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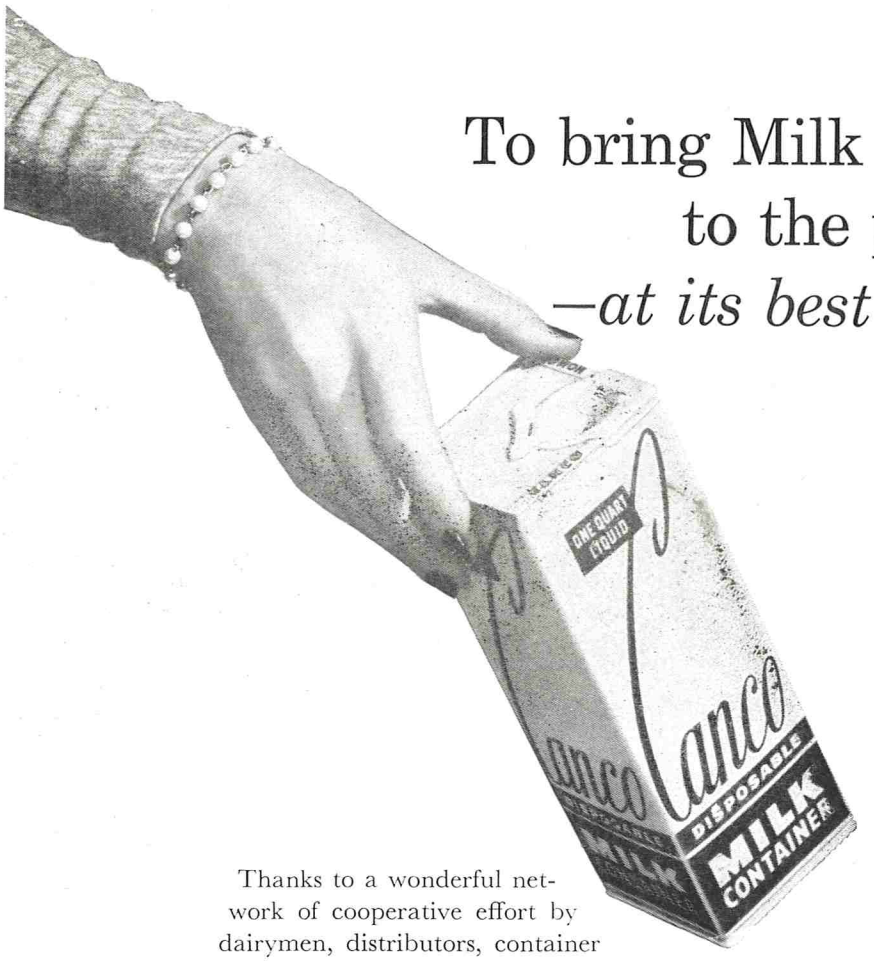

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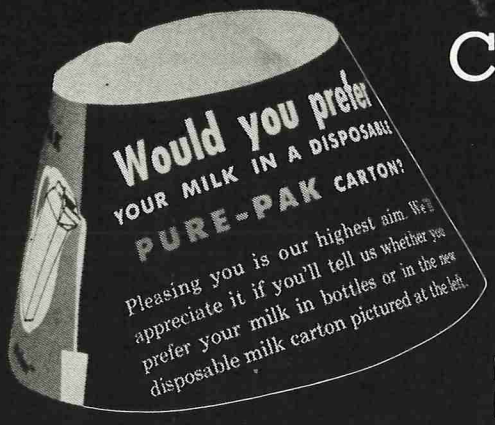

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AND THE U. S. PUBLIC HEALTH SERVICE STANDARDS

STANDARDS set by the U.S. Public Health Service in 1939 were calculated to improve the quality of milk produced on America's dairy farms. If generally adopted, it was believed that dairymen and dairy equipment manufacturers who adhered to these standards would eliminate most of the common hazards to good sanitation.

In section 7 of this Milk Ordinance and Code, the standards for sanitary *construction* of milking equipment were defined. Here were *basic* standards. Without such standards, later efforts to improve sanitation would be for the most part ineffective.

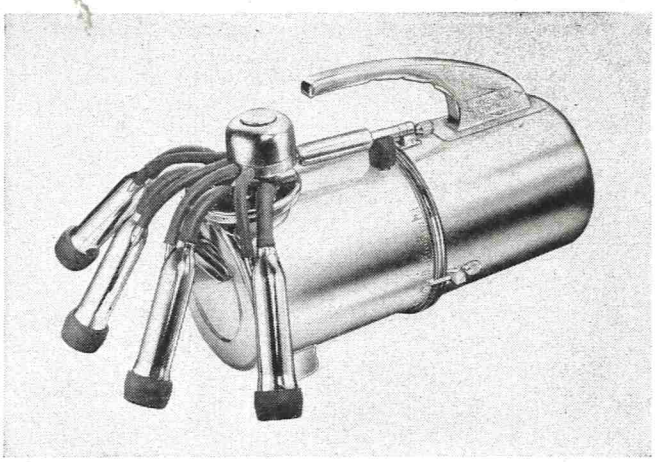
In creating a new suspended-type milker, our Rite-Way designers discussed the sanitation features of their new design with U.S. Public Health Service sanitation consultants. Our goal was to make sanitation *practical*. We reasoned that a genuinely sanitary milker would be well worth any possible extra costs incurred in its manufacture. Rite-Way carefully met every condition of section 7 of the Code.

Two design features were considered to be of primary importance.

(1) the vacuum line and pulsator should be separated as far as possible from the milk line. It was recognized that the cleanest vacuum lines would be those most difficult for milk to enter under average farm operating conditions.

(2) the milker itself must be *easy to clean*. Since prompt cleaning after each milking is absolutely necessary, the entire milker and pail must be designed for quick and thorough cleaning under normal procedures.

The result was a completely new idea—a pail that unfastened in the middle and came completely apart, exposing every square inch of its interior for quick, thorough cleaning. To keep the milk line clean, the pulsator was attached to the vacuum line in a way that made it impossible for the milk to enter either the pulsator or the vacuum line. These features were rigidly tested in the laboratory and on the farm. The result: the most practical and sanitary milker yet devised.



"Swing" is the only suspended or floor-type milker whose construction complies with the U.S.P.H.S.

Rite-Way called their new milker the "Swing". Today, it is widely advertised and a large part of our sales message stresses such important features as its proper teat cup positioning, lighter weight, narrower shape, and its ease of adjustment to any cow.

But the outstanding feature of "Swing" is its contribution to good sanitation. *Today, it is the only suspended or floor-type milker whose construction complies with U. S. Public Health Service standards.*

The standards established by this agency are available—indeed manufacturers who are interested are encouraged by the U.S. Public Health Service to design their equipment so as to comply with the provisions of the Milk Ordinance and Code. We feel we have measured up to our responsibility by adhering strictly to these standards.

We invite further inquiry and will be glad to send complete information on the Swing Milker or any other item in the Rite-Way line.

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PACKAGE MACHINERY COMPANY
East Longmeadow, Massachusetts
Chicago, Illinois • *Oklahoma City, Oklahoma*

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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, Shelbyvllle, Ind.

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Editorial Notes

ANNOUNCEMENT CONCERNING THE SANITARIANS AWARD FOR 1955

Announcement is made that nominations will be accepted for the annual Sanitarians Award until May 15, 1955, and all members of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. are requested to give consideration to the nomination of individuals whose professional work in their communities has been outstanding.

The Award, which consists of a Certificate of Citation and $1,000 in cash, is sponsored jointly by the Diversey Corporation, Klenzade Products, Inc., Oakite Products, Inc., Pennsylvania Salt Manufacturing Company, and the Mathieson Chemical Corporation, and is presented annually by the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. The next presentation will be made at the 42nd annual meeting of the ASSOCIATION which is to be held at Augusta, Georgia in October 1955. Paul Corash, Chief of the Milk Division, New York City Health Department, was the recipient of the first Award which was presented in September 1952. Dr. E. F. Meyers, Chief of the Milk, Meat and Food Division of the Grand Rapids, Michigan Health Department, received the 1953 Award; and Mr. Kelly G. Vester, Sr. Sanitarian of the Rocky Mount, North Carolina Health Department, the 1954 Award.

The Executive Board of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. has established the following rules and procedures governing the Sanitarians Award.

Eligibility

The rules concerning the eligibility of candidates for nomination are: (1) A nominee shall have made a meritorious contribution in the field of milk and food sanitation to the public health and welfare of a county or municipality within the United States or Canada, and shall be currently employed as a professional milk or food sanitarian, or both, by a county or municipality. Employees of State or Federal Agencies, or industry, are not eligible for the Award.

(2) The work of a nominee on which the Award is to be based must have been completed during the five year period immediately preceding January 1 of the year during which the Award is to be made. Under special circumstances, consideration may be given to related work accomplished by a nominee during the seven year period preceding January 1 of the year during which the Award is to be made. Under this rule, the principal work to be considered for the 1955 Award must have been performed during the period January 1, 1950 to January 1, 1955, and the related work during the period January 1, 1948 to January 1, 1955.

(3) Any living citizen of the United States or Canada who, at the time of nomination is employed as a professional milk or food sanitarian, or both, by a county or municipality, is eligible for the Award. Membership in the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. is not a prerequisite of eligibility, and there are no restrictions as to race, sex or age.

(4) Co-workers are eligible for nomination if each has contributed equally to the work on which the nomination is based.

(5) No person who has once received the Award shall be eligible for nomination.

Nominations

Any member of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. in good standing, except members of the Committee on Recognition and Awards, may nominate a candidate for the Sanitarians Award; however, no member may submit more than one nomination in any given year. Nominations shall be sent to Mr. H. L. Thomasson, Executive Secretary of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., Box 437, Shelbyville, Indiana, and must be accompanied by:

(1) A brief biographical sketch of the nominee.

(2) A resume of the work and achievements for which recognition is proposed.

(3) Supporting evidence of the achievements and activities of the nominee.

(4) When possible, reprints of any publications relative to these efforts.

The deadline for submission of nominations is *May 15, 1955,* and all nominations and supporting evidence submitted to the Executive Secretary must be postmarked prior to midnight of that date.

Selection of the Recipient

The Committee on Recognition and Awards of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. has full responsibility for selecting from the nominations submitted the recipient of the Sanitarians Award. In judging the contributions of each nominee, the Committee will give special consideration to (a) originality of thought, mode of planning, and techniques employed in carrying out the work, (b) the comprehensive nature of the work, and (c) its relative value as it affects the health and welfare of the community. The Committee will give consideration also to the efforts of the nominee to establish professional recognition in the community in which he serves, as well as to his research and development, administrative, and educational achievements. Solicitation on the part of an individual or institution in behalf of a nominee is not desired, since the Committee will request verification of submitted information or additional information when necessary.

If, after reviewing the nominations and supporting evidence, the Committee should decide that the work and achievements of none of the nominees have been significantly outstanding, the Award shall not be made. In this connection, it is fundamental that if meritorious professional achievement cannot be discerned, the Award shall be omitted for a given year, rather than to lower the standards for selection of a recipient.

The 1955 Committee on Recognition and Awards consists of: John D. Faulkner, Chairman, Bethesda, Maryland; Harold Barnum, Denver, Colorado; Leon Blankenship, Knoxville, Tennessee; D. J. Boughten, Couer d'Alene, Idaho; William V. Hickey, Salt Lake City, Utah; Hubert Shull, Texarkana, Texas; and George Steele, St. Paul, Minnesota.

THE ROLE OF PSYCHROPHILIC BACTERIA IN THE KEEPING QUALITY OF COMMERCIALLY PASTEURIZED AND HOMOGENIZED MILK*

J. C. Boyd**, C. K. Smith, and G. M. Trout
Michigan Agricultural Experiment Station, East Lansing, Michigan

(Received for publication May 17, 1954)

Commercially pasteurized and homogenized milk, collected during the summer, fall, and winter months and stored at 40° F and 33° F, was studied for keeping quality.

When the storage temperature was lowered from 40° to 33° F, the keeping quality was found to be extended 11 to 14 days. The keeping quality of the milk stored at 40° F, when based upon the development of psychrophilic bacteria up to the 50,000 per milliliter standard, was lower than when based on the deterioration of flavor to a score of 37. The keeping quality of the milk stored at 33° F was found to be approximately the same when judged by either criterion.

The keeping quality of the milk samples collected in the fall and winter was poorer than those collected in the summer. This difference was greater when the samples were stored at 33° F than when stored at 40° F.

No oxidized flavors were encountered in these milk samples. The deterioration of flavor was closely associated with the growth of psychrophilic bacteria in all samples.

The widespread acceptance of every-other-day or three-times-a-week home delivery of milk and the tendency to centralize milk plant operations have led to a growing interest in the keeping quality of market milk. It is well known that milk of improved keeping quality would allow for a longer holding period in the dairy plant, a shorter, more uniform work week, and a greater area of distribution.

Numerous studies have been conducted on the keeping quality of milk when stored at temperatures considered to be comparable to household refrigeration[2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20]. The temperatures range from 40° to 50° F in the majority of these cases. These studies have, in general, followed the practice of expressing the keeping quality of milk as the number of days before (*a*) excessive numbers of bacteria develop, and/or (*b*) the flavor of the milk deteriorates. In most cases milk containing more than 30,000 to 50,000 bacteria per milliliter and/or having a flavor score of 37 or less has been considered poor quality.

An examination of the literature shows that the keeping quality of beverage milk has varied from as low as 2 days[19] up to as high as 20 days[3]. Burgwald and Josephson[3] and Dahlberg[5, 6, 7, 8], after rather extensive studies, conclude, however, that good quality commercially pasteurized milk would maintain a good flavor and/or bacteriological quality for 4 days at storage temperature of 39° to 45° F, but that the quality might be questioned at the end of 7 days storage.

Mott and Mazer[12], Chaffee[4], and Olson *et al.*[15] point out that the initial quality of the pasteurized milk is a factor in determining its keeping quality. Olson *et al.*[15] have shown that the presence of coliform bacteria even in small numbers in the fresh product, is associated with poor keeping quality. However, a negative coliform count on the finished product could not be depended upon to indicate that such a product would have a long storage life free from flavor deterioration due to psychrophiles.

Only a few reports have been found where studies have been made of the keeping quality of milk stored at temperatures below 40° F. Sherman *et al.*[18] stored pasteurized milk at 0° C and reported that it kept 8, and sometimes 12 weeks. Minute contamination with raw milk, however, materially reduced the keeping quality.

Dahlberg *et al.*[8] reported that whereas acid flavors developed in 8 percent of the milk samples stored for 7 days at 44° F, they did not develop in duplicate samples stored at 33° F. They report, however, that apparently bacterial growth had commenced in the milk samples stored at 33° F for 7 days, as the psychrophilic bacteria populations increased from 1 to 194 per milliliter.

Most of the studies on the keeping quality of milk have been conducted on nonhomogenized or "cream line" milk, and oxidized flavors in this milk have been common criticisms. Thurston and Olson[19] reported that "cappy" flavors developed after 2 days of storage of milk at 45° F. Dahlberg[8] found oxidized flavors in 24 percent of the samples stored at 44° F and 67 percent of the samples stored at 33° F for 7 days.

Although it has been well established that the homogenizing process will retard or prevent the development of copper-induced oxidized flavors, few reports on the keeping quality of homogenized milk have been found. Nicholas and Anderson[14] showed that pasteurized and homogenized milk might be kept as long as 2 weeks at a storage temperature of 40° F before spoilage occured.

This study was undertaken in view of the increasing demand for

Dr. J. C. Boyd received his B. S. degree from the State College of Washington in 1939, and his M. S. degree from Montana State College in 1942, and his Ph. D. degree from Michigan State College in 1952. He has had considerable commercial experience in dairy manufacturing plants and as a milk sanitarian. He served in World War II and the Korean War and is presently employed as associate professor in charge of Dairy Manufacturing at the University of Idaho.

*Published with the approval of the Director of the Michigan Agriculture Experiment Station as Journal Article No. *1571.*

**Present address: Department of Dairy Husbandry, University of Idaho, Moscow, Idaho.

TABLE 1—THE KEEPING QUALITY OF COMMERCIALLY PASTEURIZED AND HOMOGENIZED MILK AS SHOWN BY PSYCHROPHILIC BACTERIAL CONTENT AND FLAVOR SCORE WHEN THE MILK WAS STORED AT 40° F FOR VARIOUS PERIODS OF TIME.

Milk from plant	Length of time (days) milk retained a low psychrophilic bacterial population[a] and flavor score[b] when collected and stored during the month of									
	July		September		November		December		Average	
	Flavor	Bact.	Flavor	Bact.	Flavor	Bact.	Flavor	Bact.	Flavor	Bact.
A	24	10	14	3	17	3	7	3	15.5	4.7
B	14	10	14	10	17	10	10	7	13.8	9.2
C	14	10	21	10	17	14	17	10	17.3	11.0
D	21	14	14	14	17	14	17	14	17.3	14.0
Average	18.3	11	15.8	9.2	17	10.2	12.8	8.2		

[a]Bacterial content of 50,000 per ml. or less.
[b]Flavor score 37 or above.

homogenized milk and the limited research that has been conducted on its keeping quality. Storage temperatures of 40° and 33° F, at which relatively few studies of a similar nature have been made, were chosen in order to determine the advantages that might be gained by milk plants storing milk, at least while in their possession, at 40° F or less.

