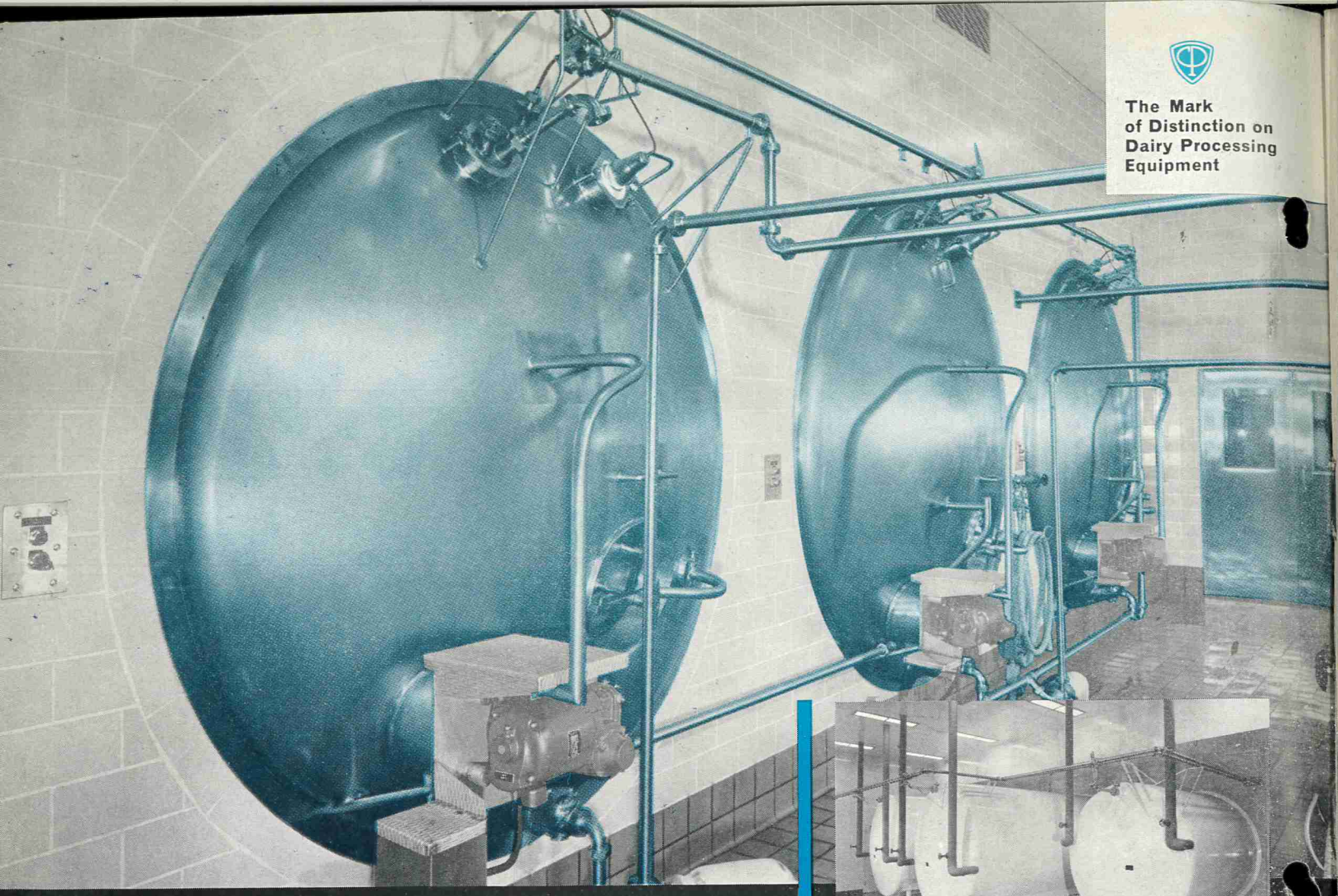
VOLUME 20 NO. 11
NOVEMBER, 1957

Journal of

MILK and FOOD TECHNOLOGY

Official Publication

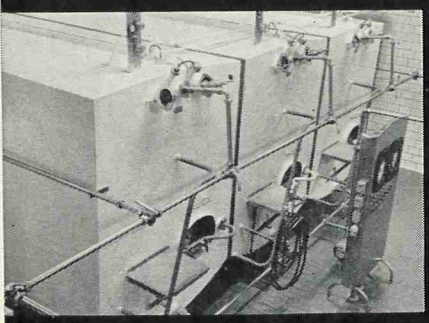
International Association of Milk and Food Sanitarians, Inc.



The Mark of Distinction on Dairy Processing Equipment

You'll Be Glad You Looked Ahead!

A typical, cleanly designed CP Cylindrical Storage Tank installation for incoming raw milk. CP Cylindrical Tanks are available in cold-hold or refrigerated models (direct expansion or sweetwater) in 1,000 to 10,000 gallon sizes.



CP RECTANGULAR STORAGE TANKS

Offer you the same high quality and efficiency and basically similar design features as CP Cylindrical Tanks.

STORAGE TANKS

Better Engineered to Protect Your Product and Your Investment . . .

- ★ Designed by CP dairy and refrigeration engineers to meet your need for lower maintenance and operating costs.
- ★ Built by CP master metal craftsmen, aided by the newest methods and fabricating equipment.
- ★ Heavy stainless steel inner lining is CP precision welded, then carefully ground and polished to CP specifications.
- ★ Special steel CP spun heads—inner and outer—are contoured for highest strength and sanitation.
- ★ CP-developed foamless agitation assures thorough mixing and fast cooling.
- ★ CP high-efficiency insulation reduces refrigeration input and costs.

GET THE STORY STRAIGHT FROM YOUR CP REPRESENTATIVE TODAY

Performance-backed by CP—the only manufacturer of both storage tanks and refrigeration equipment . . .

Manufactured and Distributed Solely By

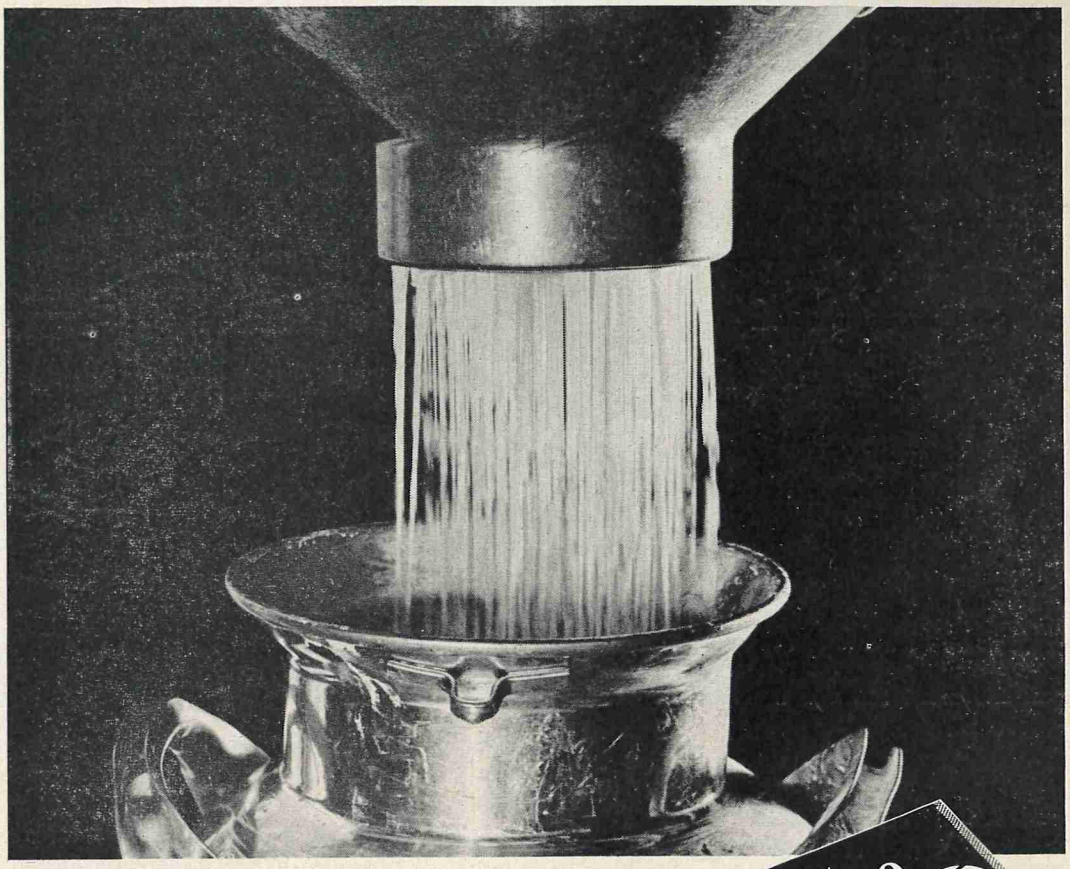
THE *Creamery Package* MFG. COMPANY

General and Export Offices: 1243 W. Washington Blvd., Chicago 7, Ill.

BRANCHES IN 23 PRINCIPAL CITIES

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD.

Why Filter Milk on the Farm?



There are *three* basic reasons for filtering milk on the farm with engineered RAPID-FLO *Fibre-Bonded*® Single Faced Disks . . .

1. **To promptly remove extraneous matter that may get into the milk in spite of ordinary precautions.**
2. **To determine corrective steps necessary for the production of clean milk day in and day out.**
3. **To provide a reliable Every Cow Check-up for mastitis, improved milk quality and lower production costs.**

RAPID-FLO® Single Faced Filter Disks are engineered by Johnson & Johnson to provide safe filtration and the all important RAPID-FLO® Check-up for mastitis and extraneous matter. When you recommend engineered RAPID-FLO® Single Faced Disks and the RAPID-FLO® Check-up, you are helping the producer improve milk quality and increase profit.

Johnson & Johnson **Filter Products Division**

4949 West 65th Street Chicago 38, Illinois

safe on sight

In accordance with U.S. Public Health Service recommendations, more and more State agencies are accepting quaternary based germicides which state their water hardness tolerance levels on the product label. The *higher* the water hardness tolerance level, the *greater the area* in which the germicide will be *safe* – beyond question, beyond the risk of public health. Onyx is glad to encourage all efforts toward this end, and as its contribution, offers germicide manufacturers quaternaries with the *highest hard water tolerance* and with *accepted* label claims.

Because water hardness is at best a variable, from well to well and from season to season, a safe germicide or sanitizer should offer the highest level of water hardness tolerance. Products based on Onyx' BTC-824, for example, are effective germicides in waters up to at least 500 ppm. Products based on other Onyx' quaternaries are effective in waters up to 1,100 ppm. All Onyx quaternaries are tested in accordance with Interpretation No. 21, Federal Register, September 1956. These claims have been reviewed and accepted by the U.S. Department of Agriculture.

*For further information on labeling procedures and on Onyx quaternaries, write for Bulletin HW-6-7. ONYX OIL & CHEMICAL COMPANY, Industrial Division, 190 Warren Street, Jersey City 2, N. J.

ask the man from Onyx

ONYX CHEMICALS

The Journal of Milk and Food Technology (including Milk and Food Sanitation) is issued monthly beginning with January number. Each volume comprises 12 numbers. Published by the International Association of Milk and Food Sanitarians, Inc., with executive offices of the Association, Blue Ridge Rd., P. O. Box 437, Shelbyville, Ind.

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

EDITORIAL OFFICES: J. C. Olson, Jr., Associate Editor, Dept. Dairy Husbandry, University of Minn., St. Paul, Minn.; H. L. Thomasson, Managing Editor, P. O. Box 437, Shelbyville, Ind.

Manuscripts: Correspondence regarding manuscripts and other reading material should be addressed to J. C. Olson, Jr., Associate Editor, Dept. Dairy Husbandry, University of Minn., St. Paul, Minn.

"Instructions to Contributors" can be obtained from the Editor for the use of contributors of papers.

Journal of

MILK and FOOD TECHNOLOGY

INCLUDING MILK AND FOOD SANITATION

Official Publication

International Association of Milk and Food Sanitarians, Inc.

REG. U.S. PAT. OFF.

Vol. 20 November No. 11

Contents

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

Subscription Rates: One volume per year
Individual non-members, Governmental and Commercial Organization subscription, 1 yr. $6.00
Public and Educational Libraries, 1 yr. $4.00
Single Copies $1.00

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

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

Non-Corrosive PENNSAN... a New PENNSALT Concept in Bulk Tank Sanitizers

Here's a bulk tank sanitizer with nine intensive years of research and field testing behind it. Pennsan, Pennsalt's new non-corrosive sanitizer, is a light amber liquid with orthophosphoric acid and an anionic wetting agent as the active ingredients. It is considered to be a new concept in this field, offering superior benefits over other types of products on the market today.

The bactericidal properties of Pennsan have been established by the company's Whitemarsh Laboratories with the widely-used and accepted Weber-Black technique. The tests show faster kill on specified organisms, in every case, than required by the revised Appendix F, U.S.P.H.S. Ordinance and Code. It is equally effective on psychrophilic bacteria. Further proof of highly effective sanitizing power has been shown in rigid field tests under actual dairy farm conditions by a well known university and Quality Control Laboratory.

It has further been established by Whitemarsh Laboratories that Pennsan does not attack stainless steel. These findings have been confirmed by manufacturers of bulk tanks and dairy equipment.

Pennsan also retains its bactericidal effectiveness even after drying on stainless steel for as long as 24 hours. Additionally, Pennsan is particularly effective in hard water, as well as cold water; and due to the low pH of use solutions, the costly problems of films and milkstone caused by hard water salts are eliminated.

Pennsan is especially recommended for sanitizing bulk farm tanks and tank trucks. It is equally effective on utensils, and all dairy and food plant equipment after thorough cleaning. These recommendations are supported by quality control tests conducted by an independent laboratory serving the dairy industry in a five-state area.

Contents are stated on the label. According to the manufacturer, Pennsan* should be used one ounce to one gallon of water. This use solution has a pH of 2.1 and contains 215 p.p.m. anionic wetting agent.

A test kit is available for determining the parts per million of the sanitizing agent in the use solution of Pennsan. The solution should be discarded when test indicates available sanitizer is 100 p.p.m. or less.

An authority in the field of preventive medicine has already reported that a use solution of Pennsan imparts only slight and temporary irritation of the cornea when tested in the eyes of rabbits. The effect is compared to that of soap.

**A trade-mark of Pennsalt Chemicals Corporation.*

Pennsalt Chemicals

Complete literature on the new Pennsan is available from the manufacturer. Write to B-K Department 478, Pennsalt Chemicals, 3 Penn Center, Philadelphia 2, Pa.

An advertisement printed as a service to dairy scientists by the Pennsalt Chemicals Corporation, 3 Penn Center, Philadelphia 2, Pa.

THE ONLY *Approved*
SANITARY METHOD OF APPLYING
A U. S. P. LUBRICANT
TO DAIRY & FOOD
PROCESSING EQUIPMENT

Haynes Spray

U. S. P. LIQUID PETROLATUM SPRAY

U.S.P. UNITED STATES PHARMACEUTICAL STANDARDS

CONTAINS NO ANIMAL OR VEGETABLE FATS. ABSOLUTELY NEUTRAL. WILL NOT TURN RANCID — CONTAMINATE OR TAINT WHEN IN CONTACT WITH FOOD PRODUCTS.

SANITARY—PURE

ODORLESS—TASTELESS

NON-TOXIC

This Fine Mist-like
HAYNES-SPRAY
should be used to lubricate:

SANITARY VALVES
HOMOGENIZER PISTONS — RINGS
SANITARY SEALS & PARTS
CAPPER SLIDES & PARTS
POSITIVE PUMP PARTS
GLASS & PAPER FILLING MACHINE PARTS
and for ALL OTHER SANITARY MACHINE PARTS which are cleaned daily.

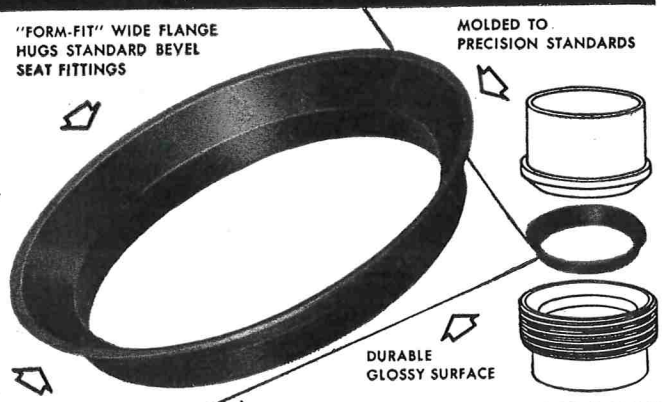
The Modern HAYNES-SPRAY Method of Lubrication Conforms with the Milk Ordinance and Code Recommended by the U. S. Public Health Service

The Haynes-Spray eliminates the danger of contamination which is possible by old fashioned lubricating methods. Spreading lubricants by the use of the finger method may entirely destroy previous bactericidal treatment of equipment.

PACKED 6-12 oz. CANS PER CARTON SHIPPING WEIGHT—7 LBS.

