JOURNAL
of
MILK TECHNOLOGY

Volume 6 May–June, 1943 Number 3

Editorials

The opinions and ideas expressed in papers and editorials are those of the respective authors. The expressions of the Association are completely recorded in its transactions.

Milk Inspection in the Army

In our last two issues, we discussed editorially the anomalous position of milk sanitarians in the inspection of milk supplies for our military establishment. We called attention to the fact that milk inspection is a duty of the Veterinary Corps, and that commissions in this organization are restricted to graduates of veterinary medicine. Experienced milk control officials (who are not veterinarians) are finding that there is no place for them in this work—unless they enlist as privates (and maybe they might be assigned to this work under a veterinary officer if there should develop a need for them). So, they are entering the Army and Navy and engaging in all sorts of military service except that for which they have received years of special training.

In this connection it is well known that most milk control men of officer material are experienced in broader aspects of food inspection than just milk. They are usually employed in the food division or some related branch of environmental hygiene. Hence, this training covers the supervision of all foods, both of animal origin as well as all others, together with rodent control, swimming pool sanitation, supervision of water supplies, and always applied sanitation. Formal courses for ther training have been established at many colleges and universities, and graduate degrees are offered.

In contrast, the training of veterinarians does not in any adequate manner qualify them to administer a milk sanitation program. An examination of the curricula of eight of the leading schools of veterinary medicine shows that only one (Cornell) offers as much as 7 credits. The others range from 1⅓ to 6 hour-credits. There seems to be general agreement that it is not practicable to incorporate in the veterinary curriculum the sort of material which would qualify the graduates as milk sanitarians.

The same limitations hold for the medical curriculum. A nationally known member of a great State Board of Medical Examiners emphatically asserts that a medical college graduate, without special postgraduate training, is not qualified as a milk sanitarian.

Army regulations stipulate that all foods of animal origin must be inspected by the Veterinary Corps. Whatever may have been the situation that originally called for this provision, the need no longer exists. Insofar as meat is concerned, all Army orders require that only Federal-inspected and stamped meat may be used. This in itself is adequate protection from the standpoint of the original

quality of the supply. Spoilage since dressing can be determined by any trained food official whether he is a veterinarian or not.

We have already pointed out the specific qualifications of a trained milk sanitarian to supervise a milk supply—and there is no other professional group who can compare with him in this respect. He likewise must usually cover all other foods.

In practical supervisory work, the Veterinary Corps relies on the functions of the local civilian health or milk control organizations. Where such local supervision is adequate, the Army Medical Department limits its work to periodic check inspections and routine laboratory examinations. Where such satisfactory local conditions do not obtain, it becomes necessary for the Department to take further action. It then relies on the ability of its regular veterinary officers to correct the situation or it has recourse to highly specialized personnel in the Sanitary Corps.

The Veterinary Corps and the Sanitary Corps both are organizations in the Army Medical Department, as are also the Medical and Dental Corps. The ranking officer in the Veterinary Corps is a Colonel. The Sanitary Corps has no such senior officer. It has chiefs of the various specialties in the Corps, such as sanitary engineering, nutrition, and laboratory work.

Commissions in the Sanitary Corps are open to non-medical graduates who are well qualified in such fields as bacteriology, biological chemistry, sanitary engineering, entomology, and related fields. Officers in the Sanitary Corps are trained in general sanitary work as well as in special duties for which they are uniquely qualified to handle.

The suggestion has been made (Bulmer and others) that all food inspection in the Army be supervised by the Sanitary Corps. This organization already includes food and nutrition specialists. It covers sanitation along the lines practiced by most food officials. Its commissions are available to non-medical men. It already is set up to handle the most involved kind of milk control. Inasmuch as veterinary officers are specifically charged to inspect only foods of animal origin, and are not trained to handle the really difficult jobs of food control, it seems obvious that the transfer of all food inspections to the Sanitary Corps would be desirable. This would centralize authority, place responsibility, and unify food control.

Such a transfer in times of war is not to be suddenly and drastically effected without possible jeopardy. It constitutes an administrative procedure that would require real executive ability. Surely our Medical Department has this degree of excellence. Now is the time to do this before our military establishment becomes any larger, with increasing obstacles. In so doing, the Army will bring itself up to date in matters of food supervision, and do a job that is administratively sound.

J. H. S.

A New Angle on Milk Inspection

IT IS common knowledge that most of the milk-borne outbreaks occur in small towns, particularly those where large percentages of the milk is either not pasteurized at all or is put through a process called pasteurization but it does not comply with all of the standards of correct pasteurizing practice. One of the answers to this problem has been the development of small pasteurizing units.

Our aggressive contemporary, JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION*, points out a possibly new difficulty to the effective enforcement in small towns of provisions for the production and handling of safe milk. The editorial writer states: "Connoisseurs of milk inspection from *alpha* to *omega* insist that their art requires (1) an engineer, (2) a physician, (3) an executive, and (4) a veterinarian (thanks), and they emphasize that none of these is competent to do the work of the other." He holds that if this is literally true, the small town hasn't a ghost of a show to provide for its citizens safe milk. The cost of maintaining these experts throws the budget out of balance and absolutely kills the idea of getting any safe milk program into operation. (The writer does hold that large cities belong to a separate category.)

We can readily sympathize with the editorial writer's thought that the perusal of a milk ordinance of many pages and a multiplicity of detailed specifications will appall the average local health officer or the influential local veterinarian. The legislators (whatever they may be called locally) naturally would consult with their leading "experts" in the town. Who else would they turn to than their health officer or their prominent physician or their best known veterinarian? We can imagine the kind of advice that would be given: "Too complicated and too expensive." And so nothing is done.

Again, coming back to the quoted editorial, he points out three desirable lines of action: (1) educating the people as to the need, (2) employing the local veterinarian on a part-time basis to instruct the farmer in sanitary milk production as financially beneficial to the producer himself and (3) framing regulations "which can be enforced by a reasonable amount of checking and supervising without throwing the town budget out of balance."

We have frequently pointed out the inability of the measures of the more recent sanitary milk enactments either to cause an increased milk consumption or to decrease the milk-borne sickness. The per capita consumption of milk has remained almost static for the last twenty years or more and the compilation of the milk-borne outbreaks, published each year by the Sanitary Section of the U. S. Public Health Service shows that the number of milk-borne outbreaks is holding its own to say the least (averaging about 42 per year). A study of these reports shows that the milk is either not pasteurized or is pasteurized in such an obviously faulty manner that any intelligent professional man, whether veterinarian, physician, engineer, or "practical" inspector could spot it in a minute—leaky valves, wide-open lines, low temperatures, mixing of raw and pasteurized milk, etc.

For a small plant of the size that serves a country town, the technology involved is not so complicated but what some reasonably well-trained inspector could supervise the entire milk supply reasonably well. The case is different with regard to the milk supply of a large city or the plants that would be necessary to supply a large military reservation. The latter requires a technically trained man who knows his way around in a large plant and who knows how to track down faulty production on a few farms out of hundreds.

And again we say: Gadgets at the expense of the public health.

J. H. S.

* Editorial, AVMA, April, 1943, p. 310.

Supplementary Report on Botulism in Canned Foods

IN the summary and discussion of the report of the U. S. Public Health Service on food-borne disease outbreaks in 1941,* we pointed out the unusual circumstance of two of these being attributed to commercially canned products. We now report on these at greater length.

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canned by a commercially packed product. The case is reported in detail by J. C. Geiger in the *Journal of the American Medical Association, 117,* 22 (1941). The organism (rare *Cl. botulinum* type E) was isolated from the gastric washings of the patients and also from the few shreds of food, mixed with garbage, adhering to the discarded can. The plant involved produced a full record of the pack, complying with accepted practices. Three persons who consumed some of the contents of the same can were not affected whereas three were made ill and one died.

In the case of the outbreak attributed to commercially canned corn, the only incriminating evidence is the fact that of five persons who participated in the meal, two who did not eat the corn suffered no ill effects whereas three persons who did eat the corn became ill within an hour. The pack was not coded, there was none of the food available for examination, and there was no evidence as to how the product was prepared, how it was cooked, nor what other foods were eaten at the same meal. This was not a botulism outbreak.

J. H. S.

We Can Help

THE inevitable wear and tear on dairy processing equipment, together with the conversion of about ninety percent of the facilities of dairy equipment manufacturers to war production more than a year ago, is now beginning to make us feel the pinch of finding replacements for worn-out equipment. The Food Distribution Administration believes that there is a large amount of idle dairy processing equipment that could be used by those who are unable to secure replacements. The Dairy Industries Supply Association, Inc., has been requested to organize a "Used Equipment Canvass and Clearing House."

There is no idea of endeavoring to salvage junk. Only existing serviceable or reconditionable used equipment is wanted. The DISA will distribute standard report forms, an 8½" x 11" sheet, requiring a very simple range of information to be entered. These forms will be held at the DISA offices, Albee Building, 1426 G Street, N.W., Washington, D. C. Copies are obtainable on request.

Comprehensive files of "Needs" as well as "Availables" will be maintained. The clearing house staff sends to the would-be buyer the name of the owner and also the equipment manufacturer or distributor whose representative has examined the machine. The DISA does not enter directly into the transaction.

It is hoped that the report forms will be given wide distribution. Milk sanitarians could lend their good offices to expedite this voluntary and patriotic undertaking of the DISA. Of course, no inspector would divulge to anyone what idle equipment there may be lying around. However he could very well bring the merit of the canvass to the dairy products processers themselves and then leave the matter in their hands. And of course, the possible installation of used equipment, however well sponsored and pedigreed, will require particularly close inspection to maintain milk products at safe levels of health value.

J. H. S.

* Editorial. This JOURNAL, 6, 68 (1943).

Irregularities in the Agar Plate Counts of Pasteurized Market Milk

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FOR a period of one year during 1937 and 1938, seven selected laboratories plated routine market milk samples on the old standard agar, A.A.M.M.C. agar and T-G-E-M agar. (1) A study of the resulting counts led to the adoption of the T-G-E-M agar as standard for milk control work. The Bacteriological and Serological Laboratories of the Louisville and Jefferson County Health Department cooperated in this study and compiled counts during the one year period of the study. The results of this study showed that there was a marked increase in counts on the T-G-E-M agar over the old standard agar when plated from the same sample. This increase in count was not regular but in general varied inversely with the magnitude of the count. In our laboratory no wide variations were noted in the counts made on samples from known low-count pasteurized supplies and on Certified milk, which represented only a small part of our daily receipt of samples.

Following the adoption of the T-G-E-M agar as standard for milk control work, we plated milk control samples, from the same dilution bottle, on both the old standard agar and the T-G-E-M agar. These plates were incubated at 37° C. and were counted after 48 hours of incubation. The counts were compiled over a period of one year, and included all routine pasteurized milk, cream and chocolate-milk samples, the material studied differing in this respect from that of the earlier study. No counts were included in the study when the phosphatase test showed incomplete pasteurization. In the latter study some unusual differences in the counts of the two agars were noted. In some instances counts from properly pasteurized market milk were in the hundred-thousands and millions on T-G-E-M agar, while the counts on the old standard agar from the same sample were in the hundreds. The most extreme discrepancy noted in counts on the two agars was 1100 on the old standard agar and 2,800,000 on the T-G-E-M agar. Although these extreme differences were not numerous, there were many split-sample counts falling in the range of low-thousand counts on the old standard agar, and hundred-thousand counts on the T-G-E-M agar. T-G-E-M plates from Grade "A" market-milk samples were chosen when the counts were greatly at variance with the old standard agar counts.

The colonies on the T-G-E-M agar were as a rule much larger than the so-called "pin point" colonies. Many of the thermoduric organisms produced colonies on the T-G-E-M agar measuring several millimeters in diameter. Some of them produced colonies much larger, while on the old standard agar plates from the same sample the colonies were of "pin point" variety, and in some instances hardly visible. This irregularity of colony size made it difficult tentatively to classify the organisms as thermoduric on the T-G-E-M agar. Generally the finding of "pin point" colonies on the old standard agar had indicated thermoduric organ-

isms. As these extremely high counts are used in grading market milk their importance to the milk distributor is evident.

There was a definite increase in the counts on T-G-E-M agar over those on the old standard agar when plated from the same sample. The T-G-E-M agar increased between five and ten times the counts obtained on the old standard agar of 116 of the 1888 samples studied and an increase of over ten times was obtained on the T-G-E-M agar over the old standard agar from 112 of the 1888 samples. Thus it can be seen that nearly 20 percent of the samples studied had count increases on the T-G-E-M agar of more than five times those obtained on the old standard agar.

Table 1 shows instances in which the T-G-E-M agar increased the old standard agar counts beyond the 30,000 grading limit. That less than 10 percent of the counts on T-G-E-M agar were over the 30,000 grading limit was in all probability due to the fact that 62 percent of the T-G-E-M agar counts that were 10 or more times as high as the counts on the old standard agar, and 51 percent of the T-G-E-M agar counts that were between 5 and 10 times as high as the old standard agar, were from samples showing counts below 1000 on the old standard agar. Less than 3 percent of all samples had higher counts on the old standard agar than on the T-G-E-M agar, and in the majority of these counts there was only a small numerical difference between the counts of the two agars. However, in over 50 percent of the samples, the material increase in the T-G-E-M agar counts over the old standard counts contributed to degrading average counts for many of the milk distributors.

A morphological study of the organisms growing in apparently pure cultures on 228 plates was made by inoculating sterile milk tubes with colonies, incubating 24 hours at 37° C. and pasteurizing these milk cultures in the laboratory at 143° F. (61.7° C.) for 35 minutes. A classification of the organisms so obtained is given in Table 2. The percentage of rods and of streptococci is much greater than in similar studies by other authors. Of the 228 cultures 5 grew between temperatures of 50° C. and 55° C. All of these were streptococci.

The increase in counts of retail milk samples that had been handled in the same manner as milk that had previously given much lower counts stimulated, in the milk plant personnel, a "count consciousness" that carried on back to the producer.

Routine inspection revealed that in most cases the milk producer was guilty of supplying the milk plant with the thermoduric organisms. This was confirmed by pasteurizing in the laboratory at 143° F. (61.7° C.) for 35 minutes and planting on T-G-E-M agar all samples of Grade "B" milk supplied to the pasteurization plants. The result of this work showed that many of the Grade "B" milk supplies were contaminated with thermoduric organisms and that the flora varied somewhat from that isolated from the Grade "A" pasteurized market milk. The morphological classification of the organisms isolated from 186 T-G-E-M agar plates of Grade "B" raw milk samples which were pasteurized in the laboratory at 143° F. (61.7° C.) for 35 minutes is given in Table 3.

Inspection of equipment and method of production of Grade "B" raw milk producers revealed the most evident contributing causes of the high thermoduric counts to be:

1. Open seams in cans and pails.
2. Failure to clean milking machines.
3. Incomplete chlorination.

The Grade "B" raw milk producers have cooperated by repairing or replacing equipment, and changing production methods. This is evident as is shown by the fact that over 70 percent of the T-G-E-M high count irregularities were encountered during the first six months of the study and that a gradual decrease in high thermoduric counts has been experienced.

Because of reoccurrences of high thermoduric counts in Grade "A" market milk the task of routine pasteurization in the laboratory and plating of all Grade "B" raw supplies has aided materially in lowering the incidence of thermoduric organisms in the retail milk supplies from about 10 percent less than 1 percent.

TABLE 1

INSTANCES IN WHICH THE T-G-E-M AGAR INCREASED THE OLD STANDARD AGAR COUNTS BEYOND THE 30,000 GRADING LIMIT

Range on Old Standard Agar	*No. of Counts*	*Counts Over Limit (30,000) on T-G-E-M Agar*	
		No.	*Percent*
Under 5000	1473	46	3.1
5100–10,000	84	16	19
11,000–25,000	126	42	33.3
26,000–30,000	62	9	14.5
Totals	1745	113	6.5

TABLE 2

MORPHOLOGY OF BACTERIA FROM T-G-E-M AGAR PLATES OF GRADE "A" MARKET MILK SURVIVING LABORATORY PASTEURIZATION AT 143° F. FOR 35 MINUTES

Morphology	*No. of Cultures*	*Percent fo Cultures*
Micrococci	91	40
Streptococci	82	36
Rods	55	24
Totals	228	100

TABLE 3

MORPHOLOGY OF BACTERIA FROM T-G-E-M AGAR PLATES OF GRADE "B" RAW MILK PASTEURIZED IN THE LABORATORY AT 143° F. FOR 35 MINUTES

Morphology	*No. of Cultures*	*Percent fo Cultures*
Micrococci	108	58
Streptococci	54	29
Rods	24	13
Totals	186	100

REFERENCE

1. Abele, C. A. Results of Bacterial Plate Counts of Milk on Three Media and at Two Temperatures of Incubation. Amer. J. Pub. Health, 8, 821–845 (1939).

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NEW BUTTER STANDARDS

Revised U. S. Standards for grades of butter have been promulgated by the Secretary of Agriculture, effective February 1, 1943. In general, they omitted U. S. 91 score, provision being made for elevation of top grades 91 score butter to the 92 score level. Straight or short 91's are scored 90. Letters are used instead of numerical designations, for example, AA for U.S. 93 score, A for U.S. 92 score, B for U.S. 90 score, C for U.S. 89 score, and CG "cooking grade" for butter below U.S. 89 score. The new grades can be obtained from the U. S. Department of Agriculture, Food Distribution Administration, Washington, D. C.

The Minnesota Babcock Method Applied to Concentrated Milk, Chocolate Milk, and Ice Cream*

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The Minnesota Babcock Method (1) is known to have the advantage of yielding clear fat columns from concentrated milks and plain ice cream. In addition the procedure is relatively simple, and test-bottle washing in connection with the method can be done easily. It was believed that these advantages made it desirable to investigate the accuracy of the results yielded by the method.

Lucas (2) reported a comparison of the Minnesota Method with the Mojonnier for 50 samples of ice cream for which results by the Minnesota method were found to average 0.512 percent too high. Martin (3) has reported an average variation from the Mojonnier of +0.39 percent for 70 samples of ice cream. Others who have had experience with the Minnesota Method have reported that it yields high results.

Experimental

No definite plan of procedure for this work could be outlined in advance, but rather a trial and error procedure was followed. In all cases the ether extraction method was used as a standard of comparison. The ether extraction method used was a combination of the Mojonnier and Roese-Gottlieb, which made use of as much of the Mojonnier equipment as was available in this laboratory. That this procedure is as accurate as the Mojonnier method is attested by the fact that in check-testing identical samples against results obtained with the regular Mojonnier method at three other experiment stations, the values obtained always were in close agreement. In this paper the method described will be referred to as the gravimetric.

The majority of the results herein reported were obtained in testing ice cream, as this product was more readily available than concentrated milks. However, some results with evaporated and with sweetened condensed milks were obtained as well as a few with chocolate milk.

Effect of Water-Bath Temperatures

Recognizing that the Minnesota Babcock test results tend to be too high, the originators of the method have suggested a water-bath temperature of 120° F. (48.9° C.) for tempering the fat columns before reading. A study of the effect of reducing the water-bath temperature from 135° F. to 120° F. (57.2° C. to 48.9° C.) was conducted. Tests read without the use of reading fluid, from a bath at 135° F. (57.2° C.) were transferred immediately to a bath at 120° F. (48.9° C.) and reread after being allowed to remain there for at least 5 minutes. The results, recorded in Table 1, show an average reduction of 0.061 percent in the reading due to lowering the water-bath temperature.

Accuracy of Results with Original and Second Reagents

At the time this work was started, the Minnesota reagent used was prepared as originally directed by Peterson and Herreid (1). Comparisons with the gravimetric results were made for 21 samples of ice cream. The Minnesota Babcock test procedure originally recommended for buttermilk was followed except that the amount of reagent was increased from 10 to 15 ml., and 9-gram samples were weighed into 20 percent ice cream test bottles (Nafis, No. 6920). Before the work on these samples had been completed it was learned that the composition of Minnesota reagent being sold had been changed.

TABLE 1

Reduction in Minnesota Babcock Results Caused by Changing the Tempering Bath Temperature from 135° F. to 120° F.