PROCEDURE

Homogenized milk samples. A number of 1-quart containers, usually 24, of homogenized milk were obtained from each of four milk processing plants. The milk was taken from the daily run of the cooperating plants, by their regular personnel, who were instructed to take the containers in succession from the filler. The milk was obtained in paper containers from three of the plants and in glass from the fourth. Two of the milk plants pasteurized by the holding method, 143° F for 30 minutes, and the other two by the high-temperature, short-time method, using 161° F or more for 16 seconds.

The milk samples were delivered to the laboratory by the regular special delivery service of the cooperating plants and arrived within 2 to 3 hours after being taken from the filler. Normal care, such as icing, was given the samples during this interval. Immediately after arrival at the laboratory, one-half of the samples from each plant were placed in a 40° ± 1° F storage room, and the remainder in a 33° ± 1° F storage room.

Four series of samples from each milk plant were analyzed, using the 40° F storage temperature. These samples were collected in July, September, November, and December, giving a series of samples representing the summer, fall, and winter months. Three series of samples were stored at 33° F. These samples were one-half of the samples collected in September, November, and December.

Frequency of analysis. The commercially pasteurized and homogenized milk samples stored at 40° F were analyzed, both bacteriologically and organoleptically, immediately upon arrival at the laboratory and again after 3, 7, 10, 14, etc. days, until the flavor of the milk had deteriorated to a point where the milk was no longer considered salable. The samples stored at 33° F were analyzed similarly every 7 days until, based on flavor score, they were considered unsalable. A new, previously unopened container was used for each analysis.

Bacteriological analysis. Psychrophilic bacterial counts were determined according to Standard Methods[1] except that an incubation temperature of 40° F was used for 20 days. A maximum of 0.1 ml of milk was placed in each plate. In many cases no colonies developed on these plates. In such cases, considering that one colony would equal a count of 10, an arbitrary count of 5 per milliliter was assigned the sample for analytical purposes.

Flavor examination. After the samples for bacteriological analysis were withdrawn, the milk was examined for flavor by a panel of experienced judges. The milk was transferred from the original container into identically marked clean glass bottles, keyed and scored, with the identity of the sample being unknown to the judges. Samples of milk of various ages, as well as defrosted, frozen homogenized milk, were intermixed in the group for scoring. The milk was scored and criticized according to the American Dairy Science score card[13]. The recorded scores were

TABLE 2—THE KEEPING QUALITY OF COMMERCIAL PASTEURIZED AND HOMOGENIZED MILK AS SHOWN BY PSYCHROPHILIC BACTERIAL CONTENT AND FLAVOR SCORES WHEN THE MILK WAS STORED AT 33° F FOR VARIOUS PERIODS OF TIME.

Milk from plant	Length of time (days) milk retained a low bacterial psychrophilic population[a] and flavor score[b] when collected and stored during the month of					
	September		November		December	
	Flavor	Bact.	Flavor	Bact.	Flavor	Bact.
A	42	....	28	14	21	7
B	42	....	28	28	28	28
C	42	....	49	49	35	35
D	42	....	21	21	14	21
Average	42	....	31.5	28	24.5	22.5

[a]Bacterial content of 50,000 per ml or less.
[b]Flavor score 37 or above.

either averages of the written scores of the various judges to the nearest 0.5 point, or were mutually agreed upon by the judging panel. A flavor score of 25 instead of 0 was given for analytical purposes when the milk samples were considered unsalable.

The keeping quality end-point was recorded as the last day on which the milk was judged as still retaining a good flavor (flavor score 37 or above) and/or yet having a psychrophilic bacterial count of 50,000 per milliliter or less.

RESULTS

Keeping quality of milk stored at 40° F. The keeping quality of commercially pasteurized and homogenized milk, as shown by the number of days that the milk retained a low psychrophilic bacterial population and good flavor when stored at 40° F, is shown in Table 1.

Based only on the retention of its good flavor (flavor score of 37 or above), milk from plants A, B, C, and D during the summer, fall, and winter months kept well for an average of 15.5, 13.8, 17.3, and 17.3 days, respectively. When the keeping quality was based on the length of time the milk retained a low psychrophilic bacterial population (bacteria content of 50,000 per milliliter or less), the average keeping quality of the milk from plants A, B, C, and D was only 4.7, 9.2, 11.0 and 14.0 days, respectively.

The average keeping quality of the milk collected and stored in July was slightly better than that of the samples collected and stored in September, November, and December. The trend appears to have been toward a poorer keeping quality in the milk collected in the fall and winter months.

Keeping quality of milk stored at 33° F. Duplicate samples of the milk collected and stored at 40° F were stored at 33° F during the months of September, November, and December. The keeping qualities of these samples are shown in table 2. The keeping quality, based on the length of time the milk retained a good flavor, averaged 42 days for the September milk, 31.5 days for the November milk, but only 24.5 days for the milk collected in December. Data on the keeping quality of these samples based on their psychrophilic bacterial content were available for the milk samples collected and stored in November and December only. However, these limited data indicate slightly poorer keeping qualities of the December milk. These data point to a greater seasonal trend toward relatively poorer keeping qualities in the fall and winter milk stored at 33° F than in that stored at 40° F.

TABLE 3—THE INCREASED KEEPING QUALITY OF COMMERCIALLY PASTEURIZED AND HOMOGENIZED MILK AS SHOWN BY PSYCHROPHILIC BACTERIAL AND FLAVOR SCORES WHEN THE STORAGE TEMPERATURE WAS LOWERED FROM 40° F TO 33° F.

Milk from plant	Increased length of time (days) milk retained a low psychrophilic bacterial population score[a] and flavor score[b] when the storage temperature was lowered from 40° F to 33° F during the month of					
	September		November		December	
	Flavor	Bact.	Flavor	Bact.	Flavor	Bact.
A	28	....	11	11	14	4
B	28	....	11	18	18	21
C	21	....	32	35	18	25
D	28	....	4	7	− 3	7
Average	26.3	....	14.5	17.7	11.8	14.2

[a]Bacterial content of 50,000 per ml or less.
[b]Flavor score 37 or above.

These data also show the keeping quality based on psychrophilic bacteria content to be approximately the same as the keeping quality based on flavor score when the milk samples were stored at 33° F. Duplicate samples stored at 40° F showed a consistently poorer keeping quality when based on psychrophilic bacterial content than when based on flavor score. This would indicate that when the milk was stored at 33° F a smaller number of bacteria were capable of producing objectionable off-flavors.

Difference in keeping quality at 33° F and 40° F. The extent to which the keeping quality of commercially pasteurized and homogenized milk was extended when the storage temperature was lowered from 40° F to 33° F is shown in Table 3. An examination of these data shows the keeping quality, based on flavor scores, of the milk samples collected and stored at 33° F in September to be extended an average of 26.3 days over duplicate samples stored at 40° F. This additional keeping quality amounted to 14.5 and 11.8 days, respectively, for the samples collected in November and December. There were no data available to indicate how long the bacteriological keeping quality might be extended by this low-temperature storage for the samples collected in September, but for November and December this extension amounted to 17.7 and 14.2 days, respectively.

Relationship between psychrophilic bacterial content and flavor score. The relationship between the number of psychrophilic bacteria and the flavor of the milk stored at 40° F is shown in Figure 1. These data show that the flavor of the milk was not impaired appreciably until there was a marked increase in the psychrophilic bacterial content.

The relationship between the flavor and psychrophilic bacterial content when the milk was stored at 33° F is shown in Figure 2. Again, a similar relationship existed between the numbers of bacteria and flavor deterioration at 33° F as at 40° F, but at the lower storage temperature the bacterial growth and flavor deteriorations were markedly retarded. This latter observation would be expected. Interestingly, however, when the milk was stored at 33° F it developed a poor flavor at a lower psychrophilic bacterial population than when it was stored at 40° F, 2,500,000 versus 26,800,000 per milliliter.

A comparison of data in Figures 1 and 2 also shows that on the average the milk stored at 33° F maintained a good flavor and/or bacteriological quality for 21 to 28 days, whereas duplicate samples of this milk stored at 40° F maintained a good flavor and/or bac-

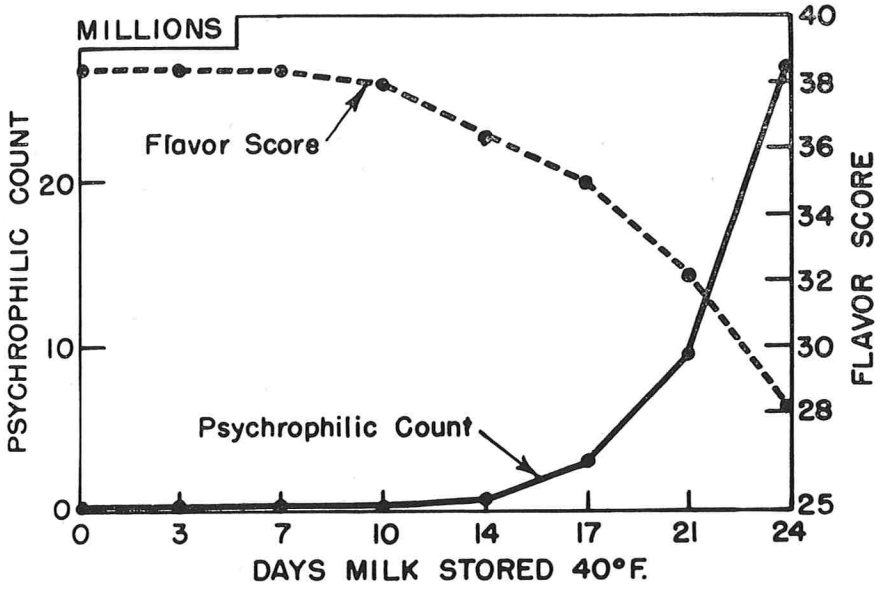

Figure 1. The relationship of the logarithmic average bacteria counts to the average flavor scores of commercially pasteurized and homogenized milk stored at 40° F.

teriological quality for only 10 to 14 days. Thus, based on the conditions of this study and recognizing that some milk will have better and some poorer keeping qualities, the lowering of the storage temperature seven degrees, 40° F to 33° F, resulted in increasing the keeping quality 11 to 14 days.

An analysis of the flavor scores and flavor criticisms shows the most common criticisms of the milk samples scoring 37 or above were "cooked," "feed," "flat," and "lacks freshness," in that order. The most common criticisms of the flavor of the milk scoring 36.5 or less were "unclean," "bitter," "high-acid," and "sour." Occasional "rancid" and "fruity" flavors were encountered. Interestingly, no oxidized flavors were encountered. No significant difference was observed in the frequency or type of off flavor that developed regardless of whether the milk samples were stored at 40° F or 33° F.

Discussion

The observation made in this study that December milk had poorer keeping quality than that collected in September or November is in agreement with the reports of Dahlberg[8] and Burgwald and Josephson[3] that summer milk had superior keeping qualities over winter milk. In the current study this seasonal variation was shown to be greater when the samples were stored at 33° F than when stored at 40° F. No satisfactory explanation is available as to why this occurs. Accordingly, additional studies on the seasonal variations in the keeping quality of milk are necessary.

The keeping quality of adequately refrigerated homogenized milk is closely associated with bacterial growth. When the milk was stored at 40° F, the bacterial increase was sufficiently rapid that the keeping quality of the milk based on a 50,000 per milliliter bacterial standard was substantially lower than when it was based on flavor score. The results of these studies are in agreement with the conclusions of Dahlberg[5, 7] and Burgwald and Josephson[3] in that milk kept satisfactory for 4 days, but was of questionable bacteriological quality after 7 days storage. Based on flavor score, however, the keeping time of homogenized milk was markedly longer, ranging consistently from 13 to 17 days.

When the milk was stored at 33° F, the keeping qualities, based on flavor and/or bacterial content, did not differ greatly.

The results indicate that it would be advantageous for dairy plants to use as cold a storage temperature as possible, preferably below 40° F in order to extend the keeping quality of the milk.

Summary

Commercially pasteurized and homogenized milk, collected during the summer, fall, and winter months and stored at 40° F and 33° F, was studied for keeping quality.

When the storage temperature was lowered from 40 to 33° F, the keeping quality was found to be extended 11 to 14 days. The keep-

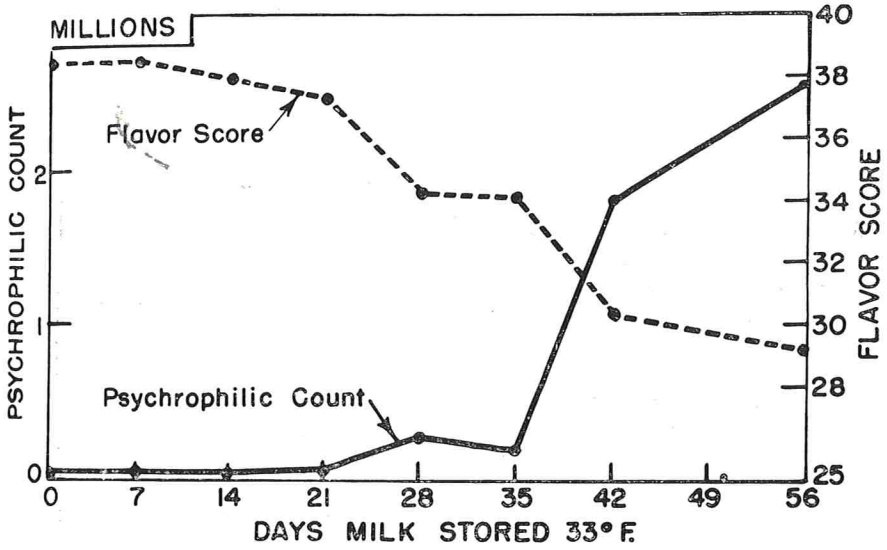

Figure 2. The relationship of the logarithmic average bacteria counts to the average flavor scores of commercially pasteurized and homogenized milk stored at 33° F.

ing quality of the milk stored at 40° F, when based on the development of psychrophilic bacteria up to the 50,000 per milliliter standard, was lower than when based on the deterioration of flavor to a score of 37. The keeping quality of the milk stored at 33° F was found to be approximately the same when judged by either criterion.

The keeping quality of the milk samples collected in the fall and winter was poorer than those collected in the summer. This difference was greater when the samples were stored at 33° F than when stored at 40° F.

No oxidized flavors were encountered in these milk samples. The deterioration of flavor was closely associated with the growth of psychrophilic bacteria in all samples.

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REPORT OF THE COMMITTEE ON FROZEN FOOD SANITATION — 1954[1]

The activities of the Committee on Frozen Food Sanitation during the past year were confined largely to the collection of information and data on the sanitary conditions under which frozen desserts are processed and dispensed at roadside stands. The surveys of roadside stands dispensing frozen dairy foods were made by Mr. O. A. Ghiggoile in California and Dr. V. C. Stebnitz in the Chicago area. On the basis of the information and data obtained by Mr. Ghiggoile, he prepared suggested regulations for roadside stands dispensing frozen dairy foods. Copies of these regulations were distributed by the committee chairman to the various members of the committee for their review and comment.

In view of the observations made by various members of the committee and the data collected from the above mentioned surveys it is apparent that more strict supervision should be given to the sanitary control of roadside stands dispensing frozen desserts. A majority of these establishments do not prepare their own mix and in some instances it has been found that mix is held for a considerable period without adequate refrigeration. Many of the roadside establishments are not being maintained in a clean sanitary condition.

At the committee meeting on October 20 it was agreed that further field work should be done on the sanitary control of roadside stands dispensing frozen desserts before suggested regulations are prepared for this phase of the frozen food industry. It is the committee's hope that desirable research work and field studies can be completed so that definite proposals for adequate sanitary control of roadside stands dispensing frozen desserts can be submitted to the Association at its next annual meeting. The committee further agreed that its activity would be confined exclusively to the public health aspects of frozen foods. In addition to completion of the work on frozen desserts the committee agreed to undertake a study of prepared frozen meals, raw and precooked. An effort would also be made to collect information and data on the prepackaging of frozen foods.

Frank E. Fisher
Archie B. Freeman
O. A. Ghiggoile
S. R. Howe
J. A. King
Geo. F. Kirchoff
J. C. McCaffrey
S. E. Smith
Dr. V. E. Stebnitz,
Chairman

[1]Presented at the 41st Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., Atlantic City, New Jersey, October 21-23, 1954.

THE FREEZING POINT, THE PERCENTAGE OF SOLIDS, AND THE SPECIFIC GRAVITY OF PASTEURIZED MILK AS INDICES OF ADDED WATER

A. C. Dahlberg

Department of Dairy Industry, Cornell University, Ithaca, New York

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The detection of the adulteration of milk with added water is a topic of current interest. There has been a gradual increase in the dependence upon the freezing point of milk alone as an infallible criterion from which exact quantities of added water may be determined. This idea has been encouraged by the use of a simple formula for calculating the percentage of water added to milk[1] as well as by the need of regulatory officials for such a method.

Perhaps no single incident illustrates this complete confidence in and dependence upon the freezing point of milk as does the adulteration case brought into the Court of Crimes in Dade County by the State of Florida in February, 1954. The case was based entirely upon the analyses of three quarts of milk sold by one company which the state reported as follows:

Sample	% butter-fat	% solids-not-fat	Lactometer reading	Freezing point °C	% added water based on freezing point
1	4.2	9.09	33	−0.506	8
2	4.1	8.82	32	−0.505	8
3	3.8	9.26	34	−0.508	7
Average	4.03	9.06	33	−0.506	8

The state chose to disregard the apparently normal composition of the milk as being irrelevant and based its prosecution solely upon the abnormally high freezing points which, using −0.550°C as a standard, indicated the presence of 7 or 8 percent added water. The jury failed to reach a decision.