THE HAYNES MANUFACTURING CO.
709 Woodland Avenue · Cleveland 15, Ohio

HAYNES SNAP-TITE GASKETS



LOW COST...RE-USABLE

LEAK-PREVENTING

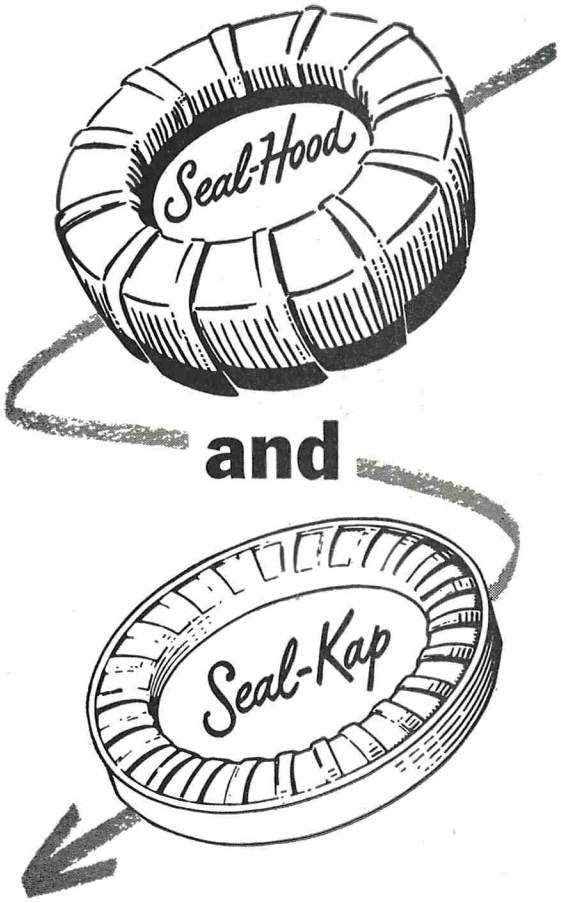
NEOPRENE GASKET for Sanitary Fittings

Check these SNAP-TITE *Advantages*

- Tight joints, no leaks, no shrinkage
- Sanitary, unaffected by heat or fats
- Non-porous, no seams or crevices
- Odorless, polished surfaces, easily cleaned
- Withstand sterilization
- Time-saving, easy to assemble
- Self-centering
- No sticking to fittings
- Eliminate line blocks
- Help overcome line vibrations
- Long life, use over and over

Available for 1", 1½", 2", 2½" and 3" fittings.
Packed 100 to the box. Order through your dairy supply house.

THE HAYNES MANUFACTURING CO.
709 Woodland Avenue · Cleveland 15, Ohio



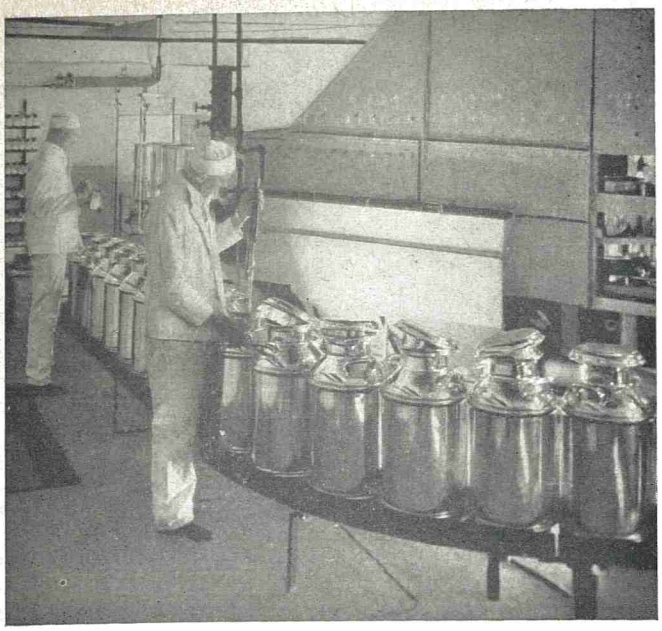
keep milk fresh to the last drop

• From dairy to consumer these modern, practical closures completely seal the bottle mouth. On the capping line, and during delivery, hands never touch the pouring lip.

In the home, this cleanliness and sure protection continues. Seal-Hood and Seal-Kap closures snap tightly back on after each use, keeping milk at the peak of freshness and purity until the bottle is empty. And because both cap and seal are combined in one unit, users enjoy far easier handling than with ordinary caps.

Capping with Seal-Hood and Seal-Kap is a *single operation* process. Naturally, dairymen benefit from sizable savings in milk loss, time and maintenance costs . . . because no separate hooder is needed.

AMERICAN SEAL-KAP CORP.
11-05 44th Drive
Long Island City 1, N. Y.



FROM HERE

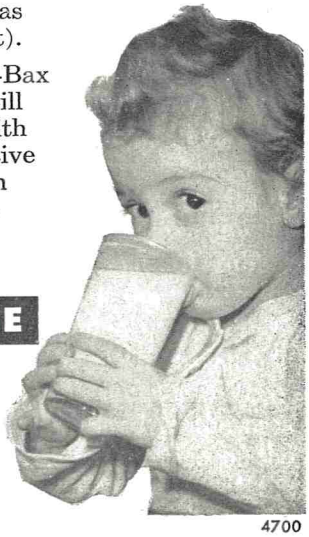
protect milk quality with LO-BAX

Everything that contacts milk needs Lo-Bax treatment.

Safe and dry, easy to use, Lo-Bax is the fast, economical chlorine bactericide for sanitizing dairy plant equipment, containers and potential danger spots. To suit your requirements, it comes as Lo-Bax Special and as LoBax-W (with wetting agent).

Introduce your suppliers to Lo-Bax too... they'll benefit and so will you. You can furnish them with the free samples and informative literature that Olin Mathieson will be glad to send you. Just write today.

TO HERE



Lo-Bax® is a trademark

4700

LO-BAX

OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

WISE OPERATORS ROTATE CULTURES

"HANSEN'S" DRI-VAC

T M REG. U S. PAT OFF

MIXED STRAIN

MULTIPLE-TYPE CULTURES

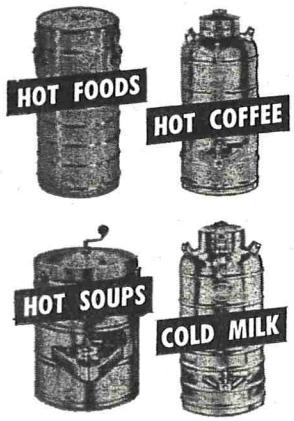
Mixed Strains Assure Vigor and Finest Flavor Development

The wide variety of totally unrelated multiple-type Dri-Vac Cultures assures you of day-in and day-out successful culture propagation. Dri-Vac Cultures enable you to establish a number of different lactic combinations that may be used on an alternate basis to avoid culture failures. Dri-Vac Lactic Culture is ready to go on the first propagation. Simplifies starter making . . . excellent keeping quality for reserve use. Write for details now.

CHR. HANSEN'S LABORATORY, INC.
9015 W. MAPLE STREET — MILWAUKEE 14, WIS.

Institutions — Schools — Hospitals — Industrial Plants — Hotels — Caterers — Camps — Air Lines — Government — Civil Defense — Commercial Feeding Operations.

THE "AERVOID" CENTRAL KITCHEN SYSTEM HAS PROVED ITS WORTH IN ALL FIELDS OF MASS-FEEDING



AerVoiDs provide . . .
Sanitary Vacuum Insulation -
A positive Health Safeguard!

To-day's "Modern" trend toward centralization of food preparation is a milestone toward Economy, Better Quality and Higher Sanitary Standards.

Into this new picture nothing fits like AerVoiD's Portable, Stainless-Steel, High-Vacuum Insulated, food, soup and liquid Carrier-Dispensers. AerVoiDs alone provide the proven quality and durability to survive under rough usage, spreading their cost over a long period of uninterrupted service.

All AerVoiD Equipment, so indicated in our specifications is "In Compliance" with the sanitary construction requirements of the U. S. Public Health Service Ordinances and Codes.

Write for FREE Literature Kit MFT-01

Our Consulting Service is also FREE

VACUUM CAN COMPANY
19 South Hoyne Avenue, Chicago 12, Illinois

AERVOID REG. U.S. PAT. OFF. *Vacuum Insulated* **Hot or Cold Food, Soup, Milk, Coffee and Beverage Carrier-Dispensers**

HEAT PENETRATION INTO PRECOOKED FROZEN CRAB CAKES

MELVIN A. BENARDE

University of Maryland, Seafood Processing Laboratory, Crisfield, Maryland

(Recieved for publication August 25, 1957.)

Heat penetration into commercially prepared precooked frozen crab cakes was determined. Split samples were used to determine heat penetration into cakes following wrapper directions and under conditions encountered in homes. In both cases probable inadequate heating was obtained.

Pre-cooked frozen foods have found a ready market with the American populace. Apparently, these "items of convenience" fit our changing patterns of living since these new foods are replacing, in large part, similar items normally prepared and cooked at home.

Straka and Stokes (2) have reported that "the dangers of excessive microbial contamination in pre-cooked frozen foods are real". Thus, a potential health hazard may be a distinct possibility. To further complicate the problem adequate cooking procedures for frozen items generally have not been advanced.

Figure 1. Copper-constantin (24-gauge) thermocouple wires inserted into crab cakes. The terminal ends are connected to a Brown Portable Potentiometer (Model 126 W3).

Melvin A. Benarde received the B.S. degree from St. John's University, Brooklyn in 1948. He received the M.S. degree from the University of Missouri in 1950 and the Ph. D. degree from Michigan State University in 1954. Prior to joining the Seafood Processing Laboratory of the University of Maryland, where he now serves as an Assistant Professor, he was with the Naval Food Research Unit in Bayonne, New Jersey, and the Public Health Research Institute of the City of New York, Inc.

The recent report *Public Health Aspects of Frozen Foods*, by the Committee on Frozen Food Sanitation (*1*) came to grips with this problem and pointed out areas of potential health hazard. Their recommendations touched upon an area recently investigated in our laboratory.

In the course of studying antibiotic residues in breaded and fried crab and oyster cakes, temperature determinations at the approximate center of these cakes were made. When it was found that heat penetration was slow and did not arrive at values reportedly sufficient to kill pathogens at completion of cooking, we speculated on the degree of heat penetration into pre-cooked frozen crab cakes. To assuage our curiosity a small scale study was undertaken. This paper reports the results obtained.

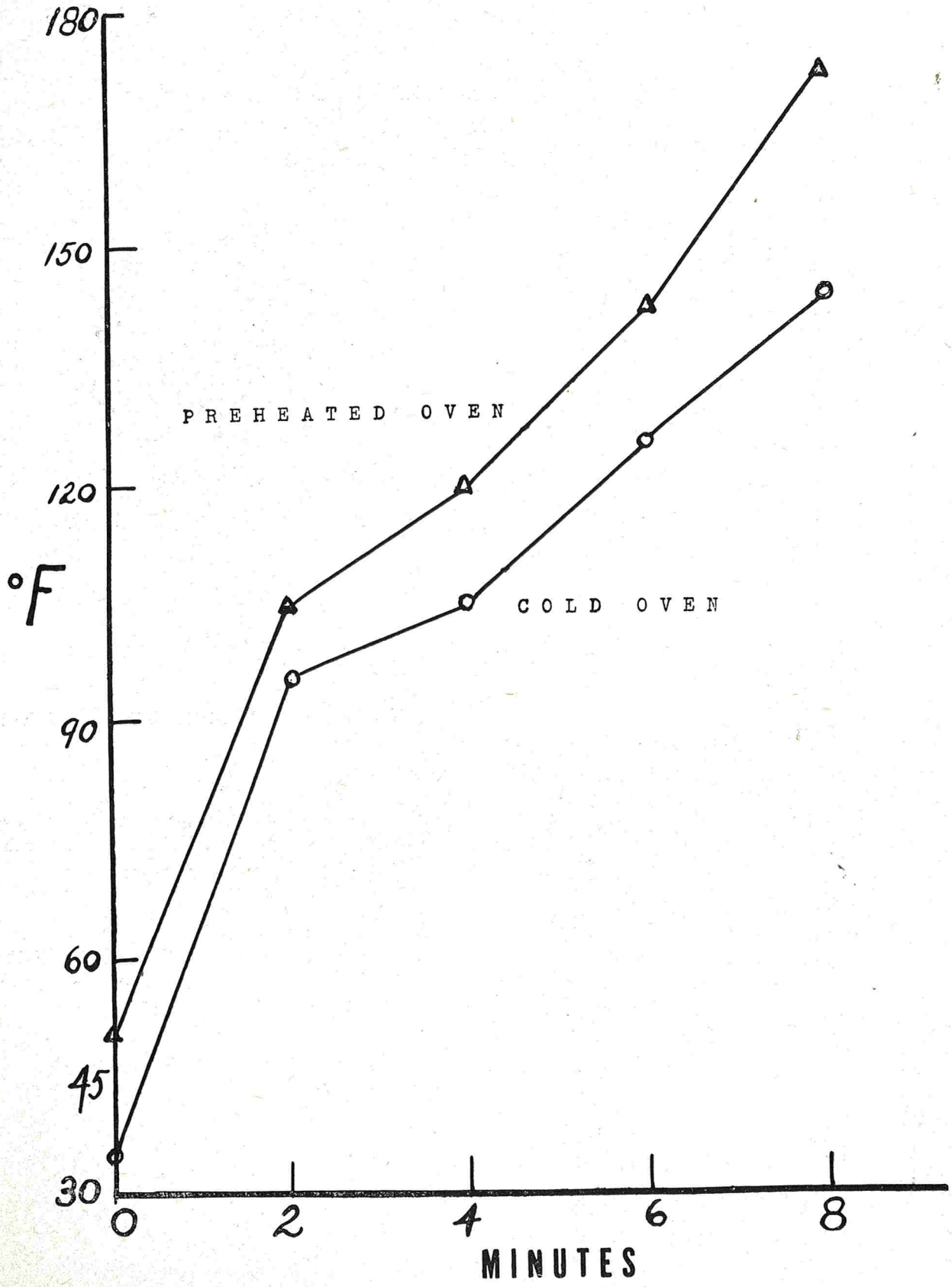


Figure 2. Heat penetration into precooked frozen crab cakes (2¾ x ¾ - approximately 140 g.) in preheated and cold oven. Oven temperature was 300° F. during heating period.

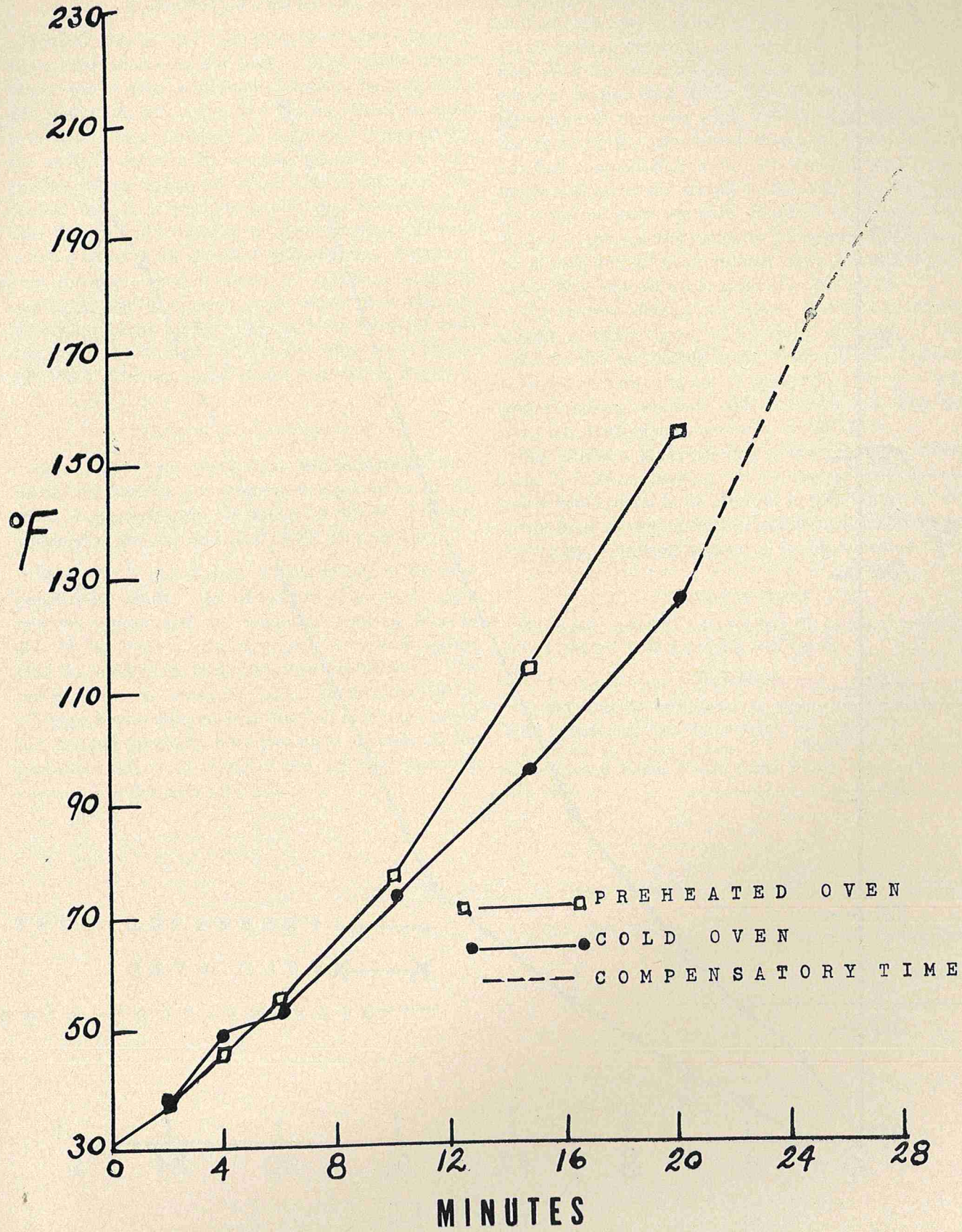


Figure 3. Heat penetration into precooked frozen deviled crab cakes (2½ x 1½ in. - approximately 170 gm.) in preheated and cold oven. Oven temperature 400° F. during heating period.