Reduction in reading	*Number of readings*
None	18
0.05	2
0.1	9
0.15	1
0.20	5
Total number of tests	35
Average reduction	0.061%

A quantity of the second reagent, already prepared, was obtained and used for samples 12 to 21, inclusive, the other samples having been discarded previous to purchasing the second reagent.

Comparisons of Minnesota Babcock results with the gravimetric results, using both the original and the second reagents, are shown in Figure 1. It is evident that the original reagent gave results that were far too high for all samples with the exception of the chocolate-flavored ones. The chocolate ice creams were not readily digested by the reagent, and undigested masses of solids usually rose with the fat into the necks of the test bottles. The second reagent yielded more accurate results than the original for samples 12 to 21, inclusive. Nevertheless the results obtained with the second reagent were not accurate enough to be satisfactory.

The Third Minnesota Babcock Reagent

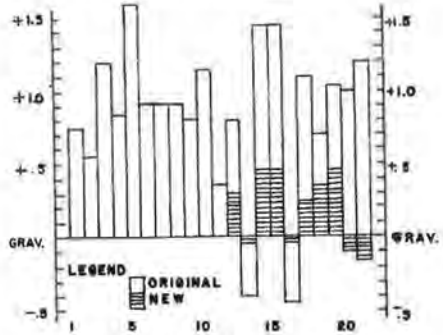
The composition of the Minnesota reagent was changed a second time and the resulting reagent is the one now being sold. For clarity it will be designated as the third Minnesota reagent. A quantity of this reagent, herein designated as the third reagent, was purchased from the licensed manufacturer and tried. The procedure recommended for its use in testing ice cream was as follows:

> Weigh 9 grams of ice cream mix or melted ice cream into a 20 percent ice cream test bottle. Add 15 ml. of reagent and shake thoroughly. Digest 10 to 15 minutes in a water bath at a temperature of 180° F. or higher, shaking the bottle once or twice during the digestion period. Centrifuge one-half minute, fill with hot water to float the fat into the graduated neck of the bottle. Place the test in a water bath at 120° to 130° F. After 4 minutes read the results without the use of reading fluid.

A number of samples of ice cream, evaporated milk, and sweetened condensed milk were tested as directed by this procedure. It was found that repeated tests of individual samples failed to give consistent results. Some results were in close agreement with

FIGURE 1

VARIATIATIONS OF MINNESOTA BABCOCK METHOD RESULTS FROM GRAVIMETRIC USING BOTH ORIGINAL AND SECOND REAGENTS



NOTE: SAMPLES 13 AND 16 WERE CHOCOLATE

NEW REAGENT USED ONLY FOR SAMPLES 12 TO 21 INCLUSIVE.

* Published with the approval of the Director of the West Virginia Agricultural Experiment Station as *Scientific Paper No. 301.*

† Department of Dairy Husbandry.

‡ Deceased February 29, 1940.

gravimetric results whereas others for the same sample were much too high.

It was observed that the butterfat columns almost invariably exhibited long upper and lower menisci. Undoubtedly the inclusion of these menisci in the reading accounts in part for the high results so often obtained. However, careful measurement of these menisci in a number of the butterfat columns and the calculation of the non-fat volume included when reading the extremes of the menisci showed that the resulting error is not great enough to account for all of the variations observed.

It was observed also that when samples were digested at or near boiling a bubbling occurred at the surface of the liquid in the test bottle. That this is the result of the boiling of the alcohol contained in the reagent was indicated by the lack of bubbling in tests digested with reagent from which the alcohol was omitted. The possibility that high results occur because of the solution of alcohol in the butterfat, and that the lower results sometimes obtained, especially when digestion is carried out at or near boiling, occur because the alcohol boils off from the fat layer, proved unfounded when fats removed from the upper parts of the fat columns failed to show loss in weight after drying for several hours in a vacuum oven at 100° C.

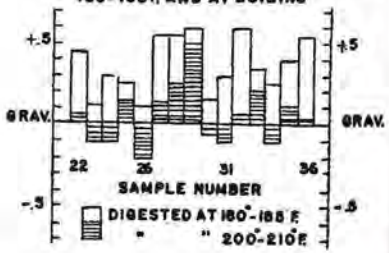
These findings indicate that the high results sometimes obtained are caused probably by the inclusion of some substance with the butterfat. It is doubtful that this substance is lecithin, first, because the work of Peterson and Herried showed that the addition of lecithin did not cause an increase in the reading in the case of the original reagent, and second, because variations in percentage readings for single samples were considerably greater than the expected lecithin content of the samples tested. What substance, if any, contaminates the butterfat liberated by the use of the Minnesota Babcock reagent and procedure was not determined.

As very accurate results were obtained frequently when using the third Minnesota reagent it seemed likely that a careful study of the effects of variations in procedure might indicate a method that would give accurate results consistently. Accordingly a study of the effects of variations in procedure, mostly within the limits of that recommended by Peterson and Herreid, were tried.

The effect of digestion temperature. Largely because of the previously mentioned observation that some alcohol boils off when the tests are digested in a boiling water bath, the effects were studied of digesting the tests at two different temperature ranges. The lower range was 180° to 185° F. (82.2° to 85.0° C.) and the higher range 200° to 210° F. (93.3° to 98.9° C.). The results, given in Figure 2, show that tests digested at the higher temperature yielded more accurate results as a group than those digested at the lower temperature, but were too variable to be very reliable. A consideration of these facts suggests that other factors not controlled in this study of the effect of temperature must account for these variations.

The effect of shaking during digestion. The directions furnished with the third Minnesota Babcock reagent when the work was being done were not specific, requiring that the tests be shaken once or twice during digestion. This raised a question as to whether

FIGURE 2
VARIATIONS OF MINNESOTA BABCOCK RESULTS FROM GRAVIMETRIC WHEN DIGESTED AT 180°-185° F. AND AT BOILING

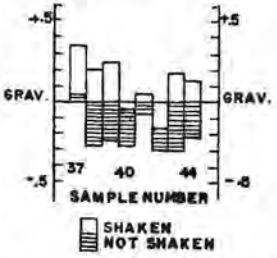


shaking should be done once or more and whether the tests should be subjected to gentle or vigorous shaking. In studying this question eight samples of ice cream mix were tested following the recommended procedure except that in one series the bottles were shaken vigorously at frequent intervals during digestion, whereas in a second series the tests were not shaken during digestion.

The results of this trial are shown in Figure 3. It is evident from these data that frequent, vigorous shaking of the tests during digestion caused a noticeable increase in the percent of fat found. The shaken tests tended to yield results that are too high, whereas the non-shaken samples tended to yield results that were too low.

Further experiments showed that shaking vigorously once during digestion in a boiling water bath gave the same results as did frequent vigorous shaking, if the single shaking was done 2½ to 5 minutes after the beginning of digestion, but that considerably lower readings occurred when the shaking was delayed until about 10 minutes after the beginning of digestion. Also it was found that gentle shaking caused lower results than were obtained when the tests were shaken vigorously.

FIGURE 3
THE EFFECT OF SHAKING DURING DIGESTION ON THE MINNESOTA BABCOCK TEST



Saponification. As the Minnesota reagent is alkaline, containing sodium hydroxide, it is important to know whether or not saponification of the butterfat may be a factor in causing variable results. In order to study this as well as some other points, ice cream mix samples Nos. 45 to 50, inclusive, which varied in butterfat content from 15.71 to 3.86 percent, were tested using boiling water as a digesting bath. Variations in digestion time of from 10 to 30 minutes were made and both gentle and vigorous shaking were employed. Also, in order to determine the effect of the use of colored reading fluid on the fat test readings in 20 percent ice cream test bottles, the tests from the vigorously shaken lot were returned to the water bath immediately after reading and after remaining in the bath (135° F. or 57.2° C.) for 3 to 5 minutes longer, reading fluid was added and the tests reread, care being taken to add the fluid just before the reading of each test.

The results of this trial are recorded in Table 2 in terms of the variations of the readings of the several Minnesota tests from the gravimetric results. Digestion periods of 20 minutes or longer tended to give results that became progressively lower as the time in the digestion bath increased. It would seem that this result may be attributed fairly to saponification. The reduction in reading due to 15 minutes digestion as compared to that due to 10 minutes is not great and would not seem to be a factor seriously affecting the accuracy of the results. Observations of the digestion of the tests at the temperature of boiling water indicate that at least 10 minutes are required to carry digestion sufficiently far. Accordingly a digestion period of 10 to 15 minutes is to be recommended.

Effect of reading fluid. A comparison of results for series 2 with those of series 3 in Table 2 reveals the reduction in reading caused by the use of colored reading fluid. The amount of this reduction is shown in Table 3 in the form of a frequency distribution.

TABLE 2

VARIATIONS OF MINNESOTA BABCOCK FROM GRAVIMETRIC RESULTS WHEN SEVERAL VARIATIONS OF THE MINNESOTA PROCEDURE WERE USED

Shaking procedure used	*Time digested in boiling bath*	*Variations from Gravimetric in Percent Fat* 45	46	47	48	49	50	*Extreme of variations*	*Average variation*
Series 1:	10 Min.	+.05	—.1	+.04	+.13	+.29	+.04	—.1 to +.29	+.075
Shaken gently	15 "	+.05	+.1	—.01	+.03	—.06	—.06	—.06 " +.05	+.008
No reading	20 "	—.05	—.15	+.04	+.03	—.06	—.21	—.21 " +.03	—.066
fluid used	25 "	—.15	—.25	—.21	—.12	—.11	—.26	—.26 " —.12	—.20
	30 "	—.15	—.30	—.21	—.27	—.16	—.26	—.30 " —.15	—.225
Series 2:	10 "	+.40	+.30	+.39	+.48	+.49	+.29	+.29 " +.49	+.391
Shaken vigor-	15 "	+.45	+.30	+.39	boiled out	+.44	+.34	+.30 " +.45	+.38
ously	20 "	+.30	+.30	+.34	" "	+.34	+.34	+.30 " +.34	+.324
No reading	25 "	+.20	+.10	+.29	+.38	+.29	+.34	+.10 " +.38	+.266
fluid used	30 "	+.05	—.10	+.19	+.43	+.29	+.39	—.10 " +.39	+.208
Series 3:	10 "	+.05	—.05	+.04	+.03	+.09	—.11	—.11 " +.09	+.008
Tests of series	15 "	+.05	—.10	—.01	boiled out	+.09	—.06	—.10 " +.23	+.033
2 reread using	20 "	—.15	—.15	—.11	" "	—.01	—.06	—.15 " —.01	—.096
colored read-	25 "	—.20	—.25	—.21	+.03	—.11	—.01	—.25 " —.01	—.125
ing fluid	30 "	—.35	—.50	—.36	+.03	—.11	+.04	—.50 " —.03	—.208

Reductions in 93 percent of the cases were within the limits of 0.35 to 0.45 percent. This reduction is sufficient to cause all of the tests that were shaken vigorously during digestion, and consequently gave high results when read without the use of reading fluid, to yield readings that did not vary more than 0.1 percent from the results shown by the gravimetric methods.

TABLE 3

THE REDUCTION IN FAT PERCENTAGE READINGS CAUSED BY THE USE OF COLORED READING FLUID ON MINNESOTA TESTS OF ICE CREAM MIX IN 20% ICE CREAM TEST BOTTLES

Reduction in reading	*Number of readings*
0.30 to 0.37%	11
0.38 " 0.42%	11
0.43 " 0.47%	4
0.53 " 0.57%	2
Average Reduction	0.398

SELECTION OF PROCEDURE

The foregoing results show that the Minnesota Babcock method may yield widely varying results for the same sample of ice cream or ice cream mix if the procedure is varied. If the tests are shaken vigorously once or twice or more during the early stages of digestion, especially during the period from 2½ to 5 minutes after starting digestion, fat percentage readings usually will be 0.35 to 0.4 percent higher than if shaking is gentle or if the samples are shaken vigorously only once 10 minutes after digestion. As it is difficult to interpret directions requiring gentle shaking it seems best to require vigorous shaking and compensate the higher results by the use of reading fluid at the time of reading.

A digestion bath temperature of 180° F. (82.2° C.) causes results that are appreciably higher than those caused by a boiling bath. As, under ordinary conditions, a boiling temperature can be maintained more readily than a lower one, it seems best to use the boiling temperature. When the digesting bath is heated by flame or electric hot plate it is desirable to use a false bottom in the bath in order to keep the test bottles off the bottom and prevent the direct transfer of heat from the heating unit to the test bottles, in which case higher temperatures might prevail in the liquid within the bottles than in the water bath.

RECOMMENDED PROCEDURE

In view of these considerations it seems best to recommend the following procedure for ice cream mix and condensed milk products.

Weigh 9 grams of prepared sample each into two 20 percent ice cream test bottles. Add 15 ml. of Minnesota reagent. Shake thoroughly. Digest 12 to 15 minutes in a gently boiling water bath, having the bottles in a rack held at least 2 inches above the bottom of the bath. Shake the tests vigorously at the time when at least half the contents of the bottle have turned dark brown (usually about 2½ minutes after placing them in the water bath). Shake vigorously again about 1 minute later. (Note: Some care may be necessary when starting to shake the bottles the second time as the alcohol in the reagent may boil off through the neck of the bottle taking with it some of the mixture.) Place the tests in a centrifuge and centrifuge them for one-half minute at the speed used for the regular Babcock test. Add hot water (130°–140° F. or 54.4°–60.0° C.) to float the butterfat well up into the neck of the test bottle. Centrifuge for one-half minute. Place the tests in a water bath at 133°–137° F. or 56°–58° C. and leave for 5 minutes. Just before reading each test allow colored reading fluid (such as glymol) to flow gently onto the surface of the fat column. Hold the bottles in a level position and read as one would read a Babcock cream test. To secure accurate readings apply divider points to the smooth side of the bottle neck. When adjusting the lower point of the dividers keep the eye on a level with that point and when adjusting the upper point raise the eye accordingly. Average the duplicate determinations.

Results obtained by this method for seven samples of ice cream and one each of evaporated and condensed milk are shown in Table 4.

The Minnesota Method has failed consistently to give satisfactory results either with chocolate milk or chocolate ice cream. Because the results with chocolate-flavored products were entirely unsatisfactory, they have not been tabulated in this paper.

TABLE 4

RESULTS OBTAINED WITH ICE CREAM MIX, EVAPORATED MILK, AND SWEETENED CONDENSED MILK USING THE REVISED MINNESOTA METHOD

Sample number	*Product tested*	*Percent butterfat found* Gravimetric method	Minnesota method
46	Ice cream mix	11.30	11.3
47	" " "	15.71	15.7
48	" " "	11.57	11.65
49	" " "	9.91	9.82
50	" " "	3.86	3.75
51	" " "	11.82	11.73*
52	" " "	13.06	13.0
53	" " "	14.53	14.5
54	" " "	14.65	14.6
55	" " "	14.51	14.4
56	Evaporated milk	7.93	7.86*
57	" "	7.83	7.8
58	Sweetened condensed milk	8.87	8.8
59	" " "	8.83	8.8*

* Average of three determinations. Other results are averages of two determinations.

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Checking Commercial High-Temperature Short-Time Pasteurization Installations *

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There are three questions that must be satisfactorily answered regarding high-temperature short-time pasteurization. They are as follows:

1. At what temperature and for what length of time must milk be held to insure proper pasteurization?

The United States Public Health Service and other health agencies have studied this method of pasteurization for over 15 years. Their recommendations of 160° F. for 15 seconds in approved and properly operated equipment are satisfactory.

2. Accepting that temperature and holding time as safe and satisfactory, the next question to be answered is: how can that temperature and holding time be accurately controlled?

The flow diversion valve, when properly adjusted and sealed answers this point.

3. The third and most important question to be answered is: when is a high-temperature short-time unit approved and properly operated?

Health departments may favor and approve the method of high-temperature short-time pasteurization and even go so far as to adopt local and state laws and ordinances making this method legal but they certainly should not stop there. Every unit and installation should not be given approval until it has been thoroughly and frequently checked and found to be properly operated. In certain localities high-temperature short-time units are installed and placed in operation without being checked by any health agency. This is a grave mistake.

What constitutes *properly* operated installations? A high-temperature short-time installation is properly operated when the following items have been *fully* and *continuously* complied with:

1. When the recording and indicating thermometers (meeting United States Public Health Service specifications) have been tested for proper "lag" and also found to be accurate to within 0.5° F. between 150° and 160° F.

2. When the flow diversion pen is in perfect working condition and is recording every diversion of milk from the forward flow to the diversion tank. Note: Some operators have not been properly informed regarding the purpose of this part of the recording device or its use.

3. When the holding time has been carefully checked and found to be at least 15 seconds.

4. When the diversion adjustment has been set and officially sealed to divert properly all milk below 160° F. back to the raw milk ballast tank.

5. When the variable speed pump has been set and officially sealed to insure continuously a holding time of not less than 15 seconds. Note: One make of variable speed pump has been found to increase its speed, due to wear and stretching of the belt.

6. When the pressure on the pasteurized side of the plates is at all times greater than the pressure on the raw side of the plates. At the beginning of the run, water may precede the milk and establish proper pressures. In the regenerator sufficient pasteurized milk head should be present to maintain a milk level for one hour during shut down.

7. When a proper slope of at least one half inch to the foot is insured, for the holder tube, from the outlet to the inlet. Low points, other than the inlet, trap air and shorten the holding period. Note: Eccentric fitting on the ends of the holder tubes makes possible the improper change of slope of the tube. Bell type or concentric fittings should be used.

8. When all air and milk leaks have been completely stopped. Air sucked into units greatly reduces the capacity of the machine.

9. When there is an absence of leakage to the forward flow while the valve is in the diversion position.

10. When a constant head of milk is maintained in the surge tank.

11. When measured capacity corresponds to the calculated capacity from a pre-determined accurate check of the actual holding time. For example, suppose we had a unit equipped with a holder tube having a capacity of 50.42 pounds of milk and a variable speed pump set to give a 15 second holding time. This unit should then deliver 11,000 pounds per hour. If in checking the capacity of this unit at some later date the capacity was found to be greatly above or below 11,000 pounds per hour, then we could not say that the unit was properly operated.

12. When temperature control is operating smoothly insuring a steady flow of milk above 160° F. Frequent diversions are not desirable. They are bad for the product and may be dangerous.

13. When parts to controlled pump are properly put together to insure an air-tight seal. Wear on the back bearings or the reversing of the back bearings of certain pumps permits air intake thus decreasing the unit's capacity.

14. When all openings to the units are labeled so that the operator knows what products can be obtained and at what temperatures they may be obtained from such openings.

15. When holding time is at least 15 seconds during diversion.

Checking High-temperature Short-time Units

To same time and to facilitate the original testing, the units should be completely installed and thoroughly tested by the manufacturer or his agents. When the manufacturer has properly installed and checked the equipment and is satisfied that the units are adjusted to pasteurize milk properly, then the milk inspection authorities should be asked to make their test and seal the units for operation. No installation should be commercially used until tested and sealed by the inspection department.

The Steps to Be Followed

1. With a level, check the slope of the holding tubes; slope to be not less than one-half inch per foot towards the inlet. If slope is found incorrect, adjustments must be made before further checking of the unit, as a low point other than the inlet will make possible the "trapping" of air pockets, which will decrease the holding time materially. If the pump is sealed for a 15 second "holding period," the capacity of the unit will be greatly reduced.

2. With the proper slope of the "holder tube," see that the standards that support the tube are so constructed and permanently set that changes of slope will be impossible. Note: This item has given the plant operator and health authorities a great deal of unnecessary trouble. Milk samples from one plant that supplied the Army and Navy were found to give positive phosphatase readings. In checking this high-temperature short-time unit, the holding time was found to be only 12 seconds instead of 16 seconds. The slope of the holder tube

* Presented at the Dairy Short Courses, Division of Dairy Industry, University of California, January 6, 1942.

had been changed, throwing a low spot at the wrong point in the holder tube. Pipes dropping from the final heater to the inlet of the holder tubes should be marked for identification as the substitution of shorter lengths of pipe have been found to change the slope of the holder tubes.