There has been an accumulation of data during the past 20 years indicating that the standard of −0.550°C may be slightly too low for normal milk today and the variations in results indicate that a uniform standard for average milk may not be fair under all circumstances[3, 14].

In view of this situation it was believed to be desirable to consider the facts as known today to promote reasonable interpretation of existing knowledge and to stimulate research to acquire new information where needed to permit a proper understanding of the problem.

Brief Historical Statement

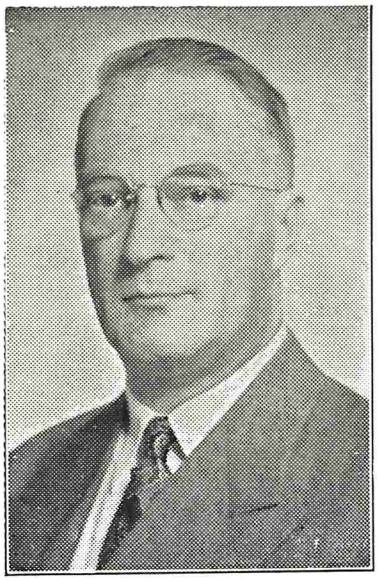
The addition of water to milk is a method of adulteration that was recognized early in the history of commercial dairying.

Thus, in England in 1856, Ruricola[12] pointed out that the lactometer was a good method of detecting the addition of water to milk. It was recognized that the lactometer reading varied with the fat content as well as with added water so that the percentage of "cream" in the milk needed to be known for proper interpretation. Consequently, research and experience had found the specific gravity of the milk serum and skimmilk to be a better index of added water. Some data, including a table showing the influence of added water on the specific gravity, were presented.

In the United States in 1866 Flint[5] also recognized the seriousness of this problem. A complicating factor in detecting the presence of added water was the occasional use of burnt sugar in watered milk. Flint emphasized the variability in the composition of the milk of individual cows and particularly differences due to varying fat contents. He presented a drawing of a lactometer with readings in percentages of added water which was similar to the New York City lactometer of later years. Also a device was illustrated which indicated the "cream" content of milk as such knowledge was essential to a correct understanding of the results.

During the present century the relationship of the percentages of fat and solids-not-fat and the lactometer reading have been used as a means of detecting added or extraneous water in milk. This relationship has not been found adequate to calculate exact percentages of added water except when the analysis of the authentic pure milk as secreted by the cows was known. In spite of numerous researches and publications reporting the relationship of the percentages of fat and solids-not-fat and the specific gravity, there have been those who have doubted their value for determining added water and many analysts have sought a more reliable, specific method.

One of the first specific tests for added water, introduced about



Arthur C. Dahlberg was born in Wisconsin, received the B. S. degree from the University of Minnesota in 1915 and the Ph.D degree from the University of Illinois. He was an instructor at the University of Minnesota, creamery extension specialist in North Dakota, superintendent of a cooperative creamery in Fargo, North Dakota, and in 1921 became head of the dairy department at the New York State Agricultural Experiment Station, Geneva, New York. In 1943 he went to Cornell as Professor of Dairy Industry.

He was given the Borden Award for dairy research in 1943; he conducted a special study of the dairy industry of Central America for the U. S. government during the war; and recently he directed a nation-wide study of city milk regulations and milk quality for the National Research Council.

TABLE 1—THE ANALYTICAL BASES USED FOR ENFORCEMENT OF THE LAW PROHIBITING THE ADULTERATION OF MILK WITH WATER IN 35 STATES

	Number of states	% of states
Responsible State Agency		
Agriculture	22	63
Health	13	37
Analyses made on suspected samples		
Fat	34	97
Solids-not-fat (or T.S.)	31	89
Specific gravity	31	89
Freezing point, always[1/]	19	54
Freezing point, sometimes	8	23
Serum ash or refractometer reading	18	51
Bases for prosecution		
Legal standards for fat and solids	1	3
Legal standards with supplementary data	8	23
Composition alone (fat, solids, and sp.gr.)	1	3
Freezing point alone	1	3
Composition, freezing point, sometimes supplementary data required	20	57
Composition, supplementary data (not freezing point)	3	9
No enforcement of the law	1	3
Practices of special interest		
Prosecute if freezing point shows added water but composition is normal[2/, 3/]	8	23
Prosecute if freezing point shows normal milk but composition shows added water[3/]	0	0
Prosecute on basis of serum refractometer reading and ash content with supplementary data available	4	11

1/Although the answer on the questionnaire was that freezing points were always made answers to other questions showed that the test was usually made only on those samples of doubtful purity as shown by other tests, especially the solids-not-fat and specific gravity.

2/Seven of the eight states actually obtain supplementary data but use freezing point data in court.

3/Several states volunteered that such data were not obtained or that such data indicated the need for special investigation rather than prosecution.

1880, was the nitrate test which was based upon the assumption that all water contains nitrates. This test was found to be so delicate that it could detect whether or not the milk utensils had been properly dried before the milk was poured into them. By 1915 there was some question about its accuracy and now the method has been discarded.

The specific gravity of the milk serum was found by Bull[2] to provide a better basis than the refractometer reading of the serum for detecting added water in milk. The refractometer method is in the current edition of Official Methods[1]. The measurement of the ash content of serum, Lythgoe[10], as a method for determining added water in milk is still official today[1]. One merit of the analysis of the milk serum is the elimination of errors due to variations in the fat and casein content.

Except for the obsolete nitrate test these methods all depend upon the percentages of certain milk constituents, their relationships and effect upon the physical properties of milk. For this reason the detection of added water in milk by the freezing point method is particularly valuable as it is governed by the osmotic pressure of the blood of the cow rather than by the percentages of the various milk constituents. It serves as a check test independent of the composition, refractometer reading, ash content, or specific gravity. The relative constancy of the freezing point of milk and its value in detecting added water was studied and recognized prior to this century but it remained for Hortvet in 1921[7] to develop a technic applicable for general laboratory use and which was promptly accepted into Official Methods[1].

CURRENT METHODS USED BY REGULATORY OFFICIALS

A questionnaire was mailed to all state officials in charge of the enforcement of laws dealing with the adulteration of milk with water except for one state where the standard for watering might be altered by the result of a case now in court. Questions were to be answered yes or no and each official was requested to write a simple statement of the procedure for gathering evidence and prosecution if the questionnaire did not give a clear picture of the situation. It is obvious that the exact details and understanding could be obtained in all cases only by personal interviews but the information secured shows the present situation reasonably well.

Replies were received from 35 states, Table 1, and no further attempt was made to secure information from the other states. The regulatory officials of one state did not test milk for adulteration with water because milk was purchased and sold exclusively on a butterfat basis.

Of the 35 states supplying data all but one tested milk for its fat content and all states except four determined the total solids by actual analysis and the specific gravity. These analyses show compliance with the laws on milk composition. Slightly more than half of the reporting states, 54 percent, always determined the freezing point of milk and the same approximate percentage, 51 percent, analyzed the serum for the percentage of ash and/or determined its refractometer reading; all of these tests being used as an index of added water. As 77 percent of the states always or sometimes made freezing point tests on milk suspected of adulteration with water as compared with 51 percent for tests on the milk serum it is evident that the former is the more popular.

The actual basis of information on which to prosecute for added water in 57 percent of the states was a combination of the composi-

TABLE 2—VARIATIONS IN THE AVERAGE FREEZING POINT OF MILK OF INDIVIDUAL CITIES AND PLANTS IN EIGHT CITIES

City	City averages and variations		Plant averages and variations			
			Lowest plant average		Highest plant average	
	Freezing point °C	% variation from average[1/]	Freezing point °C	% variation from average[1/]	Freezing point °C	% variation from average[1/]
Sacramento	−0.553	+2.4	−0.557	+3.1	−0.551	+2.0
Rochester	−0.545	+0.9	−0.549	+1.7	−0.540	0
Minneapolis (Summer)	−0.543	+0.6	−0.551	+2.0	−0.535	−0.9
Minneapolis (Winter)	−0.541	+0.2	−0.550	+1.9	−0.536	−1.1
Washington	−0.541	+0.2	−0.557	+3.1	−0.530	−1.9
Boston	−0.538	−0.4	−0.544	+0.7	−0.532	−1.5
Louisville	−0.538	−0.4	−0.541	+0.2	−0.529	−2.0
Houston	−0.538	−0.4	−0.545	+0.9	−0.523	−3.1
Birmingham	−0.535	−0.9	−0.539	−0.2	−0.532	−1.5

1/The freezing point was substracted from the general average of all cities (−0.540° C as given in N.R.C. Pub. 250) and the difference was expressed as percentage of 0.54. The figures with the minus signs would indicate percentages of added water if the average freezing points were used as the basis of calculation; a calculation that is unfair as the standard should make allowance for those milk supplies with freezing points normally above the average.

The general average of −0.540° C includes all results but the average of one city omits the milk of two plants as it contained added water. Inclusion of this watered milk would have raised the average freezing point of the milk of that city by 0.009° C.

tion of milk, the freezing point, and sometimes other confirming data. The next most popular data for prosecution was violation of the legal standards for fat and solids with confirming evidence of added water, 23 percent of the states. There were 9 percent of the states that prosecuted on the composition of milk with confirming data without information on the freezing point. These three bases of prosecution included 89 percent of all states.

It is evident from the data that the regulatory officials of most states prosecuted for the adulteration of milk with added water only after a thorough study had yielded confirmatory evidence of adulteration by more than one method.

Considerable discussion accompanied the questionnaire from the three states which produced about 28 percent of the entire milk supply of the United States. Their programs were interesting.

In one of the states the milk samples were analyzed for fat, total solids, and ash, and the specific gravity was determined. When these tests left any doubt concerning possible adulteration by the addition of water, freezing point tests were made. In all cases where the samples were taken from milk being sold by producers, authentic samples were secured under supervision from milk just as produced by the respective herds of cows, and comparisons were made between the original and the herd samples. In those instances where the evidence indicated adulteration the producers or dealers, as the case might be, were given an opportunity to explain. When no satisfactory explanation was made, and a penalty was not paid, the matter was taken to court.

In the second of these three states the percentages of fat and total solids, and the specific gravity were determined. If any suspicion of adulteration was indicated by the composition, then the refractometer reading was made on the milk serum and its ash content was determined. No freezing point tests were made. Whenever possible the results of tests on plant samples were checked against authentic herd samples of producers.

In the third state each sample was tested for fat, total solids, and specific gravity as the relationship of these figures to each other gave the clue as to whether or not the sample should be tested for the actual percentage of added water by the freezing point method. All data were presented in court but prosecution was based on the freezing point.

It is clear that the officials of all three states drew their conclusions from considerable confirmatory data and information. They analyzed the milk for composition and specific gravity, and other data were secured which might or might not include the freezing point and tests on the milk serum.

SOURCE OF ANALYTICAL DATA

The data secured in the nationwide research on the quality of milk in eight cities by the National Research Council[3] have been studied to show the significance of the lactometer reading, the percentage of solid-not-fat, and the freezing point as an index of added water. Unfortunately, the lactometer reading and total solids were determined only on the composite samples of milk taken on three consecutive days at each of the 58 plants. Hence, all plant data show average composite samples and not individual daily samples.

THE ANALYTICAL DATA

According to Dahlberg, Adams, and Held[3] the freezing points of the milk of the eight cities could be arranged into three groups with statistically significant differences between groups. However, omitting the milk of two plants in one city where added water was detected, there were only two groups: the one consisted of the milk of Sacramento, and the other included the milk of all other cities. This grouping indicates considerable uniformity in results, yet questions the possibility of a completely satisfactory national standard.

Percentage variations from the

average freezing points of the milk of all cities were calculated by the following formula.

$$\% \text{ variation} = \frac{(\text{Observed f.p.} - 0.54)\ 100}{0.54}$$

This formula is identical with the one given for calculating the percentage of added water by the Offical Methods of the Association of Official Agricultural Chemists[1] except for the standard freezing point. In this formula the freezing point of − 0.540° C as reported by Dahlberg, Adams, and Held[3] was substituted for the − 0.550° C standard of the A.O.A.C.[1]. It will be observed in Table 2 that the freezing points of the milk of the eight cities (nine studies) showed variations around the mean from +2.4 to −0.9 percent or a total range of only 3.3 percent.

When the analyses of average milk of individual plants were compared with the average freezing point of −0.540° C, then the percentage variations range from +3.1 to −3.1 percent. In other words, the percentage variations in the freezing points of milk among plants was about double that which occured in the milk of the several cities.

On the basis of statistical analysis the milk supplies of the eight cities could be arranged into four groups with significant differences in the percentages of solids-not-fat[3]. This shows greater variation in the percentages of solids-not-fat than in the freezing points of the milk of the several cities.

These percentage variations in the solids-not-fat have been calculated by the following formula based upon the average solids-not-fat content of 8.62 percent as reported by Dahlberg, Adams, and Held[3].

$$\% \text{ variation} = \frac{(\text{Observed s.n.f.} - 8.62)\ 100}{8.62}$$

This formula follows the same principle as the one used for the freezing point. The percentages of solids-not-fat were adjusted to the average fat content of the milk of each city on the basis of 0.4 percent solids-not-fat for each percent of fat.

Percentage variations from the average solids-not-fat content of milk of the eight cities showed a range for each city from +3.4 to −2.6 percent or a total of 6.0 percent, Table 3. Composite samples of individual plants showed variations from the average of +4.9 to −4.5 percent or a total of 9.4 percent. These percentage variations from the average are about half again greater for solids-not-fat than for freezing point.

In a similar manner the percentage variation in the lactometer readings have been calculated by the following formula based upon the average lactometer reading of 32.1 as reported in the National Research Council study[3].

$$\% \text{ variation} = \frac{(\text{Observed l. r.} - 32.1)\ 100}{32.1}$$

The percentage variations in lactometer readings of the eight city milk supplies fluctuated from +2.2 to −2.5 percent, a total of 4.7 percent. Lactometer readings on the average milk of the 58 individual plants studied in the eight cities varied from the average of all cities from +3.4 to −4.7, a total of 8.1 percent. These variations are slightly less than those reported for solids-not-fat.

As there were statistically significant differences in the freezing points and solids-not-fat content of milk of various cities one might question the desirability of comparing local data with national standards. With this thought in mind the analyses of the milk of individual plants were compared with the average results secured on the milk of the city in which the plants were located. To illustrate, in the formula for figuring the percentage variation in freezing points in Sacramento the average used as a standard for comparisons was −0.553° C, in Birmingham it was −0.535° C, etc. Then the percentage variations were grouped so that the number of samples of milk in each class could be ascertained. The results are presented as a frequency distribution in Table 5.

This comparison with a local standard materially reduced the percentage variations in the data.

TABLE 3—VARIATIONS IN THE AVERAGE SOLIDS-NOT-FAT OF MILK OF INDIVIDUAL CITIES AND PLANTS IN EIGHT CITIES

	City averages and variations			Plant averages and variations: Highest plant average		Plant averages and variations: Lowest plant average	
City	% fat	% Solids-not-fat	% variation from average[1]/	% Solids-not-fat	% variation from average[1]/	% Solids-not-fat	% variation from average[1]/
Birmingham	4.04	8.91	+3.4	9.04	+4.9	8.60	−0.2
Sacramento	3.82	8.78	+1.9	8.97	+4.1	8.44	−2.1
Houston	4.24	8.75	+1.5	8.99	+4.3	8.57	−0.6
Boston	3.78	8.74	+1.4	8.97	+4.1	8.39	−2.7
Rochester	3.66	8.65	+0.3	8.87	+2.9	8.44	−2.1
Minneapolis (Summer)	3.52	8.52	−1.2	8.74	+1.4	8.37	−2.9
Minneapolis (Winter)	3.55	8.47	−1.7	8.59	−0.3	8.36	−3.0
Washington	3.87	8.37	−1.7	8.62	0	8.34	−3.2
Louisville	3.79	8.40	−2.6	8.54	−0.9	8.23	−4.5

1/The % solids-not-fat was substracted from the general average of all cities (8.62% as given in N.R.C. Pub. 250) and the difference was expressed as percentage of 8.62. The figures with the minus signs would indicate percentages of added water if the average % solids-not-fat were used as the basis of calculation; a calculation that is unfair as the standard should make allowance for those milk supplies with percentages of solids-not-fat normally below the average.

The general average of 8.62% includes all results but the average of one city omits the milk of two plants as it contained added water. Inclusion of this watered milk would have decreased the solids-not-fat content of the milk of that city by 0.12%.

TABLE 4—VARIATIONS IN THE AVERAGE LACTOMETER READING OF MILK OF INDIVIDUAL CITIES AND PLANTS IN EIGHT CITIES

City	City averages and variations		Plant averages and variations			
			Highest plant average		Lowest plant average	
	Lactometer reading	% variation from average[1/]	Lactometer reading	% variation from average[1/]	Lactometer reading	% variation from average[1/]
Birmingham	32.8	+2.2	33.0	+2.8	32.5	+1.2
Sacramento	32.4	+0.9	33.0	+2.8	31.9	−0.6
Boston	32.4	+0.9	33.2	+3.4	31.6	−1.6
Houston	32.4	+0.9	32.8	+2.2	32.2	+0.3
Minneapolis (winter)	32.3	+0.6	32.5	+1.2	31.9	−0.6
Louisville	32.0	−0.3	32.5	+1.2	30.9	−3.7
Rochester	32.0	−0.3	32.5	+1.2	31.7	−1.2
Washington	31.8	−0.9	32.2	+0.3	31.3	−2.5
Minneapolis (summer)	31.3	−2.5	31.8	−0.9	30.6	−4.7

1/The lactometer reading was substracted from the general average of all cities (32.1 as given in N.R.C. Pub. 250) and the difference was expressed as percentage of 32.1. The figures with the minus signs would indicate percentages of added water if the average lactometer reading was used as the basis of calculation; a calculation that is unfair as the standard should make allowance for those milk supplies with lactometer readings normally below the average.