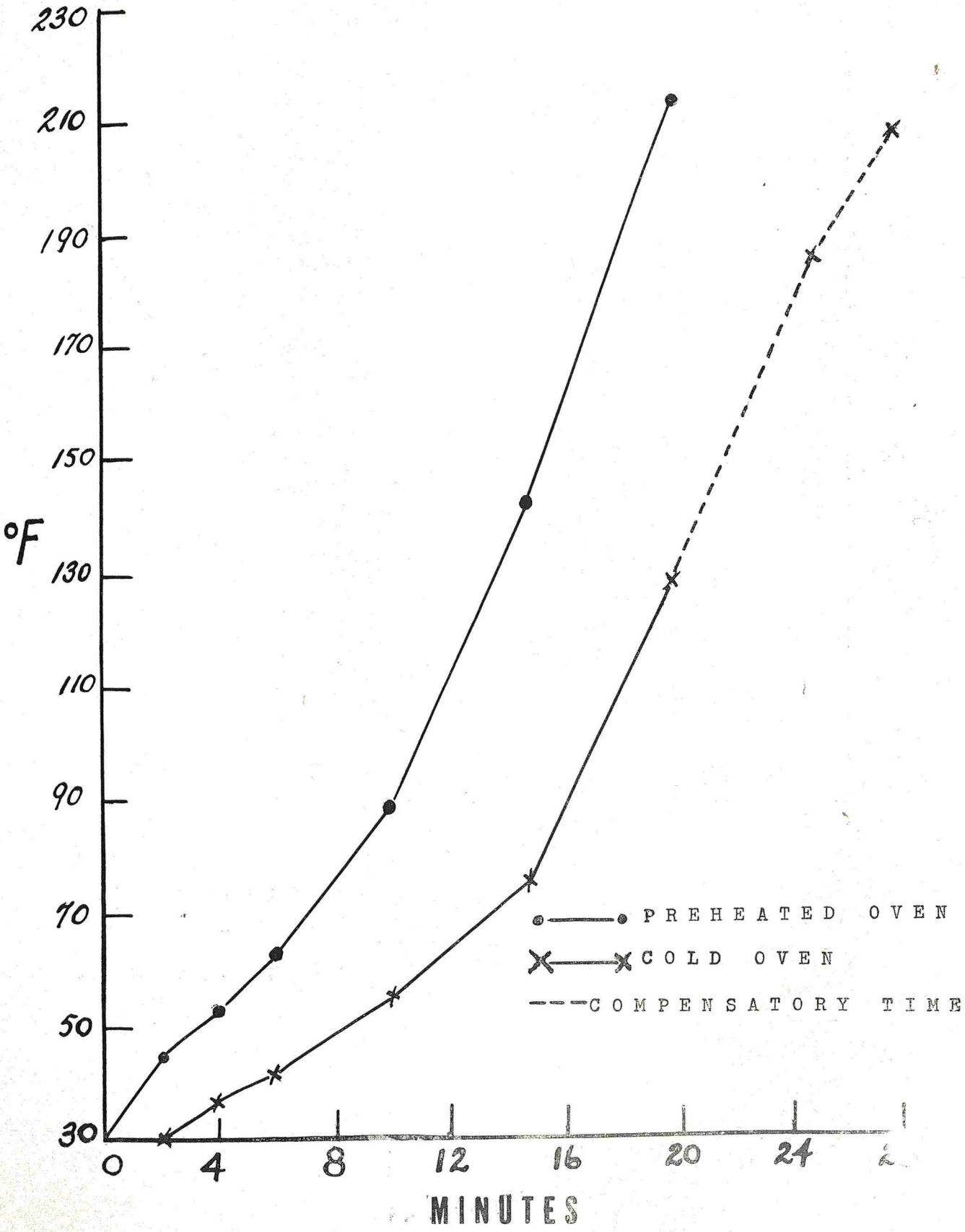


Figure 4. Heat penetration into precooked frozen deviled crab cakes (2¼ x 1¼ in. - approx. 150 gm.) in preheated and cold oven. Oven temperature was 400° F. during heating period.

EXPERIMENTAL PROCEDURES

Several varieties of frozen crab cakes were obtained from retail stores in our area. Since many housewives often save additional minutes in preparing pre-cooked frozen items by placing them in cold ovens, and then bringing to suggested temperature, the samples were split; one-half placed in an oven pre-heated according to label instructions and the second half in a cold oven. It was interesting to note that different companies recommended different cooking times at the specified temperature. Temperature readings were obtained by inserting 24-gauge copper-constantin thermocouple wires into the approximate center of the cakes and the terminal ends connected to a Brown Portable Potentiometer (Model 126 W3). The apparatus in use is shown in Figure 1.

RESULTS AND DISCUSSION

Before the heat penetration determinations were made, the surface and internal temperatures of the cakes were obtained. Readings of 32-35° F. were obtained at the surfaces and 19-23° F. internally.

Figures 2, 3, and 4 show typical results of the heat penetration study. As shown in Figure 2, eight minutes represented the suggested cooking time of 300° F. as given on the wrapper. It would appear that the cold oven treatment was insufficient. The pre-heated oven treatment, although it provided for a higher final temperature at the end of 8 min., might not provide adequate heat treatment in view of the protective effects of many of the colloidal materials contained in the crab cake mix.

Figure 3 shows the heat penetration curves for another crab cake of different size and with a different set of cooking directions, namely, 400° F. for 20 minutes after the oven has arrived at 400° F. After 20 minutes in the cold oven, 126° F. was recorded at the center of the cake while 150° F. was attained by the cakes in the pre-heated oven. The broken line, labelled compensatory time, was an additional cooking period given the sample in the cold oven to equal the time the oven normally required to become pre-heated to the specified cooking temperature. It may be observed that an additional eight minutes would carry the temperature to probable safe levels.

The curves shown in Figure 4 indicate results similar to those shown in Figure 3, although in this instance the pre-heated oven treatment did indicate a probable safe internal temperature after the suggested cooking interval (400° F. for 20 min. after the oven has reached a temperature of 400° F.).

Our findings indicated that present wrapper directions for home heating of pre-cooked frozen crab cakes leave much to be desired in providing an adequate heat treatment from a public health standpoint especially if heating is done in an unpreheated oven.

ACKNOWLEDGEMENT

The author gratefully acknowledges the technical assistance of Mrs. Dorothy Collins and Mr. Paul Dorsey.

REFERENCES

1. Report of the Committee on Frozen Food Sanitation - 1956. J. Milk and Food Technol., 20: 145-148. 1957.

2. Straka, R. P. and Strokes, J. L, Microbiological Hazards of Pre-Cooked Frozen Foods. Quick Frozen Foods, 18: 182-185. 1956.

THE EFFECT OF MILKING PRACTICES UPON THE DETERIORATION OF MILKING MACHINE INFLATIONS

GERALD M. WARD, VIRGIL R. ELSEY AND J. A. HURRY

Colorado State University, Fort Collins, and Gates Rubber Co., Denver, Colorado

(Received for publication June 4, 1957)

This research was designed to study the effects of milking practices upon the deterioration of natural rubber liners. Winter rations appear to produce a more severe rate of blistering than either summer pasture or ration.

Cleaning seemed to have little effect upon rate of blistering. Storage in 10% lye solutions increased the time to blister. Pure fatty acids were shown to produce blistering. Udder ointments and mastitis treatments used in this study had no appreciable effects on blistering of rubber.

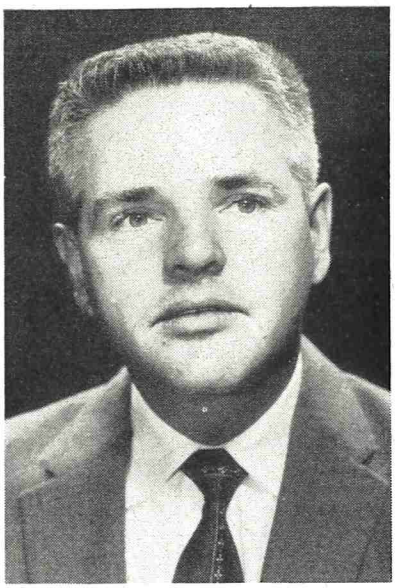
The rather rapid blistering or roughening of the inner surface of natural rubber liners for milking machines, in some field locations, is a problem of long standing. Up to the present time no adequate findings are available to explain the deterioration. It is well-known however that natural rubber (Hevea) is easily attacked by oils and certain other reagents.

English workers have investigated this problem in considerable detail *(1, 2, 5, 6, 7)*. They have concluded that the fatty secretions from the skin and hair of the cow are very important in the deterioration of rubber. Claydon *(3, 4)* has investigated the relation of bacterial contamination in rubber liners with microscopically inconspicious deterioration. The results of a comparison of natural rubber and neoprene inflations has been reported by White and Folds *(9)*.

To minimize the effects of deterioration of liners, general purpose (GRS* Neoprene) and special purpose (Hycar, Perbunan) synthetic rubbers have been used rather extensively in recent years. These synthetics provide a product which has a lower rate of blistering; however, these products lack, in many instances, some of the properties of natural rubber (resilience, hand, etc.) which makes it the preference of some dairymen for milking machine usage.

It has been noted from field observations and in this study that the blistering of the inner surface of the teat cup liner is principally confined to the area where the teat impinges on the inner surface of the rubber liner (see Figure 1). The remainder of the liner is usually free of any noticeable defects. The degree of blistering or roughening depends upon the number of cows milked and other factors.

*GRS — The Government Reserve Board identification for Buna S types of general purpose synthetic rubber.



Gerald M. Ward received the B.S. degree from the University of Maine in 1947, the M.S. degree from the University of Wisconsin in 1948 and the Ph. D. degree from the State College of Washington in 1951. He served in dairy extension work in Kansas and Washington prior to appointment at Colorado State University in 1953, where he is an Associate Professor in the Dairy Industry Department.

In this investigation the following factors were studied with respect to the effects of each on the blistering and/or roughening of milking inflations; *(a)* effect of secretions from the teat and/or udder, *(b)* effect of udder salves and oil base antibiotics for mastitis treatment, *(c)* effect of poor cleaning methods, *(d)* effects related to the breeds of cows, *(e)* effects due to the type of ration, *(f)* effects which might be related to season of the year, and *(g)* effects of milk or milk fat absorption.

METHODS

Inflations made of a blend of natural rubber (Hevea) and general purpose (GRS) were used for this study. The two rubbers were in the ratio of 70 percent Hevea (natural rubber) to 30 percent GRS (General purpose synthetic). These inflations were made from a single controlled batch of rubber at the Gates Rubber Company factory in Denver, Colorado. The production of the actual inflations was care-

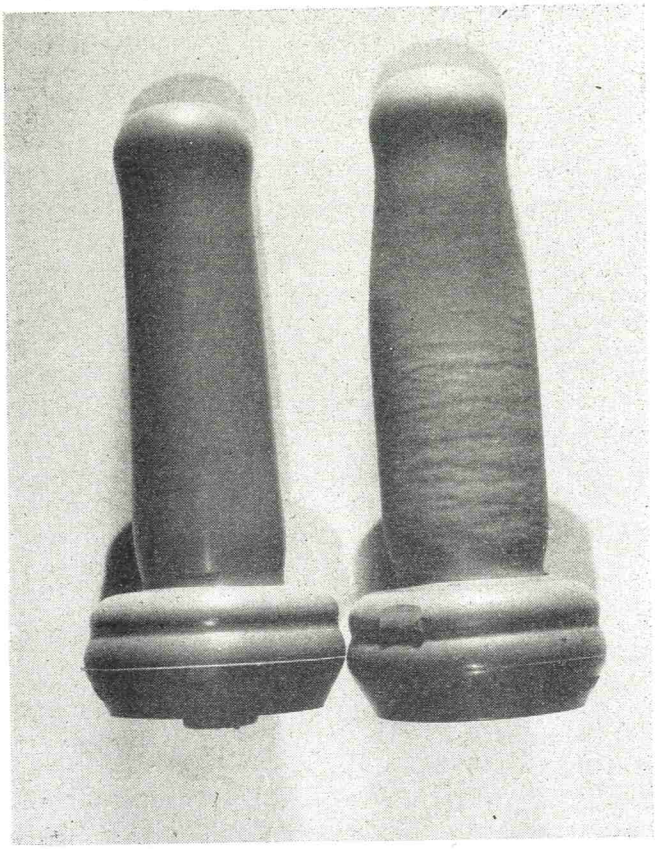


FIGURE 1. An unused natural rubber milking machine liner (left) and a similar liner showing the typical severe blistering after several weeks of heavy usage.

fully supervised through all phases of manufacture to insure a uniform product.

The Colorado State University milking herd of about 80 cows was used in this study which covered a period of one year. This herd consisted of Holstein, Guernsey, Jersey and Brown Swiss breeds. All cows were milked with a bucket type milker using the inflations previously described which were the L-22 type with a cushion top. The cows were tied in stanchions while being milked and were fed during the winter the usual ration which consisted of good quality hay, corn and alfalfa silage. In the summer (four months) the cows had access to pasture grass or green chopped alfalfa. A grain ration of 12% protein was fed at the rate of about one pound of grain to each five pounds of milk.

At the start of each experimental phase new inflations were installed and the time required to observe visible roughness was noted. At that time a new set of inflations was installed and later removed when visible roughness was again noted. This procedure was repeated during the course of the experiment. Milking machine heads were equipped with counters for those trials where the number of milkings involved was important.

An artificial milking set-up was designed consisting of a set of liners containing a sponge in each liner with the top end plugged. The liners were attached to a vacuum line at a vacuum level and pulsation rate to conform to conditions existing at the barn. The entire set-up simulated as nearly as possible actual milking conditions.

RESULTS

Secretions from the teat and/or udder

In an attempt to eliminate or minimize the effect of any oily secretion from the teat and/or udder, the teats and lower udder of three Holsteins were thoroughly washed with acetone just prior to milking. Eleven days or 66 milkings were required to produce any noticeable or significant blistering. It should be noted, however, that these liners were performing six milkings per day.

Acetone extractions of used liners which had blistered and/or roughened were made in an attempt to separate a fraction which would rapidly blister rubber when applied to the inner surface of a new inflation. Since sufficient material was not extracted from liners, it was decided to use special absorbent liners. These special liners consisted of a pure gum rubber compound and were highly absorbent. They were used for about one week and then extracted with acetone. The acetone extract was separated into saponifiable and non-saponifiable fractions.

In a further attempt to prepare a concentrate of the extracted material, the acetone was boiled off and the residue taken up in sodium hydroxide. This resulted in two seperate layers. From this material three fractions were prepared: *(a)* the top layer, *(b)*, the bottom layer, and *(c)* a mixture of the two layers. These were applied to new inflations. The material dried rapidly, but in the treatment where the two layers were combined, some eruptions occured while none were found with the material from separate layers. The bottom layer, or more insoluble layer, was assumed to be the non-saponifiable fraction. The significance of the results obtained are not clear.

It is significant that the residue from the extraction of the used liners was found to give a positive test for cholesterol. Cholesterol is present in butterfat in appreciable quantities and is also believed to be a constituent of glandular secretions. For these reasons tests were carried out with cholesterol. The cholesterol was soluble only in ether. It was noted that ether treatment alone produced a swelling of about two times the normal size of the rubber in 18 hours. When the rubber was allowed to dry and the ether had evaporated, the cholesterol came to the surface of

the rubber. When it was scraped from the surface, it was replaced by more cholesterol from the rubber. Swelling but not blistering resulted from this treatment.

In another trial, sections were cut from new liners and placed in melted, unsalted butter at room temperature. After six hours of exposure, the rubber had swollen and blistered.

Udder Salves and Antibiotics Treatments

Several udder ointments used for chapped teats were applied to cows of the University herd. These ointments did not cause liners to blister faster than those used on untreated cows.

One machine was equipped with new liners and was used exclusively in milking cows which had been treated for mastitis with antibiotic preparation. The rubber on this machine did not blister any more rapidly than those used on the regular herd.

Cleaning methods

It was felt that perhaps improper cleaning was a contributing factor to the deterioration of the rubber. The cleaning method in regular use consisted of a thorough rinse in tepid water immediately after milking. The liners were removed from the shells and brushed clean daily with a good washing powder. Once a week the inflations were boiled for twenty minutes in a 10% lye solution. This was done in a special piece of commercial stainless steel equipment. The liners were stored dry and sanitized immediately before use. To study poor cleaning methods, one set of liners were not cleaned until four hours after milking and compared with liners which were cleaned immediately after milking. The two treatments did not cause any appreciable difference in speed of blistering. At the same time one set of liners was cleaned and stored all day in a cold 10% lye solution. This treatment delayed the appearance of blistering by 7 to 10 days over the usual treatment.