3. Make certain that gaskets are placed in their proper locations, and that all joints are air tight. Leaks on vacuum lines can go unnoticed if careful attention is not given to them. If the unit is checked and sealed while air leaks are present it will be possible to decrease the holding time and increase the capacity when these air leaks are later eliminated. Vacuum gauges should be a part of each high-temperature short-time unit to detect these leaks.

4. Prepare to check the accuracy of the thermometers. Remove the recorder stem from holding tube. Insert accurate test thermometer with proper immersion line through a rubber cork or special seat and into the hole at the top of the holder tube. This will leave the regular indicating thermometer in position along with the test thermometer. Both thermometers should be so placed as to come in contact with a full flow of water. Start the unit and circulate water through it at 160° F. When the temperature of the water has become stabilized, check the temperature of the indicating thermometer against the check thermometer. If correct remove test thermometer and insert recorder bulb. Start unit and bring the temperature to slightly above 160° F. (to prevent diversion while testing is being done). Check accuracy of recorder, adjust if not correct.

5. Determine the diversion temperature by circulating water at a temperature above 160° F. Bring the temperature of the heating medium down slowly until the diversion point has been found; if it is too high or too low, adjust diversion regulator located within the recorder box. When the diversion point has been determined to be 160° F. or slightly above, replace the plate over the diversion adjuster and seal it with properly identified lead sealers. Lead seals equipped with copper or brass wires only should be used.

6. The holding time can now be checked. Supply sufficient water to raw diversion tank to insure against air entering the unit. Two methods may be used with a fair degree of accuracy.

a. By pumping in a small charge of methylene blue into the inlet of the "holder tube" and recording the time with a stop watch at the inlet and by recording the time the dye appears at the pet cock (provided for this purpose) at the outlet of the holder tube. The following precautions should be taken:

(1) A small pipe closed at the end and perforated with about four small holes should protrude slightly inside of inlet of holder tube and this connected to a pump or pressure gun giving a measured amount of dye.

(2) Valves on the gun or pressure tank should be as close as possible to the end of holder tube. Note: Each inch will increase the inaccuracy of the timing. In checking the time required for the dye to reach the outlet of the holder, place a white paper background near the end of the faucet. This will aid in detecting the dye when it appears. The first appearance of color should be considered the end point.

b. The second method of checking, which may be considered the most accurate, is the salt and potentiometer method. The following equipment is necessary:

(1) High pressure cylinder with air guage. Capacity about two quarts. This should be equipped with flexible high pressure tubing and spring type air valve. Note: One pressure on air value at 80 pounds pressure will release about 20 ml. of saturated salt solution.

(2) Make up a quart of saturated salt solution and place it in the cylinder and attach cylinder to inlet of holder. Pump in air to desired pressure.

(3) A potentiometer (similar to those used in checking caustic solutions) may be used. By enlarging the contact points with light sheet copper the sensitivity may be greatly increased. This can be easily made to detect 0.3 ml. of a saturated salt solution in 100 ml. of water, and will also show the presence of air within the system.

Procedure: Place the end of electric cord with removable enlarged points through the indicator thermometer outlet. Be certain that the points are about in the center of the "T" of the connection at top of the holder tube and seal cord with proper rubber seat to prevent leakage. Note: the small two-point trailer light plugs are the proper size to use, as they will pass through the holes in the end of the holder tube.

Procedure: "Start the unit and circulate water at slightly above 160° F. (to prevent diversion during checking). Inject about 18 ml. of salt solution into inlet of holder tube with pressure gun. Record the time at which the salt solution is injected, and also the time the potentiometer indicates the appearance of salt. When a 15 second holding time has been finally determined check the capacity of the unit by determining the time it takes to fill a ten gallon can." The weight of 86 pounds for ten gallons should be used as more milk than water is pumped due to the more efficient sealing of joints by milk. When the exact holding time has been determined the variable speed pump should be sealed making it impossible for the operator to change the capacity of the pump. Each unit should be checked thoroughly more than once and at monthly intervals. The complete phosphatase test should also be used frequently on all high temperature milk, but should not be used to substitute the other method of checking.

The following formula may be of assistance in determining capacities of high-temperature short-time units:

EXAMPLE 1

If the desired capacity of the unit is 11,000 pounds per hour what capacity will be needed for the holder tube to insure 11,000 pounds?

$$\frac{11{,}000 \text{ lbs.} \times 15 \text{ (seconds holding time)} \times 1.1 \text{ (safety factor)}}{3600 \text{ (seconds per hour)}} = 50.42 \text{ lbs. or capacity of holder tube use.}$$

EXAMPLE 2

Given the size of the holder tube, how can the capacity of a unit be determined?

$$50.42 = \frac{\text{"x" times 15 (seconds holding time) times 1.1 (safety factor)}}{3600 \text{ (seconds per hour)}}$$

$16.5x = 181{,}512$ or (50.42×3600)

$x = 11{,}000$ lbs. or capacity of unit.

The author believes that the pasteurization of milk by the high-temperature short-time method is safer and has many advantages over the "holding" method. Proper supervision must be maintained over each installation.

The Status of Regulations and Practices in Determining Extraneous Material* in Milk

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THE 1941 Committee on Applied Laboratory Methods submitted a report to this Association in which was included evidence showing factors that affect the reliability of the various methods of testing milk for sediment, the efficiency of certain types of sediment testers, and further presented suggestions anent the subject of testing milk for extraneous material. The Committee report was presented in full in the JOURNAL OF MILK TECHNOLOGY, Volume 5, No. 5, pages 281–297, 1942. In view of the results of the three independent studies reviewed in this 1941 Committee Report, the project for 1942 was directed at ascertaining the status of methods actually employed, and regulations prevailing in the milk markets of the country. A questionnaire was prepared, consisting of 16 separate questions, which was submitted to milk sanitarians in practically all geographic areas of the country, including those officers in large, medium, and small communities. The questionnaire was sent also to the state regulatory agencies. One hundred twenty-three replies to the questionnaire were received from community sanitarians, and 44 from state regulatory sanitarians. A tabulation of the results derived in making the survey is herewith presented. The statistical appraisal of the information presented by the sanitarians includes only those questions answered. In some instances the sanitarians chose not to answer the question, or did not have the information available.

TABLE 1

	Community		*State*	
	Number	*Percentage of total*	*Number*	*Percentage of total*
(a) None used	33	27.0	6	16.0
(b) Off the bottom type (tester withdrawing sediment from can bottom)	48	40.0	25	69.0
(c) Wisconsin, or Lorenz type (milk transferred from can to tester)	39	32.0	5	13.0

1. *Type of sediment tester used in 123 markets* (Table 1).

Approximately one-fourth of the community health officers do not practice platform testing of milk for sediment. In several of these instances, the state inspectors did testing for sediment, and the sanitarian made only sediment tests on bottled milk. No geographical influence was found to determine whether or not testing for sediment was practiced.

2. *What make of tester is used?*

Of the replies, 88 community and 27 state sanitarians cited the names of the sediment testers they used for platform testing. These are listed in Table 2.

TABLE 2

MAKE OF SEDIMENT TESTER USED IN 88 MARKETS

A. *Off the Bottom Type*

	Community	*State*
Rapid Tester Corporation	9	1
Langsenkamp-Wheeler	9	15
Evers	7	3
Carkhuff	9	0
Monarch	2	0
Hinman	2	2
Sediment Test Supply	2	0
Lowry	1	0
Shikles	1	1
O'Hara	1	0
	43	22

B. *Transfer Type*

	Community	*State*
Pressure type (Lorenz)	20	2
Vacuum type (Winder McNally)	18	0
Erikson	1	0
Kendal	1	0
Wendler	1	0
Ann Arbor	1	0
H. W. Higgins	1	0
Superior Metal Products Co.	0	1
Own Make	0	1
King	0	1
	43	5

There was some evidence that group familiarity with a tester influenced its selection. For example, the Longsenkamp-Wheeler and Rapid Tester Corporation testers were more frequently cited in reports from the middle America states while the Carkhuff and Evers testers were more frequently cited as being used in the eastern and western states, respectively.

3. *Filtering area of filter disc.*

Inquiry was made of the actual diameter of filtering area of sediment discs when in place in the testers. Diameters of from seven-eighths to one and nine-sixteenths inches were cited, showing that the density of sediment on a disc will be influenced by the type of tester used, and will necessitate a different sediment grading standard.

4. *Periodicity of sampling.*

Monthly sampling of milk for sediment is the most frequently used period for examination of the milk. Nevertheless, many sanitarians examine the milk for sediment at very infrequent, or irregular intervals, using other techniques more regularly for testing milk quality. See Table 3.

Approximately one-fourth of the community sanitarians make use of the sediment test for supplementary or special purposes. The factors that determined when the sediment test was used irregularly were:

	Community	*State*
Time and convenience	4	13
High bacteria counts	3	2
For retests of milk	4	1
Weather	5	..
Educational work	1	..
Complaint	2	..

TABLE 3

FREQUENCY OF PERIODS OF SAMPLING AS FOLLOWED BY 89 COMMUNITY AND 39 STATE INSPECTION AGENCIES

	Community		*State*	
	Number	*Percent of Total*	*Number*	*Percent of Total*
Weekly	8	9.0%	0	0.0%
Bi-weekly	5	5.0%	3	7.0%
Tri-weekly	0	0.0%	1	3.0%
Monthly	42	47.0%	13	33.0%
Bi-monthly	7	8.0%	2	4.0%
Infrequently	4	4.0%	6	15.0%
Irregular	23	26.0%	14	36.0%

* Presented before the 31st Annual Convention, International Association of Milk Sanitarians, October 31, 1942.

5. *Procedures employed for withdrawing sample of milk for sediment test.*

When the sample of milk is transferred from the can to the tester for testing of sediment (*e.g.* in vacuum or pressure type testers) the procedures are generally used with the following frequencies:

Methods of Treating Milk Prior to Transfer to Sediment Tester

	Community	State
(a) Stir milk in the can, then sample	20	8
(b) Sample unstirred milk	7	13
(c) Sample one pint from last pint or quart remaining in can	12	1
(d) Sample taken from weighing tank	2	..

6. *When the milk is sampled with an off-the-bottom type tester, two ways are generally used in withdrawing the sample, as follows:*

	Community	State
(a) Simply immerse sediment tester to can bottom, hold stationary, then withdraw sample	22	10
(b) Move tester over can bottom while withdrawing milk,		
(1) Rotary motion (circular)	25	12
(2) Directly across can	4	7

7. *Selection of cans for testing for sediment.*

Sanitarians are inclined to select any can for testing, though morning's milk, for reasons of ease of testing, and full cans, for reasons of representivity, are in part selected. It is interesting to note that one sanitarian selected a partly full can only on the observation that it tended to contain more sediment. Other sanitarians explained a preference on the basis of milk temperature and ease of testing, or tendency for presence of sediment.

TABLE 4

INFLUENCE OF AGE AND FULLNESS OF CAN ON SELECTION FOR SEDIMENT TEST

	Community	State
Page		
(a) any can	53	23
(b) evening's milk	3	4
(c) morning's milk	7	6
Fullness		
(d) any can	42	19
(e) full can only	22	8
(f) partly full can only	4	..

8. *Selection of cans for testing.*

There is a difference in the procedure used by sanitarians when selecting cans for the sediment test. From the reports submitted by city and state sanitarians, the percentage figures in Table 5 were derived:

TABLE 5

	Community	State
(a) Sanitarians testing every can sent by shipper	35%	26%
(b) Sanitarians testing only part of producer's shipment	65%	46%
(c) Sanitarians who pass on entire shipment if tests from one, or two cans are acceptable	60%	53%
(d) Sanitarians who reject entire shipment if test from any can (one or more) is unacceptable	76%	11%
(e) Sanitarians who test all cans when one or more cans are unacceptable	70%	60%

9. *Disposal of milk classified unacceptable according to sediment test.*

One of the problems sanitarians face is disposal of milk rejected on the basis of the sediment test. See Table 6.

In two cases the milk is destroyed; in one of these permission to do so is granted by the producer. In two instances the milk is held for a period sufficient to induce souring before it is returned.

10. Essentially only one method is employed by sanitarians to minimize the reshipment of uncolored or unmodified rejected milk to the plant on subsequent days. This consists in checking weights of the preceding day or for the several preceding days. Penalties for reshipment of rejected milk as determined by weight consisted of exclusion from the market for 3 days, rejection of the entire shipment, personal call for inspection, etc.

TABLE 6

	Community	State
(a) Return only that milk classified unacceptable (cans with unacceptable sediment test) to the producer	57	24
(b) Return entire shipment (when one or more cans have unacceptable sediment test) to the producer	10	5
(c) Divert the milk to operations involving manufactured dairy products	6	..
(d) Add to the milk one of the following when it is rejected: steam, buttermilk, rennet, charcoal, or color. (The use of rennet and charcoal seems more prevalent in western states)	23	13

TABLE 7

METHODS OF REPORTING TO PRODUCERS PRESENCE OF UNACCEPTABLE SEDIMENT TEST OF MILK AT PLATFORM

	Community Sanitarians	State Sanitarians
Post card report	4	..
Call by inspector	6	3
Return of sediment disc	8	4
Letter to producer	10	3
Tagging of can	7	4
Exclusion until approved	2	2
Permit revoked	1	..

12. The patient of milk sanitarians in tolerating repeated shipments of substandard sediment milk is shown by the data in Table 8:

In two markets the milk is excluded for a 10 day period. In another the following plan is in force:

First rejection, exclusion for 3 days.
Second rejection, exclusion for 7 days.
Third rejection, excluded until approved.
Fourth rejection, permanent exclusion.

13. Milk sanitarians in our various communities and states are restricted in part by the lack of uniformity in declaring or recognizing the conditions permissible for straining of milk as shown in Table 9.

TABLE 8

FREQUENCY OF SUBSTANDARD SEDIMENT TESTS PERMISSIBLE BEFORE EXCLUSION OF PRODUCER FROM MARKET

	In Communities	In States
Exclude producer after 1 substandard test	3	2
Bar the producer after 2 substandard tests	14	2
Prohibit shipment after 3 substandard tests	15	4
Halt acceptance after 4 substandard tests	4	1
Limit delivery after 5 substandard tests	..	1
Exercise no set rule on acceptability of substandard milk	18	10

11. When milk is returned to the producer in an unmodified form, sanitarians employ several practices for informing the producer of the rejection. In the light of the evident effects of coloring or otherwise treating milk, some of these methods seem much less drastic. Some of the methods are reported in Table 7:

In 9 of the communities and in 3 of the states where the ordinances do not mention straining, department regulations permit straining only when single service discs are used.

TABLE 9

REQUIREMENTS OF ORDINANCES ANENT STRAINING OF MILK ON FARMS

	In Communities	*In States*
Ordinances permitting straining of milk	21	3
Ordinances requiring straining	40	14
Ordinances that do not mention straining	18	10
Ordinances prohibiting straining	1	..
Ordinances permitting straining only when single service discs are used	46	10

14. *Requirements of ordinances anent use of sediment test.*

There is a significant difference among either community or state ordinances as to whether the sediment test is designated a recognized procedure in assaying milk for its quality. The situation is expressed in Table 10.

While many community and state ordinances or regulations do not specifically state that the results of the sediment test shall be used to qualify milk, many sanitarians use the test evidently on the basis of the requirements stipulated in most ordinances that milk shall be free of filth or contamination or adulteration. From this point of view nearly all milk ordinances indirectly imply approval to use the sediment test of milk.

15. Twenty out of 80 community sanitarians (25 percent) and 9 of 26 state sanitarians (34 percent) recognize a difference in requirements on sediment for milk destined for fluid market milk consumption and milk for manufactured products. Fifteen of 66 community (20 percent) and 7 of 26 state (25 percent) sanitarians make modifications in their sediment grading procedures because of adverse windy or winter weather.

16. *Types of sediment standards used for grading sediment tests of milk.*

There is significant difference in the standards used by milk sanitarians for the grading of sediment discs obtained from milk. The following tabulation illustrates the frequency of use of different types of standards in 66 communities.

Connecticut Official Milk Sediment Standards	14
New Jersey Health Officers Association Standards	5
Kendal Co. Tester Standard	1
State of Wisconsin Department of Agriculture Standard	2
Sediment Testing Supply Co. Standard	2
Sanitarians own Standards	6
No standards	7
Unnamed standards	24
U. S. Public Health Service Standard	3
International Association Milk Dealers' Manual Standard	1
California State Dept. of Agriculture & Markets Standard	1

Many of the state milk inspection agencies, as in Minnesota, Illinois, Oregon, Iowa, Kentucky, California, Connecticut, Missouri, and Montana, use their own standards, either of printed, photostat, or photographic material. In other states, the standards known as the New Jersey Health Officers Association, the Connecticut, and the Evaporated Milk Association Sediment Test Standards were mentioned as being used. Obviously, there is a manifest difference in the appearance of the standards from the communities and states, emphasized in part by dependence upon the method employed in making the test for sediment, *i.e.*, mixed, or off-the-bottom sample. A critical examination of representative sediment tests of the "grades" of milk (good, fair, poor) submitted by the sanitarians in cities and states shows that there is great lack of uniformity in what constitutes an acceptable milk, even when the sediment test discs are appraised on the basis of similar methods of testing. A milk producer moving from one community to another would in many instances be hard put to it to understand that what was rejectable in one area would be acceptable in a second. There is evidence too that sanitarians are not wholly satisfied with photographic or reproduced-on-paper standards. Many for example do not use any standard except their personal "spot" judgment. In other instances, as in Detroit, a set of actual milk test discs are selected and mounted for use of the sanitarians.

TABLE 10

	Community Ordinances	*State Ordinances*
(a) Ordinances specifically designating that sediment test be used	27 (26%)	13 (40%)
(b) Department regulations designating that sediment test be used even though it is not required in ordinance	23 (40%)	5 (28%)
(c) Frequency of use of sediment test to qualify milk even though it is not mentioned in regulation or ordinance	35 (70%)	18 (90%)
(d) Occurrence of distinction in grading results of sediment tests when milk is used for fluid (bottled milk) and manufactured products	20 (25%)	9 (34%)

OBSERVATIONS

The results of this survey bring to light several points. There is lack of uniformity in the use of the sediment test for the grading of milk, some using it on the milk delivered by the producer at the intake, others only on the bottled product. Interestingly some sanitarians have taken the trouble to look askance at the sanitary or unsanitary merit of the testers and their use. There are two preponderant groups using off-the-bottom and transfer-the-milk type of sediment testers, but among each of these exists marked non-uniformity in the specific utensils used for the test, the method of using the equipment, or the interpretation of the results. There are significant differences in appraisal of the merit of the sediment test in inducing production of milk of the quality desired in the various communities. Finally, the grading standards now available are non-uniform in type and character, and their deficiencies have made for dissatisfaction with them on the part of the sanitarians.

There is growing feeling on the part of many sanitarians that what is called "acceptable milk" should be amply and clearly defined. Certainly the milk described acceptable in one region cannot, or may not be classified acceptable in another, on the basis of the results of this survey. If the sediment test is held to be of value in grading the quality of milk, the sanitarians are in great need of the opportunity to reappraise the merit of their instruments, and methods, and to standardize their procedures on the basis of better known values.*

* The author wishes to thank those many sanitarians who kindly answered the questionnaire, provided materials, and submitted letters discussing problems on the testing of milk for sediment.

Report of Committee on Communicable Diseases Affecting Man, 1942*

PAUL B. BROOKS, *Chairman*

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

SO FAR as your Committee has been able to discover there have been no startling or epoch-making discoveries or developments in its special field since the last annual meeting. There are, however, some developments of interest to report. Also (and this might be considered the most important thing we have to discuss) our participation in the World War has created an emergency situation in which it has become necessary for us to view the prevention and control of communicable disease from a new angle. First of all it is more important than ever, for obvious reasons, that these diseases be prevented. To mention one concrete example in support of that statement: in a paper by the Chairman of this Committee published in the JOURNAL OF MILK TECHNOLOGY in 1939, reference was made of a survey made to ascertain the effect on local business of an extensive milkborne epidemic of scarlet fever in a large village in New York State. The principal industry was a shoe factory employing several hundred people. The survey revealed that this plant had shut down for four days because so many of its employees were involved in the epidemic. The company operating that plant is now on the list of so-called "war industries." Such a shut-down, serious enough in 1939, would be much more serious now.