The general average of 32.1 includes all results but the average of one city omits the milk of two plants as it contained added water. Inclusion of this watered milk would have decreased the lactometer reading of the milk of that city by 0.5.

Except for six samples to be discussed later, all samples of milk by the three tests; namely, freezing point, lactometer, and solids-not-fat, showed no variations greater than 3 percent. However, about three-fourths of all samples were within 1 percent of the local average freezing point, two-thirds of all samples were within 1 percent of the local average lactometer reading, and about one-half of all samples were within one percent of the local average solids-not-fat content. These data should apply specifically to tests for the adulteration of pasteurized milk with added water as regulatory officials appeared to be enforcing regulations on the basis of 3 to 7 percent variation from the average as a minimum for prosecution for added water.

Detailed analyses of the six samples showing more than three percent variation from the local average by any one test are reported in Table 6. Sample 1 gave a low solids-not-fat content, −3.5 percent variation from the average solids-not-fat content of the average milk of the city in which the processing plant was located, but a normal lactometer reading and freezing point. This sample was especially high in its fat content and there is reason to think it was standardized with cream. Samples 3 and 4 showed from 2.8 to 5.3 percent added water by all tests, and the plants acknowledged the addition of water. Samples 2, 5, and 6 clearly were doubtful samples which indicated that further study would need to be made on the milk processed by these plants to ascertain whether the milk might contain about 2 percent of added water as indicated by the combined results of all tests. The tests by the three methods on these six samples confirmed or supplemented each other as to the presence of added water.

DISCUSSION

The freezing point of milk is often said to be a constant but, like all properties of unstandardized biological materials of fairly uniform composition, it is more accurate to call it a variable that fluctuates within relatively narrow limits. The magnitude of these variations in the freezing points of authentic milk in the United States and England has been generally accepted as ±3 percent of the average[1, 4]. There are isolated examples of authentic milk samples of individual cows showing much greater variations, especially when the cows were on starvation diets[8]. Such wide discrepancies would not be expected in authentic mixed milk supplies but data on such supplies are rare or nonexistent. There are fluctuations in the freezing point of milk due to the individuality of the cow which would tend to become smaller in mixed milk supplies.

The freezing point of milk tends to rise with increased environmental temperatures above 85° F, starvation diets, high grain feeding, etc., which would probably alter the milk of most cows in any area at the time in the same manner[4, 10, 13]. Possibly some of these conditions together with the normal variation in the freezing point of milk of individual cows explain significant differences in the freezing points of mixed milk supplies of various areas[4]. In 1939 Lampert[9] found the freezing point of authentic herd samples of California milk to be −0.536° C and the lowest freezing point was −0.547 whereas in 1953[3] the freezing point of mixed commercial milk of Sacramento was −0.553 and the highest freezing point of the milk of any plant was −0.551. It should be obvious from this change of 3.1 percent in the averages that the freezing point of the milk of an area may not remain constant. The significance of these variations is important in consideration of averages and tolerances on an area or national basis.

The specific gravity and solids content of the milk of individual cows are too variable to be used as universal standards of purity from which percentages of adulteration can be calculated. Furthermore, the determination of the percentage of fat in milk requires careful mixing of the samples and the Babcock test is subject to more

variation than the usual chemical technic. Any analytical error in the fat test is transferred to the solids-not-fat percentage which is always obtained by difference. The common lactometer is not an especially precise instrument but an old design[13] and a recently improved model and procedure[15] have much greater accuracy. A reliable determination can be made easily by the Westphal balance also. The correct preparation of the milk sample for the specific gravity test is fundamental.

To some degree the greater constancy of the freezing point is indicated in mixed milk supplies when judged on the basis of a uniform standard of composition and freezing point for all cities, Tables 2, 3, and 4. Thus, the total percentage variations in freezing point, lactometer reading, and solids-not-fat were 6.2, 8.1, 9.4, respectively for pasteurized milk of individual plants. If the freezing point were accurate in detecting added water within 3 percent, then the lactometer reading and the solids-not-fat corrected for differences in fat content were accurate within about 4½ percent. Such uniformity in the percentage of solids-not-fat and lactometer reading was unexpected.

The fact is that the freezing points and percentages of solids-not-fat in milk vary significantly from one area to another so that the fairness of one standard needs justification. A national standard for the lactometer reading and the solids-not-fat content of milk may not be just and further research is needed to determine the universal fairness of such a standard for the freezing point when enforced within narrow limits.

Data presented in Table 5 demonstrate that local standards for milk based upon the freezing point, lactometer reading, and the percentage of solids-not-fat adjusted by calculation for differences in the fat content can be expected to agree within 3 percent on mixed milk supplies. The six samples of milk that varied more than 3 percent from the local average on any one test were of doubtful purity in reference to added water by all tests. It is equally significant that the three tests always confirmed each other and in all cases where one test showed 3 percent or more of added water the other tests also gave evidence of added water. The better grouping of the freezing points in the range ±1 percent indicated more uniformity in this test but the lactometer reading and the solids-not-fat corrected to the average fat content were equally uniform within 3 percent tolerance and should not be overlooked as a method of detecting added water if the local average has been established.

It should be borne in mind that if one calculates the percentage of added water on the basis of variation from the average, the calculation is valid only for milk that originally tested the same as the average. If 3 percent variation is normal for the freezing point of milk then the standard must be reduced by that amount to be fair to pure samples with normal high freezing points. In England normal milk with a high freezing point has been cared for by a standard of −0.53° C so that the calculated water will be usually less than and will not exceed the percent added. In this country the standard is the average without tolerance, but with acceptance of milk within 3 percent of the average as being normal, so that when the

TABLE 5—FREQUENCY DISTRIBUTION OF THE VARIATIONS FROM THE LOCAL AVERAGE STANDARDS FOR SOLIDS-NOT-FAT, LACTOMETER READING, AND FREEZING POINT OF PASTEURIZED MILK IN EACH OF EIGHT CITIES

Percent variation from city average	Percent of samples		
	Solids-not-fat	Lactometer	Freezing point
+4.1 to 5.0	0	0	0
+3.1 to 4.0	0	0	0
+2.1 to 3.0	8.6	3.4	1.7
+1.1 to 2.0	15.6	12.1	6.9
+0 to 1.0	29.4	34.5	41.4
−0 to 1.0	15.5	31.0	32.8
−1.1 to 2.0	17.2	10.3	12.1
−2.1 to 3.0	5.2	5.2	1.7
−3.1 to 4.0	6.9[1]/	3.4[1]/	1.7[1]/
−4.1 to 5.3	1.7[1]/	0	1.7[1]/

Note. The milk of each of the 58 plants was represented by a composite sample of 3 consecutive days. The difference between the average test of the milk of each plant and the average of the milk for the city in which the plant was located was divided by the average test of the milk of the city and then multiplied by 100 to secure the "per cent variation from city average". The data include the milk of the two plants in one city in which added water was found.

1/Detailed data on these samples given in Table 6.

TABLE 6—THE SIX SAMPLES OF PASTEURIZED MILK WHICH SHOWED MORE THAN THREE PERCENT VARIATION FROM THE LOCAL AVERAGE BY ANY OF THE THREE TESTS

Sample	Percentage of added water			Interpretation
	Solids-not-fat	Lactometer	Freezing point	
1	−3.5	−0.9	+0.2	Not watered[1]/
2	−4.0	−2.5	−1.1	Doubtful
3	−5.3	−3.4	−5.0	Watered[2]/
4	−3.6	−2.8	−3.3	Watered[2]/
5	−3.8	−1.2	−1.1	Doubtful
6	−2.0	−3.4	−1.7	Doubtful

Note. Each sample of milk was a composite of the milk of 3 consecutive days for each plant. The percentage variation or added water was based upon the local average for each city in which the sample was processed.

1/The analysis of this sample was 5.18% fat, 9.06% solids-not-fat, and a lactometer reading of 1.0325. The milk was produced by Jersey cows and may have contained added cream as one of the samples in the composite tested 6.1% fat.

2/The addition of water at the plants was acknowledged.

milk is found to contain added water the percentage often exceeds the amount added. The same consideration of the average versus the lowest test for authentic samples holds true for percentages of solids-not-fat and lactometer readings as a basis for calculating percentages of added water. Accurate percentages of added water can be calculated only if tests are available on samples of known purity to serve as the standard. However, milk generally has been adulterated with added water when tests show variations from the average of an increase of 0.016° C or more in the freezing point, and a decrease equal to or exceeding 1.0 in the lactometer reading (0.001 sp. gr.) and 0.26 percent in the solids-not-fat content. The results of the three methods should agree to yield conclusive evidence of adulteration with added water.

After writing this report an extensive study was received on estimating solids-not-fat by Herrmann, Anderson, and Bele[6]. Two-day herd samples of milk as delivered to drying plants located in midwestern and far western states showed a standard error of estimate of 0.20 percent solids-not-fat when based upon calculations involving both the fat content and lactometer reading. Except for a limited number of samples showing extreme deviations, all calculated values were within 0.30 percent of the average, thus suggesting that even two-day herd samples may not often exceed the percentage variation of three found in the present study.

CONCLUSION

A survey by questionnaire revealed that the enforcement of laws pertaining to adulteration of milk with added water was delegated to the Departments of Agriculture in two-thirds of the states and to the Departments of Health in the other states. The milk was nearly always tested for fat, solids, and specific gravity. About half of the states usually made freezing point determinations on milk suspected of adulteration with added water, or made refractometer readings and analyzed for the ash content of the milk serum. Nearly all prosecutions were based on a rather complete analysis and study of the samples suspected for adulteration without dependence upon the results of one test alone.

Comparison of analyses of pasteurized milk samples of individual plants (not authentic as to purity) when compared with a general average standard showed maximum variations below the average of 3.1 percent in freezing points, 4.7 percent in the lactometer readings, and 4.5 percent in the percentages of solids-not-fat corrected to the average fat content. If the comparisons were made with local standards for each producing area then variations for all samples, except six, were less than 3 percent by each of the three methods. The analyses indicated the reasons for these six samples not complying within the three percent variation and the results by the three tests supplemented each other in the detection of added water.

It would appear that on mixed milk samples from pasteurization plants (not from individual cows or herds) the lactometer reading, the percentage of solids-not-fat, and the freezing point varied rather uniformly within 3 percent of the average of the local milk supply and were about equally valuable in detecting added water providing the standards were based upon local samples.

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REPORT OF COMMITTEE ON MEMBERSHIP — 1954[1]

There are members of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. in eighty states, countries and territories throughout the world.

On July 29, 1954, the total paid membership of the association was 3,819 as compared with 3,542 on September 1, 1953. This represents almost an 8 percent increase in membership between these two dates.

We feel that there are certain statistics which may be of interest to all members and they may encourage some to make a definite effort to increase the membership of the organization in the states in which they reside. When the 1954 membership list of the association was received, a check on the distribution showed that approximately two-thirds of the entire membership resided in eleven states. New York had 12½ percent of the total number and Wisconsin had 9 percent. From these states the membership decreased until we found sixteen states having less than ten members and one state having no members. That means that there are seventeen states in

which one new member would represent at least a 10 percent increase in membership for that state.

New York and Wisconsin have more than three-hundred members each. California, Connecticut, Illinois, Pennsylvania and Washington have between two-hundred and three-hundred members; Florida, Indiana, Kansas, Minnesota and Missouri between one-hundred and two-hundred members; Georgia, Michigan, New Jersey and Oklahoma between eighty and one-hundred members; Iowa, Massachusetts, Maryland, Oregon and Virginia between sixty and eighty members; Colorado, Kentucky, Ohio and Tennessee between forty and sixty members; Arizona, South Dakota and Texas between twenty and forty members; Alabama, District of Columbia, Nebraska and North Carolina between ten and twenty members; and the other states have less than ten members. The state that, on January 1, 1954, showed no members is South Carolina.

We realize that it is very difficult to develop interest in an organization where the members are few and far between. When one considers the distribution of the membership of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC. as of January 1, 1954, it is evident that there must be a number of prospective members in most states.

During the past year we have tried to divide the states among the personnel of the Membership Committee so that each of us would be responsible for a small number of states. Due to the makeup of the Committee, some of the members had to be asked to assume responsibility for states at considerable distance from their homes. We have tried to correct this for the coming year by asking president-elect Parkin to appoint a Membership Committee with better geographical distribution.

It is our plan to ask the members of the Membership Committee in 1955 to be responsible for a group of states near their homes and they in turn will select someone in each state to be the state representative and to work with those in his state who might be possible members.

In reviewing the occupations of those who are now members of the association, we find that a large proportion of the membership is made up of city, state and national health officers, university professors and representatives of the dairy industry. It is difficult to find very many members from any of the other food industries on the membership rolls of the association. It seems to me that as members of the Association we have a tremendous field which has not been touched in other industries. We know that there is some over-lapping of interests of different organizations, but sanitation is so important to all phases of the food industry that it would seem reasonable to believe that it is a field that most men connected with the food industry should support.

As each of you listen to the papers and reports which are presented, I am sure that you know of someone among your friends and acquaintances who could profit in his business by the information which you are receiving. Such a person is a logical prospect for membership in the Association.

A couple of years ago, the Association prepared a small brochure on the ideals of the Association and the benefits of membership, which is available for distribution to all prospective members. The members of the Membership Committee will have a supply of these brochures and will be glad to send them to any prospects that you suggest.

Those members who are in teaching positions have an excellent opportunity to contact future members for the Association, and it may be that a few words of commendation for the organization and its publications will be all that is necessary to get a student to add the *Journal of Milk and Food Technology* to the list of publications which he wants to receive.

Our Executive Secretary is only too happy to send sample copies of the Journal to prospective members, if you want him to do so. If you feel that it is better for you to hand the prospective members a copy of the Journal, I am sure that Mr. Thomasson would be only too glad to send you extra copies for that purpose. It is only by bringing the publications of the Association and its ideals to the attention of non-members that we can hope to interest them in our organization.

Many of you are asked at different times in the year to give talks on the subject of sanitation. If you can bring out the fact that there is an organization of international scope that is primarily interested in the sanitation of milk and food products, you will be helping our organization by bringing this information to the attention of those who may never have heard of it.

The Membership Committee is anxious to receive any suggestions that any of you feel will assist us in increasing the membership of the Association; however, we must ask the cooperation of each of you and all of you in contacting people that you know should be members. Certainly a group of 15 to 16 on one committee cannot be expected to cover the entire United States and Canadian Provinces, to say nothing of possible prospects in other countries, without much help from men and women who are on the job at closer range.

We appreciate the efforts which all of you have made in the past year and we sincerely ask your cooperation in the future in order that we may increase the membership of the Association and thereby increase its effectiveness and usefulness to all of us.

Recommendations:

1. That the President make appointments to the membership committee with better geographical distribution.
2. Especially strive to obtain increased membership from the food field.
3. Attempt to increase membership in those areas which are numerically low.
4. Encourage all members of the Association to help increase membership by direct contact with their friends and acquaintances who are not already members.
5. Make better use of the membership brochure which is available for distribution to prospective members.
6. Encourage educators to commend to their students the Association and the Journal and include the Journal on the required list for students and libraries.
7. Make greater use of the service provided by the Executive Secretary of sending sample copies of the Journal to prospective members.

8. Encourage speakers at meetings to help increase membership by adding comments about the Association and its objectives.

9. Invite all members of the Association to send in any suggestions to the Membership Committee that might be of help in increasing the effectiveness and usefulness of the committee toward increasing membership in the Association.

Respectfully submitted,

Hugh T. Templeton,
Chairman

L. K. Crowe,
Vice Chairman

L. Wayne Brown
H. E. Calbert
E. R. Eichner
Emil Mikolajcik
James M. Nakahara
Ivan Van Nortwick
Alexander A. Pais
Kenneth L. Pool
P. E. Riley
L. O. Tucker
Howard H. Wilkowske

[1]Presented at the 41st Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., Atlantic City, New Jersey, October 21-23, 1954.

THE NEED FOR SANITATION IN THE BAKING INDUSTRY

LOUIS A. KING, JR.
Department of Bakery Sanitation, American Institute of Baking
Chicago, Illinois

Editorial Note: This is the first of a series of papers on bakery sanitation which was presented at the Arizona Bakery Sanitation Seminar, sponsored by the Phoenix Health Department, Phoenix, Arizona, October 6, 1954.

The National Sanitation Foundation has as its slogan "Sanitation is a way of life". Sanitation is much more than this. In fact, since time immemorial, sanitation has been a way of survival. Sanitation is more than the usual concept of housekeeping. In its broadest sense it is the production of a wholesome product, in a clean plant—a product free from foreign or deleterious material.

Bakery foods are nutritious foods; also, because of their nutritional quality they are attractive to rodents and insects. Many are subject to bacteriological activity; hence, sanitation is a battle against insects, rodents, and bacteria. In years gone by, foods, including bakery foods, were prepared at home in small quantities. Insect infestation and rodent depredation were at a minimum. As the world became industrialized, the production of food became more complex. It now has become necessary to store foods for long periods of time and to move them great distances. The longer food is held and the further it is transported, the greater is the possibility for insect and rodent damage.

In the baking industry, our first problems of sanitation arise on the farm. They are then greatly magnified in storage, intermediate processing, and in transit. Many of our ingredients, particularly wheat, are subject to insect infestation in the field. In some instances, ingredients are subjected to rodent contamination before harvest or during intermediate processing.