Water and the cleaning solutions as used in the dairy were applied to the sponges of the artificial milking set up. These materials produced no blistering.

Breeds of Cows

In this trial a separate machine was used to milk seven cows of each of the Jersey, Guernsey, and Holstein breeds. The liners used to milk the Jersey cows blistered much more rapidly than those used for the other two breeds. Those liners used on the Holstein cows blistered somewhat more rapidly than those on the Guernsey cows.

Type of Ration

Throughout the winter and spring months, at about two-week intervals, new inflations were put on all of the machines and observations were made on the length of time required for blistering to develop. From December 1 until the time that the cows went on pasture, the length of time required was consistently 3 to 5 days. On May 29th the college herd was divided into three groups: one group was turned on pasture, one group was fed green chopped alfalfa and the other group was fed alfalfa silage. Beginning at this time and continuing until late fall, a period of 10 to 14 days was required for blistering compared to 3 to 5 days when the cows were on winter feed. The pasture, green chopped alfalfa and silage feeding was ended on September 24th. On the following day all machines were equipped with new liners and 10 days were required to produce noticeable blistering. This procedure was repeated several times and about a month later the liners were again blistering in 3 to 5 days During this time the cows were receiving a ration consisting primarily of corn silage and hay.

In July individual milking machines were set up to milk two different groups of cows; one group was on pasture and the other group was on alfalfa silage feed. The liners used for the cows on the silage feed blistered in four days while those liners used for the cows on pasture required ten days to reach the same degree of blistering.

Seasonal Effects

Seasonal effects, of course, are associated with ration effects since the only changes in the rate of blistering occurred immediately after the cows were changed to summer feed. On the other hand, where pasture and green feeding were stopped a thirty-day period elapsed before the rate of blistering returned to the winter level. Other than the effects noted at the times of the change to summer feed, there were no appreciable differences observed in the rate of blistering throughout the year.

Milk and Milk Fatty Acids

A marked difference in blistering rate was found between summer and winter seasons, presumably due to effect of ration; the blistering rate being greater in winter than in summer. It is also well-known that the fatty acid composition of butterfat varies from summer to winter *(10)*. For these reasons a study of the individual component fatty acids was made. These studies were made with the artificial milking set-up and the results are included in Table 1.

The data in Table 1 indicate that the fatty acids of intermediate chain length produce the most rapid blistering. When the acids were diluted with milk, blistering was more rapid than with water. The

TABLE 1 — THE TIME REQUIRED FOR BLISTERING OF INFLATIONS TO BECOME EVIDENT IN THE PRESENCE OF FATTY ACIDS WHEN TESTED IN THE ARTIFICIAL MILKING SETUP

Acid	Dilution in carrier	Extent of blistering
Stearic Acid	1 to 10 in acetone	Slight in 20 hours
Palmitic	1 to 10 in acetone	None in 12 hours
Linoleic	1 to 1 in water	Swelling in 2 hours
Lauric	1 to 1 in water	Swelling and some blistering in 2 hours
Capric	1 to 10 in acetone	Severe in 2 hours
Caproic	1 to 10 in acetone	None in 2 hours
Capyryllic	None	Severe in 2 hours
Butyric	None	Slight in 12 hours
Raw Milk	None	None in 3 hours
Raw Cream	None	Slight in 3 hours
Linoleic	1 to 5 in milk	Typical blisters in 3 hours
Lauric	1 to 5 in milk	Slight in 2 hours
Capric	1 to 5 in milk	Very slight in 2 hours
Caprylic	1 to 10 in milk	Severe in 2 hours
Butyric	1 to 10 in milk	Slight in 3 hours

blistering developed was identical with that which developed under barn conditions except when linoleic acid was used, in which case atypical blistering developed. The blistering was also confined to the area of impingement between the sponge and the inner surface of the liner.

It might be pointed out for the sake of comparison that three hours operation of the artificial milking set-up was equivalent to about one day's use of a milking unit under the conditions in the University herd. Twelve hours of operation would be equivalent to four days of use under herd conditions and twenty hours of operation equals six to seven days of operation under herd conditions. This may be compared with the results reported of three to five days under winter conditions and ten to fourteen days under summer conditions for the development of blistering when used in the usual herd milking operations. However it should be noted that the operation of the artificial milking set-up was continuous which, of course, is not the case under herd conditions. It was found that as the interval between the use of the machines increased, the time to develop blistering was increased. This fact, of course, reduces the value of making comparisons between herd conditions and the artificial milking set-up.

DISCUSSION

Either the type of ration fed or the season of the year appeared to have a marked effect upon the rate of blistering. One year's trial would seem to indicate that the type of ration was more important than the season. When one considers the marked increase in time required for blistering which was associated with the change from winter to summer feeding and the fact that the fatty acids of intermediate chain length were the most effective in producing blisters, one might hypothesize that the summer feeding regime would cause less of these fatty acids to be present in summer milk. There is some support for this reasoning. Reichert-Meissl numbers of butterfat were found to be somewhat lower in the summer months although differences were rather small *(10)*. We were unable to find any information on the fatty acid composition of milk produced under conditions of heavy silage feeding. It is apparent from Table 1 that several of the free fatty acids were much more effective in blistering rubber than was milk or butterfat. Perhaps some free fatty acids are formed in the act of milking and adhere to the milker rubber, however, the damage noted under barn conditions could be explained on the basis of milk alone without the necessity of postulating the presence of free fatty acids.

The authors realize that an explanation for rubber deterioration based upon the action of fatty acids of intermediate chain length is based on meager evidence, however the data obtained provide some indication that the presence of such acids might be a factor in promoting blistering.

The observations made on the effect of the type of ration upon the deterioration of inflations warrants further investigation, particularly studies on the effect of dry-lot feeding of a winter type ration as compared to pasture or green chopped feed.

The ointments or mastitis treatments used in this study had no appreciable effect upon the rate of blistering of milking machine inflations. Likewise, the efficiency of cleaning did not appear to influence the rate of blistering. Soaking in 10% lye solution between milkings, however, did materially reduce the speed of blistering. The value of lye solutions in the extraction of fat from milker liners has been shown by Jensen *(8)*.

In this study, cows of the Jersey breed produced much more rapid blistering of the inflations than the Holstein or Guernsey breeds with the Holsteins producing slightly more rapid blistering than the Guernseys.

CONCLUSIONS

Winter rations appeared to produce a more severe rate of blistering than either summer pasture or ration.

Different rates of blistering appeared to be associated with different breeds of cows.

Cleaning appeared to have little effect upon the rate of blistering. Storage in 10% lye solutions increased the time required to blister. Pure fatty acids were shown to produce blistering.

Udder ointments and mastitis treatments used in this study had no appreciable effects on blistering of rubber.

REFERENCES

1. Berridge, N. J. The Deterioration of Milking Rubbers. L. The Effect of Microorganisms. J. Dairy Research, **18**: 247, 1951.

2. Clarke, Pamela M., Berridge, N. J. and Gardner, E. R. The Deterioration of Milking Rubbers. V. The Effect of Rubber Composition. J. Dairy Research, **22**: 144. 1955.

3. Claydon, T. J. Contamination of Milking Machine Teat-Cup Liners as Affected by Inconspicious Deterioration of the Interior Surfaces. J. Dairy Science. **36**: 707. 1953.

4. Claydon, T. J. Bacterial Counts of Milk as Affected by Inconspicious Deterioration in Milking Machine Teat-Cup Liners. J. Milk and Food Technol., **18**: 160. 1955.

5. Cooper, J. H. The Deterioration of Milking Rubbers. IV. Fat in Milk Liners. J. Dairy Research, **22**: 138. 1955.

6. Cooper, J. H. and Gardner, E. R. The Deterioration of Milk Rubbers. III. The Effect of Farm Treatment. J. Dairy Research, **20**: 354. 1953.

7. Gardner, E. R. and Berridge, N. J. The Deterioration of Milker Rubbers. II. The Effect of Fat. J. Dairy Research, **19**: 13. 1952.

8. Jensen, J. M Fat Extraction From Milker Rubber with Lye Solutions. J. Dairy Science, **38**: 835. 1955.

9. White, J. C. and Folds, G. R. A Study of Milking Machine Inflations Made of Neoprene Compared with those of Natural Rubber. J. Milk and Food Technol., **17**: 256. 1954.

10. Zehren, V. L. and Jackson, H. C. A survey of United States Butterfat Constants. I. Reichert-Meissl, Polenski, and Refractive Index Values. J. Assoc. Official Agri. Chem. **39**: 194. 1956.

THE INFLUENCE OF THE MAXIMUM TEMPERATURE RISE IN BULK TANKS ON MILK QUALITY

I. THE EFFECT ON RANCIDITY

P. J. VanDemark and R. P. March

Laboratory of Bacteriology and Department of Dairy Industry

Cornell University, Ithaca, N. Y.

(Received for publication June 10, 1957)

On adding warm morning milk to cold evening milk no development of rancidity was detectable with blend temperatures of 40°F., 50°F., and 60°F., but was apparent at a maximum rise of 70°F. Under conditions simulating every-other-day pick-up no significant increase in rancidity occured on raising the blend temperature to 60°F., but a measureable increase did occur with a blend temperature of 70°F. The increment in acid degree values between 24 and 48 hours is much less with every-other-day pick-up than with samples picked up daily.

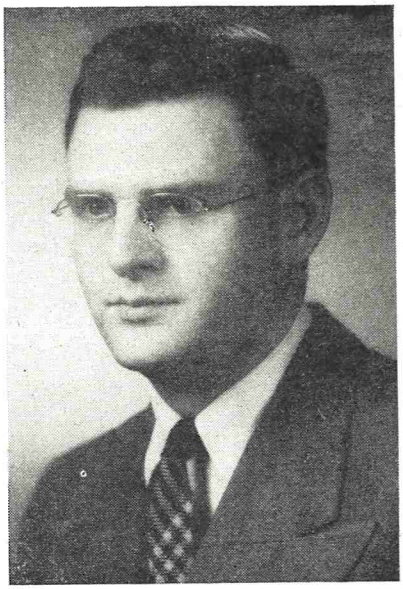
The United States Public Health Service milk ordinance (Item 23r, Section 7, 1953) requires that milk be cooled on farms to at least 50°F. and maintained at this temperature, or lower, until delivered to the milk receiving or processing plant *(1)*. This provision and regulations incorporating it were originated for can cooling operations and have now been applied to milk cooled in bulk tanks, thus requiring that blend temperatures in tanks never exceed 50°F. However, in actual practice there are cases where blend temperatures sometimes go above 50°F. for a short interval during the second milking when tanks are used to capacity or the loading rate is very rapid.

There has been no indication that temperatures 10 degrees or so above 50°F. for a short duration has had any detrimental effect on the milk, but in view of the above requirements it seemed advisable to study the effect of blend temperatures on milk quality and to determine whether or not 50°F. is a critical temperature, and, if not, where the upper limit might be.

Two areas for investigation seemed obvious; one, the effect on lipase activity or rancidity; the other, the effect on bacterial growth in the milk. The former study is presented in this first paper and the bacterial studies are presented in a second paper *(4)*.

Procedure

Twenty-one different farms were visited, several upon two occasions, making a total of 36 different investigations. The number of milking cows in these herds varied from 7 to 82 (see Table 1). The stage of lactation of the cows varied considerably with many cows in late stages of lactation. The quality of milk produced on these farms also varied considerably from top quality to poor quality. A number of these farms were equipped with pipeline milkers, as indicated in Table 1. The methods employed in this study were intended to simulate in the laboratory, as closely as possible, the actual farm procedure. Herd samples of evening and morning milk were taken at the farm at the time of milking and brought immediately into the laboratory. The temperature of the milk on arrival at the laboratory was usually about 90°F. To simulate bulk tanks, one-gallon milk containers were equipped with an agitator blade and motor at 33 1/3 rpm and placed in a 40°F. cooler. The cooling rates of these "simulated bulk tanks" are shown in Figure 1. It can be seen that these cooling rates are considerably slower than in the actual bulk tank performance. One-liter aliquots of evening milk were added to each of



Dr. VanDemark received the Ph. D. degree in Bacteriology from Cornell University in 1950. Since that time he has served on the staff of the Laboratory of Bacteriology within the Department of Dairy Industry. During that period he has taught elementary microbiology and his research interests have been in bacterial physiology as well as dairy and food microbiology.

TABLE 1 — DATA CONCERNING THE FARMS

Farm number	Month visited	Number of milking cows	Per cent cows in late lactation	Type of pipeline milkers, if used.
1	Sept.	10	100	
2	Sept.	80	60	Transport
3	Sept.	60	60	
4	Sept.	33	30	
5	Sept.	40	30	
6	Sept.	20	100	Around the barn
7	Sept.	60	60	
8	Sept.	80	25	
9	Oct.	40	15	
10	Oct.	40	25	
11	Oct.	43	25	
12	Oct.	80	25	
13	Oct.	30	25	
14	Oct.	32	20	Parlor
15	Oct.	42	25	
16	Oct.	40	30	Around the barn
17	Oct.	50	2	Parlor
18	Nov.	33	25	
19	Nov.	60	100	
20	Nov.	10	100	
21	Nov.	35	6	Parlor
22	Nov.	30	0	Parlor
23	Nov.	42	25	
24	Dec.	34	6	
25	Dec.	7	40	
26	Dec.	26	30	
27	Dec.	21	50	
28	Dec.	50	2	Parlor
29	Dec.	38	16	
30	Dec.	82	25	
31	Dec.	40	5	
32	Dec.	60	60	
33	Dec.	80	25	
34	Jan.	34	25	
35	Jan.	36	10	Parlor
36	Jan.	40	30	Around the barn

the "simulated bulk tanks" and cooled and held at 40°F. overnight Twelve hours later equal aliquots of the morning milk samples from the same herd were added to this pre-cooled evening milk. To vary the maximum temperature rise, the morning samples were cooled to that temperature necessary to give the desired blend temperature when mixed with an equal volume of the evening milk sample at 40°F. For example, to obtain a final blend temperature of 60°F. an aliquot of morning milk was cooled to 80°F. and then added immediately to the equal volume of the evening milk at 40°F. This procedure was followed in the preliminary portion of this study where final blend temperatures of 40°, 50°, and 60°F. were desired. In the second phase of this investigation it was desired to study the relative effect of blend temperatures of 40°, 60° and 70° F. There it was necessary to raise the temperature of the warm morning milk slightly to 100°F. in a warm water bath, then add aliquots at the desired temperature to the pre-cooled evening samples. This alteration in technique was necessitated in order to obtain a blend temperature of 70°F.

In the final portion of this study, every-other-day pick-up was simulated. To do this, equal volumes of a second evening and morning milkings were added to the original samples employing the same blending technique as outlined above.

Lipase activity of the various temperature blends was determined after 0, 24 and 48-hour time periods. No test was run after 48 hours because previous studies *(2)* have shown that there is no significant increase in rancidity after this period. This rancidity level was measured as the acid degree value using Gander's modification *(2)* of the method of Herrington and Krukovsky *(3)*. This modification is a semi-micro method, using only one gram of milkfat. In this determination the fat is titrated in a non-aqueous solvent with sodium methoxide. As with Herrington and Krukovsky's original method, the rancidity is measured in acid degrees. The threshold value, where rancidity is detectable by taste, is approximately 1.5 acid degrees or above. The method has an experimental tolerance of approximately 0.2 acid degrees.

Flavor tests were also run on all samples after 72 hours to check for any rancidity detectable by taste.