IMPORTANCE OF PASTEURIZATION

Knowing that general application of pasteurization would afford the highest degree of protection against milkborne infection, it is our clear duty, in this emergency, to stop catering to the whims and desires of those who, for business or personal reasons, are opposing pasteurization and see that it is made mandatory wherever it lies in our power. But we are faced now with the fact that, even if we can get necessary legislation, new pasteurizing equipment is practically unobtainable. Not only that but the existing equipment, in milk plants generally and on the farms, is deteriorating and wearing out and it already is difficult, if not impossible, to secure replacements. This, of course, is common knowledge and a subject by itself. Added to that is the fact of the already serious shortage of competent help on farms and in plants. It is coming to be generally recognized that, whether we like it or not, we are going to have to be satisfied with much less than we have become accustomed to regard as essential in normal times.

In this situation the greatest danger lies in a possible break-down in the pasteurization procedure, our only *effective* means of preventing the spread of infection through milk. But "it is an ill wind that blows no man good." In the milk laws and regulations of most states and municipalities, along with many important requirements, are others which reflect the ideas of individuals, or which, with little serious discrimination, have been handed along from one set of legal enactments to another and which have little, if any, real value from the standpoint of protecting health and maintaining milk quality—the actual purposes of such laws and regulations. This is a good time for an honest and systematic effort to separate "the wheat from the chaff." Our efforts should be concentrated on securing compliance with requirements which are necessary for protection of health and to assure acceptable quality. Since something must be sacrificed it should be the unnecessary and less essential requirements and many of these should ultimately be eliminated. If these things are done something of permanent value will have grown out of the annoying and inconvenient wartime restrictions.

With a view toward this end we suggest the appointment by this Association of a new *Committee on Milk Ordinances and Regulations,* its function to be to study the Public Health Service Milk Ordinance and Code and some of the available state and municipal regulations, endeavor to classify their requirements into those which are considered important and necessary and those, if any, which are so unessential that they could safely and properly be discarded, and to report its conclusions. A motion to this effect will be offered at the Business Session.

TWO STREPTOCOCCUS OUTBREAKS

On the program of the annual meeting of the New York State Association of Milk Sanitarians, held at Albany in September, were two subjects relating to milkborne infection. Our secretary-treasurer, Mr. Leete, speaking as a member of the staff of the New York State Department of Health, described what he called "An Epic Investigation of Streptococcal Fever." His discussion related to a milkborne outbreak of 44 cases of hemolytic streptococcus infection which occurred in a small village in a rural section of New York State between April 5th and 25th, 1942. In 8 cases "scarlatinaform rashes" were observed; the rest were cases of the sort commonly spoken of as septic sore throat.

The preliminary investigation pointed to milk as the source of infection. It was found that all of the cases known when the investigation was begun were employees or members of families of employees of a plant receiving about 123,000 pounds of milk daily, manufacturing cheese and milk powder, and shipping cream to New York City for pasteurization. The cheese was being sold for "lend-lease" shipment to Europe. All of the patients had drunk milk at or from the plant or, in two instances, had eaten green cheese curd.

This plant, either directly or through another receiving station, was receiving milk daily from 331 producers whose herds aggregated over 6000 cows. The milk was delivered in 2029 cans. On April 21 a "field crew" of 4 men started examination of incoming milk at each of the two plants. On April 23 a cow was found with active mastitis and whose milk showed pus on the strip cup. There was a history of udder injury about a month before the outbreak and use of a teat dilator just before the oubreak. The laboratory found hemolytic streptococci in her milk. It was found that the person who had used the teat dilator had been ill with severe sore throat shortly before, being confined to bed for two days. Other members of his family also had been ill and a diagnosis of scarlet fever had been made in one case. A throat culture from the man who applied the teat dilator was negative at the time of investigation but streptococci of Lancefield's Group A were found in cultures from other members of the family. Further typing of one of these cultures and of cultures from the cow's udder proved the organisms to be of Griffith's type 3. The "epic" feature of this investigation lies, of course, in the fact that it proved possible to pick out, from over 6000 cows in 331 herds, the cow evidently responsible for the epidemic and to find the person apparently responsible for the infection of the cow.

This was accomplished, in brief, by making Breed smears of milk coming in from each farm, looking for long-

* Presented at 31st Annual Meeting of the International Association of Milk Sanitarians, St. Louis, Mo., October 30, 1942.

chain streptococci and other evidences of abnormality, and having veterinarians examine herds from which suspicious samples came. Mr. Leete's report, giving full details, presumably will be published.

On the same program Dr. Ralph B. Little, of the Rockefeller Institute for Medical Research, Princeton, N. J., discussed "The Use of Gramacidin in Control of Streptococcic Mastitis." The studies reported by Dr. Little had been with cases of *Streptococcus agalactiae* infection. Their results and those reported by others, he said, were sufficiently encouraging to warrant trying the treatment in suitable cases. *Streptococcus agalactiae,* of course, has not been proven responsible for human infections, although observers in the past have reported isolating streptococci of this general class from certain low-grade or subacute human infections. In discussion, however, Dr. Little was asked these questions (in substance): "Have you had any experience in treatment of cases of mastitis incited by the 'human type' of hemolytic streptococcus — Lancefield's Group A—responsible for milkborne outbreaks of streptococcus infection? Would you advocate attempting to treat such cases?" Dr. Little answered that they had had no opportunity to try the treatment in this class of infections and added: "I would not advocate attempting to treat them. They are *too* dangerous."

Other Milkborne Outbreaks

The Chairman of this Committee, in a paper on "Our Unnecessary Milkborne Outbreaks," presented at a meeting at Pittsburgh, Pa., on May 14, 1942, discussed outbreaks in New York State, exclusive of New York City. Some points were brought out which, although not particularly new, may be of interest.

In the ten-year period 1932–1941, inclusive, 65 milkborne outbreaks were recorded. Of these, 61 or 93 percent originated in infections at the farms. Only 3 occurred in cities. The other 62, or 95 percent, occurred in rural towns and villages. All were traced to raw milk and the distribution is largely explained by the fact that, in New York State, the bulk of the raw milk sold is sold in the rural areas. The causes of most of the oubreaks fall in one of the following three categories: (1) udder infections with hemolytic streptococci of Lancefield's Group A, the cows having been infected by milkers with infected throats or wounds; (2) typhoid carriers; (3) *Staphylococcus aureus* and other udder infections (gastroenteritis outbreaks). Believing it to be unlikely that routine farm inspection would, in many instances, bring to light these causative conditions, the author concluded that routine farm inspections have practically no effect in the prevention of such milkborne outbreaks.

Among the milkborne outbreaks referred to in the discussion were 24 of gastroenteritis. These represented a minority of the gastroenteritis outbreaks recorded in the State. The majority, in which the source was determined, were traced to sources other than milk (other foods and water). Several of those milkborne were attributed to pre-formed entero-toxin in milk from cows with udders infected with *Staphylococcus aureus.* The toxin, the author stated, appears to be formed after the milk leaves the udder and when it is allowed to stand for several hours without refrigeration. In New York State no such outbreaks have been traced to pasteurized milk. Pasteurization destroys staphylococci but the entero-toxin is not destroyed even at a much higher temperature than that required for pasteurization.

The Public Health Service report on outbreaks due to milk and milk products in 1940 lists 35 outbreaks as milkborne and 8 as due to milk products. All of the latter were outbreaks classified as gastroenteritis or food poisoning. Of the outbreaks attributed to milk 2 were bacillary dysentery; 10 gastroenteritis or food poisoning; 2 scarlet fever; 3 septic sore throat; 14 typhoid fever and 4 undulant fever. Comparing the total numbers of cases noted, in outbreaks of streptococcus infection (scarlet fever and septic sore throat) with totals for typhoid, they present the usual picture: in 4 outbreaks of streptococcus infection there were more than four times as many cases as in 13 typhoid fever outbreaks. In making this computation one outbreak of streptococcus infection and one of typhoid were not included because the evidence of milk having been responsible seemed inadequate.

Milk Suspected Versus Proven Cause

This brings us to a point touched upon in the Committee's report of last year. In 7 of the outbreaks listed in the Public Health Service Report it either was stated that milk or the milk product was "suspected" or the evidence presented seemed inadequate to warrant definite conclusions.

A case in point is an outbreak of 47 cases of bacillary dysentry in the Borough of Richmond (Staten Island), New York City. New York City previously had not recorded an outbreak as milkborne in 16 years. A reference notation in the back of the report says "Although no definite vehicle was determined, pasteurized milk was suspected since a carrier was found working in the pasteurizing plant." Yet this appears on the face of the report as an outbreak due to pasteurized milk.

Dr. Samuel Frant, Director of the Bureau of Preventable Diseases of the city health department, has given us further details. The outbreak occurred in a home for retired mariners having 850 inmates and employees. The institution consumed about 700 quarts of milk daily, about 350 quarts being produced in its own dairy and pasteurized at the institution, the balance being purchased from one of the principal local dealers. "Laboratory reports on food, water and milk were negative," Dr. Frant wrote, "and the exact manner in which the disease spread through the institution could not be determined." Forty-one carriers of the Sonne organism were found among food handlers, one of them an employee of the institution pasteurizing plant. "It was assumed that there had probably been contamination of a widely distributed food" and milk seemed the most likely vehicle. It was suspected principally because of the carrier in the pasteurizing plant and on the assumption that all of the 47 patients probably had used the milk. However, there was no definite information as to the distribution or individual use of the milk. Dr. Frant agrees that this should be considered an outbreak *possibly* due to milk.

While it is important that records of milkborne outbreaks be as complete as possible, it seems equally important that only those outbreaks be recorded as milkborne in which the evidence incriminating milk is reasonably adequate according to sound epidemiological standards. The Committee respectfully suggests that the Public Health Service, in future reports, list those outbreaks in which milk is suspected but not reasonably proven to be responsible under a separate heading: "Outbreaks Possibly Milk-borne."

Canadian Outbreaks

Dr. Richmond, as a member of this Committee, has made his annual canvass of the Canadian provinces, asking about milkborne infection during the past year. Five provinces reported no outbreaks. Quebec reported an outbreak of 15 cases of scarlet fever in August, 1942, traced to raw milk. Manitoba mentioned 5 cases of undulant fever in 1941 and 4 in 1942 "found to be due to . . . raw milk" but had no record of other milkborne disease. Dr. Amyot, for British Columbia, referred to 26 reported cases of undulant fever, expressing the opinion that the actual number of cases "is very much in excess of this number." Re-

ferring to cases of typhoid fever reported principally from rural areas, he said "It is possible that some of these may be due to consumption of raw milk but, unfortunately, we do not have an epidemiologist on our staff and only having one public health engineer for the whole province it is practically impossible to carry out any detailed work of the type we would like to be able to do in an endeavor to collect the type of figures which you have in mind." It seems pertinent to add that a similar situation apparently exists in a considerable part of the United States and probably accounts, in large measure, for the inadequacy of our records of milkborne communicable disease.

BRUCELLA INFECTION AND PREVENTION

Dr. Flood, a member of the Committee and Secretary of the San Francisco Medical Milk Commission, had expected to assemble some data concerning their experience with Brucella infection which, he wrote, would explain why the Commission recommended pasteurization of its Certified milk, which was begun in 1939. This material, however, has not become available in time for use in this report.

In this connection many states have fairly recently entered upon programs of calfhood vaccination as one method of control of Bang's disease. It seems to have been quite generally concluded that this measure, of those available, offers the greatest promise of ultimate general control of the disease. Dr. E. T. Faulder, of the New York State Department of Agriculture and Markets, report that in that state the program was initiated in the Fall of 1941 and that up to the date of writing (Oct. 13, 1942) 17,219 calves had been vaccinated.

A strain of *Brucella abortus,* identified as "Strain 19," seems to be generally used. This strain, isolated several years ago in the laboratory of the Federal Bureau of Animal Industry, has from the first shown a very low virulence but a rather high antigenic quality. Calves vaccinated at 4 to 8 months of age go through a period in which the serum agglutinin titer rises and then falls, the blood reaction usually becoming negative before the breeding age is reached. Vaccination of older heifers is discouraged, at least one reason being that, when the breeding age is reached, the animals may still have positive reactions. The use of "Strain 19" vaccine on mature cows is also not approved.

From the standpoint of this report, our interest would be chiefly in the effect, if any, which calfhood vaccination might have on the incidence of human brucellosis or undulant fever. The question probably is somewhat academic. A survey of the literature reveals no evidence to suggest that Strain 19 can incite human brucellosis. On the other hand, even though this measure may prove highly successful as a control measure, it is quite unlikely that the degree of reduction in Bang's disease within the next few years will be sufficient to materially affect the incidence of undulant fever traceable to infected milk supplies. In fact, repeating what has been said many times before, pasteurization is the only measure which can be considered dependable for the protection of milk consumers against brucellosis.

This rather fragmentary report is respectfully submitted by the *Committee on Communicable Diseases Affecting Man.*

PAUL B. BROOKS, *Chairman*
L. ARNOLD J. G. HARDENBERGH
R. G. FLOOD R. A. GARCIA
A. R. B. RICHMOND

Report of Committee on Frozen Desserts Sanitation*

F. W. FABIAN, *Chairman*
Michigan State College, East Lansing, Michigan

FROZEN desserts apparently are having a hard time during the present emergency. The International Association of Ice Cream Manufacturers is trying to get the War Production Board to classify ice cream as a food rather than a confection. Everyone familiar with the food value of ice cream knows that it is one of the finest and most nutritious of dairy foods. England ordered the manufacture of all ice cream to cease after September 30 of this year. The reasons given were the shortages of materials and the transportation difficulties since, as they pointed out, the shipping container weighed more than the ice cream being shipped. This is a suggestion for us since in many cases mix, rather than the finished ice cream, could be shipped to advantage. This is being done in many places at present. Doubtless some adjustments will be necessary if ice cream and frozen desserts are to be manufactured for the duration of the war.

Other factors presenting difficulties are shortages of sugar, vanilla, and metals essential in the frozen desserts industry, such as nickel, chromium, tin, and steel. The universal shortage of labor in all industries, the lack of rubber for motor vehicles, and now gasoline rationing, likewise, will take their toll.

The scarcity of chlorine which has been used so universally as a dairy sterilizing agent is not as serious as it once was due to the development of new dairy cleaners. Extensive experiments over several years with acid cleaners show that they are not only excellent detergents but also leave machinery and equipment with fewer bacteria than the alkali detergents. They are especially efficient in reducing peptonizing and thermophilic bacteria. Those who have used them over a period of years are very enthusiastic about the results obtained. It looks as though acid cleaners have a great future.

The shortage of essential materials and labor is going to place a greater burden on official health agencies, especially the inspectcors and laboratories. They shall have to increase their vigilance over all the manufactured products. If it is necessary to choose between checking the raw and finished product, the time and attention should be devoted to the finished product.

Dr. J. H. Shrader, Referee for Chemical Methods for Frozen Desserts of the American Public Health Association, has with the assistance of his Associate Referee brought forth several Proposed Methods for analyzing frozen desserts. They are:

1. Accurate Sampling for the Determination of Milk Fat of Ice Creams Containing Insoluble Particles, Such as Fruits, Nuts, and Crumbs of Pastry, Etc., by P. H. Tracy.
2. Determination of Milk Fat in Ice Cream and Ice Cream Mix by a Modified Babcock Technique, by W. H. Martin.
3. Determination of Stabilizers in Frozen Desserts, by F. L. Hart.
4. Determination of Percent Overrun in Ice Cream, by P. S. Lucas.

These methods in addition to those already published in the eighth edition of *Standard Methods for the Examination of Dairy Products* should give us a set of methods by which frozen desserts may be controlled more ac-

*Presented at the Thirty-first Annual Meeting of the International Association of Milk Sanitarians, St. Louis, Mo., October 30, 1942.

curately. More methods are being formulated and will appear from time to time.

As usual the Chairman has asked the various members of the committee to contribute to the annual report. The contribution of each member is set forth.

THE MANUFACTURE AND SALE OF ICE CREAM IN CANADA DURING THE YEAR 1942

W. C. Cameron, Ottawa, Canada

The ice cream industry in Canada during the year 1942 has been concerned largely with operating within the various requirements and restrictions placed on it under present wartime economy. These requirements and restrictions are the outcome of various conditions, the main one of which being the need for conserving milk fat.

The total milk production of Canada is being taxed to the utmost to meet the increased demand for various dairy products. Large quantities of cheese and concentrated milk are required to fill the contracts with Great Britain. The British Ministry of Food has expressed the desire that Canada supply, as far as possible, the dairy product requirements of other Empire countries, and the domestic markets of Canada are asking for increasing amounts of milk fat in the form of milk, cream, butter, cheese, concentrated milks, ice cream, etc.

In order to avoid an excess of some products and a shortage of others, some measures of control have been necessary, among which are Orders Nos. 40 and 44 of the Dairy Products Board. These Orders state in effect that manufacturers of ice cream shall not sell a greater quantity of ice cream, ice cream mix, sherbet, or sherbet mix during any one quarter of 1942 than was sold during the corresponding quarter of 1941, the exception to these orders being that there is no restriction on the sale of ice cream to the armed forces when in camps that are provisioned by the Department of National Defense, or to patients in military and civilian hospitals. Although the sale of ice cream to munition factories, shipyards, and canteens catering largely to service men is not considered as being exempt under the provisions of the above-mentioned Orders, the Dairy Products Board has requested that the requirements of such places be met from the supply of ice cream for civilian use. Whatever ice cream is then available for sale is to be apportioned to strictly civilian accounts as fairly as is possible.

To further aid in the conservation of milk fat and to use the available supply to best advantage it was believed advisable to revise the standards of composition for ice cream. Under authority of the War Measures Act a maximum butter-fat content in ice cream was stipulated, namely, 13.5 percent. The minimum requirements were unchanged (13 percent). However, as the need for conserving fats of all kinds, and particularly milk fat, became more urgent, the minimum and also the maximum fat standards for ice cream were reduced in the month of June, with the approval of the Department of Agriculture, the Department of Pensions and National Health, and the industry. These revised standards are: milk fat not less than 9.5 percent and not more than 10.5 percent by weight, for both plain and fruit ice cream; total solids not less than 34 percent by weight; and food solids per gallon not less than 1.7 pounds, of which not less than 0.47 pound shall be milk fat. In addition, a gallon of ice cream must weigh not less than 5 pounds. The Orders in Council prescribing these revised standards having been passed under authority of the War Measures Act, they will automatically be rescinded when peace is declared, and at the same time the pre-war standards for ice cream will again be in force.

Prior to the declaration of war the term "sugar" in the definition for ice cream meant sucrose, and it was illegal to use other sugars such as glucose, dextrose, etc. However, with sugar for industrial uses now restricted to 70 percent of the 1941 requirements, the regulations under the Food and Drugs Act of the Department of Pensions and National Health with respect to the use of this product in ice cream have been revised. This revision permits the use of honey and combinations of not less than 75 percent sucrose with not more than 25 percent of such sugars as dextrose and glucose. The use of the various substitutes for sucrose necessitated certain changes by manufacturers in cabinet temperatures, manufacturing methods, formulae, etc.

Wartime economy, with its restrictions on available supplies of gasoline, rubber, tin, and various other supplies, and shortage of labour to produce supplies, has required many adjustments in the ice cream industry of this country. Delivery service has been reduced to the minimum, and in many cases manufacturers servicing the same territory have made mutual agreements whereby each week one of them only would supply and deliver all the ice cream to that territory. Under these circumstances manufacturers who owned cabinets in retailers' stores permitted these cabinets to be freely used for the storing of ice cream made by other manufacturers.

Single service metal containers have almost entirely disappeared from use, and even paper containers are being made without the customary metal supporting rim at the top. During the winter and early spring months of this year officials of the Dominion Department of Agriculture made a survey of the returnable metal cans for ice cream which had found their way into uses other than for ice cream, or which were lying idle on the premises of restaurants, hotels, and elsewhere. This survey revealed that the industry had not been giving the necessary attention to the collection of these containers, resulting in unnecessary waste and expense. The industry was advised to correct this condition.

