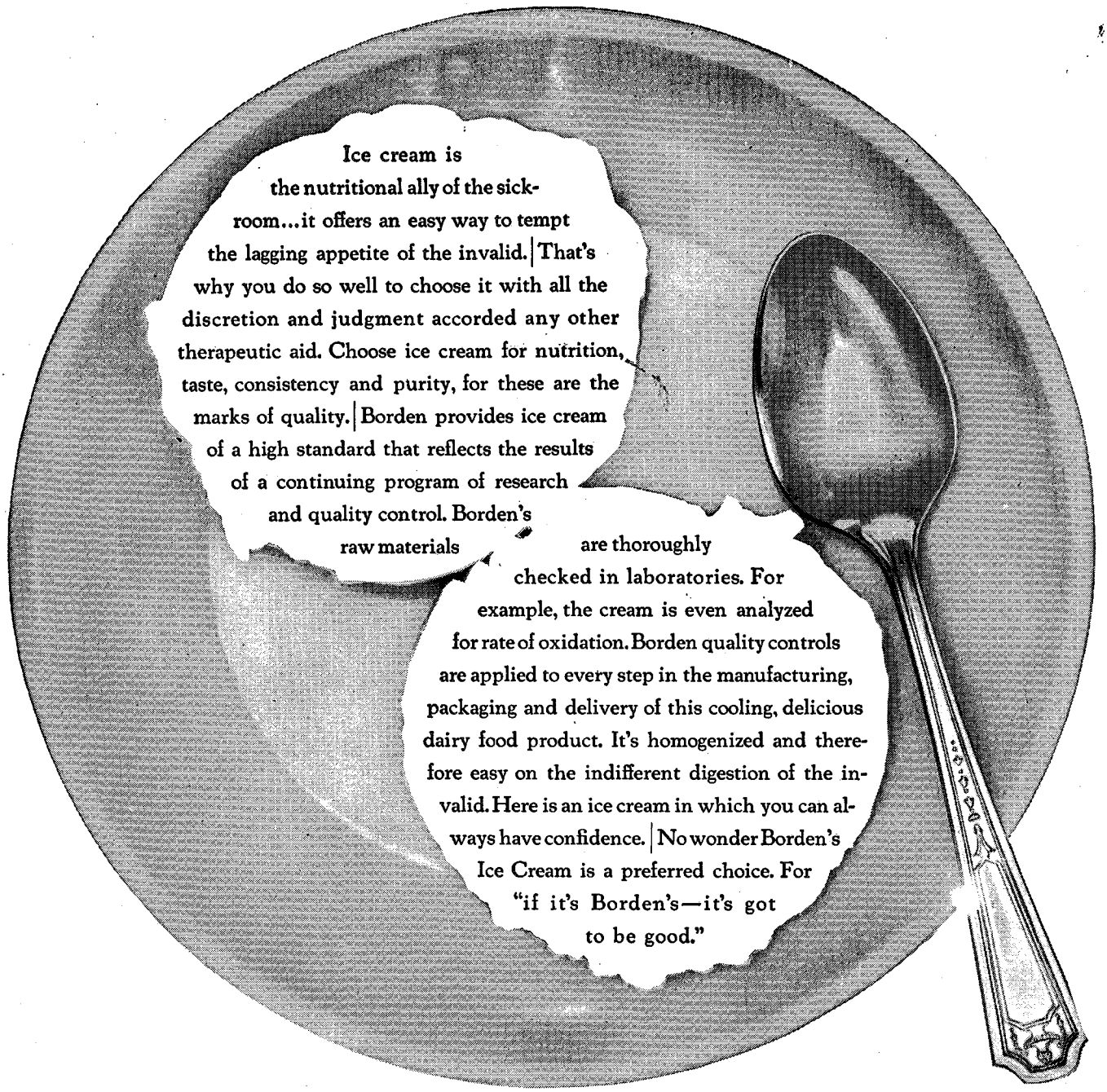
"That's why the Diversey 5-2 Method of can care is so practical . . . it gives me an extra factor of safety . . . peace of mind! Diversey 5-2 Method . . . five days on an alkaline cleaner two days on an acid cleaner . . . assures me, regardless of how my can washing man feels or what personel problems he may have, that our dairy always delivers sparkling clean, film-free, undamaged cans to our patrons and that milkstone build-up is eliminated. There is no unnecessary maintenance costs or inconvenience with Diversey 5-2!"

"I've switched for the last time . . . switched to Diversey 5-2 Method . . . it makes sense to me!"