RESULTS

Table 2 shows the results of taste tests and rancidity measurements on milk samples with blend tempera-

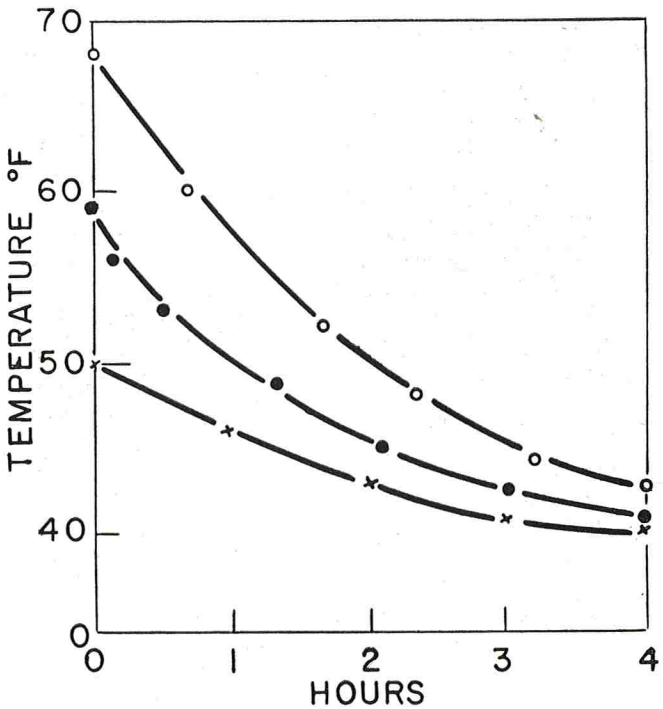


FIGURE 1. The cooling rates of the simulated bulk tanks with various blend temperatures.

tures of 40°, 50° and 60°F., respectively. In no case did any of these samples develop a rancid flavor. While milk samples from various farms showed differences in acid degree values with the variation in blend temperature, the overall average of these acid degree values is relatively constant with the variations in blend temperatures of 40°, 50° and 60°F. These data are perhaps better illustrated in Figure 2, where

TABLE 2 — THE COMARATIVE EFFECT OF BLEND TEMPERATURES OF 40°, 50° AND 60° F. ON THE ACID DEGREE OF MILK SAMPLES UNDER SIMULATED EVERY-DAY PICKUP

Trial	Flavor	Initial	After 24 hours Total	After 24 hours Increase[a]	After 48 hours Total	After 48 hours Increase[a]
Acid degree values using blend temperatures of 40°F.						
1	Good	0.209	0.284	0.075	0.334	0.125
2	Good	0.336	0.437	0.071	0.428	0.062
3	Good	0.395	0.515	0.020	0.545	0.050
4	Good	0.197	0.187	−0.010	0.203	0.006
Mean of 17 trials	None rancid	0.430	0.509	0.079	0.532	0.102
Acid degree values using blend temperatures of 50°F.						
1	Good	0.232	0.270	0.038	0.332	0.095
2	Good	0.406	0.460	0.054	0.463	0.057
3	Good	0.416	0.577	0.161	0.624	0.208
4	Good	0.175	0.189	0.014	0.190	0.015
Mean of 17 trials	None rancid	0.458	0.572	0.059	0.566	0.108
Acid degree values using blend temperatures of 60°F.						
1	Good	0.209	0.307	0.098	0.346	0.135
2	Good	0.379	0.415	0.036	0.428	0.049
3	Good	0.499	0.605	0.106	0.575	0.176
4	Good	0.179	0.189	0.010	0.211	0.032
Mean of 17 trials	None rancid	0.441	0.515	0.074	0.562	0.121

[a]Change in acid degrees from initial value.

the increment in acid degrees at 24 and 48-hour periods is plotted against the maximum blend temperature. This plot would seem to indicate that there is little, if any, significant rise in acid degree values with blend temperatures as high as 60°F. Figure 3 is an attempt to show graphically the relative minimum average and maximum acid degree values obtained in this experiment. The threshold level in acid degrees

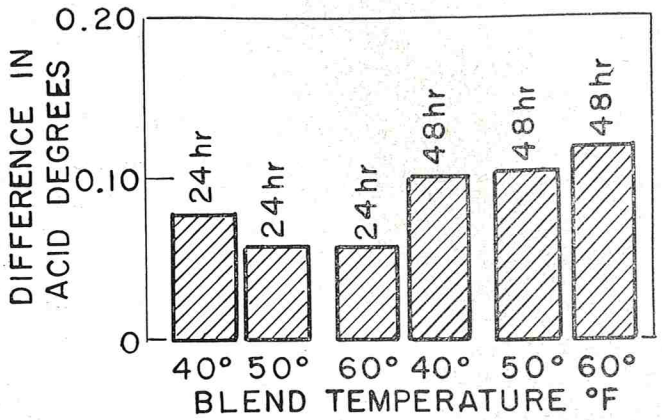


FIGURE 2. Influence of blend temperatures of 40°, 50° and 60°F. on the difference between the initial acid degree value and that obtained after 24 and 48 hours storage.

where rancidity is detectable by taste is also shown in this figure. It can be seen that all values were below this threshold value.

It was therefore thought desirable to experiment with a higher blend temperature of 70°F. The results of these latter experiments are summarized in Table 3 and Figure 4. Examination of these data shows an average rise in rancidity of 0.2 acid degrees occurring when the blend temperature is increased from 60° to 70°F. This rancidity increase at 70°F. was sufficient to be detected organoleptically in 4 of the 15 farms tested in this phase of the study. In one of these 4 cases (Run #29) the rancidity was caused by factors other than blend temperature. As in the previous study, the differences in acid degree values between the blend temperatures of 40° and 60°F. were small. One would expect the rancidity rise to be even more marked if one increases the blend temperature to approach the melting point of milk fat, this critical temperature being shown by Herrington and Krukovsky (3) to be approximately 85°F.

Table 4 shows the values of experiments intended to simulate every-other-day pick-up. In these every-other-day pick-up experiments 0 time was on the first addition of morning's milk to the precooled evening milk, and the next two additions of milk were made at the 12 and 24-hour periods. Examination of these acid degree values shows little significant increase in the total acid degrees of every-other-day pick-up over that of every-day pick-up. However, close examination of the data shows a marked difference in the rate of increase in acid degrees between the 24 and 48-hour periods. With every-other-day pick-up (Table 4) the increase between the 24 and 48-hour period is much less than that found in every-day pick-up (Table 3). This observation is perhaps better illustrated in Figure 4. It would appear that the initial increase in acid degrees in both cases is about the same, but

TABLE 3 — THE COMPARATIVE EFFECT OF BLEND TEMPERATURES OF 40°, 60° AND 70° F. ON THE ACID DEGREE OF MILK SAMPLES UNDER SIMULATED EVERY-DAY PICKUP

Trial	Flavor	Initial	After 24 hours Total	After 24 hours Increase[a]	After 48 hours Total	After 48 hours Increase[a]
	Acid degree values using blend temperatures of 40°F.					
1	Good	0.415	0.417	0.002	0.469	0.056
2	Sl. Oxid.	0.347	0.442	0.095	0.640	0.293
3	Sl. Feedy	0.299	0.362	0.074	0.330	0.042
4	Good	0.608	0.708	0.100	0.704	0.096
Mean of 15 trials	One slight rancid sample	0.569	0.812	0.243	0.973	0.404
	Acid degree values using blend temperatures of 60°F.					
1	Good	0.396	0.449	0.053	0.462	0.066
2	Sl. Oxid.	0.353	0.422	0.069	0.803	0.450
3	Sl. Feedy	0.273	0.320	0.032	0.336	0.048
4	Good	0.568	0.676	0.108	0.741	0.173
Mean of 15 trials	None rancid	0.542	0.772	0.230	0.948	0.406
	Acid degree values using blend temperatures of 70°F.					
1	Good	0.361	0.512	0.151	0.623	0.262
2	Sl. Oxid	0.377	0.519	0.142	0.820	0.443
3	Sl. Feedy	0.293	0.414	0.126	0.445	0.157
4	Good	0.566	0.772	0.206	0.865	0.299
Mean of 15 trials	Four rancid samples	0.555	0.877	0.322	1.145	0.590

[a]Change in acid degrees from initial value.

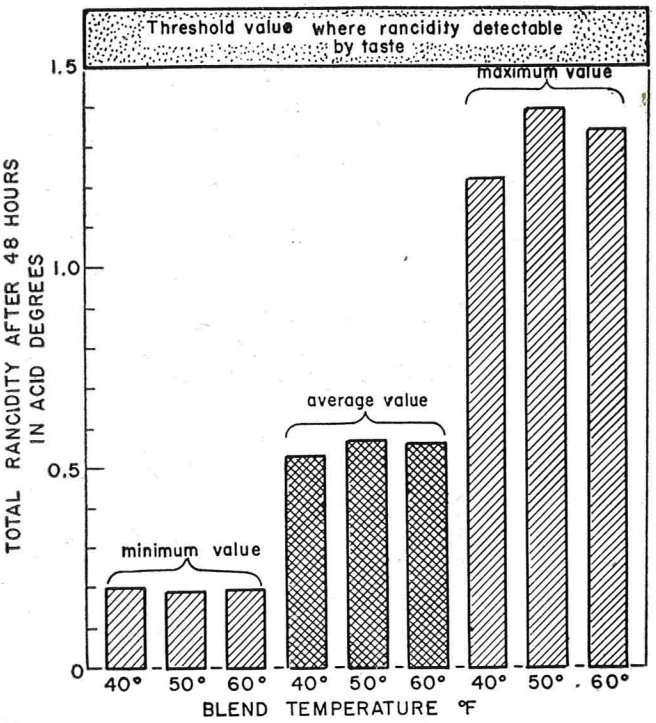


FIGURE 3. Illustration of the minimum, mean, and maximum acid degree values obtained with relation to the threshold acid degree level detectable by taste.

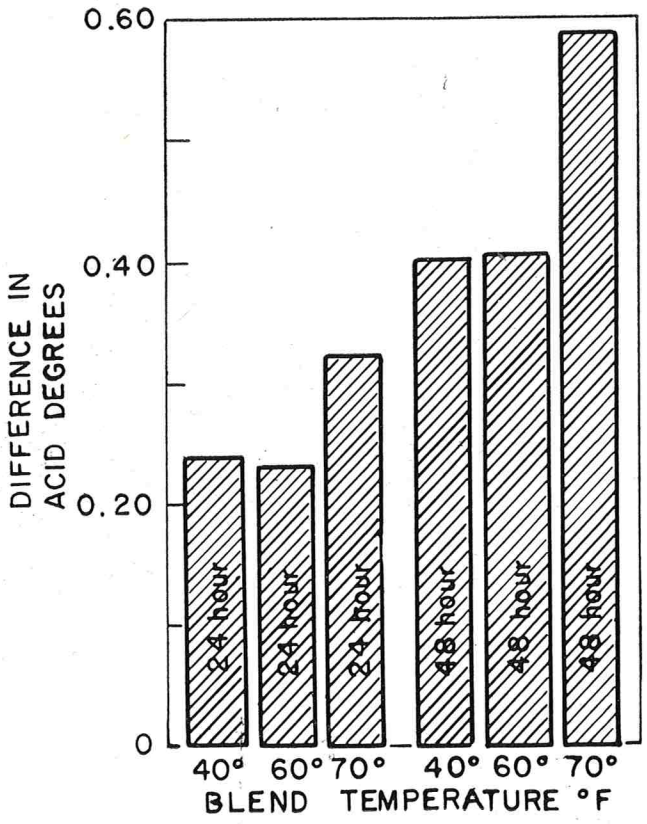


FIGURE 4. Influence of blend temperatures of 40°, 60° and 70°F. on the difference between the initial acid degree value and that obtained after 24 and 48 hours storage.

that on the third and fourth additions of milk in every-other-day pickup there is, of course, a dilution effect with fresh milk which causes a slower rate of rancidity increase during this time period.

DISCUSSION

When cold raw milk is warmed to 85°F. and recooled it will quickly develop a rancid flavor. This phenomenon, which is known as temperature activation, was demonstrated by Herrington and Krukovsky in 1939. This temperature of 85°F. is a critical one, in that on

TABLE 4 — THE INFLUENCE OF BLEND TEMPERATURES ON RANCIDITY WITH SIMULATED EVERY-OTHER-DAY PICKUP.

Trial	Flavor	Initial	After 24 hours Total	After 24 hours Increase[a]	After 48 hours Total	After 48 hours Increase[a]
Acid degree values using blend temperatures of 40°F.						
1	Good	0.121	0.445	0.324	0.478	0.357
2	Sl. rancid	1.081	1.381	0.300	1.461	0.380
3	Good	1.148	1.462	0.314	1.570	0.422
Mean	—	0.783	1.096	0.313	1.170	0.387
Acid degree values using blend temperatures of 50°F.						
1	Good	0.153	0.527	0.374	0.535	0.382
2	Sl. rancid	1.107	1.427	0.320	1.492	0.385
3	Good	1.170	1.491	0.321	1.578	0.408
Mean	—	0.810	1.148	0.338	1.202	0.392
Acid degree values using blend temperatures of 60°F.						
1	Good	0.137	0.485	0.348	0.578	0.441
2	Sl. rancid	1.064	1.394	0.330	1.809	0.415
3	Good	1.132	1.495	0.343	1.630	0.498
Mean	—	0.778	1.125	0.347	1.339	0.561
Acid degree values using blend temperatures of 70°F.						
1	Good	0.144	0.505	0.361	0.535	0.391
2	Sl. rancid	1.078	1.498	0.420	1.748	0.670
3	Good	1.172	1.727	0.555	2.120	0.948
Mean	—	0.798	1.243	0.445	1.468	0.670

[a]Change in acid degrees from initial value.

heating to either lower or higher temperatures the increase in rancidity will not be as great.

This relationship between temperature rise and the degree of rancidity increase has not been well-studied or elucidated. Regulations concerning maximum temperature rise in raw milk apparently have been established so as to be on the ultraconservative or safe side. However, the data in the present paper indicates that the increase in rancidity with respect to the rise in blend temperature is not a linear relationship; instead, the increase in rancidity is apparently an exponential function of the blend temperature.

As the blend temperature approaches the critical temperature of 85°F., the increase in rancidity is rapid, but at temperatures further from this critical temperature the increase is much less. Thus, as shown in the data presented, the increase in acid degrees on raising the blend temperature from 40° to 60°F. is negligible, and cretainly far below that level detectable by taste. However, on increasing the blend temperature to 70° F., the acid degree begin to increase at a more rapid rate and one would expect that as blend temperature approached 85° F. rate of increase would be even more marked.

While the data concerning the relationship of every-other-day pick-up to rancidity increase presented here is somewhat incomplete, it would seem to indicate that there is no marked rancidity problem over and above that normally encountered in every-day pick-up The data would seem to indicate that the third and fourth additions of milk on the second day actually dilute the rancidity level and delay the overall increase. Furthermore, on each subsequent milking the blend temperature rise becomes less, and one would expect the increase in acid degrees with each addition to be less than that resulting from the initial blending of morning and evening milk.

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine the effect of various blend temperatures upon the lipase activity in milk.

It is known that warming cold raw milk to 85°F. and recooling will greatly stimulate lipase activity and cause rancidity.

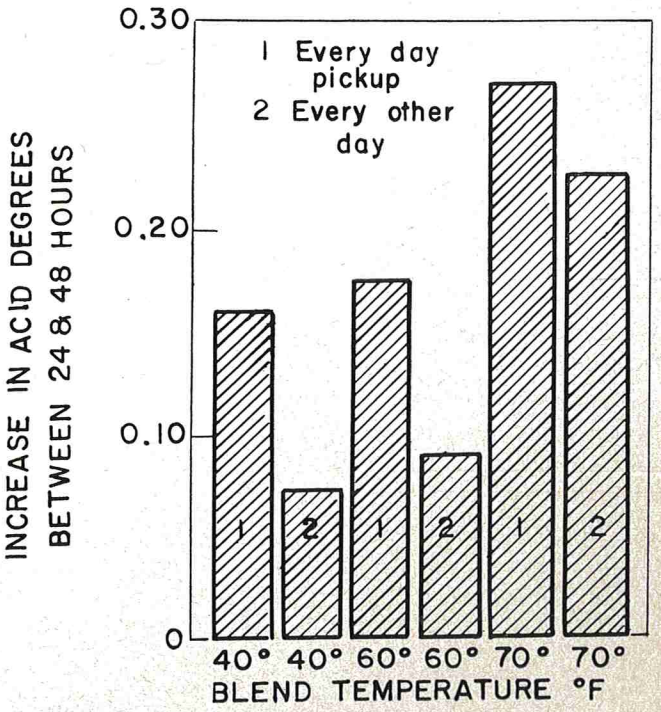


FIGURE 5. A comparison of the increase in acid degree value between every day and every-other-day pickup within the 24 to 48 hour storage period.

When the second milking is added to the cold milk in a bulk tank, the blend temperature may sometimes rise above 50°F.

In this study herd samples were collected from a wide cross section of farms and cooled to 40°F. with constant agitation. Twelve hours later equal portions of herd samples at various temperatures were added to the cold milk to give blend temperatures of 40°, 50° and 60°F. The milk was then cooled to 40° with agitation. Lipase activity was measured in terms of acid degrees (Gander's modification of Herrington and Krukovsky) after 0, 24 and 48 hours. There was no significant increase in acid degrees in this series of tests. Therefore, blend temperatures of 40°, 60° and 70°F. were investigated.

The blend temperature of 70°F. in this series caused an increase of acid degrees up to 0.2, and the development of slightly rancid flavors in 3 out of 15 samples.

Every-other-day pick-up of milk was studied on three farms. The data show no significant increase in acid degree values between 40° and 60° F. blend temperatures, but there was a significant increase at 70°F. The increase in acid degree values between 24 and 48 hours is much less with every-other-day pick-up than with samples picked up daily.

REFERENCES

1. Milk Ordinance and Code. 1953 Recommendations of the Public Health Service, Item 23r, Section 7, Part III, 1953.

2. Gander, G. W. A study of lipolysis in milk. M. S. Thesis, Cornell University, Ithaca, N. Y., 1955.

3. Herrington, B. L. and Krukovsky, V. N. Studies of lipase action. II. The activation of milk lipase by temperature changes. J. Dairy Sci., **22**: 137, 1939.

4. VanDemark, P. J. and March, R. P. The Influence of Maximum Temperature Rise in Bulk Tanks on Milk Quality. II. The Effect on Bacterial Counts. J. Milk and Food Technol., In Press, 1957.

KENTUCKY AND INDIANA AFFILIATE ASSOCIATIONS HOST INTERESTING AND SUCCESSFUL ANNUAL MEETING

The Kentucky and Indiana affiliate associations played hosts to a highly successful and interesting Annual Meeting of the International Association of Milk and Food Sanitarians, Inc. Nothing was left undone by the Local Arrangements Committee headed by Chairman H. L. DeLozier and Co-Chairman Edmund H. Stoy in providing for the comfort and enjoyment of those in attendance during the four day meeting Oct. 7-10, 1957.