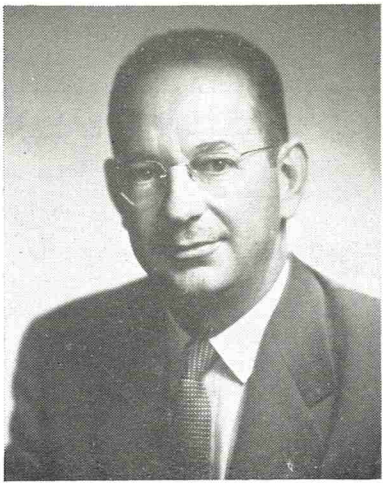
The number of insect species that affect bakery products runs into hundreds. Many of these insects are native to this country while others have been imported, in most instances, involuntarily. Recently, a new insect has appeared in this country—the Kapra beetle. This insect was widely distributed throughout the rest of the world, but in the past year or so it has been found in the far southwest.

Rodents that affect bakeries are not native to this country. Man brought them from Europe and other parts of the world. Today, rodents such as rats and mice, are universally distributed throughout the country. In fact, the only area of the Northern Hemisphere not infested with rats is the Province of Alberta, Canada.

Since our problems are many before we receive our ingredients, we must outline a program that will combat not only problems that arise during the manufacture, but which will protect us from the errors of our suppliers. The following is an outline of our needs for sanitation processes and what we should do to meet them.

I. Examine incoming ingredients.
  A. Check cars for cleanliness.
  B. When possible, sift representative samples from each shipment.
  C. Examine individual bags and cartons for rodent and insect damage.
  D. Send samples to laboratory for microscopic examination.

II. Store ingredients and supplies under good conditions.
  A. All materials stored on skids.
  B. All stacks away from walls.
  C. Proper turnover.
  D. Need for orderly storage.
  E. Clean storage areas.
  F. No old or obsolete materials, unless regularly cleaned and re-



Louis A. King, Jr. is Director of Bakery Sanitation, American Institute of Baking.

Mr. King is a graduate of Mississippi State College, majoring in Chemistry. Following graduation he did graduate work at the University of Vermont. Mr. King joined the staff of the American Institute of Baking on March 15, 1948 and was made Director on December 15, 1951. Before joining the staff of the Institute, Mr. King was associated with the Connecticut Dairy and Food Commission, and had served as an inspector with the Federal Food and Drug Administration.

He is a member of the Institute of Food Technologists, the National Committee of Food Sanitarians, the American Public Health Association, the Illinois Public Health Association, the National Association of Bakery Sanitarians, the National Association of Sanitarians and the International Association of Milk and Food Sanitarians. Currently, he is President-elect of the National Association of Bakery Sanitarians and has recently been elected President of the National Committee of Food Sanitarians for the year 1955.

stacked.

III. Have good operating practices.

A. Bags brushed before emptying contents.

B. All materials, where possible, sifted through a fine mesh screen before use.

C. Ingredients stored in covered containers.

D. Seamless containers used for scaling and transfer of ingredients.

E. Equipment provided which can be readily cleaned.

F. Regular cleaning of production areas.

G. Daily cleaning of product zone areas in contact with product while wet.

H. Pans and racks cleaned periodically to remove thin layers of burned on grease.

I. Baking pans stored on clean trucks and inverted when not in use.

The above represent only a few of the conditions which must be controlled through a sanitation program. As our products vary, so do the needs for sanitation. Sanitation is especially important in the production of those products which can develop food poisoning organisms.

The need for sanitation in the bakery is great and no one will ever develop a magic formula for producing a sanitary plant. If we concede that hard work is the basic ingredient and if we accept the necessary hard work, we can properly apply elbow grease and, as a result, have a plant that is entirely sanitary.

THE BAKERY SANITARIAN[1]

WILLIAM H. ZIEMKE

Fairfax Bread Company, San Francisco, California

Since the enactment of the Food and Drug Act of 1938, great progress has been made in the sanitary standards of the baking industry.

We have departed from the old idea that a food plant must be kept clean because the law requires that we do so. The Baking Industry recognizes that it pays to keep a plant clean. We have a responsibility to protect the purity and quality of the foods we make for human consumption. We have departed from the occasional clean up campaign. We recognize a sanitary bakery is a year round job.

In order to satisfactorily clean a bakery and keep it in a sanitary condition, a well organized and effective sanitary program must be established. This requires that management be familiar with the basic principles of sanitation. It must have sufficient interest to provide adequate personnel for doing the job. To carry out this program you must have a trained sanitation crew who are familiar with the proper use of cleaning equipment and materials. A recognition that competent supervision and full appreciation of the need of such are without a doubt the most important factors in a good sanitation program. The effectiveness of a sanitation department is only as strong as the individual in charge of the program and the degree of authority given to him.

The bakery sanitarian, to do an effective job, must be responsible only to management. There are many reasons for this. I believe the most important is the difference of opinion within an organization as to what constitutes sanitation. If he is subordinate to the superintendent, you can well appreciate that his ideas and suggestions will get lost before they reach the top.

Sanitation today is very different from that practiced some years ago. Production men, with their beginnings established in the so called good old days, find it difficult to bring their thinking into line with the present day ideas of sanitation. Your bakery sanitarian must have the following requirements: he must have leadership qualities; he must also possess some technical knowledge of cleaning materials, and know the functional properties of ingredients in various insecticides and fumigants; he must have knowledge of the problems of production operations, equipment design and building construction; and he should be able to recognize the common insects that infest the bakery.

The planning and supervision of the following activities is the responsibility of the sanitarian:

1. Inspection of the plant
2. Cleaning of the plant
3. Proper spraying of the plant for insect control
4. Fumigation of specific equipment for insect control.
5. Establishment of a rodent control program.

Mr. Ziemke is a graduate of the University of Minnesota with a B. S. in Agricultural Biochemistry. Since leaving Minnesota, he has had wide experience in the milling and baking industry having been associated with the Commander Larabee Milling Co.; the Mennel Milling Co.; the National Yeast Co.; and the Quality Bakers of America. In his present position as Chief Chemist, Fairfax Bread Co., Safeway Stores, Mr. Ziemke's activities include the fields of quality control, sanitation, and production for the United States and Canadian bakeries of his company.

You probably cannot find a man within your organization already having all of the above qualifications or familiar with the above functions. However, you can in all probability find a man on your payroll that can *be taught* the know how of each and all of these. In many parts of the country there are short courses in the practice of sanitation. Your sanitarian should be permitted to take advantage of these. There is also in the field of sanitation a group of highly trained consultants who are available for a nominal fee to serve you in your training program and to give you the outsiders' point of view.

Generally speaking, however, my remarks on the *bakery sanitarian* are confined to the bakers own in-plant sanitarian and not that of a specialized man having broad educational background in theory and practice of sanitation.

In selecting this sanitarian it is best not to take a production worker who has been working on the processing line for a considerable number of years. Such a

[1]Second of the series of papers on bakery sanitation presented at the Arizona Bakery Sanitation Seminar, sponsored by the Phoenix Health Department, Phoenix, Arizona, October 6, 1954.

man has been accustomed to the present way of doing things and all too frequently resists changes.

As stated earlier, *knowledge of each sanitation operation* and *leadership* qualities are the most important attributes for the sanitarian to possess. These are necessary for the administration of a good sanitation program within a plant.

A bakery sanitarian must be able to train others to do an efficient and effective job in properly cleaning every piece of equipment in every department in the bakery. He cannot possibly do all the work himself, consequently, he must encourage those under his supervision to take pride in maintaining a sanitary plant. *His function* is to establish the proper level of cleanliness and constantly to *follow up* to determine that the job is properly done and the schedules maintained. In this regard it is very *helpful to organize a sanitation committee.* This committee may consist of the *sanitarian,* the *general manager, superintendent* and *chief engineer* and possibly rotating foremen. This committee should plan the plant's program. It would especially be responsible for the establishment of better cooperation among personnel in maintaining a sanitary plant.

In order to do an effective cleaning job, an individual must be supplied with the proper cleaning supplies and equipment. He must know what to use and why. The use of improper detergents may result in waste of time. The excessive use of an insecticide will result in a waste of money.

Let us now turn briefly to some of the overall in-plant functions of your sanitarian and his assistants, keeping in mind at all times that insanitary conditions are hidden. For the remainder of our discussion I will confine myself to a few of the *direct sources of contamination* of bakery products.

With reference to insects, the principle offenders are the flour beetles, silver fishes, roaches, flys, Indian meal moths and Mediterranean flour moths. To control these properly all ingredients and materials brought into the bakery must be inspected. In this respect, the ingredient we are most concerned with is flour. Every car of flour must be inspected before it is unloaded. If insects are found on the outside of the bags, the infestation without a doubt was picked up in transit, the flour having been loaded in an improperly cleaned car. Such a car must be fumigated with methyl bromide, the bags thoroughly brushed and reloaded into a clean car.

The next step is sifting the contents of the bags using either a 30 mesh wire screen or a 9 XX silk which will retain the adult insects or larvae. If any insects are found inside the bag, the flour must be rejected. It is not fit for human consumption.

Flour must be stored on skids 10 inches above the floor if possible in a clean, well ventilated storage area. Sufficient space should be allowed around the stacks for ventilation and application of insecticides.

Only an orderly storage room can be kept clean. Every bag or box containing supplies should be classified and be accessible for regular inspection and be used in the order of receipt.

The use of compressed air to clean such places as cracks in storage areas and many other parts of a bakery is definitely objectionable. The cracks must be sealed so no possible source of food is available. The movement of dust and flour from one spot to another by either blowing or brushing is very poor practice. Only a vacuum cleaner should be used for removing dust.

All noticeable dust and dirt must be removed on the outside of bags before the flour skid is hauled to the dump bin.

The next area that needs regular cleaning is the flour handling equipment. This is a direct source of contamination for bakery products. Flour that is conveyed through infested equipment will carry along insects, insect fragments and excreta. Flour handling equipment must be absolutely cleaned of all flour. This should be done preferably every two weeks. For this purpose a vacuum cleaner must be used to remove the flour. Cleaning the flour handling equipment should begin with the flour dump bin and continue on through the various parts of the equipment including the flour hoppers over the mixers. All housing of flour handling equipment must have sufficient openings to allow for access to the equipment and for complete removal of the flour. The reason for this is that fumigants will not effectively penetrate beyond an inch into the flour.

After the flour handling equipment is completely cleaned of flour, the *outside* crevices and corners throughout the equipment should be sprayed with insecticide. The interior of the system should be thoroughly fumigated with a mixture of ethylene dichloride and carbon tetrachloride.

There are many other possible sources of direct contamination; for example, ingredient containers, dusting boxes where starch is not used such as those found at the rounder, overhead proofer and moulder. No source should be overlooked and a *regular schedule of cleaning should be maintained* at all times. *A plant schedule should be established which will permit cleaning by area, giving priority to jobs needing the most attention. A frequency chart must be followed. Good housekeeping rules must be maintained.* The accumulation of dust on floors, in equipment, on walls, pipelines, etc. are conducive to insect infestation. Equipment coming in contact with the product should be cleaned daily immediately following the shutdown.

From the mixing room on through the dough room, make up department, proof boxes, bread coolers, wrapping and shipping department, good housekeeping must be practiced. All dirt, dust and damp areas must be eliminated if possible. Wherever possible all cracks or crevices must be sealed.

Your sanitarian must be aware of the fact that the shipping department can be a serious source of infestation. Returnable shipping boxes must be cleaned outside the shipping department. Too frequently they are returned containing garbage, roaches and rodents.

The best way to control rodents is to keep them out. Your sanitarian must periodically inspect foundation walls and windows for any possible openings that will permit the entrance of rodents. Windows that are to be opened must have tight fitting screens. The Engineering Department has the

responsibility of making the building rodent proof, keeping screens in proper repair and tight fitting.

Before closing, I want to emphasize again the *need for selecting a capable man to head your sanitation department, a man who appreciates a good housekeeping program, one who appreciates the fact that a bakery must be thoroughly cleaned before using insecticides and fumigants.* It is generally agreed that thorough cleaning of a bakery is more than 80% of any sanitation program. The use of insecticides and fumigants are, for all practical purposes, useless in areas where dust, dirt and other accumulations are present.

Sanitation is a day by day task and not an occassional house cleaning job. You have a responsibility to provide the consuming public with a wholesome unadulterated product. Select your sanitarian with that thought in mind and then give him the tools and cooperation he needs.

REPORT OF
COMMITTEE ON RECOGNITION AND AWARDS — 1954[1]

The Committee on Recognition and Awards has the responsibility of selecting two nominees for awards each year. The Citation Award is given to a member of the Association who has contributed outstanding service to the Association over a period of years.

The Sanitarians Award was first given at Minneapolis in 1952. Five candidates were nominated that year. In 1953, eight candidates were nominated, and in 1954, the list had grown to twelve.

Early in 1952, Past-President, Ken Weckel, interested five manufacturers and distributors of sanitation chemicals in sponsoring an annual award of $1,000.00 and a framed certificate; the award to be given to a sanitarian who has made meritorious contribution in the field of milk and food sanitation for the public welfare of a county or municipality in the United States or Canada. One of the eligibility requirements states that the nominee be currently employed by a county or municipality as a professional milk or food sanitarian. The sponsors are the Diversey Corporation, Pennsylvania Salt Manufacturing Company, Klenzade Products, Inc., Oakite Products, Inc., and the Olin Mathieson Chemical Corporation.

No change has been made in the rules of eligibility, nominations, and selection of the recipient since the origination of the Award in 1952. Each year in November an announcement is made in the Journal of Milk and Food Technology to the effect that the Executive-Secretary will receive nominations for candidates for the Sanitarians Award for the coming year. The announcement carries a description of the Award, the list of sponsors, and the procedure and rules for selection of the nominee, together with the name of the Recognition and Awards Committee. The immediate past president serves as chairman of the committee.

Rules for eligibility and type of supporting evidence together with a guide for selecting the recipient are necessary for any contest. It was the feeling of those who worked up the procedure and rules that some limitations on the area of employment of prospective candidates should be made. Since the local sanitarian is usually the forgotten man as far as recognition and salary is concerned; and since it would be difficult to compare the result of the work of state, federal, and industrial Sanitarians with local sanitarians because of the disimilarity of their work and responsibilities, the area of competition was limited to county and municipal sanitarians.

One item of eligibility which has been generally overlooked by persons nominating candidates is the period of work in which the candidates' accomplishments are to be judged. The eligibility rules definitely limit the period to five years immediately preceding January 1st of the year during which the award is to be made. Under special circumstances, related work accomplished by the nominee during a period not to exceed seven years previous to the time of the award may be considered. This year's committee was quite critical of some brochures presented because of the difficulty in determining what was accomplished prior to 1949 and since that date. Some material presented was not in sequence, and clearly did not do justice to the work of the candidate. It must be remembered that the committee can make choices only on the basis of the supporting evidence in the brochures. We are sure that the work of some candidates deserved better supporting evidence than was presented.

The number of candidates submitted for consideration has more than doubled in the past two years. It is hoped that as the Award becomes more generally known, that the number of candidates will increase. It can readily be seen that the work of the committee will increase accordingly. The committee believes that the material submitted must be streamlined and presented on standard forms. One member suggests that the form be as follows: a biographical sketch, list of jobs, major achievements, publications, and a limited description of the reasons for recommending the candidate. The concensus of opinion of the committee is that this procedure be recommended to next year's committee.

The timing of the contest is important. The rules call for nominations and supporting evidence to reach the Executive Secretary on or before May 15. This year one nomination was not considered because it failed to reach the Executive Secretary before the dead line. The committee must have the material in sufficient time to adequately study and select the winner.

This year, candidates were submitted from the following areas: California — 3, Wisconsin — 1, Indiana — 1, New York — 2, Florida — 1, North Carolina — 1, Alabama

[1]Presented at the 41st Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., Atlantic City, New Jersey, October 21-23, 1954.

— 1, Oklahoma — 1, and South Dakota — 1. Some areas have never submitted candidates. In most cases the candidates were submitted by individuals. In others the State Affiliates selected one candidate as a result of a committee selection. Your Recognition and Awards Committee urge a wider participation geographically in this event. We believe there are many outstanding hard working local sanitarians whose work warrants consideration for this honor. We also urge sponsors of candidates to carefully read the procedure and rules before submitting their nominations. A well-prepared brochure is necessary.

Respectively submitted:
Dr. John Sheuring, Georgia
James Foster, California
P. Edward Riley, Illinois
William Kempa, Canada
Harold J. Barnum, Colorado, Chairman

REPORT OF THE COMMITTEE ON SANITARY PROCEDURE — 1954[1]

Although the Committee on Sanitary Procedure has participated in only two joint-meetings with other 3-A Sanitary Standards Committees since the 1953 Annual Meeting of this Association, the accomplishments during the intervening nearly fourteen months have been considerable, even though the number of 3-A Sanitary Standards published during this interval has been small.

The first of the joint-meetings was held at the Georgian Hotel, Evanston, Illinois on October 19, 20 and 21, 1953. Tentative Sanitary Standards reviewed and considered included those for: Portable and Stationary Bucket- or Pail-Type Milking Machines, Inlet and Outlet Leak-Protector Plug Valves for Batch Pasteurizers, Can Washers for Freshly-Dumped Milk Cans, Batch Pasteurizers and Milk Evaporators. Amendment of the 3-A Sanitary Standards for Farm Holding and/or Cooling Tanks and revision and amplification of those for Stainless Steel Automotive Transportation Tanks for milk and milk products were also discussed.