Under present conditions manufacturers are keeping the number of flavours, sizes of packages, types of novelties, etc., at a minimum. The merchandising of ice cream has now become a matter of distributing in an adequate manner the volume available for sale, the demand usually exceeding the supply.

REPORT OF ANDREW J. KROG, PLAINFIELD, NEW JERSEY

1. *Army Specifications and Bacteriological Control*

By virtue of its recent expansion, the U. S. Army now has camps, depots, warehouses, and arsenals established in every corner of New Jersey.

The Army's bacteriological specifications demand that ice cream offered for sale to its agencies be free from coliform organisms in 1 ml. portions.

Since supplying the Army is "good business," many of the ice cream manufacturers who have previously not been particularly interested in whether or not coliform organisms were present in their products (New Jersey's state law does not regulate bacteriological contents of ice cream, and many municipalities have no coliform standard for ice cream) have undertaken to establish rigorous coliform control in their plants.

The army standard has done more to elevate the bacteriological level of

ice cream manufactured for sale in New Jersey in one year than all other factors in the preceding ten.

The characteristics of a processing system which permit the regular manufacture of coliform-free ice cream (as reported in detail in the literature) are:

(a) Absolutely clean mix pasteurization, homogenization, cooling and storage equipment, sterilized just before use, as a fully "closed" system.
(b) Absolutely clean freezing and packaging equipment, sterilized from the pipe lines from the storage tanks as a fully "closed" system.
(c) The selection of coliform-free fruits and nuts, where such materials are to be added to the pasteurized mix, or the processing of fruits and nuts (to inactivate coliforms) before their addition to the pasteurized mix.
(d) The use of modern equipment makes positive coliform control easier. The direct filling of containers and the machine-cutting and wrapping of brick ice cream reduce the opportunities for contamination by coliform organisms. "Sanitary-head" homogenizers, "pump-empties" batch freezers, and continuous freezers lend themselves to the manufacture of coliform-free products.

It is hoped that local health control agencies will take advantage of the stimulus given to the dairy industry by the Army's purchasing power, and will provide for the establishment of regulations in all areas to require the maintenance of coliform-free ice cream and fluid milk products.

2. Ice Cream is a "Food"

There is no doubt that the U. S. Army considers ice cream as a "food" rather than a "confection." The enlisted men's diet is carefully regulated; ice cream is a regular item on the Army menu. Ice cream is a "morale-building" food. It has positive appetite appeal.

In spite of the Army's cognizance of ice cream as a reliable food, the War Production Board has recently classified ice cream as a "confection." There is no doubt that the Board is desirous of utilizing the raw materials, personnel, and equipment at present occupied in ice cream manufacture so as to best aid the war effort, but the importance of ice cream as a food has long been glossed-over.

A cold "sweet" is definitely a seasonal confection. When Jacob Fussell first made ice cream in 1851, his first thought was to prepare a cooling pudding. But the composition of ice cream has changed; so has its purpose. Ice cream is now a good concentrate. It still has a pleasant taste. It is now a reliable food, easy to take, and acceptable to "hard to feed" infants, children, and adults, during all seasons.

Efficient metabolism requires more than the ingestion of so many calories. It demands suitable proteins, vitamins, minerals, fats, and carbohydrates. Without going into an elaborate discussion of physiological chemistry or reviewing the literature of the past twenty years on the value of amino acids of dairy proteins, or of dairy fat, or of the need for the utilization of skim-milk: where else are so many necessary ingredients so blended into an appetizing food?

A prescription calling for the food values represented in ice cream would drive a pharmacist to despair. Pediatricians enthusiastically recommend ice cream even for infants; the older child's poor food intake on a hot day is compensated by a serving of ice cream. The old-fashioned executive, who had worked his way up to "crackers and milk," has now been promoted to a dish of ice cream.

No one has ever looked at ice cream and declaimed, "I say it's spinach, and to hell with it!"

The Army has demonstrated that ice cream is a food for its personnel. It is similarly important for civilians.

3. The Sugar Situation

In last year's report, the practice of the utilization of sugars other than sucrose, in the formulation of the ice cream mix, was described in relation to "minimum food solids" regulations. The present limited sugar supply has further stimulated the substitution of other materials for sucrose.

There is, basically, nothing wrong with substituting one sugar for another; or utilizing a less highly refined product, which possesses, in addition to a percentage of (6 or 12 carbon) sugar, a percentage of related polymer.

The usual commercial ice cream contained, ten years ago, between 14.0 to 17.0 percent of sucrose. A quarter to a third of the sucrose was found, in the past ten years, to be replaceable with dextrose, providing a satisfactory mix at slightly lower cost. During the recent years, incompletely converted syrups, containing dextrins, were successfully used to replace sucrose.

In the opinion of this commentator, as long as the materials used to replace sucrose are as wholesome and digestible as sucrose, there is no objection to intelligent substitution, provided adequate declaration is made. It is recognized that a higher solids mix is better than one of lower solids, all other things being equal; and that under the present market, it is extremely expensive to attempt to raise dairy serum-solids by means of delactosed skim milk concentrates.

It is respectfully suggested that the Association's committee study the market's various liquid and solid materials designed to replace a portion of sucrose in ice cream, classify them as to composition and behavior in ice cream, and develop a system of nomenclature so that these items will be described more aptly than by the expression "sugar." The committee may also decide on the policy to be adopted regarding the utilization of substitute materials.

4. Minimum Weight—Overrun Control

Although a few more states, and many municipalities, have adopted laws regulating the minimum weights of standard containers of ice cream, there has not been too rigorous an effort made to enforce them. Those areas which boast of very intelligent "minimal food solids contents" regulations have, in many instances, not enforced these too actively, either.

The purpose of either type of regulation is certainly sound. Enforcement is simple, if some basic principles are kept in mind.

The regulations generally refer to the ice cream which is sold to the ultimate consumer. This eliminates the need for attempting the control of "bulk" shipments, unless the law provides for such. The plant-packaged items in the "consumer" sizes—quarts, pints, half-pints, cups, novelties, etc., are the items which need control. Retail-outlet packaged items generally do not need control, since most retailers squeeze out enough overrun, by their usual "dipping" habits, to meet any "weight" or "minimal solids" specifications.

The adoption of "direct-filling" methods in plant packaging makes it extremely important that such items be watched carefully. We have found that checking the overruns of plant-filled consumer containers at frequent intervals is necessary to protect the consumers from getting more than their share of air.

We take for granted that every container is full. Thus, a pint container is assumed to carry a full 16 fluid ounces of ice cream, even if the packaging machine pistons may not have completed their stroke; or the direct-fill interfered with by an air bubble. We weigh the container full, and again empty, being careful that we have no moisture on the container's surfaces, at either time. The difference in weight is, of course, the ice cream. By using a sensitive scale registering in 1/16 ounce for quart, pint, and half-pint containers, and one registering in 0.1 gram for smaller sizes, we get accurate weighings. The overruns are obtained by consulting tables made

out for converting weights to overruns, for the various sizes of containers.

We obtain the weight of food solids per gallon of ice cream, from the total solids determination, calculated on the basis of the overruns found in the packages. We anticipate that when we will adopt a "minimum food solids" regulation in our own area, it will be necessary for us to point out to some manufacturers the extent of variation of food solids per gallon with overrun.

5. Ice Cream Mix Ingredients

In last year's report, mention was made of the increasing use of "plastic cream" and "butter made from plastic cream" for the ice cream industry. The advantages of a butterfat concentrate which contains phospho-protein in its original percentage ratio to the fat (instead of the altered ratio found in butter) were pointed out as increasing the "whippability" of mixes. The need for using sound dairy products for the manufacture of the plastic cream articles was stressed. (Inferior quality milk and cream do not lend themselves to manufacture into plastic cream, although they can be utilized in manufacturing certain types of butter.) Another advantage of plastic cream was the absence of biacetyl—the flavor constituent developed in butters through the conversion of citrates by the organisms of butter cultures. (A biacetyl-containing butter, although very satisfactory for table use, is unsatisfactory in ice cream manufacture, since the biacetyl transmits a "butter" rather than a "cream" flavor to the finished product.)

The recommendations of this commentator last year asked that the Committee standardize practices regarding the use of plastic cream and butter made from plastic cream. So far, very little attention has been given to this point, but it is hoped that the next few months will see something done definitely in this direction.

Dried buttermilk powder is another ingredient whose utilization in the ice cream mix is receiving serious consideration, at this time. It is well known that in the process of churning cream to butter, a portion of the phospholipin involved in the stabilization of butterfat globules leaves the fat to go into the buttermilk. The poor homogenizability of mixes constructed from butter, and the poor whipping has been explained as being related to this phospholipin deficiency. It is not illogical to expect that the incorporation of buttermilk solids into a mix made with butter should improve its characteristics. Many investigators have found that butter mixes are improved by such addition.

In today's market, a premium is placed on whole and skim milk concentrates through the demands of the "lend-lease program." Buttermilk from the butter manufacturing area does not at present have a large field of utilization. This commentator suggests that since dried buttermilk powder can be used successfully in the manufacture of ice cream, the Committee give this product its consideration during the next year, and arrive at standards for its employment.

6. Plant Improvements

There is no need to talk about the impossibility of getting metals for fabrication into new equipment for ice cream plants. Everyone who is in health control work knows from his own experience that adequate priorities are impossible to obtain.

This is no reason, however, for health officers to fail to demand that equipment which is at present operating in plants be kept at other than its peak efficiency, and that sanitation standards be not lowered. A plant's facilities must be kept up to standard at all times. Walls, ceilings, and floors which have become porous can be repaired without a priority order. Equipment must be cleaned directly after its use and sterilized immediately before its re-use. Although the manpower shortage is recognized, the development of efficient cleaning methods and sterilizing procedures will permit satisfactory cleaning, in spite of inexperienced workers. The present situation places a greater responsibility on management. Where untrained help must be used, it is the foreman's duty to see that the workers are instructed soundly, before assuming their responsibilities. It is important, too, that the foreman check the work of plant personnel before their release. It is to be expected that the next year or two will see the situation getting worse, rather than better. It is doubly important, therefore, that all new employees be schooled thoroughly, and the foreman adopt a regular checking procedure to prevent the development of a situation where an untrained worker is to teach another inexperienced helper.

7. Sanitary Control

The cleaning problem, when neglected, gives rise to the presence of excessive numbers of thermoduric and thermophilic organisms in the freshly frozen ice creams, and to high coliform contents in the finished product. The coliform content was discussed in No. 1 above. Thermophilic organisms are propagated primarily through the establishment of a "milk stone film" on hot equipment lines. In order to prevent such proliferation, the cleaning crew must be checked regularly, to see that milk stone does not accumulate at any portion of the processing system. The use of "soft" water is of fundamental importance in decreasing the deposition of the salts referred to as "milk stone."

Thermophilic organisms can be expected to be present in ice creams fabricated from pasteurized mix ingredients, but the levels of thermophilics so encountered are very minor compared to those arrived at when mixes are "reprocessed." Control agencies must bear in mind the ingredients used in the mixes from individual plants, and should chart the usual concentration of thermophils to be able to distinguish when faulty plant practices have been responsible for unusual concentrations.

8. The Food, Drug, and Cosmetic Act

The standards for the identity of ice cream, as established by the State Department of Health, in conjunction with its recent Food, Drug and Cosmetic Act, warrants serious consideration by all who are involved in the public health control of this product. It is respectfully suggested that all health officers work to the goal of providing consumers at all times with the best type of product obtainable. Let us recognize that the next few years will bring with them many unusual problems. Let us keep faith with our laws and with consumers by cooperating with each other and with the industry, to the best of our abilities.

REPORT OF L. C. BULMER, BIRMINGHAM, ALABAMA

In the midst of world chaos, and at a time in this country when we are seeing many non-essential industries fast disappearing, or otherwise their transformation to some more practical purpose connected with the War Effort, there are those among us who watch with the critical eye of amazement the present expansion and prosperity trend of the ice cream industry throughout America.

Such expansion of this particular industry is not, of course, for the purpose of alleviating the hunger of the starving populations of Europe and China, or for the use of our soldiers now fighting in the sun-scorched deserts abroad, many of whom, if they did but know it, have perhaps eaten ice cream for the last time in their lives. On the contrary, this greater manufacture of ice cream and its associated novelties is due to the sudden increased spending power in America, and to the more abundant use of the product as a confection in the home

by way of giving sugar rationing the run-around. And this, of course, is in a country which would still constitute the best fed nation in the world today, even though ice cream were suddenly and permanently discontinued for the period of the duration.

Sentimentally, we have come to regard ice cream as a typical American institution which has grown by leaps and bounds ever since it was introduced from Europe to this country, more than a century and a half ago. From a nutritional aspect, we now recognize ice cream in itself as a highly nutritive and relatively cheap product, composed predominantly of concentrated dairy products; although this does not necessarily apply, in all respects, to some nickel novelties with which the ice cream industry has become burdened and cluttered up, particularly in the past quarter of a century. Then, too, there are certain sherbets and a number of flavored sweetened water-ices which the ice cream industry manufactures and sponsors, that can scarcely be set forth as shining examples of either cheapness and nutritive value in the true sense of the terms. And, in addition to the purely sentimental and nutritional phases of the ice cream question referred to, there is the broader and more serious economic angle to be considered at the present time.

Up to the present, the ice cream industry in this emergency has largely conducted a policy of "business as usual," and even to the embarrassment of some of its best friends, including the Government of this country, has followed the-war-can't-hurt-us sort of attitude. It is true, to be sure, largely through necessity, that the ice cream industry has recently found substitutes for cane sugar in the form of glucose, corn sugar, honey, and indirectly, through the greater use of sweetened condensed milk, while, in addition has succeeded, in part, in finding substitutes for cocoa and chocolate. But, all this has been done more or less as a cold-blooded business proposition, in an effort to evade, rather than to squarely face, "the devil" for a showdown.

Those of us who hold ice cream in high esteem, both as a food and a confection, must necessarily regard with some degree of disappointment and alarm the present trend of, shall we say, rather vulgar increased per capita consumption, and in consequence, the corresponding expension of the industry itself. Why? Well, firstly, because such increase is out of all proportion to the relative importance of needed and valuable dairy products entering into the manufacture of ice cream, such as evaporated and condensed milk, milk powder, and butter, which, contrary to ice cream, are readily transportable for consumption abroad, and which at present, in this total war, if not world revolution, we should now be finding technical ways and means of building up reserves, for the future, in hitherto undreamed of quantities; secondly, because expansion of the ice cream industry is putting a severe extra burden on the already strained transportation system of this country; thirdly, because such expansion absorbs more of our now scarce and precious labor in this country; and fourthly, because increased manufacture of ice cream is greatly taxing the life of pasteurization equipment, which should now be conserved by all means, lest, before this war ends, we may need it to transfer to the fluid milk industry to safeguard against its complete jeopardy due to the growing serious shortage of such equipment.

These are but a few of the thought-provoking factors involved in the present ice cream problem that undoubtedly must be in the minds of many who are persuaded to the belief that this war may be a very, very long one in which, as yet, we are not up to our ankles.

What is the answer? It would seem, at least, that all governmental officials have a right to look to the ice cream industry for more cooperation and expect it to take a more consistent long range view of the dark picture which lies ahead.

To this end, it would seem that the first step should be for the ice cream industry to clean house of its countless so-called nickel ice cream novelties and water-ices, and to revert back to the more conservative manufacture of bulk ice cream in a manner as to relieve labor, equipment, and transportation problems. Such a step, in addition, would relieve serious congestion of operations in the vast majority of ice cream plants in this country, a factor which frequently constitutes a potential public health hazard, due to its rendering cleansing and sterilizing of equipment more difficult.

Beyond this, it would appear a question largely of careful planning with a view to insuring the ultimate survival of the ice cream industry on a sound footing until that time when, at long last, this world conflict may one day come to an end. And, undoubtedly it would be both in better taste and more financially sound in this emergency to do this voluntarily now before governmental economists are obliged to step in and to hasten such steps in a manner which may perhaps leave little or no time for due consideration as to the best manner in which to effect necessary retreat for the duration.

In the meanwhile, those of us who are doing our "fighting" at home, and are being allowed to rest our bulging stomachs through over-eating in comfortable beds, should be required speedily to discontinue our selfish guzzling of vital dairy products now being extravagantly used in the manufacture of ice cream in order that they may be put to better use in the War Effort, and the surplus stored away to feed millions upon millions in a famine-stricken world that will cry for succor from America at the crack of dawn on Armistice Day, when ships of mercy may once more ply the seven seas in safety—and will, if they have a cargo!

REPORT OF JOHN M. SCOTT, GAINESVILLE, FLORIDA

The regulation of the manufacture of frozen desserts in Florida began in 1929 with the passage of the Florida Ice Cream Law. Under this law, the provisions of which were very limited, the butter fat content of ice cream was brought up to a recognized standard. Prior to this time any frozen milk product was sold as ice cream regardless of the amount of butter fat contained therein.

The second accomplishment that could be attributed to the 1929 law was the pasteurization of all ingredients in the ice cream except the flavoring, fruits, and nuts. Prior to 1929 a properly pasteurized mix was almost unknown except in the large ice cream plants.

The sanitary regulation of the Florida ice cream industry was accomplished by the passage of the Florida Frozen Desserts Law in 1933. This law and the regulations adopted from time to time have been adequate for the control of the sanitation so vital in the manufacture of food products. The regulations recommended by the Committees on Sanitary Control of Ice Cream of the International Association of Milk Sanitarians and the International Association of Ice Cream Manufacturers have been in effect in Florida, with minor changes and only a few additions, since 1933. No change whatever has been made in our regulations since December, 1939.

One regulation of sufficient importance to warrant special mention was that put into effect November 3, 1937, authorizing the regular inspection of the source of supply of the milk and

cream used in the manufacture of ice cream and the plants where ice cream or ice cream mix is manufactured. No ice cream and very little ice cream mix is shipped into Florida from other states, and the cream that is used by Florida manufacturers comes from approved sources only. This is an important contribution to the high quality of Florida ice cream.

In Florida "ice milk" may be sold if properly packaged. The enforcement of the ice milk requirements has not been too difficult, and we believe the public is fully aware that this product is not ice cream.

Ice milk cannot be sold in bulk; dipping it for the purpose of making mixed drinks is prohibited. The package must be plainly labeled with the words " Ice Milk," and the name and address of the manufacturer must be shown. Imitation ice cream cannot be sold in Florida, so there is little chance for violations of the ice milk regulations. Frosted Malted Milk, or Frozen Malted Milk, must conform to ice cream standards.

It did not take long to bring the Florida ice cream maker into line when a State butter fat standard was established. At the present time only an occasional sample is low in fat, and a reminder to the manufacturer is all that is necessary to get him to adjust his formula.

The present degree of sanitation existing in the Florida ice cream plants was not achieved as quickly as the standardization of the mix. Our first task was to clean out the back rooms in many cold drink shops. All manufacturers had to equip their places with hot water and steam for washing and sterilization of equipment. If the plant was not equipped with a pasteurizer, the operator had to purchase a pasteurized mix from an approved source.

The larger plants in Florida installed the equipment required by the new regulations and have been continually improving their plants, installing up-to-date equipment as required from time to time. Many of the small operators discontinued the manufacture of ice cream after the regulations were put into effect and began to buy their ice cream.

The counter-type ice cream freezer has been a problem in Florida as well as in most other states. Many counter freezers are installed in drug stores and other stores where the manufacture of ice cream is of only secondary importance to the owner or manager. Others are installed in small cold drink stands. Space is at a premium in practically all of these stores, and it is imperative that the ice cream-making operations be protected from the coughs and sneezes and wandering hands of the customers.

Each freezing unit and hardening cabinet must be completely enclosed with suitable impervious materials, the enclosure being large enough to accommodate the operator. The enclosures are frequently of glass with not more than two serving windows. These serving openings are not more than eighteen inches in width and are not directly in front of the freezer or dispensing cabinet. The floor of this freezing room must be of a material that will not absorb moisture and can be easily cleaned.

For cleaning and sterilizing, the counter freezer operator must have a metal wash sink sufficiently large to permit the submerging of the dasher in hot water, as well as brushes, alkaline washing powder, hot water, and steam. The freezers and accessories must be dismantled and valves taken apart and washed and sterilized after each day's use.