Pre-convention activity was underway early Sunday morning for at that time the local Committee was completing last minute preparations and the Executive Board of the Association began their sessions which extended through Monday. Sunday evening was the occasion of a pleasant event when Sarah Vance Dugan, Director of the Food and Drug Division, Kentucky Dept. of Health held an open house for the officers of the Association, the Local Arrangements Committee, and the delegates from the affiliate Associations. The world famous mint juleps prepared by the expert hand of Mr. Dugan eased the tensions and added to the congeniality and fellowship which was evident throughout the evening.

Monday was a day of committee meetings and the meeting of the Affiliate Council. The Committe on

Dr. C. K. Johns, Banquet Toastmaster.

Dr. J. H. Shrader former Editor of the Journal

Constitutional revision was particularly active this year and suggested several changes for consideration by the Executive Board of the Association. Of particular significance was the recommendation that the Council elect a Chairman from the delegates to the Council. Under present constitutional authority the immediate Past President of the Association must serve as Chairman of the Affiliate Council.

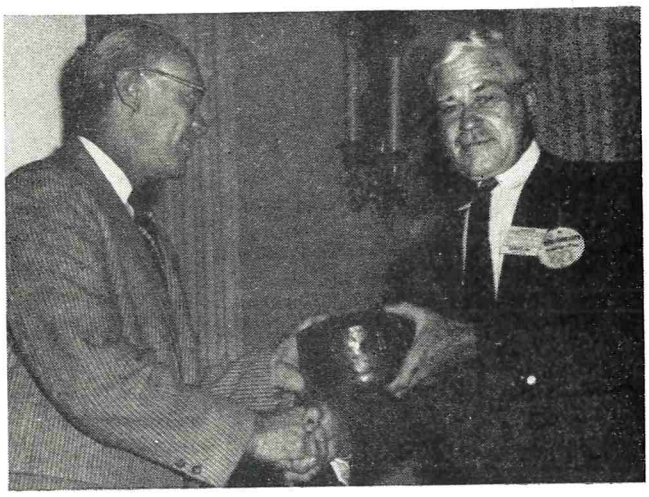
It seemed apparent from a discussion in the Council meeting that the question of a change in the name of the International to "International Association of Sanitarians", thus dropping the words "milk" and "food" as presently included, will have to be faced by the Association. This was definitely indicated by the rather strong feelings of some that expansion of the Associations' activities into areas of sanitation other than milk and food is essential to the best interests and future growth and development of the Association. Consequently a change in name to one

implying broader interest and encompassing all areas of sanitation was felt by many to be indicated. Opinion was not unanimous in this regard for others expressed view points quite to the contrary.

Monday evening again served as a pleasant and enjoyable break in convention business. That evening the Kentucky and Indiana affiliates were hosts at a cocktail party held at the convention hotel which provided an opportunity for the renewing of old acquaintances and the making of new ones.

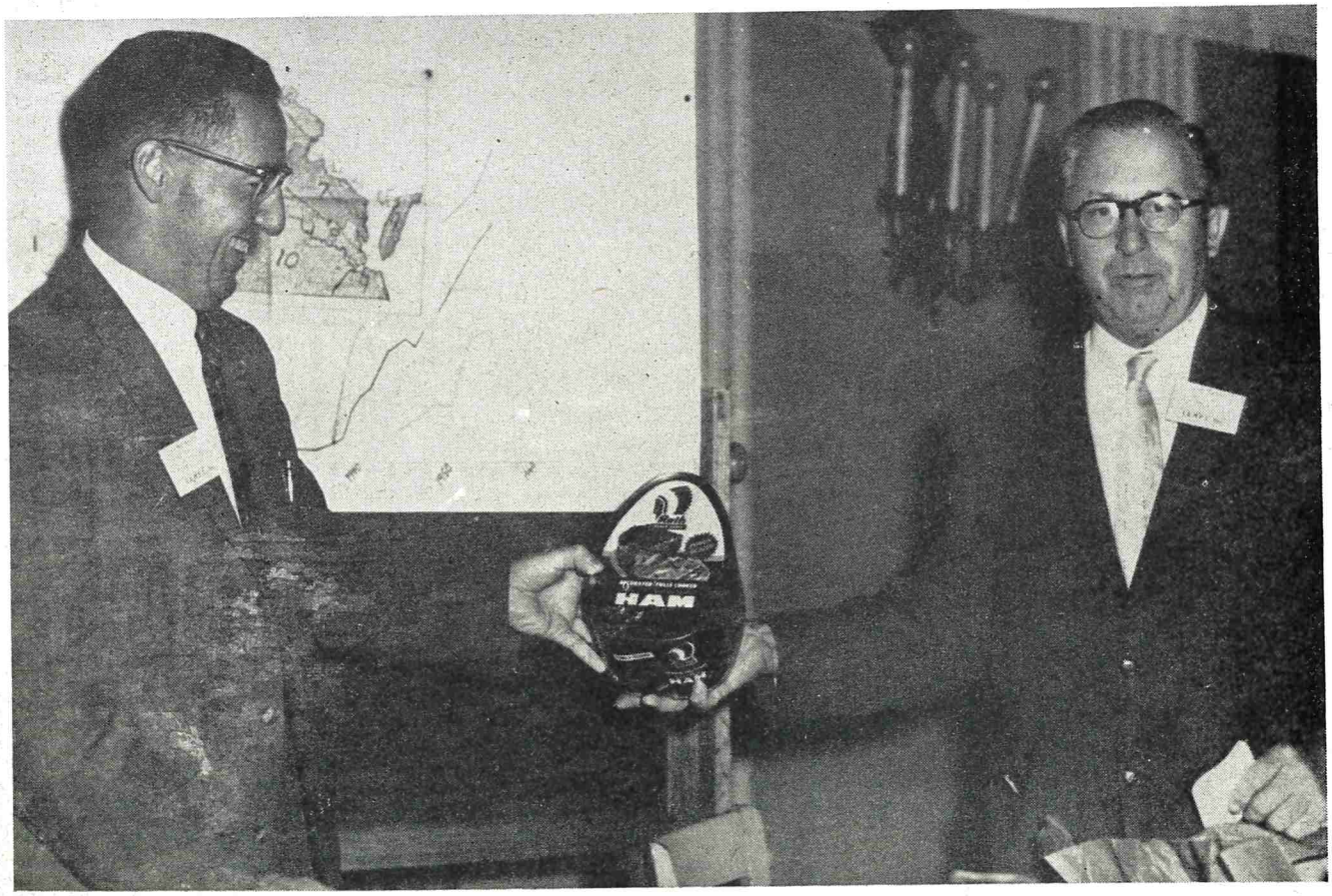
On Tuesday morning after the welcoming address by Mayor Broaddus of Louisville the formal program got underway with President Paul Corash giving a Presidential Address stressing the progress of the Association through its activities and highlighting certain areas of future Association interest.

Just 20 years ago the first issue of what is now the Journal of Milk and Food Technology appeared. Our September issue of this year commemorated that event and carried as the lead article the address given by Dr. J. H. Shrader on Tuesday morning. Dr. Shrader served as the first Editor of the Journal and continued in that capacity until December 1954. While he was not able to remain throughout the rest of the meetings he enjoyed being back to an Annual Meeting of the Association and his many friends were happy to see him.



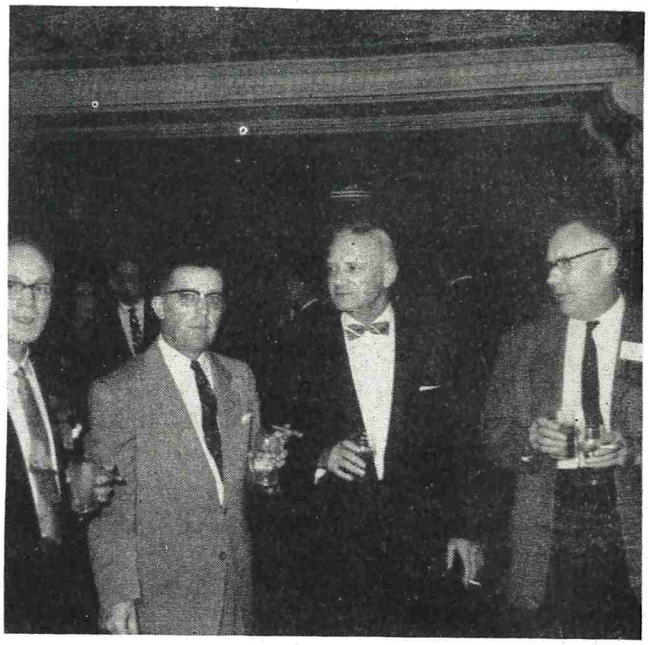
"Bill" Hickey (left) New York City, formerly Salt Lake City, Utah, receives door prize of New York cheese from "Bill" Skinner, New York State Association of Milk Sanitarians.

Among the many evidences of the work of the Local Committee were several exhibits depicting

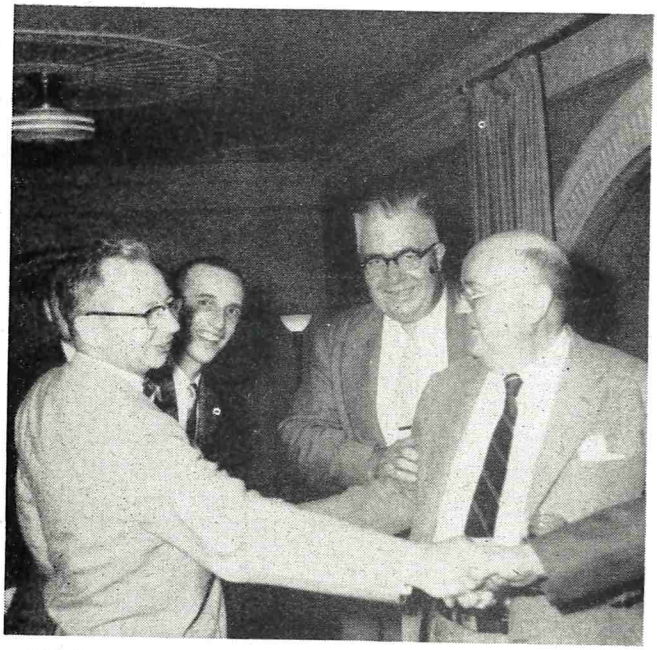


Harold Austin, Coca Cola Co., Atlanta, Ga., (left) receives ham made from an Iowa corn fed hog. Presented by Harold Bayes, Iowa Association.

Two dairy bacteriologists, Dr. Marvin Speck of North Carolina State College and Dr. J. C. Olson Jr. of the University of Minnesota register early.



L. E. Mayhugh, Dan Conley, Frank Manning and Harry DeLozier of the Kentucky Association talk over a few details of arrangements at the Monday Evening party.



Old friends, Dick Parry (R. I. Assoc.), Jim Burrows (Michigan), Charlie Holcombe (Minnesota) and C. B. Shogren (Wisconsin) greet each other at pre-convention gathering.

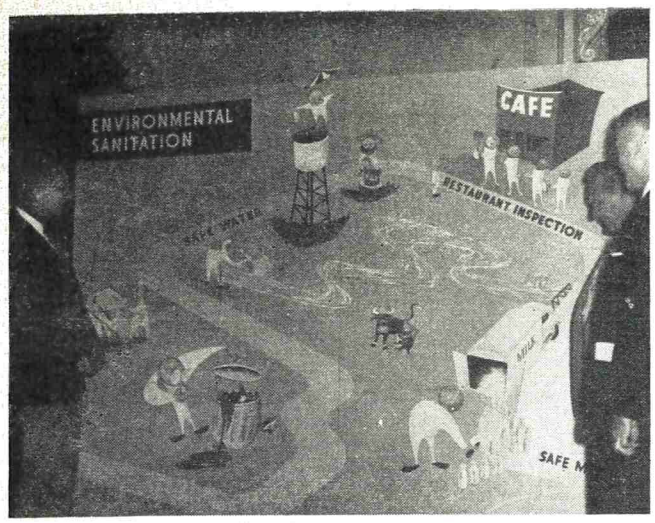
various activities in various areas of sanitation. These created considerable interest and an expansion of this feature might well be considered by the Association in connection with future meetings.

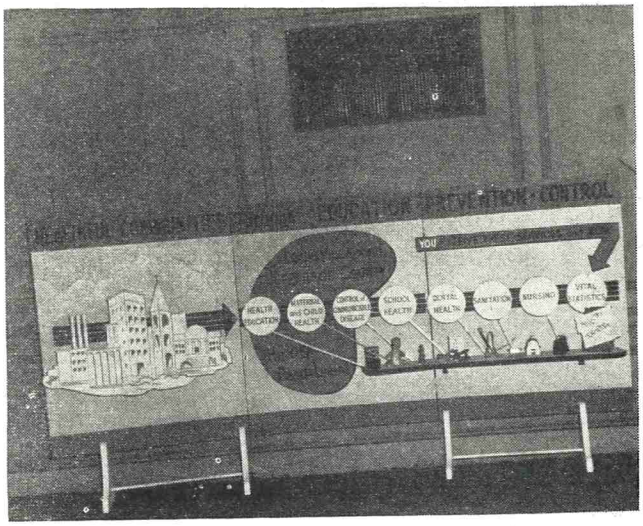
Two social events followed Tuesday's program. A smorgasbord was staged in the beautiful Crystal Ballroom of the Brown Hotel and the Tri-Cities Dairy Technology Society held their monthly meeting at the Sheraton-Sealbach Hotel to which all were invited. At the latter event Dr. C. K. Johns from the Department of Agriculture of Canada, and a Past President of the Association gave the address of the evening. Dr. Johns, recently returned from two trips to Europe, gave a very interesting talk on some of his observations on milk sanitation in Europe. His address will appear later in the Journal.

Many significant and informative papers were given during the course of the formal program. These and the several Committee reports will appear in subsequent issues of the Journal.

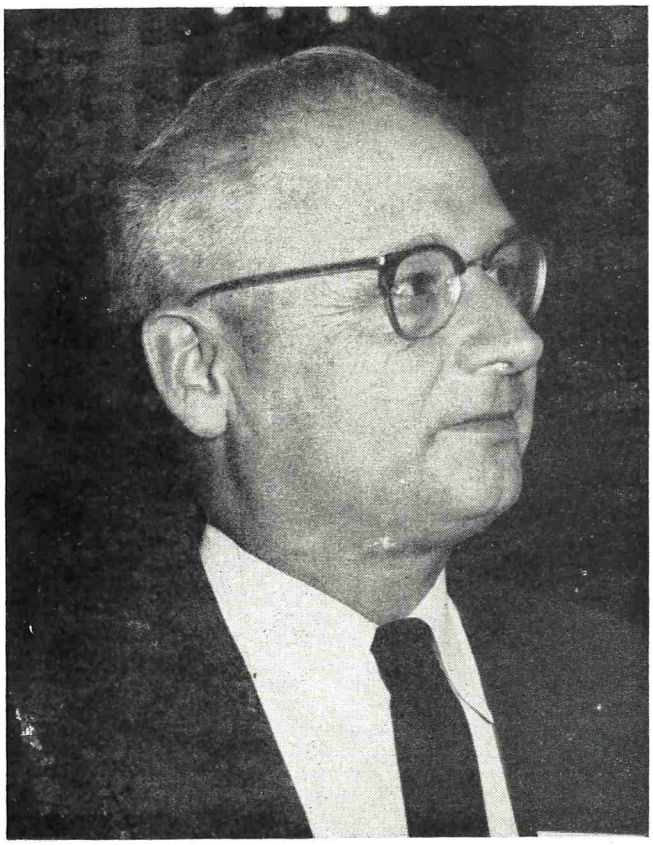
The high point of the convention took place on Wednesday evening at the Association Annual Banquet. Following an excellent address by Kentucky

Harold B. Robinson, President.





Two of the several milk and environmental sanitation displays arranged for by the local committee.



John J. Sheuring, elected 2nd Vice-President.

Commissioner of Health, Dr. Russell E. Teague the two Association Awards were presented. Harold J. Barnum, Denver Department of Health received the highest award given by the Association, the Sanitarian's Award, which is accompanied by a check for $1,000 made available by five commercial organizations. The Citation Award was presented to Dr. Fred C. Baselt of the American Can Company. As always these announcements come without prior knowledge of the recepients or of anyone other than the Awards Committee.

Throughout the convention sessions, door prizes donated by the various affiliates were given to the holders of the lucky numbers.

The closing session of the meetings on Thursday afternoon was devoted to the business meeting.

REPORT OF THE COMMITTEE TO STUDY THE POSSIBILITY OF USING THE MAIL BALLOT

One of the resolutions adopted at the 43rd Annual Meeting of the Association in Seattle last year was that "a study be made of the possibility of using the mail ballot."

Article IV, Section 1 of the Constitution, provides that:

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

For many years, it has been the practice of the Executive Board to hold a meeting of the new officers and the Executive Board immediately after the close of the Annual Business Meeting. This is imperative if the sound business affairs of the Association are to

be continuous, especially where the monthly publication of a nationally distributed Journal is involved.

In carrying out this study, the committee wrote to the secretary of each of the 27 affiliates, requesting a copy of that Association's constitution and by-laws. Only 13 replies were received. A review of each was made which disclosed that only two of the affiliates provided for the election of officers by mail ballot. In the other 11 affiliates, the Officers and or Executive Board members are elected at the Annual Business Meeting.

Many of the members of the Association never have the opportunity of attending an Annual Business Meeting. Election of Officers by a mail ballot is certainly a more democratic method, as it would permit every member to cast his vote in the annual election. However, in one of the two affiliates using this method, only approximately 50 per cent of the membership avail themselves of this opportunity.