Complete agreement was not reached on any of these tentative Sanitary Standards or suggested revisions during that joint-meeting. A sub-committee, consisting of Messrs. Weber, Parkin, Goslee and Corash (chairman) was appointed to meet with manufacturers of milking machines to formulate more specific text of the Tentative Sanitary Standards for Milking Machines, with respect to the effectiveness of check-valves. Another subcommittee, consisting of Messrs. Meany and Wainess, was appointed to meet with the Task Committee on Sanitary Standards for Can Washers in order to advance the formulation of Tentative Sanitary Standards with more appeal to sanitarians.

The second joint-meeting was held at Bear Mountain Inn, Bear Mountain State Park, New York, on April 27, 28 and 29, 1954. Agreement was reached on Sanitary Standards for Stainless Steel Automotive Milk Transportation Tanks for Bulk Delivery and/or Farm Pick-Up Service, and on Sanitary Standards for Inlet and Outlet Leak-Protector Plug Valves for Batch Pasteurizers. The former were published in the September number of the Journal. The latter have been subjected to necessary editorial revision and must be approved at the next joint-meeting.

Considerable progress was made at this meeting in agreement on provisions in the Sanitary Standards for Stainless Steel Batch Pasteurizers; and Tentative Sanitary Standards for Manually-Operated Bulk Milk and Milk Products Dispensers, submitted just prior to the joint-meeting, were subjected to an explanatory review during an evening session which lasted until 12:10 A.M.

The report of the Subcommittee on Milking Machine Check-Valve Function and Effectiveness, appointed at the Evanston joint-meeting, was not unanimous. The manufacturers proposed that the Sanitary Standards provide that check-valves "effectively deter" entry of moisture or other contamination into the milk receptacle. The sanitarians insisted that entry be "prevented". After much discussion, and a caucus by both sanitarians and manufacturers, it was agreed that:

(a) A test for determination of the effectiveness of check-valves (or other device to prevent contamination of the milk), satisfactory to sanitarians and to manufacturers is to be sought or developed. Such a study is to be inaugurated at once.

(b) The Sanitary Standards for Milking Machines, including a provision that contamination from the vacuum system shall be *prevented*, are to become effective two calendar years (24 months) following the date of mutual acceptance of such a test and procedure.

The Subcommittee met with manufacturers before leaving Bear Mountain, and another meeting was held at Poughkeepsie, N. Y. on May 28. At the latter meeting Professor R. P. March, of the Dairy Department of Cornell University proposed a rather sensitive test procedure for detecting minute quantities of tagged contaminant in the milk. The manufacturers were to subject this test to trial. To date no comments concerning the test have been received.

Since the Bear Mountain Inn joint-meeting, subcommittee joint-meetings have been held in Poughkeepsie, N. Y. (as stated), at Chicago on Sanitary Standards for Can Washers, and at New York on Sanitary Standards for Bulk Milk Dispensers.

At the next joint-meeting, to be held in Evanston on November 10, 11 and 12, 1954, an effort will be made to reach agreement on five Tentative Sanitary Standards, which have been under consideration at one or more joint-meetings, to make progress on five Tentative Sanitary Standards under consideration for the first time, and to effect revision of 3-A Sanitary

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Standards for Farm Tanks and/or Storage Tanks. The results of that joint-meeting will, of course, provide material for the 1955 Annual Report of this Committee.

It must be obvious to everyone who hears or reads this Report that incalculable time and effort are represented in every 3-A Sanitary Standard which finally reaches the publication stage. We are taking the liberty, however, of emphasizing two significant aspects of the endeavor involved in these 3-A Sanitary Standards. Firstly, the cost to the Association is limited to the postage required for essential Committee correspondence, and the space in the Journal required for their publication. Monetarily, the Association is getting quite a bargain! Secondly, 3-A Sanitary Standards are essentially the work of sanitarians, most of whom are members of this Association. Members of the Committee on Sanitary Procedure are, of course, official representatives of the Association. All of the representatives of the U. S. Public Health Service who participate in the deliberations are members of the Association. And many of the members of the Subcommittee on Sanitary Standards of the Dairy Industry Committee, and of Task Committees, are also members of this Association.

Although this Association cannot—and does not—claim full credit for the development of 3-A Sanitary Standards, they actually are an Association project, and belong to you —not only collectively, but individually.

But such proprietorship — even though it be a windfall — involves certain individual responsibilities. 3-A Sanitary Standards are the result of the best judgment of your representatives. In some features of some of them a compromise between sanitation and fabricating and machining techniques has been unavoidable. They are subject to relatively ready amendment or revision. The responsibility to which we refer is the obligation to regard them as *standards,* in the full meaning of the term, and to apply them "as is".

If it is felt, in any quarter, that such individual responsibility rests only upon those who have had an opportunity to participate actively in the formulation of the 3-A Sanitary Standards, it is respectfully pointed out that the membership of the Committee is published in the Journal, several of the administrative officers of the Association, including the Executive Secretary, are members of the Committee, and many of the Affiliate Associations have standing committees on Sanitary Standards, the Chairmen of which know how to contact the Committee. In short, any suggestions concerning Sanitary Standards can be placed in the hands of the Committee without resort to formality or "red tape".

We take this occasion to impress upon each of you that refusal of individual sanitarians to accept and abide by 3-A Sanitary Standards are embarrassing to every member of the Committee on Sanitary Procedure. We have been led to understand that we represent and speak for the Association and all its members, and even a single instance of refusal to accept 3-A Sanitary Standards is a reflection upon the judgment of the Committee, and raises a question as to whether it speaks for the entire Association.

Many of the members of this audience will remain to attend the Dairy Industries Exposition, where examples of equipment which conforms to 3-A Sanitary Standards will be on view. May we suggest that you all bear in mind that Sanitary Standards have not been developed for all of the types of equipment on display, and conformance to 3-A Sanitary Standards is not mandatory. Members of the Committee will welcome expressions of your opinions about the degree of conformance of any specific piece of equipment to current 3-A Sanitary Standards. But the Committee is convinced that the popularity of 3-A Sanitary Standards among exhibitors will not be enhanced by argumentative clinics among sanitarians gathered in their booths.

We regret the necessity to report the resignation of two members of the Committee. Leslie E. Jenne, of the Washington Affiliate Association, has entered an unrelated vocation. Harold Wainess, who has taken an active part in Committee deliberations for nearly a decade, has also submitted his resignation, since he has become a consultant to the Dairy Industry.

Respectfully submitted,

H. E. Bremer
E. B. Buchanan
Paul Corash
Milton R. Fisher
H. Clifford Goslee
Mark D. Howlett, Jr.
C. K. Luchterhand
James A. Meany
I. E. Parkin
Ivan Van Nortwick
Harold Wainess
C. W. Weber
C. A. Abele, Chairman

REPORT OF THE COMMITTEE ON COMMUNICABLE DISEASES AFFECTING MAN — 1954[1]

The Committee on Communicable Diseases Affecting Man has concentrated its efforts this past year on the development of a "Standard Procedure For The Investigation Of Milk-Borne And Food-Borne Disease Outbreaks." We had expected to present this Procedure in final form to the Executive Board at this meeting; however, as we now realize, our original schedule was too optimistic, in view of the distribution we have given the present draft for review and comment.

In this regard. we have, with the approval of the Executive Board of this Association, distributed the current mimeographed draft of the Procedure to Committees of public health organizations outside this Association as follows: (a) Subcommittee of State Epidemiologists, State and Territorial Health Officers Association; (b) Subcommittee on Communicable Disease Control, American Public Health Association; (c) Coordinating Com-

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mittee on Laboratory Methods, American Public Health Association; (d) National Office of Vital Statistics, Public Health Service, Department of Health, Education, and Welfare, and (e) Communicable Disease Center, Public Health Service, Department of Health, Education, and Welfare. In addition, it has been sent to a number of nationally recognized epidemiologists for their review and comment.

The response of these organizations and individuals has been most gratifying. Generally, our Association has been commended for undertaking this project. Many constructive suggestions have been received and evaluated; however, since a majority of the members of this Committee were unable to attend this meeting, it will be necessary to call a special Committee meeting this fall for the purpose of reviewing and discussing as a group, the comments received.

One of the most significant developments as a result of the distribution of the Procedure, was the decision of the Subcommittee on Epidemic Intelligence of the State and Territorial Health Officers Association to recommend to the Committee on Arrangements of their Association that they include a discussion of this Procedure on the agenda for the 1955 spring meeting of the State epidemiologists. They also recommended that an invitation be extended to a representative of our Committee on Communicable Diseases Affecting Man to meet with the State epidemiologists and participate in their discussion. In view of this development we are looking forward to further improvement of the procedure as a result of suggestions coming out of the meeting of State epidemiologists, and possible endorsement by the State and Territorial Health Officers Association. This may delay publication beyond the coming year, but our present goal is to have the Procedure published by the next Annual Meeting of our Association.

A copy of the current draft of the Procedure is attached to this report for the information of the Executive Board.

Respectfully submitted,
R. J. Helvig, Chairman
H. L. Bryson
Raymond Fagan
John H. Fritz
Stanley L. Hendricks
E. R. Price
H. H. Rothe
Timothy Sullivan

WISCONSIN MILK DEALERS ASSOCIATION COMMEMORATE DEVELOPMENT OF VITAMIN D FORTIFICATION OF MILK

At the annual meeting of the Wisconsin Milk Dealers' Association the following resolution was offered by the Resolutions Committee and unanimously adopted.

RESOLUTION

"WHEREAS, This year marks the 25th anniversary of the discovery of the process for the addition of vitamin D to foods, and

WHEREAS, milk has long been regarded, during this period, as the ideal food to which vitamin D should be added, and

WHEREAS, the early acceptance by the medical profession and by the milk industry followed this discovery, and

WHEREAS, during the ensuing years the process of adding vitamin D to Homogenized milk has come to be almost universally accepted and universally used by the milk industry, and

WHEREAS, the result of this prompt acceptance by the dental and medical professions and by the milk industry of this important scientific fact has resulted in incalculable benefits to the health and well being of our entire population particularly growing children, and

WHEREAS, in the instance of growing children rickets, was a common illness among a large percentage of children prior to the fortification of milk with vitamin D, and

WHEREAS, it is now a fact that there has been almost a complete disappearance of rickets among children, a fact to which vitamin D fortification of milk is entitled to a great deal of credit.

THEREFORE, be it resolved that the Wisconsin Milk Dealers, in convention assembled reaffirm their confidence in the process of adding vitamin D to milk and urge that all milk dealers everywhere continue to fortify all Homogenized milk with vitamin D in the amounts which have been determined to be adequate and to emphasize to their customers, to their employees, and to the public at large the importance of the vitamin D fortification of milk.

FURTHERMORE, that all milk dealers be urged to give greater emphasis in their advertising and in their selling effort to the importance of vitamin D fortification of milk.

Dated December 14, 1954
Resolutions Committee:
Bruce D. Brown,
Chairman
B. Blochowiak
W. A. Cullison
Hugh Gear
Clinton Hatch
Wisconsin Milk Dealers' Association, Inc.
Harry Klueter,
Executive Secretary

ATLANTIC DIVISION PURCHASING UNIT SET UP AT CANCO

American Can Company has announced the creation of a purchasing department in its Atlantic division with headquarters in New York, to take effect January 1, 1955. The activities of this new unit were formerly handled by the company's general purchasing department.

Warren V. Duke was named manager of the new department and Charles A. Schults assistant manager.

Mr. Duke started with Canco in 1933 as a purchasing clerk. He served three years in the Navy during World War II and upon returning to the company was appointed manager of the ingot metals and specialties division of the general purchasing department. In 1953 he became purchasing manager of the fuels and factory supplies division.

A veteran of 24 years with Canco, Mr. Schults has served in a number of capacities in the manufacturing and purchasing departments. He had been a buyer in the general purchasing department, and during the Korean conflict was manager of the government controls division.

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NEWS AND EVENTS

PROGRAM
NATIONAL CONFERENCE ON INTERSTATE MILK SHIPMENTS
HOTEL PEABODY, MEMPHIS TENNESSEE, MARCH 29 AND 30, 1955

MARCH 28, 1955

9:00 A.M. - 5:00 P.M.—Executive Board Meeting.
7:00 P.M. - 10.00 P.M.—Committee Meetings.
7:00 P.M. - 10:00 P.M.—Registration.

MARCH, 29, 1955

8:00 A.M.—Registration.
9:00 A.M.—Conference Convenes.
9:00 A.M.—PROBLEMS AND POTENTIALS OF THE CONFERENCE.
Dr. K. G. Weckel, Madison, Wisconsin
9:30 A.M.—REVIEW OF THE CONFERENCE BASIC AGREEMENTS.
D. B. Whitehead, Jackson, Mississippi
10:00 A.M.—ECONOMIC FACTS ON INTERSTATE SHIPMENT OF MILK.
Karl Shoemaker, Madison, Wisconsin
10:45 A.M.—A REVIEW OF CONGRESSIONAL BILLS AFFECTING INTERSTATE MILK SHIPMENTS.
Charles Holcombe, St. Paul, Minnesota
11:15 A.M.—THE DAIRY PRODUCTS IMPROVEMENT INSTITUTE'S PROGRAM.
Dr. A. C. Dahlberg, Ithaca, New York
Lunch
1:30 P.M.—ACTIVITIES OF THE PUBLIC HEALTH SERVICE IN THE INTERSTATE MILK SHIPMENT PROGRAM.
Harold B. Robinson, Washington D.C.
2:00 P.M.—SYMPOSIUM ON TUBERCULOSIS AND BRUCELLOSIS ERADICATION.
1. Survey of the Present Status of Regulations in the 48 States.
Dr. A. K. Kuttler, Washington D.C.
2. The Need for Standardization from the Viewpoint of Control Agencies.
For Importing Areas:
Dr. H. J. Rollins, Raleigh, North Carolina
For Exporting Areas:
Dr. Ralph L. West, St. Paul, Minnesota
3:30 P.M.—CONFERENCE PROBLEMS
6:15 P.M.—BUFFET SUPPER AND SOCIAL HOUR.
8:30 P.M.—SPECIAL COMMITTEE CONFERENCES.

MARCH 30, 1955

9:00 A.M.—REPORT OF CONFERENCE CONSTITUTION COMMITTEE.
Dr. M. R. Fisher, Chairman, St. Louis, Missouri
9:30 A.M.—REPORT OF SPECIAL COMMITTEE ON DRY MILKS.
J. T. Walsh, Chicago, Illinois

10:15 A.M.—SYMPOSIUM ON YOUR INTERSTATE MILK SHIPMENT PROGRAM AND THE MECHANICS OF THE ADMINISTRATIVE PROCEDURE AND HOW IT WORKS.

Moderator, Luther Hortman, New Orleans, Louisiana

1. *Receiving Area*:
   a. Industry Representative.
      Harold B. Stone,
      Dallas, Texas
   b. Local Health Department Representative.
      Dr. R. G. Ross,
      Tulsa, Oklahoma
   c. State Enforcing Agency.
      Joe Lakey, Austin, Texas
   d. State Certifying Agency.
      John McCutchen,
      Jefferson City, Missouri
2. *Shipping Area*:
   a. Regional Public Health Service.
      L. C. Peckham,
      Chicago, Illinois
   b. State Enforcing Agency.
      Harvey Weavers,
      Madison, Wisconsin
   c. State Certifying Agency.
      Enos Huffer,
      Springfield, Illinois
   d. Industry Representative
      Neal McBeath,
      Shawano, Wisconsin
   e. Local Health Department.
      Harry W. Johnson,
      Bluffton, Indiana.

12:00 NOON—Lunch

1:30 - 4:30 P.M.—1. DISCUSSION ON THE UTILIZATION OF THE CONFERENCE AGREEMENTS.
2. REPORT OF COMMITTEES.
3. BUSINESS MEETING.
Adjournment.

SPEAKERS

Harry W. Johnson — Milk Sanitarian, City Health Department, Bluffton, Indiana.

Dr. A. C. Dahlberg — Advisor to the Board of Directors, Dairy Products Improvement Institute, Inc., Ithaca, New York.

Joseph Lakey — Director, Bureau of Food and Drugs Texas State Department of Health, Austin, Texas.

Dr. M. R. Fisher — Chief of Milk Control, St. Louis Dept., of Public Health, St. Louis, Missouri.

H. L. Hortman — Director, Division of Milk and Dairy Products Louisiana State Board of Health, New Orleans, Louisiana.

Enos G. Huffer — Chief, Bureau of Milk and Foods, Illinois State Department of Health, Springfield, Illinois.

C. H. Holcombe — Director, Agricultural Products Inspection, Minnesota State Department of Agriculture, St. Paul, Minnesota.

Dr. A. K. Kuttler — Chief, Brucellosis Eradication Section, U. S. Department of Agriculture, Washington D. C.

John McCutchen — Director, Division of Food and Drugs, Missouri State Board of Health, Jefferson City, Missouri

L. C. Peckham — Senior Sanitarian, U. S. Department of Health, Education, and Welfare, Chicago, Illinois.

Harold B. Robinson — Chief, Milk Sanitation Section, U. S. Department of Health, Education, and Welfare, Washington D. C.

Dr. H. J. Rollins — State Veterinarian, State Department of Agriculture, Raleigh, North Carolina.

Dr. R. G. Ross — Chief Milk Sanitarian, Tulsa Department of Health, Tulsa, Oklahoma.

Harold B. Stone — Marketing Specialist, Foremost Dairy, Dallas, Texas.

Karl Shoemaker — Associate Professor of Economics, University of Wisconsin, Madison, Wisconsin.