Frozen malted milk machines must be installed and operated in the same manner as other counter type freezers.

Due to the great numbers of transient ice cream manufacturers who migrate to Florida during the winter season each year it was necessary for us to establish regulations dealing specifically with this type of installation. Practically every fair, circus, and carnival had one or more concessions where frozen desserts were made. Though the customers bought freely of these inferior products, it was necessary to take steps to protect the public from the possible illness that lurked in every mouthful.

Florida requires that all transient manufacturers pay a ten dollar license fee for each stop they make within the State. This discourages the less desirable operator.

These transients must sell only ice cream made from pasteurized mix purchased from a licensed manufacturer. These operators have a particular bent for mixing up some strange concoction in their trucks that would not comply with any law or regulation. They have no satisfactory means of protecting the various ingredients of their mix from contamination as they move from state to state and town to town, and they have no means of pasteurizing their mix as required.

The ice cream mix that they purchase must be stored at a temperature of 50 degrees Fahrenheit or lower and must be protected from contamination. No ice cream may be put through the freezer a second time.

The freezing operations must be enclosed in a manner very similar to that required for counter-freezer installations. The machines must be of an approved type that can be easily cleaned. Freezers and accessories must be dismantled and valves taken apart and thoroughly washed and sterilized after each day's use. For cleaning and sterilizing, a metal wash sink, brushes, alkaline washing powder, hot water, and steam must be provided.

Though the Florida restrictions on transient ice cream manufacturers are numerous and rigid, they are not prohibitive, as is shown by the fact that twenty-six licenses were issued to seven operators between October 20, 1941, and May 2, 1942. These inspections consume a great deal of time during our winter fair seasons, but the time is well spent if we prevent one epidemic in twenty years. We do not know of a single epidemic on record that has been traced to ice cream in this State, and we will do our level best to preserve this record in the years to come.

F. W. Fabian, *Chairman*
Ralph E. Irwin — M. R. Fisher
Andrew J. Krog — L. C. Bulmer
John M. Scott — A. C. Miller
R. V. Stone — H. L. Delozier
W. C. Cameron

Effect of the War Situation Upon Equipment and Materials

O. K. Burrows

Public Relations and Personnel Director, Cherry-Burrell Corporation, Chicago, Illinois

The first effect of the war on the manufacturers of dairy equipment was to establish virtually two headquarters for every company. The usual head office remains at the old stand, but is of much less importance than in the past in directing the design, manufacture and sale of dairy equipment. The other office, and the more important today, is in Washington. Many agencies are attempting to direct our business—some old established ones such as U.S.D.A., U.S.P.H.S., Bureau of Foreign and Domestic Commerce, etc.—and a huge new one, the War Production Board, created to gear out total national production to winning this war.

The future of the dairy industry, not only until Victory, but long thereafter rests in many hands in Washington, but at the moment primarily with WPB, in its various departments.

Washington is a crowded city. Housing is a real problem. Hotels are jammed day and night. Long distance circuits sag with passioned pleas for help every day. Between 4 and 5 P.M. it is virtually impossible to find a taxicab. Office space for government agencies is at a premium—you find a man in one building today and gone tomorrow—to be relocated if you're lucky. The miracle is that so much has been accomplished by WPB. They face the greatest material procuring, manufacturing and transportation job in the world's history, with an organization feverishly whipped together in less than a year. Even our greatest industries—the far flung U. S. Steel, General Electric, and General Motors, old, established, seasoned and proven—are not infallible. So we do not find perfection in Washington but we expect it nevertheless.

Many industries, many companies, large and small have gone into war work or have gone out of business. You have seen this in your home city. Men are paying for our apathy and unpreparedness.

Metals

Dairy machinery uses large quantities of critical metals in normal times. Stainless steel predominates in most machines. It is eighteen percent chromium, 8 percent nickel and the balance iron. When General Jonathon Wainright was forced to surrender on Bataan, again due to lack of preparedness, we lost over one-third of the world's supply of chromium, and over half of America's supply. On good authority, it is claimed that if we should reconquer the Philippines tomorrow, it would take a year and a half to rebuild roads, storage bins and shipping docks left in ruins last April, and even though most of our nickel supply comes from neighboring Canada, practically every pound of nickel is needed for high test steel, armor plate, ordnance casting and a million other "shooting war" articles.

So early this year a WPB restrictive order, M-21-D, was issued by the Alloy Steel Branch: "No person shall consume, use, process, fabricate or deliver corrosion or heat resisting alloy iron or alloy steel containing 4 percent or more of chromium, except on a preference rating of A-1-K or higher." Later, on appeal, certain machines were released for manufacture, but only from such inventory as manufacturers had then available. However, this machinery could be and can now only be delivered when allowed by WPB. As a result, most dairy equipment fabricators had to lay men off in March and April, 1942, losing many to other seemingly more essential industries.

Then came the restrictive order on copper usage. Here again, the industry cooperated by cutting out many uses of copper (bronze) such as for trim, rails, decoration, etc. In addition, the overall use of copper, including its use in brass, bronze, and nickel alloys had to be immediately reduced by at least 30 percent in pounds. It was claimed by the lecturers on material that war needs for copper in 1942 would be 1,200,000 tons and the total refining capacity of the nation's producers early in 1942 only totaled 800,000 tons. So the dairy industry has had to get along virtually with copper, brass, and bronze in inventory.

Machinery

Knowing these conditions, and the equally alarming situation with regard to tin, zinc, lead, rubber, aluminum and other dairy materials, all reputable manufacturers and their jobbers in March, April, and May, 1942, tried to enforce a self-imposed priority system on all sales of dairy machinery. The buyer's pressure was great. Those who had delayed changes in plants and processing rooms, rushed in to get their needs covered. Then came a request—yes, a demand from WPB—to report all equipment sales, and the percentage sold as rated and unrated orders. This survey showed so great a percentage of machinery moving into plants without rating that WPB immediately froze all equipment orders then on file with all manufacturers under limiting order L-83, as amended, on May 18, 1942.

This order prohibits the buyer of dairy equipment from purchasing any piece of new processing equipment costing $300 and over without an adequate priority rating issued by WPB. It also prohibits the sale of all used or reconditioned equipment without proper priority ratings. This is true whether between dealer and buyer or between two dairy plant operators, if the honest price is over $300.

Many processors in your cities, with equipment on order, thus found that they could not get their orders filled. The WPB ruling, of course, carried an appeal privilege, either on the part of the equipment manufacturer or the dairy products processor, but the results of appeal were not too satisfactory.

And so we come to the present. It is extremely difficult to get raw materials, even alternates. Stocks of finished or released machinery vitally needed for emergency breakdowns, for feeding our armed services, for feeding and keeping healthful desperately needed war workers, for manufacturing for Lend-Lease, are rapidly being depleted. A complicated system for allowing purchase of materials known as the PRP plan under suitable priority ratings has proven entirely inadequate.

Repair and Replacement

Requests for materials for the fourth quarter of 1942, to be used largely in the making of necessary repair and replacement parts, are reported by most manufacturers as coming back from Washington, cut down anywhere from one-half to one-tenth of the quantities requested.

Folks in Washington have said all along that the dairy industry is essential and vitally needed to help feed our fighting forces, war workers at home, as well as our allies. It is high time that a mighty leader in Washington—a Moses or a Solomon—stepped forth and assumed the responsibility of seeing that needed repair parts are provided and that a list of machinery be asked for and materials provided to

* Presented at International Association of Milk Sanitarians 31st Annual Convention, St. Louis, October 31 1942.

protect our vast dairy products production in 1943. If it is not done soon, it will be too late. Already most machinery manufacturers are hard at work on contracts for war work, to keep skilled men and costly machines busy. When these jobs start on the production of "shooting war" materials, neither the army nor the navy or anyone else will let a lathe making anti-aircraft gun parts be stopped to produce parts for a flow diversion valve.

Assemblers working on airplane parts, running into thousands of sub-assemblies, can not be stopped to turn out a couple of pasteurizers. An unofficial survey estimates that already 75 percent of the work hours of the dairy equipment industry are actually spent now on out-and-out war work.

Where Inspectors Can Help

Here's what you, as health officers, sanitarians, public health workers and inspectors, can do to help your plant owners get *needed* equipment to meet the swelling demand:

1. Be as lenient as possible in your inspection under present conditions, commensurate with safeguarding public health.

2. Advise and guide your plant owners in repair and replacement of equipment. Keep reminding them to repair overworked equipment before it breaks down.

3. Uurge your plant owners to run longer hours if possible rather than increase equipment capacity.

4. Get your advanced practices and new ordinances on the statutes, then make allowances to suit the present situation.

5. When a real need for equipment exists and when public health is really in danger, then insist on new equipment. Help your plant owners by writing letters supporting either their PD-1A or PD-414 applications. Be specific, give facts, write a full report as to why change is necessary. There is still some equipment available. WPB officials do not want epidemics to cut down war production anywhere due to a contaminated milk supply increasing "absentee" reports.

It will help if your letter is notorized, thus avoiding fear on part of WPB officials that case is not really justified.

6. Every plant has lost skilled manpower. Help your plant owners by making helpful suggestions to "green" help. Help educate them to dairy industry sanitation standards.

Manpower

Another effect of the war situation is loss of manpower in our fabricating industry through: (1) Enlistment and draft of skilled workers and, (2) Loss of men to other industries in war work who are paying unusually high wages for welders, grinders, machinists, engineers, foremen, etc.

Unfortunately, women workers are not easily adapted to the highly skilled mechanical and assembly operations in making dairy machinery.

Every manufacturer has a responsibility in taking care of the machines in the field bearing his trade mark. This is a really troublesome problem today when dairy equipment service men and erection engineers can demand "real" wages in war work. Yet we must carry this responsibility.

Substitute Material

The engineers and research people in the dairy equipment field have been busy trying to find and develop alternate materials. Specifications have been written and rewritten. The aim at first was to have the alternate material as suitable or even more suitable than the material then used. As the metal situation has become more critical, the question has become one of finding any suitable material that will work. If stainless steel is not available for some part in the milk zone and bronze or nickel alloy cannot be used, it is better to have a part made of cast iron heavily tinned or chromium plated than to have no part at all.

For example, take a storage tank. The lower jacket has to support the weight of the tank and the milk. Therefore, between the lining and the jacket, you need a substantial insulation—cork. And there is still some cork available, but it must be conserved. Hence, the lower half of the tank will be insulated with cork as long as the supply lasts and the upper half of the tank will be insulated with fiber glass or rock wool or some suitable insulation, which does not have to carry weight but which will keep the product cold.

Phenol-formaldehyde plastics are being used for agitators, valve handles, cover handles, pump impellers, pump covers, switch push buttons, oil viewer and filler caps, name plates, and decorative trim. These plastics are hard, smooth, non-porous and can be made extremely colorful. However, rather careful investigation has to be made of many classes of plastic materials when thinking of usage in the milk zone. Careful checks must also be made with regard to effect of washing and particularly, hot water and steam sterilization.

Stainless Steel

When stainless steel was first introduced to the American market, it was as "straight chrome." There was no nickel used in the mixture. It was discovered by an Englishman. Shortly afterward, however, the Krupps, in Germany, found that the addition of 8 per cent of nickel to the straight chrome mixture made a stainless steel which was more workable. It would weld better and handle better. It was easier to heat, easier to roll, easier to grind and easier to polish. Therefore, the original straight chrome stainless steel was dropped in the early 30's.

However, because of the present nickel shortage, due to so much production being needed for war materials, recent announcements from WPB indicate that possibly the use of straight chrome in the dairy industry may again come to pass. Two sheets or two pieces of sanitary tubing, the first being of chrome steel and the other chrome nickel steel, look just alike. They polish just as well and can be made smooth and sanitary. They seem to pass the tests for corrosion and, in the light of present welding techniques, seem to handle just as well. You cannot tell the two apart except by putting a magnet on one and then the other —the straight chrome is magnetic, whereas the chrome nickel steel is non-magnetic. Tests on straight chrome steel for corrosion in an accelerated lactic acid immersion test for over 24 to 48 hours seems to indicate the metal is acceptable. The effect of washing powders, citric acid, buttermilk, fruit juices, and chlorine compounds indicate that it stands up quite well.

Chrome steel was deserted back in the early 30's for use in manufacturing dairy equipment because, at that time, in the "melts" or "heats" in the steel mills they were not able to get the carbon uniformly distributed through the sheets or tubes. Thus, certain hard and soft spots developed. This would result in a fracture or crack in the sheet during fabrication in some instances. However, steel metallurgists, in recent years, have been able to control their manufacturing technique to such an extent that in straight chrome steel, they now offer a material which can be drawn in a tube or rolled into a sheet and be an acceptable alternate material.

Aluminum

Alumbinum has been practically impossible to obtain. Yet, in the past it has been used in much dairy equipment. Aluminum paint is impossible to obtain. However, recent word from Washington indicate that some secondary aluminum may soon be made available to our industry.

Tubing

It is virtually impossible to obtain sanitary tubing in metal from any manufacturers today. In order to get tinned copper or nickel alloy tubing, it is necessary to get a directive letter

from the War Production Board, countersigned by the Army and Navy Munitions Board, instructing the mills to put this tubing on the manufacturing schedule. All such manufacturers have such a demand for their products on super-high ratings as to virtually make it impossible for the dairy industry to obtain these products. On stainless steel tubing, the situation is equally bad. At the present time, dairy products processors are being served from stocks which dairy supply houses laid in. There is no new stainless steel coming from the mills. In fact, one official in Washington has indicated that one hope in this direction is possibly the use of straight chrome steel tubing, which may be made available some time during the next six months.

There has been considerable publicity in the trade papers in recent months relative to Pyrex glass tubing. Your own publication, the JOURNAL OF MILK TECHNOLOGY has carried a description and illustrations showing the methods of cutting, beading and preparing this tubing for use in dairy plants. The tubing is scratched with a diamond point, sheared off by heating with a hot electric wire and the application of cold water. The end of the tube is then heated up with a flame to approximately 1500 degrees to produce fluidity in the glass. Rapid rolling or spinning of the tube at this stage produces a bead on the end. A reclaimed rubber gasket then fits over this bead, followed by a Bakelite follower and then a standard nut can be used for completing the union. The tubing is smooth, transparent and easily kept clean. Naturally, it takes especial handling in the plant because the strength of glass depends on the finish or smoothness of the surface. Scratching or bumping weakens the tube and eventually leads to breakage. The tubing is not recommended for close hookups between pieces of equipment where contraction and expansion during heating and cooling or hot water and steam sterilization causes a shift of the equipment because the tubing will not spring or bend. The tubing also is not recommended by the manufacturers for being hooked up to pumps or homogenizers where vibration takes place. It is primarily recommended for long lengths, carefully and properly supported, preferably on special hangers suited to hold glass tubing.

Although this tubing has been talked about for a considerable number of months, it is not yet available from the manufacturer. Therefore, no dairy supply houses, at the moment, have this tubing available. Prices on glass tubing have not yet been released to the equipment and dairy supply houses.

PLASTIC

Another interesting development is tubing and pipe made of Saran plastic, manufactured by the Dow Chemical Company of Midland, Michigan. Saran tubing is made in sizes from one-eighth inch to three-quarter inch outside diameter. It is a tough thermo-plastic, especially made to replace strategic materials such as aluminum, stainless steel, nickel, copper, brass, tin, and rubber. It is resistant to most oils and chemicals, gas, air, water and other corrosive materials. It can be flared and used with fittings made of black Saran. It does not burn and is heat resistant to approximately 175 degrees. In the dairy industry, it will undoubtedly be widely used for oil lines to remote bearings, for drip streams of chlorine solutions and to handle other corrosive chemicals.

Saran is also made in pipe comparable to extrastrong steel pipe in sizes up to 2 inches. The dimensions of the pipe duplicate those of extra-strong steel pipe. It is claimed that this pipe can be welded, heated and bent. A wood or hack saw is employed to cut it to desired lengths. Ordinary pipe dies will thread it for application to standard pipe fittings. It is claimed that the basic resin is odorless, tasteless and non-toxic. However, when heated to 150 degrees, in milk, and immersed at that temperature for one hour, a sweetish, smelly odor was produced. An inspection of samples also indicates that it is porous and, hence, not suitable for use with milk.

Various manufacturers of plastic coatings have presented their products to the dairy industry as coatings on mild steel as an alternate in an emergency when more suitable metals are not available. Any metal coated must be absolutely clean. Sand blasting is probably the best. These products are known as Lastiglas, Bishopric, Lithcote and Heresite. They can be classed in general as hard, phenolic formaldehyde type of snythetic thermal-setting resins. It is applied more or less as a coat of paint might be and then baked at mild temperatures. Lastiglas and Bishopric, made by the same manufacturer, are supplied in two colors, the one used more often being a light attractive amber brown. These products have the approximate hardness of brass but are not quite as hard as the normal glass linings, known to the dairy industry. Use of a steel sponge or steel wool for cleaning purposes destroys the original luster. These phenolic formaldehyde coatings show no softening after six hours of boiling. Alkali, in the strength used in dairies, shows no particular effect other than a slight darkening of the surface.

Some publicity has been given to a lactic acid type of lacquer producted by Paul D. Watson, associate chemist in the laboratories of the Bureau of Dairy Industry, Washington, D. C. This material has been experimented with, particularly on milk cans, in the Experiment Station at Beltsville, Maryland. As compared with phenolic formaldehyde coatings, it seems to scuff more easily and powders or whitens under impact. In boiling, it shows fine blisters and softens. It seems unaffected by the usual alkali strengths used in dairies. It does appear to show superior flexibility to the phenol coatings.

SPECIALTIES

In the past, various combinations of copper nickel alloys, made of virgin materials, have been widely used in the dairy industry. Because of the shortage of copper, the supply of parts made from this metal is largely coming from inventory. However, a recent announcement from WPB indicates that secondary copper nickel alloys, which are not particularly usable in the war effort, may be released to the dairy industry as an alternate.

A new pressure control switch has been developed by one of the instrument manufacturers which can be put into a sanitary tee or a sanitary line. It has numerous uses. For example, we know that when milk filter cloths clog up, they will stand about a 15 pound pressure difference between the inlet and the outlet and if the pressure goes beyond that point, the cloth is going to tear and the milk will become contaminated with visible sediment. Putting this device in the line on the pressure or build-up side automatically throws off the milk pump switch and stops the milk flow before the filter cloth breaks.

Or, on a milk cooler where the milk flow inadvertently is stopped and the brine flow continues to go on, difficulties develop in freezing-on of the milk and bleaching and loss of cream layer. This little device in the milk line will act when the pressure builds up and thus shut off the brine pump.

There are innumerable jobs in a milk plant which can be accomplished and handled better by this very simple sanitary pressure switch. It is watertight and can be immersed in a wash sink for cleaning.

Another interesting device is the new inspector's thermometer—the one described in the U. S. Public Health Service Code. It can be used on high-temperature short-time pasteurizing

apparatus to check the recording or indicating thermometers in use. This device will take the place of some of the gadgets you have had to whittle out of corks or one thing and another in order to insert a thermometer to check a temperature operation. This inspector's thermometer can be put in the end of a holder tube in place of the mercury indicating thermometer and actually indicate what is going on in that particular instrument.

SUMMARY

In summing up, during the past several years great progress has been made in the design and the construction of coordinated equipment for processing milk and its products. At the moment, it isn't a matter of disposing of equipment in a normal way but, rather, one of making what we have go further. In the past, milk sanitarians have, in a large measure, been responsible for improvements and changes because of their friendly criticism. At the moment, we ask your cooperation with us and our customers under rather trying circumstances.

Invention and research in the fields of war production are creating tremendous changes. Machines are being improved. For example, drilling holes in an airplane cylinder once took seven machine hours. The auto industry has reduced it to nine machine minutes. Another manufacturer has developed an electrolytic process for tin plating in which a pound of tin goes three times as far as it used to. Ships are being fabricated and built upside down and then turned over and launched. Our own engineers, in the dairy equipment field and our own research people are constantly watching these developments and when Victory comes—as Victory will—it will be found that many of these alternate materials will become permanent in milk processing apparatus of the future.