On the other hand, a mail ballot plan would not permit induction into office of the newly elected Officers at the close of the Annual Business Meeting, and would undoubtedly require another meeting of the old Executive Board some 45 or 60 days later to count the ballots and officially declare the winning candidates. It would also not permit a meeting of the new Officers and Executive Board for a period of 30-60 days. Such delays might even be greater because of the wide geographical distribution of the Officers and Members of the Board and would not be conducive to the continued sound business operations of the Association and the Journal. Attendance at 2 or 3 Executive Board meetings within a comparatively short space of time would probably be extremely difficult for a majority of the Board members because of costs in time, travel, and accommodations. Assuming that an election by mailed ballot was to be placed in operation, the balloting would have to be done by first class mail and with the proposed increase of 25% in the first class postage rates, the postage costs alone would amount to approximately $350.00 plus the printing costs for envelopes and ballots. Such a plan would also require additional work of the Executive Secretary at that time of the year when his work load is extremely heavy.

Although the mail ballot method would appear to be more democratic, it is the Committee's opinion that the number of serious disadvantages outweigh its possible advantages. Therefore, the committee is not in favor of this change at this time.

The committee has also studied the manner and time of appointment of the Nominating Committee as prescribed in Article IV, Section 2 of the By-Laws. This section provides that:

"The President, at each Annual Meeting, will appoint a Nominating Committee of seven members, other than officers of the Association. This committee will submit to the Association at the Annual Business Meeting the name of at least one nominee for each elective office in the Association. These names, together with any other nominations duly made on the floor at the Annual Meeting shall be voted upon. If there are more than two nominees for any office and none receives a majority of all the votes cast, the candidate receiving the lowest count on the first ballot will be eliminated from the second ballot, and this procedure will be followed until a majority vote is reached."

In accordance with this provision, it has been the custom each year for the President to nominate seven members in attendance at the Annual Meeting and to allow them approximately twenty-four hours to select a slate of candidates for the two or more offices. No one knows he will be a member of the Nominating Committee until he gets to the meeting and has given no thought to the relative merits of possible candidates. Frequently, the majority of the members of this Committee are unfamiliar with the duties and responsibilities of the officers, the work of the Association, and know very few people outside their own affiliate. They may not be qualified to select strong candidates because they are not familiar with the active members of the Association. One of the affiliate associations has attempted to solve this problem by prescribing in its by-laws that the nominating committee shall be composed of the three most recent Past-Presidents These individuals perform most of their preliminary work by mail and make their report at the Annual Business Meeting of the affiliate association. They know their responsibility at the beginning of the year and have an entire year to make their selections.

It is the recommendation of this committee that Article IV, Section 2 of the By-Laws be amended in such a manner that the President will appoint the Nominating Committee as soon as convenient after assuming office. In order to accomplish this, it is recommended that this section be amended to read as follows:

"Each year the President, as soon as convenient after assuming office shall appoint a Nominating Committee of seven members, other than officers of the Association. One member shall be the Chairman of the previous years Committee. This committee shall submit to the Association at the Annual Meeting the name of at least one nominee for each elective office in the Association. These names, together with any other nominations duly made on the floor at the Annual Meeting, shall be voted upon. If there are more than two nominees for any office and none receives a majority of all the votes cast, the candidate receiving the lowest count on the first ballot will be eliminated from the second ballot, and this procedure will be followed until a majority vote is reached."

It is also recommended that the Secretary-Treasurer be instructed to proceed in accordance with Article VII - titled "Amendments" of the By-Laws by notifying the members that the proposed amendment will be open for discussion at the next Annual Business Meeting.

P. EDWARD RILEY, *Chairman*
HAROLD J. BARNUM
JOHN D. FAULKNER
ALAN B. MILLER

GENERAL PROCEEDINGS OF THE 44TH ANNUAL MEETING

H. H. WILKOWSKE, *Secretary-Treasurer*

The International Association of Milk and Food Sanitarians held the 44th Annual Meeting in the Brown Hotel, Louisville, Kentucky, October 8-10, 1957.

The first general business session was called to order by President-elect Harold B. Robinson followed by an invocation. The welcome address was made by the Mayor of Louisville, Hon. Andrew Broaddus who was introduced by Russell E. Teague, M.D., Kentucky Commissioner of Health.

The presidential address was given by Paul Corash which was concerned with the opportunities of the Association, its comprehensive activities and professional nature. It was an excellent address which will soon be published in this Journal in entirety so that all members may become acquainted with the thought-provoking and challenging comments President Corash made to the approximately 400 who attended the meeting in Louisville.

Following his address, President Corash outlined the duties and responsibilities of the Nominating Committee. He pointed out that nominees were needed for Second Vice-President and Secretary-Treasurer, the latter having been filled by H. H. Wilkowske for the past six years but who had notified the President that he would not accept re-nomination if such were tendered him as they had been in the past. The following were appointed to the Nominating Committee: M. R. Fisher, Missouri (Chairman); C. H. Holcombe, Minnesota; P. E. Riley, Illinois; R. W. Metzger, New York; Ellis Rackleff, Oregon; H. J. Barnum, Colorado; and W. R. McLean, Georgia.

The Nominating Committee nominated for Second Vice-President, John J. Sheuring of Georgia and Ray Belknap of Iowa. For Secretary-Treasurer they nominated Bill Kempa of Saskatchewan, Canada and Vincent T. Foley of Missouri. On succeeding days there were calls for nominations from the floor, of which there were none. The President appointed as tellers, Jim Burrows of Michigan, Joe Donovan of Massachusetts and W. C. Parkinson of Utah. The election was held and those duly elected were John J. Sheuring of Georgia as Second Vice-President and Vincent T. Foley of Missouri as Secretary-Treasurer.

During the three days of the Annual Meeting ten committee reports were made. These reports were formally adopted at the final business meeting and will be published in full in subsequent issues of the Journal.

Mr. C. A. Abele presented a report from the 3-A Symbol Council, but inasmuch as this is not a formal committee of the Association, no action was taken with respect to acceptance.

The report of the Committee on Recognitions and Awards was made by Ivan Parkin, Senior Past President. At the annual banquet a citation award was presented to Fred C. Baselt for his many years of exceptional service to the Association. The recipient of the Sanitarians award was Harold J. Barnum of Denver, Colorado. - a most worthy and deserving local Sanitarian. This award, the most cherished in its field, includes a tax-free award of one thousand dollars and is jointly supported by the Diversey Corporation, Klenzade Products, Inc., Oakite Products, Inc., Olin Mathieson Chemical Corporation and Pennsalt Chemical Co., and is administered by LAMFS.

The Financial Report was presented by H. H. Wilkowske, Secretary-Treasurer and will be published in this Journal as presented.

The report of the Executive-Secretary and Business Manager of the Journal was presented by H. L. Thomasson. It was a thorough report of his activities and he was invited to submit it to the entire membership by publication in this Journal.

The report of the Resolutions Committee was made by Past-President H. S. Adams. These will be published in full. The resolutions adopted were, in brief, as follows:

1. Thanks to the host — Kentucky and Indiana Associations.
2. Thanks to the Kentucky Allied Industries.
3. Memorial to deceased members.
4. Urging strengthening of Public Health Service Milk and Food Program.
5. Urging representation on the Joint Committee on Water Supplies.
6. Urging the appropriation of increased funds for students in Public Health.
7. Urging greater control of Antibiotics by the Food and Drug Administration.

8. The memorilization of William B. Palmer by naming the IAMFS Scholorship in his honor.

The "old business" brought to the attention of the membership at the annual business meeting was a report of a Special Committee on Constitution Revision, specifically to study the mail ballot proposal and the procedure for appointment of the nominating committee, given by P. E. Riley.

After considerable discussion the acceptance of the report was voted upon as two separate recommendations. In both instances the vote was to accept the recommendation, indicating that the large majority (only Ivan Parkin dissented) was not in favor of the mail balloting procedure and that all members present voted in favor of the reccommendation concerning the appointment of the Nominating Committee at an earlier date, providing such change is made in the By-Laws by duly prescribed procedures.

Under the item of "new business" a letter from Ray Belknap, President of the Iowa Association was read inviting the Association to meet in Des Moines in 1961 or 1962. The matter was referred to the Executive Board for consideration.

Upon recommendation of the Executive Board Dr. J. H. Shrader was elected the first Honorary Member of the Association by the unanimous vote of the members present at the Annual Meeting.

President Corash turned the meeting over to the new President Harold B. Robinson. After a few remarks the meeting was adjourned until the next Annual Meeting to be held in New York City.

Presentation of the Sanitarian's Award is made by Ivan Parkin (left), Chairman of the Awards Committee to Harold J. Barnum.

HAROLD J. BARNUM OF DENVER, COLORADO, HONORED AS SANITARIAN OF THE YEAR AT INTERNATIONAL SANITARIANS' MEETING

1957's Sanitarian of the Year is HAROLD J. BARNUM, Chief of Milk Sanitation Services of the Department of Health and Hospitals, Denver, Colorado.

The Sanitarian's award — which carries with it a check for $1,000.00 — is presented annually by International Association of Milk and Food Sanitarians, Inc. to the county or municipal public health sanitarian who has contributed most meritorously to the health and welfare of his community for the preceding five years. Presentation was made October 9 in Louisville, Kentucky, at the 44th annual convention of IAMFS in the Brown Hotel; Mr. Barnum had no foreknowledge of the impending honor.

Mr. Barnum has been closely associated with the field of milk and food sanitation since 1929, when he was a milk inspector for the Detroit (Michigan) City Health Department. He became Chief of Milk Sanitation Services in Denver in 1947, assuming this position at a time when Denver's milk sanitation rating stood at 62.28 per cent. Within a few years, Mr. Barnum had reorganized his office, induced industry and public to cooperate in joint programs, and had raised the milk sanitation rating to around the mid-90s, percentage-wise, where it has since remained.

The following is a summary of some of the activities

of Mr. Barnum in the five years preceding the current one, which have resulted in his being selected for the Sanitarian's Award:

1952 — As Chairman of the Educational Subcommittee of the Colorado Brucellosis Advisory Committee, Mr. Barnum was responsible for circulating three publications about and arousing interest in the brucellosis problem. Thus stirred, the dairy industry asked for regulations requiring blood testing and proper vaccination of all dairy cattle. The regulations were subsequently drafted with Mr. Barnum's assistance and adopted by the State Department of Agriculture. Mr. Barnum also acted promptly when unwarranted allegations concerning use of certain cleaning compounds as preservatives in milk were unjustly made, thus forestalling a situation possibly detrimental to both the public and the dairy industry. In this year also, Mr. Barnum was elected President of International Association of Milk and Food Sanitarians, and he held important posts in the Rocky Mountain Association of Milk and Food Sanitarians and the Colorado Dairy Technology Society.

1953 — A cooperative program, with the dairy industry paying the entire costs, to improve quality control through wider use of laboratories was put into effect, which resulted in improved sanitation practices on the farms where milk was produced. Mr. Barnum stimulated efforts to increase milk production in the Denver areas, to lessen dependence on milk from other milksheds, and he toured other sections of the country, observing bulk milk installations, from which he selected their best features and lessons which he encouraged in his own area as producers switched over from cans to bulk milk handling. In 1953 also, Mr. Barnum established procedure for chest X-ray of 1500 dairy plant employees as part of a tuberculosis eradication program. Mr. Barnum was named to the Executive Board of the National Conference on Interstate Milk Shipments in this year also.

1954 — As the switch to bulk milk handling continued, Mr. Barnum established a program whereby the Health Department trained and certified the drivers of the tank trucks which collect the official samples of farmers' bulk milk for official analysis. The problem of off-flavors in milk was submitted by some milk producers to Mr. Barnum for solution; realizing that its solution was beyond the scope of the Health Department, Mr. Barnum advocated an organized state-wide approach to the problem, which was then undertaken by the State Department of Agriculture and Colorado A & M College. For key pasteurization plant operators, Mr. Barnum organized a special course in high-temperature short-time pasteurization at the U.S. Public Health Service's Rocky Mountain Training Station.

1955 — During this year Mr. Barnum proposed use

Sponsors of the Sanitarian's Award representing Klenzade Products, Inc., The Diversey Corp., Pennsylvania Salt Manufacturing Co., Olin Mathieson Chemical Corp., and Oakite Products, Inc., meet with award winner H. J. Barnum (right, center), and Ivan Parkin, Chairman, Committee on Recognition and awards.

of the Universal Bottle Sampling System for collecting milk samples on a producer's farm, a program which established a standard container and technique for securing samples. Drought conditions caused Mr. Barnum to look into practices which might lower use of water in Denver's dairy plants; so successful was he in his recommendations that in 1955, Denver's 18 milk plants handled an 8.5 per cent increase in milk volume with a corresponding reduction in the volume of water used in processing of 39 per cent. Uniform standards for a water supply system for milk producing farms in the area were also promulgated by Mr. Barnum at this time.

1956 — A training program for the Health Department staff emphasizing processing and pasteurization practices in dairy plants was originated by Mr. Barnum, thus permitting his staff, in many cases, to know about the newer processes well in advance of their installation or adoption in the plants in Denver. A frozen dessert ordinance was felt needed and Mr. Barnum took the lead in plans for improving ice cream quality by a well drafted, technically based law.

Four results have come about from the work of Harold J. Barnum according to the Committee on Recognition and Awards of IAMFS. These are: (1) Public confidence in the milk and dairy industries of the Denver area is attested by the steadily increasing per capita consumption, and the dairy industry itself has restored its confidence in itself that it is producing a product of the highest quality. (2) Higher health protection for the entire population has resulted from Mr. Barnum's work. (3) A more stable milk industry has resulted which in turn has a direct effect on the social and economic welfare of the community. (4) The morale and technical proficiency of the entire public health program has been increased.

The scroll which was presented to Mr. Barnum by the sanitarians' association is inscribed:

"This Award is conferred for outstanding accomplishments in public and industry relations; for meritorious achievements in the field of milk and food sanitation and for his distinguished service as a sanitarian in the field of public health."

Mr. Barnum is the sixth person ever to receive the Sanitarian's Award. Earlier recipients are:

PAUL CORASH, Chief of the Milk Division, New York City Health Department (1952).

DR. E. F. MEYERS, Chief of the Milk, Meat and Food Division of Grand Rapids, Mich., Health Department (1953).

KELLEY G. VESTER, Senior Sanitarian of the Rocky Mount, North Carolina, City Health Department (1954).

B. G. TENNANT, Chief Sanitarian of the Escambia County Health Department, Pensacola, Florida (1955).

JOHN H. FRITZ, Chief of the Milk and Food Section of the Kansas City, Missouri, Health Department (1956).

The Sanitarian's Award is sponsored by five companies: Diversey Corporation, Klenzade Products, Inc., Oakite Products, Inc., Olin Mathieson Chemical Corporation, and the Pennsylvania Salt Manufacturing Company. The award is entirely administered by IAMFS, and the sponsoring firms have no voice whatever in selection or consideration of recipients.

Fred C. Baselt (left) receives the Citation Award from Ivan Parkin, Chairman of the Awards Committee.

FRED C. BASELT CITED FOR SERVICE TO SANITARIANS' GROUP AT LOUISVILLE MEET

Fred C. Baselt, Assistant to the General Manager of the Research and Technical Department, American Can Company, New York, is this year's recipient of the Citation Award of International Association of Milk and Food Sanitarians. Presentation was made October 9 at the Brown Hotel in Louisville, Kentucky, at the 44th Annual Meeting of the sanitarians' association.

The award is presented annually to a member of the association whose contributions over a period of years have furthered the professional advancement of IAMFS and have strengthened its growth and enhanced its reputation.

The plaque which signalized the award was inscribed:

"This Award is conferred for his extreme devotion to and advancement of the field of public health; his unswerving duties performed on behalf of I.A.M.F.S. as an officer, director, committee member, committee chairman, guide and counsellor; and also for his fairness and integrity in the administration of his job."

A member of IAMFS since 1941, Mr. Baselt has served as Associate Editor of the association's official publication, the Journal of Milk and Food Technology, since that time. He was instrumental in developing a program whereby advertising was obtained and the Journal put on a sustaining basis.

A regular attender of business and committee meetings of the association, Mr. Baselt has served widely on numerous important committees, and most recently, he has acted as Secretary to the newly formed Committee on Research Needs and Applications.