J. T. Walsh — Assistant Director, American Dry Milk Institute, Inc., Chicago, Illinois.

Dr. Ralph L. West — Secretary and Executive Officer, Minnesota Live Stock Sanitary Board, St. Paul, Minnesota.

Dr. K. G. Weckel — Professor of Dairy and Food Industries, University of Wisconsin, Madison, Wisconsin.

D. B. Whitehead — Supervisor, Food and Milk Control, Mississippi State Board of Health, Jackson, Mississippi.

Harvey Weavers — Chief, Dairy and Food Division, Wisconsin State Department of Agriculture, Madison, Wisconsin.

Neal McBeath — Sales Manager, Badger Consolidated Cooperative, Shawano, Wisconsin.

PROGRAM COMMITTEE

Harold J. Barnum — Chairman, Denver Department of Health and Hospitals, Denver, Colorado.

C. H. Luchterhand — Wisconsin State Board of Health, Madison, Wisconsin.

D. B. Whitehead — Mississippi State Board of Health, Jackson, Mississippi.

LOCAL ARRANGEMENTS COMMITTEE

Rose B. Clark — Secretary Manager, Midsouth Milk Producers Association, Memphis, Tennessee.

Glen Fulkerson — Chief Milk Sanitarian, Tennessee State Department of Health, Nashville, Tennessee.

Everett C. Handorff — Director, Bureau Sanitary Engineering, Memphis-Shelby County Health Departments, Memphis, Tennessee.

Cliff B. Luttrell — Agricultural Director, Federal Reserve Bank, Memphis, Tennessee.

Roy R. Perkins — Chief, Plant Inspection, Memphis-Shelby County Health Departments, Memphis, Tennessee.

John W. Simonton — Director, Dairy Exchange, Memphis, Tennessee.

HOTEL ARRANGEMENTS

Arrangements for room accommodations should be made by each participant directly with the Hotel Peabody, Memphis, Tennessee. Direct correspondence to T. J. McGinn, Assistant Manager, advising your

participation in the conference and room requirements. Rates: Single, $4.00-$10.00; Double bed, $6.50-$13.00; Twin beds, $8.00-$14.00; Third person in twin or double bed room, $2.50 additional.

EXECUTIVE BOARD

National Conference on Interstate Milk Shipments

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Dr. K. G. Weckel, University of Wisconsin, Madison, Wisconsin.

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C. J. Babcock, Washington D. C.

U. S. Department of Health, Education, and Welfare

Dr. R. J. Helvig, Washington D. C.

Dairy Industry

Dr. A. C. Fay, H. P. Hood & Sons, Boston, Massachusetts.

Martin M. Kloser, Bowman Dairy Co., Chicago, Illinois.

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C. H. Holcombe, St. Paul, Minnesota

Alex Shaw, Tallahassee, Florida.

State Department of Health

C. K. Luchterhand, Madison, Wisconsin.

David H. Evans, Austin, Texas.

Municipalities

Dr. M. R. Fisher, St. Louis Department of Public Health.

Harold J. Barnum, Denver Department of Health and Hospitals.

Member at Large

J. L. Rowland, Kansas City, Missouri.

THIRD ANNUAL NATIONAL DAIRY ENGINEERING CONFERENCE MARCH 8 AND 9, 1955 KELLOGG CENTER, MICHIGAN STATE COLLEGE

Sponsored by the Department of Agricultural Engineering with the cooperation of the Department of Dairy, the Department of Continuing Education, and several industrial concerns.

Authorities from all over the U.S. will discuss timely engineering problems of the dairy industry. Here is the place to get many of the answers to your problems firsthand.

For details write to: Carl W. Hall, Department of Agricultural Engineering, Michigan State College, East Lansing, Michigan.

ADDITIONAL SPONSORS FOR DAIRY REMEMBRANCE FUND

There is an increasing interest in the use of Dairy Remembrance Fund as a means for sponsoring educational and scholarship projects within the dairy industry. This was emphasized through a current announcement by Madison Lewis, president of the Fund, that the American Dry Milk Institute and National Association of Dairy Equipment Manufacturers have undertaken affiliation.

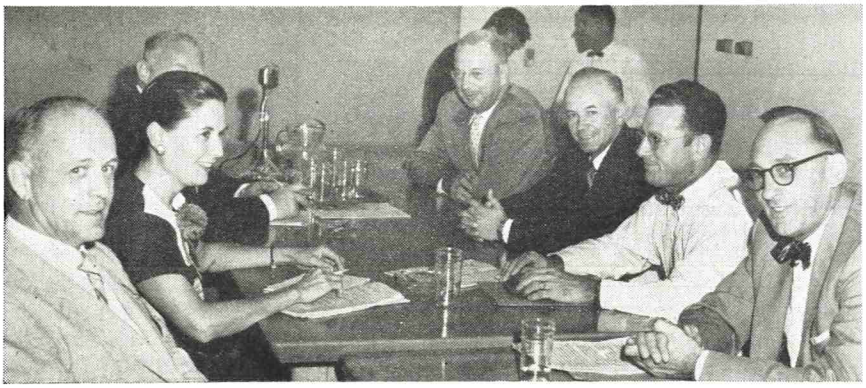
The Dairy Remembrance Fund was organized for the following purposes: (1) The maintenance of non-profit institutions in the fields of health, education or public welfare; (2) The advancement of scholarship in the field of dairy education; (3) Research projects of a non-commercial nature which may promote an improved knowledge of the production, processing or utilization of milk and milk products.

Contributions of one dollar or more may be sent to Dairy Remembrance Fund, 111 North Canal Street, Chicago 6, Illinois in honor of men and women in the dairy field upon anniversaries, promotions, milestones, deaths or births. These will be used for the published purposes of the Fund and will be allocated at the discretion of its Board of Directors, representating, in addition to the two new sponsors mentioned above, Milk Industry Foundation, International Association of Ice Cream Manufacturers, Dairy Industry Committee, Dairy Industries Supply Association, National Association of Retail Ice Cream Manufacturers, American Dairy Science Association, Dairy Industries Society, International and National Dairy Council.

BAKERY SANITATION SEMINAR SPONSORED BY PHOENIX HEALTH DEPARTMENT

A seminar on bakery sanitation designed to provide bakers, bakery employees and public health personnel of Arizona the opportunity for a better understanding of the problems inherent in the operation of a modern day bakery was held in Phoenix, Arizona, October 6, 1954. This seminar was sponsored by the Phoenix Health Department under the direction of Dr. James A. Dolce, Director of the Department. The accompanying photograph shows a number of the participants in the Seminar at a meeting at which time plans for future seminars were made.

Elsewhere in this issue of the Journal, two of the papers given at the Seminar are published.



Program planners and coordinators discussing the results of the seminar and planning follow-up and future possibilities in a bakery sanitation program. Seated from left to right are: J. O. Slaybaugh, Assistant Division Manager, Pacific Division of Diversey Corporation; Dorothy Craig, Health Educator, Phoenix Public Health Department; Dr. James A. Dolce, Director, Phoenix Public Health Department; Louis A. King, Jr. Director, Department Bakery Sanitation, American Institute of Baking; Dr. Wendell Reeder, Director, Research Division, Campbell Taggart; Paul Maier, Sanitary Engineer, C.D.C., Dept. of Health, Education and Welfare, U. S. Public Health Service; and William Ziemke, Sanitary Engineer, Fairfax Division, Safeway Stores, Inc. Two men in background are on-lookers.

OAKITE CONFERENCES STRESS NEW MATERIALS, NEW CLEANING EQUIPMENT

Ninety-one technical service representatives from the eastern and Canadian divisions of Oakite Products, Inc., gathered together at New York's Statler Hotel in November to share industrial cleaning experiences and to hear company chemists describe the properties of materials recently introduced.

Features of the three-day conferences were the informal discussions in which the representatives reported on the problems they encountered in plants, and the sometimes unorthodox ways in which they solve them—using an alkaline rust remover, for instance, to clean rubber molds; using a material designed for bottling plant conveyor chain lubrication for forming operations in metal plants. Savings in time, labor, and money made possible by the use of Oakite-engineered cleaning equipment were discussed—one representative reporting the use of an Oakite Hot Spray Unit for flowing paint stripping solution over trucks; another the advantages of cleaning buses and trucks with a unit which produces a heavy detergent foam; a third the adaption of steam guns to strip rejected pieces as they move along on a conveyor line.

One hundred and twenty-five representatives from the company's other divisions took part in similar conferences in St. Louis and Los Angeles.

1955 NATIONAL HEALTH FORUM

The 1955 National Health Forum, to be held March 23 and 24 at the Hotel Sheraton Astor, New York City, will concern itself with "Forecasting America's Health," according to A. W. Dent, Council president. The 48 national organization members of the Council annually sponsor the Forum which will take on added significance in 1955 as a feature of the Council's 35th Annual Meeting.

Roscoe P. Kandle, M.D., deputy commissioner of the New York City Department of Health and one of the nation's leading authorities on public health, is chairman of the Forum Committee.

Explaining plans for the meeting, Dr. Kandle said, "We do not expect to become prophets, but we do expect to get down to brass tacks on how prophecies are made. We will try to form some of those wise 'guesstimates' upon which any plans for the future must be built."

Different sessions at the Forum will explore the nation's resources and forces for better health.

"We will try to establish better guidelines along which the many groups interested in health may work more effectively together," said Dr. Kandle. "We will check economic trends; try to gauge how atomic developments will affect health; look at current governmental programs, and see how new health programs of labor and management should alter community plans."

The Forum program will offer both featured speakers and opportunity for general discussion.

A brigade of "Forum Forecasters" made up of representatives from the 48 Council member groups will announce National Health Forum plans at national, state, and local meetings through the autumn and winter months. Aim of these face-to-face "forecasts," Dr. Kandle said, is two-fold.

First, the speakers will make clear that everyone interested in health is welcome. The Forum is distinctly not for professional health workers only, but rather a meeting ground for the public and professional workers.

Second, the "forecasters" will point out that the National Health Forum can serve as a try-out of a type of meeting that might well be duplicated later in the year in every American community, "where the real health job is done," said Dr. Kandle, who has conducted surveys of public health problems in cities throughout the country.

Anyone wishing to attend the Forum can secure the advance program as soon as it is ready by requesting it now from the National Health Council, 1790 Broadway, New York 19.

The 1954 Forum, under chairmanship of William P. Shepard, M. D., vice president of the Metropolitan Life Insurance Company, directed attention to the staffing of America's health services and led to the Council's "Health Career Horizons" project through which the nation's high school students will be better informed about careers in health.

Dr. Kandle, before going to his present position, was associate director of Community Research Associates and field director for the American Public Health Association.

ADMI ANNOUNCES NEW CONCENTRATE FERMENT FORMULA

Today the American Dry Milk Institute, Chicago, is announcing the latest, thoroughly proven development in its ADMI Stable Ferment Process for baking bread and other yeast-raised products, namely, the new Concentrate Formula.

In a four month, exhaustive commercial test, the new Concentrate Formula has resulted in bread which scores consistently higher . . . has better external and internal properties . . . better taste and aroma.

Furthermore, the new Concentrate Formula (1) permits the baker precise control over the finished dough temperature, (2) offers added convenience of using a constant volume of ferment for each dough regardless of flour absorption, and (3) effects further economies in equipment inasmuch as the concentrate yields almost twice as much ferment. In addition, it gives superior production control and economy.

The Institute is preparing operational information on the new Concentrate Formula and will be glad to send copies on request.

JOHN T. WALSH BECOMES VICE-PRESIDENT DRY MILKS, INC.

John T. Walsh, Assistant Director of the American Dry Milk Institute, Chicago, has resigned his position effective January 15, 1955, according to an announcement made today by Dr. B. W. Fairbanks. He will join Dry Milks, Inc., Chicago as Vice-President.

Jack is well known throughout the industry having been associated with it since 1929—for 9 years with the Borden Company and the last 16 years with the Institute. He brings to his new position an exceptional background of experience

and knowledge of the industry from production through sales promotion and market development.

While the staff and membership of ADMI greatly deplore his leaving, they are happy to have him continue in the dry milk industry, and wish him all success in his new endeavor.

PAPER CUP AND CONTAINER INSTITUTE APPOINTS FIELD SANITARIAN

Samuel D. Macready, for 20 years a leading authority on sanitation, has been appointed field sanitarian by the Paper Cup and Container Institute, Homer N. Calver, Secretary of the Institute's Public Health Committee, announced.

Starting in 1926 as Director of Health and Sanitation in Hollywood, Florida, Mr. Macready became a Sanitation Officer in the Florida State Board of Health. In 1940, after special study at the School of Public Health of the University of North Carolina, he was appointed Chief of Sanitation of the Dade County Health Department in Miami, Florida, and later Sanitation Consultant to the Florida State Board of Health. In 1942 the United Fruit Company selected him to be its General Sanitary Inspector in Latin America.

Born in 1898, in Cambridge, Massachusetts, Mr. Macready now makes his home in West Palm Beach, Florida.

CONFERENCE OF PUBLIC HEALTH VETERINARIANS

Brigadier General Wayne O. Kester, Assistant for Veterinary Services, Office of the Surgeon General, U. S. Air Force, was installed on October 11, 1954 as President of the Conference of Public Health Veterinarians, succeeding Dr. Ben H. Dean, Public Health Veterinarian, California State Department of Health.

Widely known in the veterinary profession, General Kester has directed the veterinary service of the Air Force since its independent establishment in 1949. He has served with the Armed Forces for over 20 years.

General Kester entered the service as a second lieutenant in the Army Veterinary Corps in 1933, and was at Pearl Harbor during the Japanese attack. During the war he was Chief Veterinarian, U. S. Forces, Pacific Ocean Areas. Promoted to Colonel in 1943, he was awarded the Legion of Merit and the Commendation Ribbon for meritorious wartime service. He organized and operated the Army's first and largest biological warfare defense unit during World War II.

General Kester is a member of the American Veterinary Medical Association, the Association of Military Surgeons of the United States, the U. S. Livestock Sanitary Association, the American Public Health Association, and the District of Columbia Veterinary Medical Association.

Dr. Raymond J. Helvig, a commissioned officer of the U. S. Public Health Service and Assistant Chief of its Milk, Food and Shellfish Sanitation Program, has been named president-elect of the Conference of Public Health Veterinarians for 1954-55. He will succeed Brigadier General Wayne O. Kester, USAF (VC), Assistant for Veterinary Services, Office of the Surgeon General, USAF, who was installed as president at the Conference's Annual Meeting in Buffalo, New York, October 11, 1954.

Entering the service in 1942, Dr. Helvig served for a number of years as Milk and Food Consultant in the Regional Office of the Public Health Service at Dallas, Texas. On completing his assignment there, he undertook graduate study at the University of Michigan School of Public Health and was subsequently assigned for duty at the headquarters office of the Public Health Service, Washington, D. C., where he rose to his present post.

Dr. Helvig is a member of the American Veterinary Medical Association, American Public Health Association, International Association of Milk and Food Sanitarians, District of Columbia Veterinary Medical Association, and the American Board of Veterinary Public Health.

Dr. James Lieberman, a veterinary officer of the Communicable Disease Center, U. S. Public Health Service, was re-elected as Secretary-Treasurer of the Conference of Public Health Veterinarians at the Conference's Annual Meeting in Buffalo, New York, October 11, 1954. Dr. Lieberman is presently detailed as veterinary epidemiologist in the New York State Health Department's Bureau of Epidemiology and Communicable Disease Control at Albany, New York. In this position, he is engaged in studies involving the coinciding interests of animal and human health, including the zoonoses — diseases of animals transmissible to man.

Dr. Lieberman is a member of the American Veterinary Medical Association, U. S. Livestock Sanitary Association, Association of Military Surgeons of the United States, New York Academy of Sciences, and is a Fellow of the American Public Health Association.

AMERICAN INDIAN SANITARIANS ASSOCIATION SISSETON, SOUTH DAKOTA

"We sincerely believe that because we are of our own Indian race, being in constant relationship with them and presently striving toward a goal of better basic environmental sanitation practices among our people; we discover our adult people lacking primeval teachings in respect to their environment, and our children likewise in a future need for it. The latter is definitely in a great need for its teachings because they are being taught to become more independent than our preceding generations.

It is our sincerest desire that future generations, none too soon, be given the benefits of these pertinent basic philosophies of environment for their own improvement and preservation. In this way our respective environmental sanitation programs on the reservations can be supplementary; in that the seed of better health and environment can be fertilized by programs such as ours.

We realize there are many other things that need to be taught our Indian children, but, we certainly realize also; that good health is the most blessed gift in life. The mortality among our Indians is evidence that there is a need for this type of program.

It is with no wish to offend, nor other cause, that this resolution be drawn up but to promote our environmental sanitation programs to

a more efficient operation."

RESOLUTION JULY, 1954

"Whereas environmental sanitation is considered to be a basic factor in the general public health and welfare of every Indian reservation, community, state and nation, and

Whereas basic environmental sanitation has its beginning in the basic social institutions, the home and school, wherein taught the philosophies of life and attitudes pertaining to living, and

Whereas it is the feeling of the American Indian Sanitarians Association that there is a need for our people being better informed in the field of environmental sanitation in order that this basic science be more understood and better promoted,

Therefore be it resolved . . .

A. That the American Indian Sanitarians Association requests the Area Director of Schools, Bureau of Indian Affairs and other concerned agencies to study the possibilities of including a course in basic environmental sanitation in the curriculum of the Indian Service schools, and

B. That the American Indian Sanitarians Association pledges its support and the use of its Sanitarians and facilities wherever existant within the areas."

The Secretary is hereby instructed to convey this resolution to the agencies and individuals concerned.