Milk House Construction, Equipment, and Maintenance

H. A. BENDIXEN

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A YEAR and a half ago our department in cooperation with the Department of Agricultural Engineering at the State College undertook some studies on milk house construction and equipment suitable for Washington conditions.

Location of the Milk House. Because of the delicate nature of milk, the location of the milk house is governed principally by sanitary considerations. Other considerations are the ability of milk to absorb odors and finally convenience to the milk producer. To insure convenience of handling along with sanitary efficiency, the relative location of milk house and barn should be carefully planned in the beginning. For convenience, of course, the milk house should be located near the milking barn or milking parlor. The latter term seems to have been invented by Dr. Harris Moak, Secretary of the Certified Milk Producers Association of America, and as a matter of psychology should be used by us, whenever it is justifiable, because the esthetic nature of most consumers somewhat rebels against having its most important food produced in a "barn."

For sanitary reasons, however, the milk house should always be located upward from the barn, in order to assure proper drainage, and in addition should preferably be situated on the windward side of the barns to avoid the absorption of barn odors by the milk. In no case should the milk house open directly into a stable or a room used for domestic purposes, because of the danger of infection from persons other than regular examined milk handlers, as well as from flies, dust, and odors.

The standard milk ordinance requires that the milk house or milk room must be separated from the barn by at least a corridor with self-closing doors on each end, which will not be open at the same time. To keep out odors the doors should preferably be solid and not merely screen doors. The ordinance permits pouring milk into conductors which are protected between pourings, and also passing the pails of milk into the milk house through self-closing openings not exceeding four square feet in size. Such openings should not be permitted, except at the end of a corridor as mentioned above. The corridor, furthermore, should preferably be completely enclosed to prevent dust from being blown into the pail of milk on its way to the milk room, and it should have tight floors, walls and ceilings to permit thorough cleaning.

The arrangement of having a pouring and straining room outside of the milk room, which prevents the milker from entering the milk room with each pail of milk, is usually desirable. In that case the pouring vat should be located high enough to permit the gravity flow of milk over the cooler or into the separator, but not higher than necessary for the sake of the milker. The pouring vat and conductor opening should be kept covered whenever possible and provisions made for minimizing the splashing of milk as well as for keeping the pouring room in a sanitary condition.

The milk house, of course, must also be located so that water may be conveniently piped in and that a convenient driveway may be provided for the loading of the milk and the return of the containers. The driveway should preferably be hard-surfaced to reduce dust and to prevent mud from being tracked into the milk house.

Attractive landscaping gives an incentive to people to keep the surroundings neat and sanitary.

Size and Arrangement. Milk houses are more often built too small than too large. Ample room helps in keeping appearance neat. Some extra space should in most cases be allowed for expansion. Of course, too much space might be a temptation to use the milk house for purposes other than the mere handling and storing of milk and milk equipment; this should not be tolerated.

The actual size of the milk house depends entirely on the amount of milk to be handled, the method of milk disposal, provisions for heat and power available, and the general arrangement of the equipment. The standard ordinance suggests the following inside milk house dimensions for retail raw milk and raw milk-to-plant dairies:

Milk Output in gallons	*Retail Raw Milk*	*Raw Milk to Plant*
Under 20	12′ x 18′	12′ x 10′
20 to 50	12′ x 20′	12′ x 12′
50 to 100	12′ x 22′	12′ x 14′
Over 100	12′ x 24′	12′ x 16′

The above dimensions are exclusive of space for boiler, fuel, compressor, and brine tank.

Although the standard milk ordinance does not require a two-room milk house when the milk is to be pasteurized, such an arrangement is always desirable to keep the milk and clean utensils away from unclean returned containers, the splash of wash-up operations, gas engines, and other contaminating influences. Self-closing doors should separate the rooms.

Complete floor plans, construction, details, and quantities of materials required for constructing concrete milk houses and cooling tanks of all sizes are presented excellently and reliably in leaflets made available free of charge by the Portland Cement Association of 33 W. Grand Avenue, Chicago, Ill., or their local offices such as are located in the Seaboard Building, Seattle, and elsewhere throughout the country. To obtain individual plans for 1, 2, 3, or 4-room milk houses, ask for their Plans Nos. C 2141, C 2142, C 2143, and C 2144 respectively. I previously submitted (this JOURNAL, March–April, page 113) lists of a great many bulletins available free of charge pertaining to milk house plans, sterilization, cooling, etc., as well as lists of manufacturers of milk house equipment, who are always glad to send descriptive literature, prices, and other information. The Bureau of Agricultural Chemistry and Engineering of the U. S. Department of Agriculture at Washington, D. C., will be glad to send blue prints and lists of required materials for the various plans shown in Farmers Bulletin 1214. For this reason I shall not try here to cover all of the great variety of possible plans and specifications for milk house arrangement and construction, but only point out some of the more important considerations.

Floors. Nothing is of greater importance in the construction of a sanitary milk house than an impervious, self-draining floor. The cheapest of such floors (20–30¢ per square foot), which is entirely satisfactory, is a concrete floor. Highly durable floor tiles, such as the Drehmann tiles which have the advantage of being highly acid resistant and easily repaired, are being used to a considerable extent in various food factories where acid resistance, wearing ability, and appearance are stressed. These floors are excellent, but of course more expensive than concrete. The ordinance accepts brick and asphalt-macadam floors. However these are less desirable. Asphalt floors soften under hot water. They never appear clean and soon become rough and porous.

A good concrete floor should be laid on solid ground covered with a course of well-tamped cinders, and should be at least 5 inches thick. A mixture of 1 : 2¼ : 3 of cement, sand, and gravel in cubic feet is recommended by the Portland Cement Association, to be steel troweled when the mix is quite stiff in order to produce a smooth hard surface. Other recommendations are for 5 inches of a slightly leaner mix (1 : 2 : 4 or even 1 : 3 : 5) to be topped by a one-inch finishing course of one part cement to two parts sand. To produce a durable floor, it does not pay to skimp on the raw materials. The sand should pass a sieve of 4 meshes to the inch, and the gravel or crushed rock aggregates should not be over 1½″ in size. All of these aggregates must be sharp and free from limestone or any organic matter. They must be carefully measured in marked buckets or wheelbarrows and it is particularly important to keep down the amount of water used.

Ordinarily 4½–5 gallons of water are used per sack of cement varying slightly with the wetness of the sand. If with 5 gallons of water the mixture appears dry and stony, use slightly less sand and gravel in the next batch, but do not increase the water, because an excess of water in relation to cement produces a porous, low strength concrete. For maximum strength, mixing in a machine mixer should be carried on for at least 2 minutes. In hand mixing, first combine the cement and sand until a uniform mixture is obtained, then add the coarse aggregate, and finally the water. Since the hardening or curing of the cement is a slow chemical process aided by heat and moisture, the floor should be kept covered with wet burlap keeping it wet and warm for preferably seven days.

Too much attention can never be given to a good slope, which should be ¼ inch per foot with a slightly increased slope near the drain. The floor should be drained through a bell trap in the middle of the floor into a 6-inch glazed drain tile with the tile sloping away at least one foot in 60 feet. Drainage should be carried at least 50 feet away from the milk house and any water supplies. It is best to carry the floor material up on the wall for about three feet to provide a strong easily cleanable wall. Rounding off the corners between floor and walls facilitates cleaning and reduces the danger of cracking.

On loading platforms and in other places where the floor is subjected to heavy wear due to dropping heavy cans and rolling trucks, iron grids may be laid in the concrete. Care must be taken not to let them sink down into the soft concrete but to keep them absolutely flush with the floor surface. For quick patching work, a number of special products are on the market now which seem to be very satisfactory, such as the Ruggedwear Resurfacer of the Flexrock Co. of Philadelphia and other companies.

Walls. Walls should rest on a concrete foundation placed below the frost line 18–24″ deep. This precaution is particularly necessary in wet locations. If frame construction is to be used, the walls should be concrete 12–18 inches above the ground. Inside walls should be tight, and painted with a high grade washable, preferably marine enamel paint, either white or at least a light color to cause a good distribution of the light in the room and to show up dirt. Another excellent covering for walls and metal equipment in the milk house is a high grade quick drying chrome aluminum which gives a high gloss silvery appearance. The molding around the base of the walls may be of a darker color.

Concrete may be painted with a Portland cement paint and a glossy finish may be provided, after the concrete has aged for at least two months, by applying a prime coat of an aluminum pigmented phenolic resin spar varnish and a finishing coat of a high

grade outdoor enamel. A splendid list of whitewash formulas for a great many specific uses is presented in Bulletin 304 D published by the National Lime Association of Washington, D. C.

Roofs. Roofs should prefarably be of the gable type. If wood shingles are used as a roof covering they should be stained to preserve them. Prepared roofings should receive a coating of high quality asphalt paint every second year.

Ceiling. To make it possible to suspend the cooler above the bottler, the ceiling should be 9½–10 feet high. A high ceiling also causes less difficulty due to steam condensation and consequent mold development. A fine economical finishing for milk house walls and ceilings is a moisture-resistant plywood covered with a highgrade washable paint.

Ventilation. Proper ventilation is very necessary in a milk house to remove the steam before it condenses on walls and ceilings, causing mold growth, rotting of wood, rusting of metal, development of odors, and unhealthy atmospheric conditions for the workers. To provide ample ventilation, tilt-in types of windows, louvers in the gables, or roof ventilators may be used. Ventilating flues extending from the ceiling to the roof top should be made of galvanized sheet metal and should have a lot of slope to carry off the steam successfully. Small flues ending at a right angle in the middle of the ceiling seldom prevent condensation unless equipped with a suction fan. Ventilators extending along the full length of the ridge of the roof are very effective where no flat ceiling is used. These ventilators may be in the nature of skylight windows tilting inward or ridge window ventilators opening outward as used on greenhouses, or an open screened ridge covered with an overlapping ridge several inches up. All ventilator openings, of course, must be fly screened. A well constructed or insulated roof reduces steam condensation very much and warm air blown under the ceiling by means of a fan also helps to keep the moisture in suspension until removed.

Lighting and Electrical Wiring. The standard milk ordinance requires a window area equal to at least 10 percent of the floor area, which might be profitably increased somewhat because light is a material aid to sanitation. Skylights are excellent, giving a well distributed light. To be of value, of course, windows must be kept clean.

Artificial lighting must consist of at least a 25-watt light per 100 square feet of floor. For pasteurizing plants the requirement is a 50-watt light per 100 square feet, which would be preferable too for the milk house. A one-inch wick oil lamp is considered equal to a 25-watt light. and a gasoline or gas mantle lamp gives four times as much light as a 25-watt light. Light-colored paint helps considerably in the proper distribution of light.

All electrical conduits and fittings should be of non-corrodible material. For electric coolors and heaters it is best to provide 220-volt current.

Doors and Screening. Flies are the greatest menace to sanitary milk house operation because they are attracted by filth which often harbors disease germs. Consequently doors, windows, and every opening into the milk house should be effectively screened, including skylights, transoms, and drains. Screens should not be coarser than 16 meshes per inch. As an additional aid to keep flies out, the screen doors should swing out and be made self-closing by means of a spring, a pulley and weight, or other means. Poorly fitting doors may be made tighter by rubber strips around the edges. Doors which are opened a great deal may be further protected against entering flies by directing a fairly powerful fan toward the door which blows the flies back. Fly paper, traps, and spraying are other means of combating the fly nuisance. Fixed steam-operated fly-spraying devices used methodically each day are commendable in all milk rooms.

The principal equipment needed in the milk house is that to be used for cleaning and sterilizing milk containers and equipment, for cooling and cold storage of the products, for storing clean containers and utensils, a separator or a bottling machine, and clean cabinets for caps, strainer cloths, and other supplies.

Cleaning and Sterilizing Equipment. An ample supply of hot and cold water is absolutely necessary for cleanliness in every milk house. The essential steps in cleaning milk containers include thorough draining of all milk remnants and rinsing with cold water, scrubbing with a brush and alkali solution, and a second rinse to be followed by sterilization and drying. Large remnants of milk left in the can not only constitute a waste of milk, but unless carefully rinsed out with cold or lukewarm water will quickly foul the washvat and alkali solution and in every case will increase the organic matter and therefore the B.O.D. of the sewage. This may be troublesome in its disposal. Immersing milky containers in boiling water also bakes the milk on the surfaces thus causing the formation of milk stone, especially when the water is somewhat hard because milk stone is a combination of hard water minerals, washing powder, and coagulated milk proteins clinging to the metal surface by the adhesive properties of the proteins. As long as the milk stone is soft it may be removed by means of alkalis. These soften the proteins by increasing the pH. Also, certain wetting agents can force themselves between the metal surface and the film due to their interfacial tension characteristics. If the milk stone is once allowed to dry and harden, only harsh abrasives or organic acid solutions, such as 0.5 percent tartaric acid solution, can remove it.

The scrubbing of utensils should be done with a stiff brush rather than with rags, because brushes are more effective in loosening dirt and are more easily sterilized while a rag easily becomes sour and stale. Two compartment sinks, large enough for the largest utensils, must be provided and in case of chlorine sterilization, three compartment sinks are required.

After cleansing, the container should again be rinsed in clean water to remove the alkali solution which now contains more or less organic matter. If chlorine sterilization is to follow, the presence of such organic matter greatly reduces the bactericidal power of the sterilizer and if steam sterilization is to be applied milk stone is again formed.

Sterilization procedures considered satisfactory by the U. S. Public Health Service are as follows:

1. Exposure in a steam cabinet to at least 170° F. for at least 15 minutes or to at least 200° F. for at least 5 minutes with the thermometer located in the coldest zone of the cabinet.
2. Exposure to a jet of steam for at least 1 minute.
3. Immersion in hot water of at least 170° for at least 2 minutes or exposed to a flow of hot water of at least 170° F. for at least 5 minutes.
4. Exposure in a hot air cabinet of at least 180° F. for at least 20 minutes with the thermometer located in the coldest zone of the cabinet.
5. Immersed in or exposed to a flow of chlorine solution of a residual strength of at least 50 p.p.m. for at least 2 minutes.

The second method has the disadvantage that it may not completely sterilize the outside of the utensils. Which of the above sterilizing procedures is most practical depends upon local considerations. In every case ample amounts of hot water must be available for washing. The amount of equipment to be sterilized determines very largely the type of steam boiler or hot water heater needed. Steam boilers and fuel rooms should always be partitioned off from the milk house because of the difficulty in keeping out dust and dirt. With low-priced electricity available today on many of our

farms, electric boilers and water heaters will no doubt gradually replace other types, thus making for cleaner operations. Because of the convenience and effectiveness of chlorine sterilizers the use of these alone or supplementary to heat sterilization is also bound to increase as their correct use becomes better and better understood.

Sterilizing equipment is available in great variety and cannot be discussed here in detail, but sources of information are referred to below.

Home-made steam cabinets should be lined with non-corrodible metal, should be provided with tight doors, a thermometer near the bottom, and preferably a false bottom with drying coils. Such a cabinet serves as a storage place for the utensils until used. It may be located between the wash room and the milk room so that the washed utensils may be placed into the cabinet through a door on the wash room side and the sterilized equipment may be removed from the opposite door in the milk room.

Cooling and Cold Storage. The number of bacteria in milk under normal conditions is probably affected less by the original contamination during milking and from utensils than by the storage of the milk. The latter may cause tremendous multiplication of the organisms originally present. For that reason immediate cooling to 50° F. or lower is one of the cardinal points in high quality milk or cream production because this temperature greatly retards bacterial multiplication.

Where much cold water is available for cooling, dairymen have a great advantage. For the raw-milk-to-plant producer, immediate cooling of each pail of milk, as soon as it is produced, over a surface cooler, followed by storage in a cooling tank equipped with running cold water, may be all that is necessary, except for the use of a little ice in the tank during hot weather. Directions for the construction of insulated cooling tanks are given in detail in many experiment station and extension bulletins. They may also be obtained from such concerns as the Portland Cement Association. Facilities for the complete draining of the tank, location below the milk house floor for convenience, sturdy construction with angle irons around the edge, and an insulated cover are all desirable features. Electrical units for use in cooling tanks may now be obtained at reasonable prices. One kilowatt is usually considered to cool 100 pounds of milk.

On retail dairies additional refrigeration facilities are definitely needed, and electrical dry storage refrigeration has indeed many advantages. With the development of low priced compressor units as well as low prices for electrical current, most milk producers will soon demand the convenience of electrical refrigeration for their home use and even for sharp freezing of foods, which may all be provided along with milk house refrigeration by a single compressor unit. The storage cabinets may be built locally but, of course, the food compartments must be completely separated from the milk compartment. One of the greatest problems just at present is the high price of insulating cork, which has always been considered the most satisfactory insulating material. However, at this time, highly satisfactory results are being obtained with such materials as Palco Wool, manufactured by the Pacific Lumber Co., San Francisco, Cal., from the bark of California redwood trees, as well as glass wool, Celotex, and even the proper use of dry shavings. The convenience and cleanliness of electrical operation is a boon to sanitation in all fields and is bound to increase constantly. The Maryland Agricultural Experiment Station has at present even developed a small scale electric milk pasteurizer handling 2–12 gallons of milk with satisfactory results, which might become practical for small dairies and even large consumers. The total cost of operation was 0.33¢ per gallon for a 12 gallon batch with a starting temperature of 90° F. and 0.61¢ per gallon with a starting temperature of 38° F. The pasteurizer is described in the *Agricultural Engineering Journal* of March, 1941, and this JOURNAL, **4**, 187 (1941).

Efficient separators, and bottling and capping machines are available through the various dairy supply houses and cannot be discussed here. However, ample provision should be made in every milk room for clean, metal racks for the storage of cans and pails in an inverted position. The can lids should be attached to the cans to prevent their dropping to the floor, or stored in barrels or otherwise undesirable manner.

Milk Houses

Also ample clean and closed cabinet space is desirable for storing bottle caps, strainer cloths, brushes, and other similar supplies.

The discussion of milk house operation might be continued indefinitely. However, for those who are interested to study the subject from every angle, there is available (see above) a list of free literature and the names of some of the many manufacturers who are glad to supply valuable and detailed information.

(The list of Free Literature carried in the March–April issue 1942 was compiled by the author.—*Editor.*)

SALVAGE SCRAP METAL FROM DAIRY INDUSTRY

WAR PRODUCTION BOARD

Over a million pounds of urgently needed scrap metals are expected to be made available to the war production program as a result of a salvage campaign in the dairy industry announced today by the Conservation Division, War Production Board.

The campaign, to embrace about 37,000 dairy plants throughout the industry, is designed to yield large quantities of critical materials from unused and abandoned dairy processing machinery. A minimum of thirty pounds of scrap from each plant has been established as the collection goal.

Decision to embark upon the campaign followed proposals by representatives of the dairy equipment and supplies industry submitted to the War Production Board through the Dairy Equipment and Machinery Manufacturers Industry Advisory Committee. It was pointed out that there are substantial amounts of scrapped critical material in practically every dairy plant which can now be turned to good use in war plants.

Copper, nickel, brass, bronze, and stainless steel—all used in the manufacture of dairy equipment—are the most important metals expected to be made available as a result of the campaign. They will be salvaged from such types of dairy equipment as milk pumps, pasteurizers, vacuum pans, sanitary pipe and fittings, milk heaters and coolers, bottling machines, etc.

The program will cover only milk processing plants—such as bottling depots, cheese plants and ice cream manufacturers. Dairy equipment manufacturers and jobbers are actively cooperating through their sales and service representatives who come into personal contact with plant owners. They will attempt to locate potential sources of scrap and, in instances where only a small amount is involved, will transport it to a central warehouse where it will be held for sale to authorized scrap dealers. Where large and bulky types of scrap are involved—such as vat coils and cooler sections—arrangements will be made for the first empty or partially loaded truck available to pick up the machinery.

Money derived from sale of the scrap will be paid either to the plant supplying the scrap or to the USO. All overhead expenses, including sponsorship of advertising on the program, will be borne by the dairy machinery manufacturing industry.