Call your Diversey D-Man today for a *FREE* demonstration of 5-2 Method of can care!

THE DIVERSEY CORPORATION
1820 Roscoe Street • Chicago 13, Illinois
In Canada: The Diversey Corporation (Canada) Ltd., Lakeshore Road, Port Credit, Ontario

the patient can pick the flavor



Ice cream is the nutritional ally of the sick-room...it offers an easy way to tempt the lagging appetite of the invalid. That's why you do so well to choose it with all the discretion and judgment accorded any other therapeutic aid. Choose ice cream for nutrition, taste, consistency and purity, for these are the marks of quality. Borden provides ice cream of a high standard that reflects the results of a continuing program of research and quality control. Borden's raw materials are thoroughly checked in laboratories. For example, the cream is even analyzed for rate of oxidation. Borden quality controls are applied to every step in the manufacturing, packaging and delivery of this cooling, delicious dairy food product. It's homogenized and therefore easy on the indifferent digestion of the invalid. Here is an ice cream in which you can always have confidence. No wonder Borden's Ice Cream is a preferred choice. For "if it's Borden's—it's got to be good."

The *Borden* Company

350 Madison Avenue, New York 17

Manufacturers and distributors of BREMIL powdered infant food • MULL-SOY hypoallergenic food • BIOLAC infant food DRYCO infant food • MERRELL-SOULE Powdered Skimmed Milk • BORDEN'S Evaporated Milk • STARLAC non-fat dry milk • Instant Coffee • Fresh Milk • Ice Cream, and Cheese.

Application for Membership

INTERNATIONAL ASSOCIATION OF MILK & FOOD SANITARIANS, INC.
Box 286, Shelbyville, Ind.

Name _____ **Date** _____
Please Print

Address _____ ☐ **New**

☐ **Renewal**

_____ ☐ **Re-instatement.**

Business Affiliation _____

Annual Dues $5.00 ☐ **Check** ☐ **Cash**

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

(Please Print)

Box 286
Shelbyville, Ind.

Subscription Order
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 286, Shelbyville, Ind.

Change of Address

FROM

Date _____

Name _____
Please Print

Address _____

TO

Name _____
Please Print

Address _____

(Please Print)

I. A. M. F. S. & J. M. F. T.
Box 286, Shelbyville, Ind.

Order for 3A Standards

Name _____
Please Print

Date _____

Address _____

( ) Complete Set @ $1.35 =..... **( ) 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

Bowey's Inc.

Thanks! Inspector...

...FOR THE JOB YOU HAVE DONE...AND FOR YOUR CONTINUING EFFORTS TO KEEP QUALITY FIRST!

In our business, sanitation is a most vital aspect of quality. While we as manufacturers undertake the necessary research and inspection to keep DARI-RICH at the top in quality . . . it is your important function to *maintain* such standards in the field.

And these efforts over the years have greatly increased the quality of dairy products, including the nationally-famous DARI-RICH Chocolate Flavored Milk and Drink. For your help, we thank you—and endorse your constant vigilance to protect the health of our nation.

Dari-Rich
TRADE MARK REG. U. S. PAT. OFF.
CHOCOLATE FLAVOR SUPREME!

DIFCO

SEP 29
DIVISION O
DAIRY PRODUCTS

CULTURE MEDIA *for Examination of Milk*

BACTO-TRYPTONE GLUCOSE EXTRACT AGAR

is recommended for use in determining the total bacterial plate count of milk in accordance with the procedures of "Standard Methods for the Examination of Dairy Products" of the American Public Health Association.

Upon plates of medium prepared from Bacto-Tryptone Glucose Extract Agar colonies of the bacteria occuring in milk are larger and more representative than those on media previously used for milk counts.

BACTO-PROTEOSE TRYPTONE AGAR

is recommended for use in determining the bacterial plate count of Certified Milk. The formula for this medium corresponds with that suggested in "Methods and Standards of Certified Milk" of the American Association of Medical Milk Commissions.

BACTO-VIOLET RED BILE AGAR

is widely used for direct plate counts of coliform bacteria. Upon plates of this medium accurate counts of the organisms are readily obtained.

BACTO-BRILLIANT GREEN BILE 2%

BACTO-FORMATE RICINOLEATE BROTH

are very useful liquid media for detection of coliform bacteria in milk. Use of these media is approved in "Standard Methods."

Specify "DIFCO"

The Trade Name of the Pioneers in the Research and Development of Bacto-Peptone and Dehydrated Culture Media

DIFCO LABORATORIES
DETROIT 1, MICHIGAN

Printed in U. S. A.