Frank C. Estes
Secretary & Treasurer

INTERNATIONAL DAIRY SOCIETY SUPPORTS MENDES-FRANCE IN PREMIER'S 'MILK-BOOSTING'

In a cable to Premier Pierre Mendes-France, Dairy Industries Society, International congratulated the French Premier on his "drink more milk" campaign, and wished him success in his efforts. The Society, with headquarters in Washington, D. C. and members in 49 countries, is dedicated to "development of dairy enterprise throughout the world."

The cable, which was authorized by the Board of Directors and signed by the DISI Board Chairman, Robert Rosenbaum of Philadelphia, said:

Dairy Industries Society, International, an organization composed of dairy interests in many countries, salutes you with cordial greetings and wishes you much success in your personal efforts to increase the use of milk by the people of France.

Your recommendation of the use of milk as a daily beverage serves to demonstrate in a very important manner, not only to your great country but to all the world, the healthful and nutritional value of nature's most nearly perfect food—milk.

In making public the cable, Mr. Rosenbaum pointed out that, "it is not a matter of popular knowledge other than in Europe that France is a great milk-producing nation as well as world-renowned for its production of wines."

Although not a great drinker of fluid milk, the average Frenchman in 1953 consumed 703 pounds of milk in the forms of milk, cream and dairy products, as compared to only 682 pounds by the average United States consumer, according to statistics of the Foreign Agricultural Service of the U. S. Department of Agriculture. According to the same sources the French per capita use of cheese and butter was almost double that in the United States.

"Both cheese and butter help to create subtle flavors in the preparation of a wide variety of foods," Mr. Rosenbaum pointed out. "French butter and French cheese have been responsible for a large part of the reputation enjoyed by that country's master chefs for many years."

"The French Premier is obviously aware," continued the Society's board chief, "that the excess of French milk production over French consumption of all forms of dairy products reached an all time high of slightly more than 9 billion pounds in 1953. That is a higher figure than that for any other nation except the United States, whose excess of production over usage was slightly more than 12 billion pounds last year.

"Utilization of the milk supply is vital to the health of the economy, as well as to the health of the individual, in France as in any other country."

The Society's Area Director for France is Prof. E. Lancelot of Paris, a distinguished dairy educator and industrial leader.

The Board of Directors of Dairy Industries Society, International on December 17 approved a plan for a world-wide industry-spearheaded "Point IV" program for dairy development, including formation of a world milk pool to channel milk surpluses from all producing countries into areas where there is not sufficient local milk.

LITIGATION INVOLVING RESTRAINT OF MILK SALES HEARD AT FEDERAL DISTRICT COURT AT DENVER, COLORADO

Refusal by the Health Department of Colorado Springs, Colorado to grant a permit to the Lucerne Dairy Company of Denver, to deliver and sell milk in Colorado Springs resulted in the taking of testimony in the matter before Federal Judge Knaus, on December 20, 21 and 22, 1954.

The Denver milk ordinance allows milk of a 200,000 bacteria count prior to pasteurization while Colorado Springs specifies 100,000 per ml., as the maximum allowable limit. Testimony taken involved the relative similarity between the two ordinances ,the defense contending their milk met Colorado Springs requirements and that from the public health point of view there was no practical difference between the two bacterial limits.

The court specified some sixty days for attorneys for both sides to file briefs, so a decision will not be handed down until a later date.

Walter Dashiell, Engineer Director, U. S. Public Health Service, Regional Office, Denver, Harold J. Barnum, Director, Milk Sanitation Denver Department of Health, H. S. Adams, Indiana University Medical School, Indianapolis and John Brown, Milk Sanitarian, Colorado Springs and others gave testimony in the case.

WASHINGTON STATE MILK SANITARIANS TO MEET

The Washington State Milk Sanitarians' Association will hold its annual meeting and election of officers in connection with the State College of Washington Annual Institute of Dairying. Other cooperating agencies are the State Department of Agriculture, State Department of Health, Washing-

ton State Dairy Foundation, Washington State Dairy Council, and the Institute Alumni Association.

March 7 to 10, 1955, are the dates set for the Institute. On the program this year will be such features as a panel discussion of the cause and prevention of flavor defects in milk held in bulk farm tanks by men directly concerned with the problem in the state of Washington, talks on the federal milk order system, work simplification procedures, the importance of psychrophils in finished milk products, 3-A sanitary standards, advancements in detergents and sanitizers, the prevention of rancid milk in connection with pipeline milking, safety engineering, waste disposal, stabilizers for use in ice cream pasteurized by the HTST method, the certification of laboratories, the manufacture of cottage cheese with practical plant demonstrations, etc., etc.

A few of the speakers definitely scheduled include *Norman Myrick*, editor of the American Milk Review of New York City; *O. E. Ross*, Chief Chemist of the National Pectin Products Co. of Chicago, Ill., discussing and demonstrating the production of high quality sherbets; *Lee Minor* of the Technical Service Department of Wyandotte Chemicals Corporation of Wyandotte, Michigan, who will have an exhibit to illustrate his talk on electrolytic corrosion of stainless steel. *Dr. V. H. Nielsen* of Iowa State College, Ames, Iowa, bringing first-hand information on the processing and marketing of fresh milk concentrates introduced in his state, the economics of manufactured milk products plants and other topics; *Dr. Wilford C. Cole* of Arden Farms Co., Los Angeles, California, speaking on stabilizers and emulsifiers in ice cream, pipeline milking, and detergents and sanitizers; *C. A. Abele*, Director of Public Health of the Diversey Corporation, Chicago, Ill.; *G. D. Sperry* of the Technical Department of the Kelco Co., San Diego, California; *P. R. Ellsworth* of the Milk Industry Foundation, Washington, D. C.; *C. B. A. "Bill" Bryant* of Johnson & Johnson Co., Montgomery, Michigan; *R. H. Cronshey*, Challenge Cream and Butter Assn. of Los Angeles, California; and others including the personell of the Department of Dairy Science and the State College of Washington.

Further information may be obtained by writing Dr. H. A. Bendixen, Department of Dairy Science, State College of Washington, Pullman, Washington.

ROCKY MOUNTAIN ASSOCIATION OF MILK AND FOOD SANITARIANS ANNUAL MEETING

Just a brief report regarding our 1954 meeting which was held at the Cosmopolitan Hotel in conjunction with the Western State Dairy Convention on December 7, 1954. This was one of the best meetings that we have had in a long time. Many of the speakers who did their bit for the Western States Dairy Convention agreed to stay over and talk to our affiliate.

Professor A. J. Morris, Utah State College, gave an excellent talk, "Selling A Sanitation Program". Carl Hottenstein, Manager American Dairy, from your own good state of Indiana did a wonderful job too. Dr. W. K. Mosely, Mosely Laboratory, from Indianapolis, Indiana, did an excellent job as he always does in presenting the program "Bacterial Problems — Psychrophilic, Thermoduric, Thermophilic". C. A. Abele, Chairman of IAMFS Sanitary Procedures Committee, Chicago, Illinois, discussed the 3-A Sanitary Standards and their operation". After lunch Mr. William Hickey, Chairman of Food Equipment Standards Committee, I.A.M.F.S., Salt Lake City, Utah, talked on "Food Equipment Standards" and stimulated quite a discussion amongest the sanitarians present.

Peter G. Stevenson
Secretary and Treasurer
Rocky Mountain Association of Milk and Food Sanitarians

HELPFUL INFORMATION

Millipore Filters; a brochure on technical information regarding bacteriological and other analytical procedures. Millipore Filter Corporation, Watertown 72, Mass.

Fluoridation as a Public Health Measure. J. H. Shaw, Editor. 232 pp. American Association for the Advancement of Science, 1515 Massachusetts Ave., N. W. Washington 5, D. C. 1954. $4.00 to A.A.A.S. members, $4.50 non-members.

Bread. The Chemistry and Nutrition of Flour and Bread with introduction to their History and Technology. Lord Horder, Sir Charles Dodds and T. Moran. MacMillan Publishing Co., New York, N. Y. 566 pp. Price $4.50.

Handbook of Pest Control. (2nd edition) Arnold Malleo. MacNair-Dorland Publishing Co., 254 W. 31 St., New York, N. Y. 1954. 1068 pp. Price $9.25.

Food Acceptance Testing Methodology. D. R. Peryam, F. J. Pelgrim and M. S. Peterson, Editors. 115 pp. Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Road, Chicago 9, Ill.

Book — An Introduction to Industrial Mycology. George Smith. 378 pp. St. Marten's Press, Inc., New York, N. Y. 1954. $6.00.

JOURNAL OF MILK AND FOOD TECHNOLOGY
INSTRUCTIONS TO CONTRIBUTORS

Manuscripts.—Manuscripts should be submitted on suitable 8½″ x 11″ paper. The original typewritten copy double or triple spaced with wide margins not less than 1″ on all four sides should be submitted. Tabular material and illustrations should accompany the manuscript; also, each manuscript should be accompanied by (a) a glossy personal photograph of the author, (b) a brief biographical sketch of the author not more than 50 - 75 words, and (c) an abstract of the paper not to exceed 75 words. These will be used at time of publication of the paper. All material should be sent by first class mail in flat form to the Managing Editor, H. L. Thomasson, P. O. Box 437, Shelbyville, Indiana.

Authors should make every effort to present their material accurately and in a clear and concise form. In preparing manuscripts, use of the first person should be avoided. Manuscripts should be proofread carefully before they are submitted. Each manuscript will be reviewed by one or more Associate Editors. Anonymity of reviewers will be preserved.

Manuscripts reporting the results of experimental work, generally, should be divided into sections, for example: Introduction; Experimental; Results; Discussion; Summary and Conclusions; References.

Figures, Tables and Photographs. — Tables should be clear and concise. Excessively large tables, as well as those consisting of only one or two lines, should be avoided if possible. Headings should be brief but fully descriptive. Avoid presenting the same data in a table and again in a figure. Place each table or figure on a separate sheet—not in the body of the manuscript.

Figures consisting of drawings, diagrams, charts and similar material should be done in India ink on 8½″ x 11″ tracing paper or cloth. A lettering guide should be used for all written material on figures. Submit original figures rather than photographs of such figures.

Photographs should be glossy prints free of imperfections.

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References. — References should be double spaced and arranged alphabetically as to authors. References to papers by a single author should preceed references to papers by the same author and associates. References to papers by multiple authors should be listed in the alphabetical order of the several authors. Initials rather than the full first names of male authors should be given. Reference citations in the text should be made by a number in parentheses, corresponding to that number in the reference list.

Sample of journal citation: (1) Mallmann, W. L. Sanitation in Bulk Food Vending. J. Milk and Food Technol., *16*: 267-269. 1953.

Sample of Book citation: Adams, H. S. *Milk and Food Sanitation Practice.* The Commonwealth Fund. New York, New York. 1947.

Sample of Experiment Station publication citation: Watrous, G. H., Doan, F. J. and Josephson, D. V. Some Bacteriological Studies on Refrigerated Milk and Cream. Penn. Agr. Exp. Sta. Bull. 551. 1952.

Publications should be abbreviated according to the form given in CHEMICAL ABSTRACTS, vol. 45. no. 24, part 2. 1951.

Abbreviations.—Common abbreviations to be used in the text are: cm., centimeter(s); cc., cubic centimeter(s); C., Centigrade; F., Fahrenheit; g., gram(s); log., logarithm; lb., pound(s); μ, micron(s); μg., microgram(s); mg., milligram(s); ml., milliliter(s); oz., ounce(s); sp. gr., specific gravity.

News items and announcements. — Items of general interest should be submitted in the same manner as indicated for manuscripts. An informal writing style is preferred. News of the activities of affiliate associations, members and events is particularly desirable.

Letters to the Editor.—Letters to the editor are encouraged. Letters should be addressed to the Managing Editor and must be signed by the writer. Excessively long letters should be avoided due to Journal space limitations.

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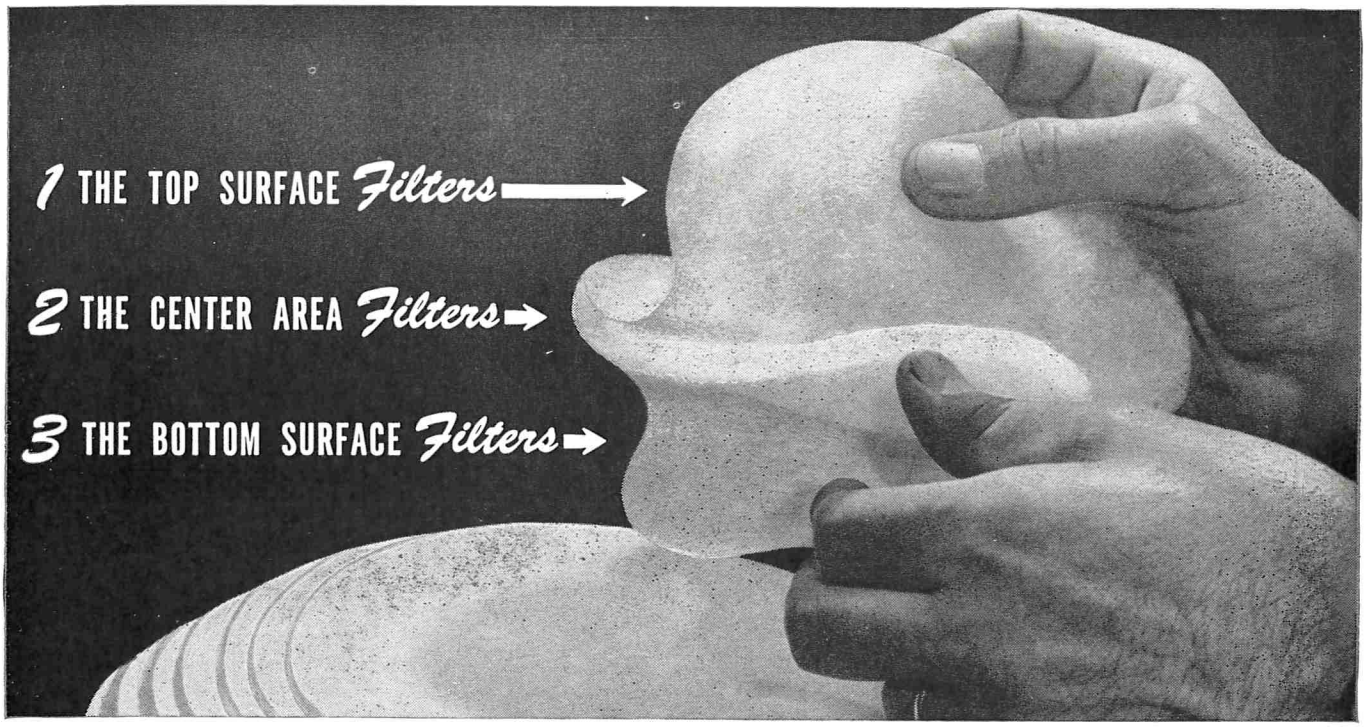

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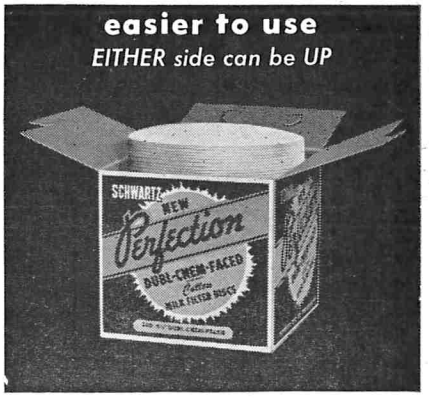

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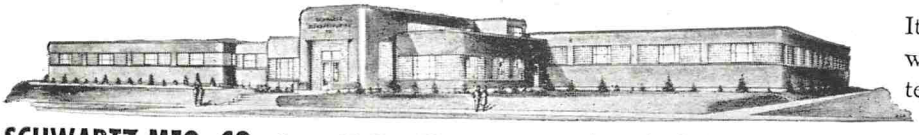

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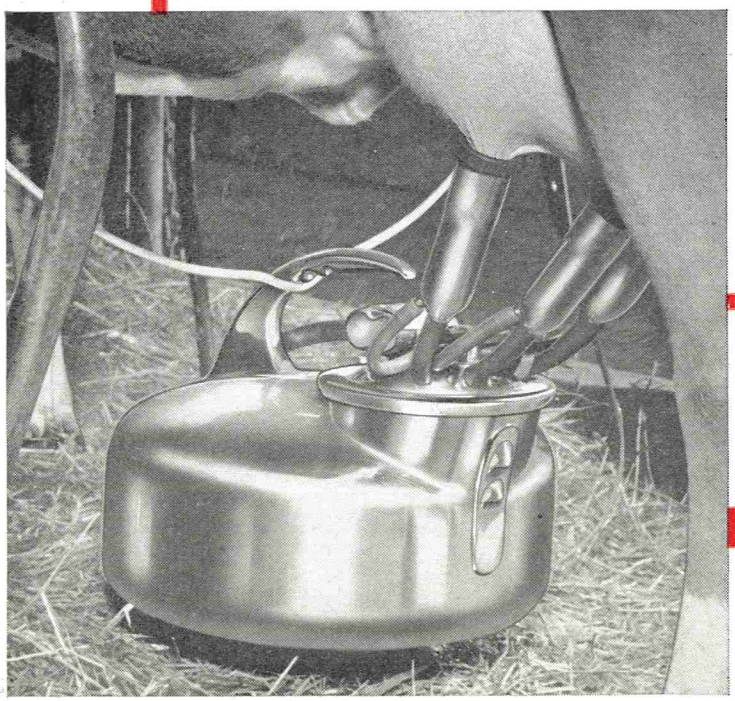

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