DAIRY MANUFACTURES CONFERENCE TO BE HELD AT URBANA, JUNE 8-10 BY THE UNIVERSITY OF ILLINOIS

A three-day meeting to discuss technical and management problems of particular importance to the dairy manufactures industry will be held by the Dairy Husbandry Department of the University of Illinois, June 8–10. Field and laboratory problems will be discussed the first day, management problems the second day, and plant production problems the third day. Subjects to be discussed include:

- Interpretation of the methylene blue test
- Testing milk for sediment
- Thermoduric bacteria in milk
- Mold content of butter
- A symposium on the problem of simplifying and unifying our milk quality control program
- The plight of the small business man
- The farm animal in the food production program
- Route consolidation
- A symposium and panel discussion on "Post War Plans to Maintain Industrial Employment and Purchasing Power without Federal Subsidy," led by men of national authority
- Control of body defects in butter
- Problems in the manufacture and distribution of butter
- Wartime production of cheese
- The manufacture of powdered whole milk
- Wartime production of ice cream

For information on hotel accommodations and for further details regarding the conference, write P. H. TRACY, **Department of Dairy Husbandry, University of Illinois, Urbana, Illinois.**

THIRTY-SECOND ANNUAL MEETING, OCTOBER 14 *and* 15, 1943

NEW YORK, N. Y.

Legal Aspects

Invalid Provisions of Milk Ordinance *

Milk—inspection—city ordinance provision held invalid.—(California District Court of Appeal, 3rd District; *Meridian, Ltd., et al.* v. *Sippy, District Health Officer,* 128 P.2d 884; decided August 29, 1942.) An ordinance of the city of Stockton designated as the city health officer the district health officer of the San Joaquin health district, the boundaries of which district were identical with those of San Joaquin County. By the ordinance every person engaged in the production, processing, or distribution of milk for retail redistribution was required to obtain a permit from the health officer before selling, distributing, or offering for sale any milk in the city. The ordinance also provided: "In no case shall a permit be issued to any person, firm, association or corporation to sell or expose for sale or exchange, deliver or distribute any milk in the city of Stockton unless the dairy, source of supply or place of origin is regularly inspected by the health officer or his authorized representatives." The health officer of San Joaquin health district did not inspect dairies beyond the boundaries of his district and, as a result of the ordinance, no dairy, although approved by the State director of agriculture, could bring any market milk from outside the boundaries of San Joaquin County and sell it in the city of Stockton. The appellant corporation owned and operated a dairy in Stanislaus County. This dairy complied with all requirements of the State department of agriculture and the ordinances of San Joaquin County, and the appellant had been granted permits under the agricultural code by the milk inspection services of the cities of Oakland and Los Angeles and the city and county of San Francisco. This appellant desired to deliver milk from its dairy to a plant in Stockton for pasteurization and thereafter for resale through said plant and other authorized distributors in said city holding valid permits. On application therefor a permit was refused by the health officer of the San Joaquin health district because the said dairy was not regularly inspected by him. In an action the trial court upheld the validity of the ordinance, but the California District Court of Appeal held invalid that portion of the ordinance quoted above.

Section 491(b) of the State agricultural code provided that, whenever a milk producer or distributor sold or delivered within the jurisdiction of two or more cities or counties, the director of agriculture, after an investigation and constultation with the health officer of each city and county involved, should designate a county or city to conduct dairy and milk plant inspection. The said section further provided: "All market milk and dairy products so inspected may be sold and delivered within the jurisdiction of any county and city; provided, that applicable local ordinances of such county or city are not thereby violated. The county or city designated by the director to render such inspection shall enforce all applicable local ordinances of each county and city into which such market milk and dairy products are sold or delivered." In compliance with this the director of agriculture had investigated and consulted with the health officers of certain cities, including Stockton, and had designated the health officer of Oakland to conduct the inspection of the appellant corporation's dairy. The quoted ordinance provision was held by the court to conflict with the above statutory declaration that "milk and dairy products so inspected may be sold and delivered within the jurisdiction of any county and city."

Another point passed on by the appellate court arose in connection with the authority conferred on municipalities by section 451 of the agricultural code to provide higher standards for grades of market milk than those provided by State law. The ordinance of Stockton did require higher standards than those required by the agricultural code, but the court, after reviewing the above-quoted portion of section 491(b), pointed out that a State permittee, if he sold milk in a city having an ordinance fixing higher standards, had to comply with those standards and that the State inspector was directed to enforce them. "Therefore, the State law provides a method which permits the free flow of whole milk into the market without unnecessary duplication of inspection without depriving the cities having higher standards of their full protection. This inspection by the designated health officer is State inspection. [Cases cited.] It must be presumed this officer will do his duty." Regarding the enforcement of local ordinances, mentioned in section 491(b), the court said that "to enforce" a law usually meant to cause the arrest and to coerce by "actual force and punishment" but that it did not necessarily imply this. It might mean "to give effect to, to cause to have force." "Section 491(b)," said the court, "deals with permits and it must mean that in issuing those permits the State 'will give force to' local ordinances or 'give effect to them'; therefore, that no permit will issue to sell milk in Stockton unless the municipal standard of requirements be so maintained. The coercion and force to be applied to violators still lies with the city."

The judgment of the lower court was reversed, the quoted portion of the ordinance of Stockton was held invalid, and the appellants were declared to have a right to carry on their respective businesses in Stockton upon compliance with the terms of the agricultural code and the higher standards required by said ordinance.

* *Public Health Repts.,* Feb. 12, 1943.

Filled Milk Prohibited *

Filled with law—held valid—proof as to whether product comes within statute's prohibition.—(Florida Supreme Court; *Setzer et al.* v. *Mayo, Com'r of Agriculture,* 9 So.(2d) 280; decided January 27, 1942, rehearing denied April 3, 1942. A Florida statute defined and prohibited the manufacture, possession, or sale of "filled milk." Filled milk was defined as any milk, cream, or skimmed milk to which had been added, or which had been blended or compounded with, any fat or oil other than milk fat, but did not include any milk or cream from which no part of the milk fat or butterfat had been extracted and to which had been added any substance rich in vitamins. Also excluded from the definition was any distinctive proprietary food compound not readily mistaken for milk or cream and meeting certain specified requirements. The use of chocolate as a flavor was also permitted.

In a suit, which was instituted in the trial court by the commissioner of agriculture, the Supreme Court of Florida had before it for decision the constitutional validity of the act and the remanding of the case to allow evidence to determine whether a certain product was condemned by the act. The defendants admitted that the product in question as such was condemned by the act but contended that the product did not come within the meaning of the prohibition. The appellate court was of the view that the statute was valid but stated that, while upholding the validity of the act, it was conscious of the rule that a valid statute could be assailed by proof of facts showing that as applied to a particular article it was without support in reason because the article, although within the proscribed class, was so different from others in the same class as to be without the reason for the prohibition, the effect of the proof depending on the circumstances of the case. The court said that its opinion was planted squarely on the doctrine of two named cases and that, as it interpreted those cases, it was not sufficient to prove that cottonseed oil and other substitutes for butterfat were wholesome and nutritious. If it is shown, said the court, that in addition to being wholesome and nutritious they are rich in vitamins that are equal to or superior to those found in butterfat and will perform the same function as food elements, they should be classed in the same category and not banned by the statute. "If therefore relators can show that notwithstanding their product is produced by substituting cottonseed oil or some other substitute for butterfat and vitamins it is wholesome and nutritious and that it is equal to or superior to whole milk as a food, the test prescribed in the last two cited cases is met and their product relieved from condemnation by the Act."

* Public Health Repts., February 26, 1943.

JOURNAL OF MILK TECHNOLOGY

Official Publication of the

International Association of Milk Sanitarians

(Association Organized 1911)

The JOURNAL OF MILK TECHNOLOGY is issued bimonthly beginning with the January number. Each volume comprises six numbers. It is published by the International Association of Milk Sanitarians, and is printed by The William Boyd Printing Co., Inc., Albany, N. Y., U. S. A.

Subscriptions: The subscription rate is $2.00 per volume. Single copy, 50 cents.

Advertising: All correspondence concerning advertising, reprints, subscriptions, and all other business matters should be addressed to the Managing Editor, W. B. PALMER, 29 NORTH DAY STREET, ORANGE, N. J.

Manuscripts: All correspondence regarding manuscripts, editorials, news items, announcements, and other reading material should be addressed to the Editor, J. H. SHRADER, 23 EAST ELM AVE., WOLLASTON, MASS.

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Association News

Chicago Dairy Technology Society

Dr. P. H. Tracy of the University of Illinois, secretary of the organization, spoke on "Ramification of the New Ice Cream Order" at the February 9 meeting, which was held as usual in the Hotel Sherman. He illustrated his topic by the use of many different kinds of ice creams.

"Problems in the Butter Industry" was the subject of Dr. H. A. Ruehe, Managing Secretary of the American Butter Institute, when he addressed the group at their meeting on March 9. In his talk he covered the new butter grading system, O.P.A. rulings and regulations, and butter rationing.

On April 13, Mr. Owen M. Richards, Secretary of the American Dairy Association, discussed the "American Dairy Association Promotional Program."

There will be no meetings during the months of June, July, and August.

B. ALDRICH,
Publicity and News Committee Chairman

Iowa Association of Milk Sanitarians

So far as we know Iowa is the only state that does not permit its municipalities to provide for pasteurization by ordinance. If the plant sells skimmed milk back to the farms for animal feed it must be pasteurized, otherwise the animals might get disease. But the city council cannot give this protection to its citizens. It might keep "the little man" from selling a few quarts of milk. We tried in vain to get this changed in the recent session of the legislature.

The state law also denies the municipality the right to employ a milk sanitarian unless he has been a resident of the city for one year. We likewise were unable to get this changed.

Iowa being a great hog state it takes most of our milk to feed the hogs. Thanks to the O.P.A. and the inequitable price ceilings, we may have no milk left for human consumption by fall. We find it difficult to get dairy farms to meet sanitary standards. If they are pressed they quit and feed hogs.

J. R. JENNINGS,
Secretary-Treasurer

Kansas Association of Milk Sanitarians

To formulate plans for the next annual meeting of the Association, the officers and directors met at Kansas State College on April 3. They decided that the meeting would be held for a day and a half at the College on November 18 and 19, 1943. The program, as tentatively arranged, will deal primarily with wartime problems confronting the sanitarian, the dairyman, and plant operator.

W. J. CAULFIELD,
Secretary

Massachusetts Milk Inspectors' Association

At the meeting of the Association on April 7, Dr. J. A. Gamble was honored with the award of merit voted by the Association for his pioneer work in milk inspection in this area.

At the same meeting the Association adopted the following resolution:

"It was voted by the members to go on record protesting against the army regulation which requires that the inspection and/or laboratory control of all milk, milk products, and the inspection of farms and milk plants, to come under the direct supervision of the United States Veterinary Corps, to the exclusion of those health officials whose duty it is to supervise the production and sale of milk in all of our communities and who are well qualified to do such things."

A copy of this resolution has been sent each Senator and Representative from Massachusetts.

R. E. BEMIS,
Secretary-Treasurer

Michigan Association of Dairy and Milk Inspectors

Through the operations of Selective Service and enlistments as commissioned officers, nearly half of the counties in Michigan are without sanitary engineers and inspectors. This enormously increases the work of those who remain.

Transportation restrictions and increased work at home renders uncertain the holding of a summer meeting. The Committee on Improving Manufacturing Milk Supplies has met twice and is progressing with its program. The Bureau of Dairying has been carrying on a cooperative program with the creameries and manufacturing plants for several months. A report on the progress will be sent to the membership within a short time.

The cities in the Detroit area have adopted the policy of interchange of milk shippers between the markets to assist the efforts of the O.D.T. to conserve transportation.

H. J. BARNUM,
Secretary-Treasurer

New York State Association of Milk Sanitarians

In New York City the Executive Committee of the Association met and decided to convert the Annual Conference into a two-day streamlined war problem conference. This is to be held in Syracuse, N. Y., on September 23 and 24, 1943.

W. D. TIEDEMAN,
Secretary-Treasurer

INTERNATIONAL ASSOCIATION OF MILK SANITARIANS

Committee Assignments — 1943

Communicable Diseases Affecting Man Their Relation to Public Milk Supplies

Paul B. Brooks, *Chairman*...Albany, N. Y.
Lloyd Arnold.....Chicago, Ill.
R. F. Cowley.....Havana, Cuba
R. G. Flood.....San Francisco, Cal.
J. G. Hardenbergh.....Chicago, Ill.
A. R. B. Richmond.....Toronto, Ontario

Dairy Farm Methods

Harold J. Barnum, *Chairman*.....
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Merle P. Baker.....Ames, Iowa
J. F. Blacklock.....Hamilton, Ontario
Rex D. Bushong.....Memphis, Tenn.
D. K. Douglas.....Louisville, Ky.
T. A. Evans.....Pierre, S. D.
R. L. Griffith.....Oakland, Cal.
R. M. C. Harris.....Richmond, Va.
R. L. Hectorne.....Bridgeton, N. J.
M. M. Miller.....Bethesda, Md.
J. J. Regan.....Utica, N. Y.

Applied Laboratory Methods

K. G. Weckel, *Chairman*.....Madison, Wis.
L. E. Bober.....Chicago, Ill.
T. H. Butterworth.....New Orleans, La.
John Flake.....Chicago, Ill.
W. A. Hadfield.....Philadelphia, Pa.
George H. Hopson.....New York, N. Y.
C. K. Johns.....Ottawa, Canada
F. L. Schacht.....Albany, N. Y.
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Frozen Desserts Sanitation

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W. C. Cameron.....Ottawa, Canada
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O. A. Ghiggoile.....Sacramento, Cal.
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John M. Scott.....Gainesville, Fla.

Sanitary Procedure

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A. C. Fay.....Boston, Mass.
Milton R. Fisher.....St. Louis, Mo.
A. W. Fuchs.....Washington, D. C.

Geo. W. Grim.....Ardmore, Penn.
M. E. Parker.....Chicago, Ill.
Sol Pincus.....New York, N. Y.
Geo. W. Putnam.....Chicago, Ill.
C. W. Weber.....Albany, N. Y.

Military Commissions

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W. B. Palmer.....Orange, N. J.
Sol Pincus.....New York, N. Y.

Committee to Study Milk Ordinances and Regulations

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K. G. Weckel.....Madison, Wis.
J. W. Yates.....Philadelphia, Penn.

Committee on Resolutions

Ernest Kelly, *Chairman*..Washington, D. C.
All ex-presidents of the Association in attendance at the Convention.

New Members

ACTIVE

Breuninger, Edward, President, Breuninger Dairies, 3015 N. 7th St., Philadelphia, Pa.
Cameron, W. C., Associate Chief, Dairy Products Inspection and Grading Service, Dept. of Agriculture, Confederation Bldg., Ottawa, Ontario.
Clark, Franklin A., Director, Division of Inspection, State Health Department, 519 Dexter Ave., Montgomery, Ala.
Ghiggoile, Oliver A., Chief, Bureau Dairy Service, Department of Agriculture, State Office Bldg., No. 1, Sacramento, Cal.
Hansen, William T., Milk Inspector, Suffolk County Dept. of Health, 15 Pulaski St., Riverhead, N. Y.
Sweeney, J. J., State Dairy and Food Commissioner, State Office Building, Hartford, Conn.
Wray, Walter H., Sanitarian, Cleveland County Health Department, Shelby, N. C.

ASSOCIATE

Anderson, Floyd, Roberts Dairy, Sioux City, Iowa.
Barney, W. B., Jr., Milk Sanitarian, City Hall, Des Moines, Iowa.
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Gard, Paul, Roberts Dairy, Sioux City, Iowa.
Hargrave, E. R., District Supt., Sheffield Farms Co., 114 Erwin St., Boonville, N. Y.
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Holland, L. R., Milk Sanitarian, City Hall, Sioux City, Iowa.
Houk, Dr. W. A., Muscatine, Iowa.
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Kirkpatrick, R. A., Manager, Pet Milk Co., North Prairie, Wis.
Knowles, Captain Jack O., Office of the Veterinarian, Tarrant Field, Fort Worth, Tex.
Kocher, Daniel S., In Charge of Production, 3110 Gilham Rd., Kansas City, Mo.

Marchant, Prof. I. A., Veterinary Bacteriology, Iowa State College, Ames, Iowa.
McGuire, Howard, Milk Inspector, Health Dept., Chamber of Commerce Bldg., Rantoul, Ill.
Nielsen, Stanley, Milk Sanitarian, City Hall, Clinton, Iowa.
Pariseau, Vincent, Plant Manager, Borden's, Farm Products Co. of Michigan, Bad Axe, Mich.
Raphael, Murry H., Chemical Laboratory Asst., New York City Dept. of Health, 1 St. Paul's Ct., Brooklyn, N. Y.
Seyfried, Fred E., Maintenance Engineer, Creamery Package Mfg. Co., 1243 W. Washington St., Chicago, Ill.
Smith, Jack K., Public Health Engineer, Jasper County Health Dept., Webb City, Mo.
Stephenson, M. V., District Engineer, Dist. Health Service, State Dept. of Health, Manchester, Iowa.
Suabedissen, R. T., Secretary-Treasurer, Suabedissen-Wittner Dairy, Inc., 729 N. Brookfield St., South Bend, Ind.
Sullivan, T. Robert, Sales Supervisor, Schwartz Mfg. Co., 1942 Kleber St., N. S., Pittsburgh, Pa.
Wildman, C. M. Laboratory Technician, Box W, Little River Station, Miami, Fla.
Workman, Dr. T. W., Production and Technical Director, North East Division, The Borden Co., 745 N. Ave., Bridgeport, Conn.

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Warren, Jeremiah P., 1126 N. Lawler Ave., Chicago, Ill.
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White, Richard A., 2110 W. Garfield Blvd., Chicago, Ill.
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Wittbrod, Harry, 5214 Cullom St., Chicago, Ill.

"Dr. Jones" Says—*

ONE of my medical journals (I've got it right here somewhere)—it's got a verbatim report of a hearing on "medical manpower" before a Congressional Committee. It took me half the night to read it but I was glad I did. Dr. Parran—he was one of 'em they had testifying there—Surgeon General of the United States Public Health Service. Another was this man Kaiser, that builds a ship a minute—or whatever it is—and the doctor that's in charge of his medical service. They furnish medical care for their workers, Kaiser does, and to a certain extent for their families.

Dr. Parran—they were on the question of how important the health services were, relatively—he'd just cited some figures that showed that "production workers"—sickness and injury among 'em meant a loss of something like 6,000,000 work days a month. Here's a little of it:

Senator Pepper: ". . . the public health then has a very direct relationship to war production and the strength of the nation?"

Dr. Parran: "No doubt of it."

Senator Pepper: "So the expenditure of money for the protection of public health . . . has come now to be a military necessity, has it not?"

Dr. Parran: "It really has."

Then it came out in Kaiser's testimony and Dr. Garfield's (that's his head doctor) that they'd found it profitable not only to provide medical and health services but even to build hospitals at their own expense. Dr. Garfield said that by having thoroughly trained people on the job and getting prompt action in various situations, there was no doubt but what lives had been saved.

And the health departments: it's the same way. They're beginning to realize that it ain't good war policy to cripple 'em by taking their people that're doing specialized jobs in essential lines—letting 'em go in the armed forces. It's not only doctors but sanitary engineers and milk sanitarians and, of course, public health nurses. If their work was ever important it's doubly so now and they can't replace 'em. If they're going to keep the old public health machine running at top speed they don't want any broken gears and leaky valves in it.

Some of these folks—they'd rather be in the army than have people wondering why they aren't. But our patriotic duty, the way I see it, is to be where we're most needed, whether it means going or staying.

PAUL B. BROOKS, M.D.

* *Health News*, New York State Department of Health, Albany, January 18, 1943.

PERSONAL CARDS

Dairy college graduate with M.S. degree wants responsible position as milk sanitarian. Eight years' experience in official milk sanitation work in all its phases in large city milk shed. **Box 1**

Young man, now employed by a milk sanitarian in a public health capacity, is interested in securing a position of a similar nature with a larger salary. Thirty-three years of age, married, no children; college graduate, B.S. degree; ten years' experience in milk work, public health experience, laboratory technician, dairy farm inspector. Draft status at present, 3-B. Would be glad to consider any offers at a minimum annual salary of $2500. **Box 2**