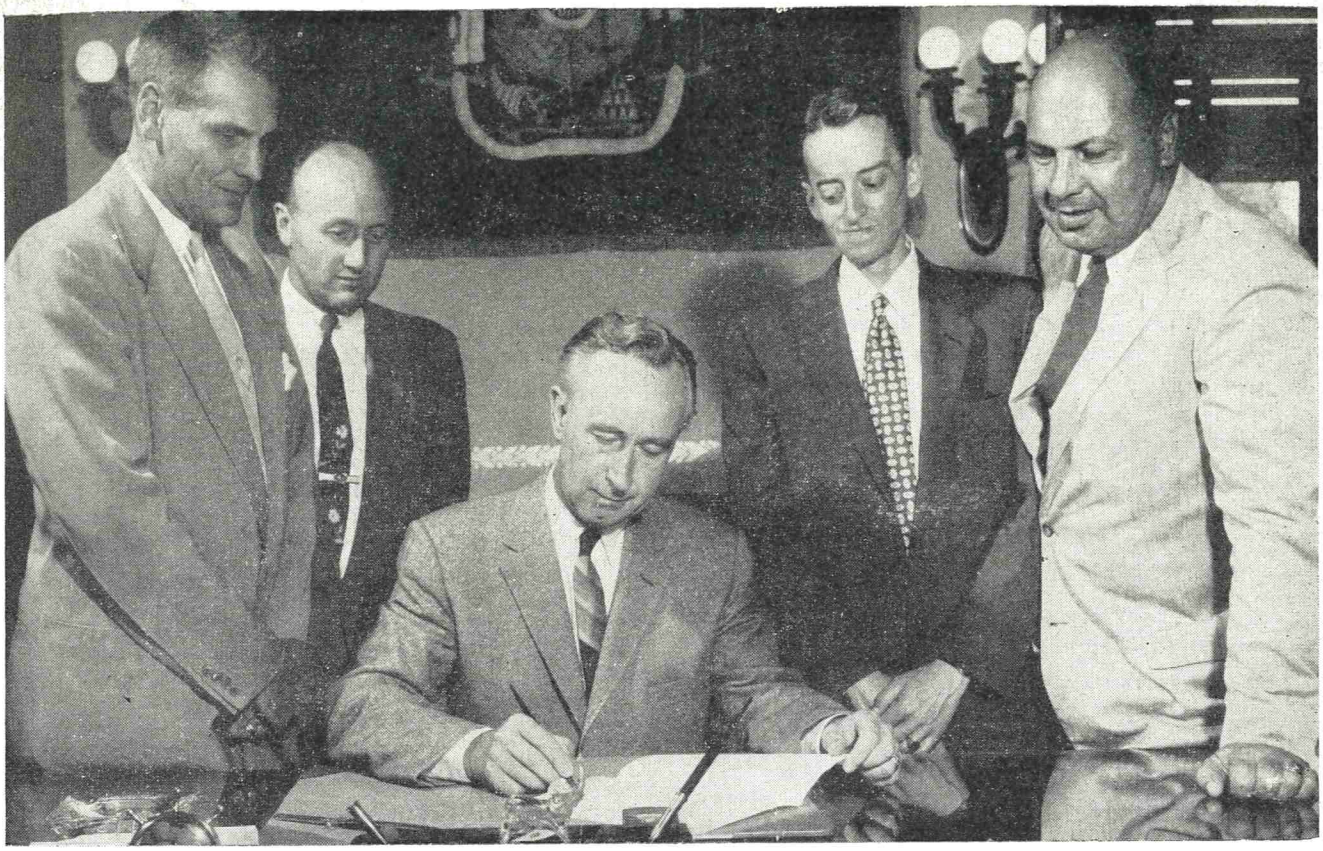
The Committee on Recognition and Awards, which selected Mr. Baselt from among the nearly 4,500 members of the international group, observed that Mr. Baselt acts as an "ambassador of good will for the association during his many visits to health departments and other institutions throughout the country."

PROFESSOR W. H. SPROULE, ONTARIO AGRICULTURAL COLLEGE, RETIRES

Dr. J. D. MacLachlan, President of the Ontario Agricultural College, has announced the retirement of Prof. W. H. Sproule, for 25 years head of the O.A.C. Dairy Department, and the appointment of Dr. D. M. Irvine as his successor, effective September 1, 1957. Prof. Sproule, one of the best known and most highly esteemed figures in the dairy industry, has been connected with the College Dairy Department for nearly forty years, and is retiring because of ill-health. Born in Vankleek Hill, he graduated from the O.A.C. in 1920. Prior to graduation, he was a member of the Royal Flying Corps during World War I. Among his contributions to the dairy industry were the organization of the Ontario Dairy Research Council in 1932, of which he was secretary until 1951; the writing of numerous scientific papers and bulletins on dairy technology; the standardization of acidity of churning cream, and the use of curd knives in cheese making; the organization of cheese sediment testing in Ontario; and the inauguration of the butter, yeast, and mould service for Ontario Creameries in 1941.

Perhaps his greatest contribution to the dairy industry has been as a teacher. During his long career at the college, most of the prominent men in the dairy industry in Canada have come under his instruction, and his influence has spread to many parts of the world through the men he trained. In 1953 Prof. Sproule was the Ontario Dairy Industry delegate to the 13th International Dairy Congress at the Hague, Holland, and in 1956, he attended the 14th World Dairy Congress at Rome, Italy, representing the Ontario Department of Agriculture.

He will be succeeded as head of the Dairy Department by Dr. D. M. Irvine, M. Sc., Ph. D., a member of the dairy faculty. Dr. Irvine who is thirty-seven years of age, is a native of St. Catharines, Ontario, where his father, a graduate of the Ontario Agricultural College, operated a dairy for many years. He has thus been connected with the dairy industry since childhood. Graduating from the O.A.C. in 1942, in Dairying, he spent three and one half years in the Armed forces overseas, as a lieutenant in the R.C.A.S.C., and one and one half years as lecturer at the O.A.C. In 1948, he was appointed to the faculty of the University of Wisconsin, where he remained for eight years, teaching, and conducting resarch in cheese production. During this time he obtained his M. Sc. and Ph. D. degrees, and developed a new variety of cheese and worked on several other new types, which are in commercial production in the United States today.



GOVERNOR SIGNS WISCONSIN SANITARIANS REGISTRATIONS ACT

From Left to Right: R. D. Kalling, R. S., Regional Vice President National Association of Sanitarians; Public Health Sanitarian, District No. 3, State Board of Health. Fon Du Lac, Wis.; C. K. Luchterhand, Member Legislative Committee, Wisconsin Association of Milk and Food Sanitarians; Senior Milk Sanitarian, State Board of Health, Madison, Wis.; Governor Vernon L. Thomson of Wisconsin; David J. Blanchard, Assemblyman, Dist. 2, Rock County, Edgerton, Wis.; H. A. Denzien, R. S. Chairman Legislative Committee Wisconsin Association of Sanitarians; Rock County Sanitarian Janesville, Wis

CLASSIFIED ADS

SANITARIANS

Immediate openings in progressive San Francisco Bay Area Health Department. Opportunity for work on a full range of public health problems in rural, suburban and metropolitan areas.

Beginning salary $394 a month with five-step increases to $484 in three years. Excellent personnel policies and benefits.

Apply: James C. Malcolm, M. D., M.P.H., Health Officer, Alameda County Health Department, City Hall, 14th and Washington Streets, Oakland, California.

FOR SALE: Single service milk sampling tubes. For further information and a catalogue, please write: Bacti-Kit Co., P. O. Box 101, Eugene, Oregon.

District Sales Representatives:

Large national bulk milk cooler manufacturer expanding its sales force in Midwest and Northeast. If you are top flight salesman with bulk milk cooler, milking equipment, dairy or milk plant experience and interested in representing well known manufacturer in fast growing field, send qualifications to Box 437, Shelbyville, Ind.

Index To Advertisers

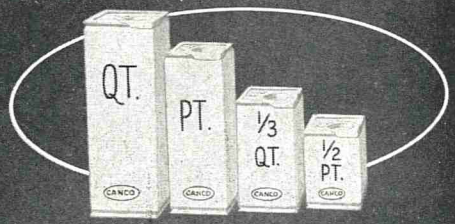
Cafeteria managers, too, prefer CANCO cartons

. . . because they save refrigerator space, minimize "clutter," and lower clean-up costs!

Canco cartons help the cafeteria manager make his lunchroom more attractive, more efficient. Because they're disposable, there are no empties to collect, store and return.

Cafeteria patrons prefer Canco cartons, too—in all of the popular sizes. For this superior container is much easier to open and provides "controlled pouring," is sturdy, handsome, sanitary.

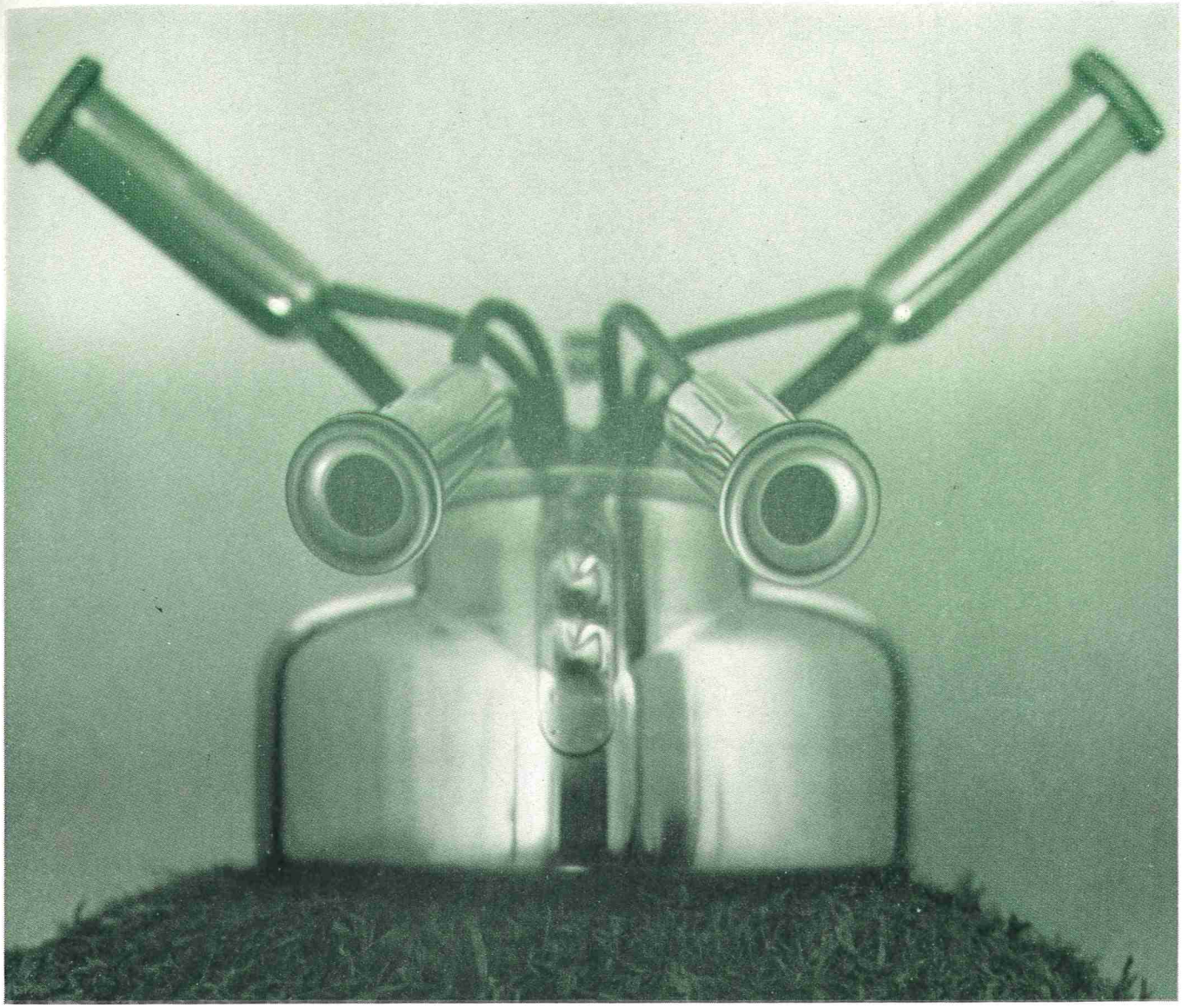
If you are a public health official, you can take pride in the fact that fresh milk is now available almost everywhere in Canco disposable milk containers. Much credit for this advance goes to public health officials, who early recognized the disposable container as a great milestone on the road to better milk distribution.



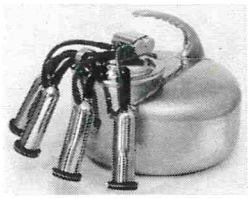
THE PREFERRED CARTON
. . . KNOWN BY
THE FAMOUS CANCO OVAL

AMERICAN CAN CANCO COMPANY

NEW YORK • CHICAGO • SAN FRANCISCO



For dairymen who are "bugs" on sanitation



Dairy farmers and commercial dairies look to products based on HYAMINE 2389 and TRITON X-100 for cleaning and sanitizing milk pails, milking machines, pipelines, and pasteurizing equipment.

The combination of HYAMINE 2389 and TRITON X-100 surfactant does an all-around job of making cleaning and sanitizing faster and easier . . . helps produce milk with low bacteria counts . . . is odorless, non-irritating and non-toxic in use concentrations . . . and is effective over a wide range of hard waters.

Write for complete information on how to use and formulate dairy detergent sanitizers with HYAMINE 2389 and TRITON X-100.

HYAMINE *and* TRITON *are trade-marks, Reg. U. S. Pat. Off. and in principal foreign countries.*

Chemicals for Industry

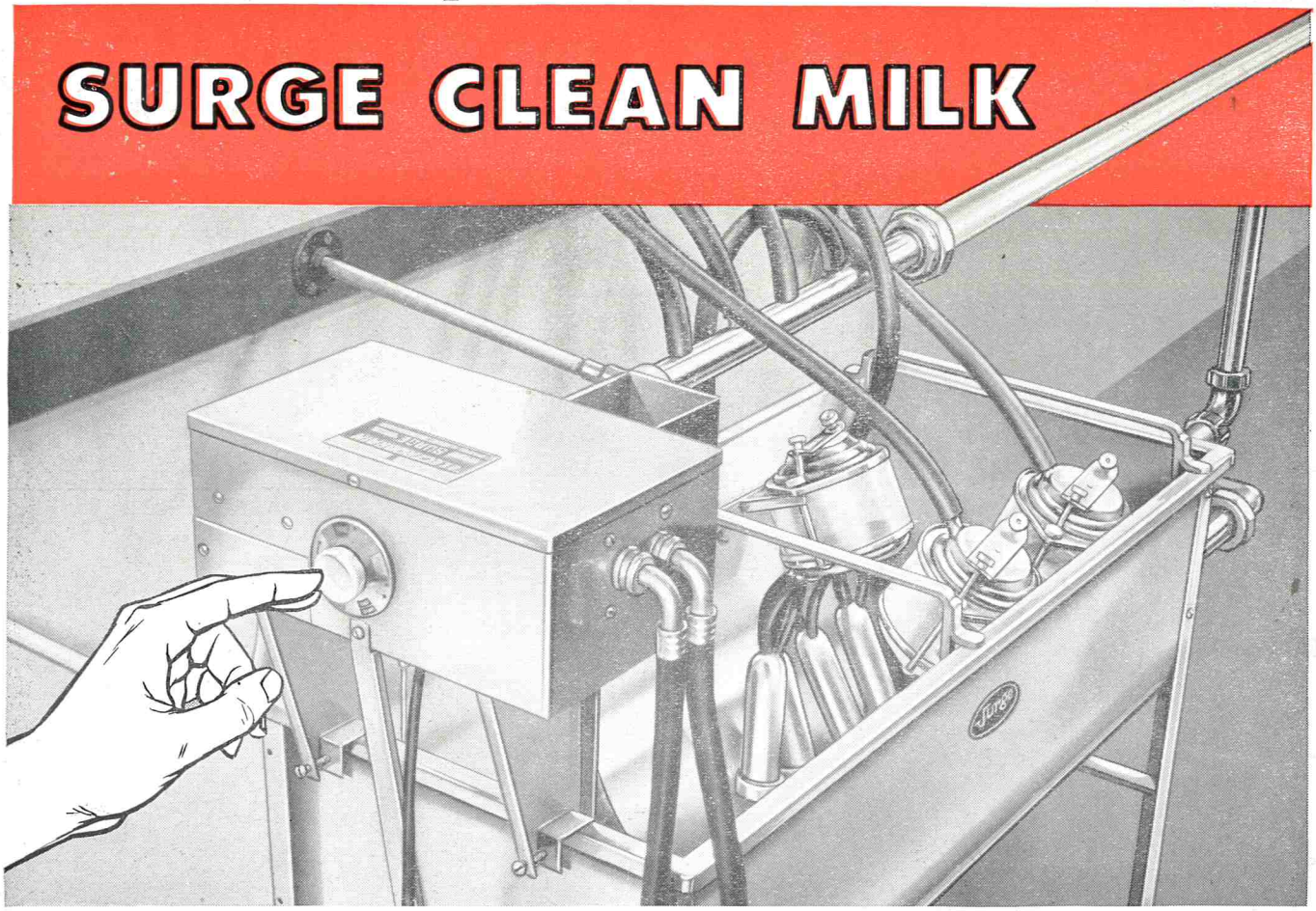
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

HYAMINE

PIPE LINES, PUSH BUTTONS AND SURGE CLEAN MILK



Sanitation inside the pipe of a pipe line milker has become a challenge for us all.

That's why Surge has spent so much time and effort to build a satisfactory pipe line washer that works automatically. We figure the more ELECTROBRAIN relieves a dairy farmer of drudgery, the better his sanitation will be . . . and the more he will produce Surge Clean Milk.

Surge doesn't have to build an ELECTROBRAIN . . . nobody else does — why should Surge? Surge does build an ELECTROBRAIN because it is not only the best guarantee that can be found that a right, proper and thorough job of washing will be done . . . but every dollar spent to buy it will save more dollars' worth of time than just about anything else around the farm.

SURGE

BABSON BROS. CO.

2843 WEST 19TH STREET • CHICAGO 23, ILLINOIS

ATLANTA • HOUSTON • KANSAS CITY • MINNEAPOLIS
SACRAMENTO • SEATTLE • SYRACUSE • TORONTO