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NOTICE TO MEMBERSHIP–PAGE 285

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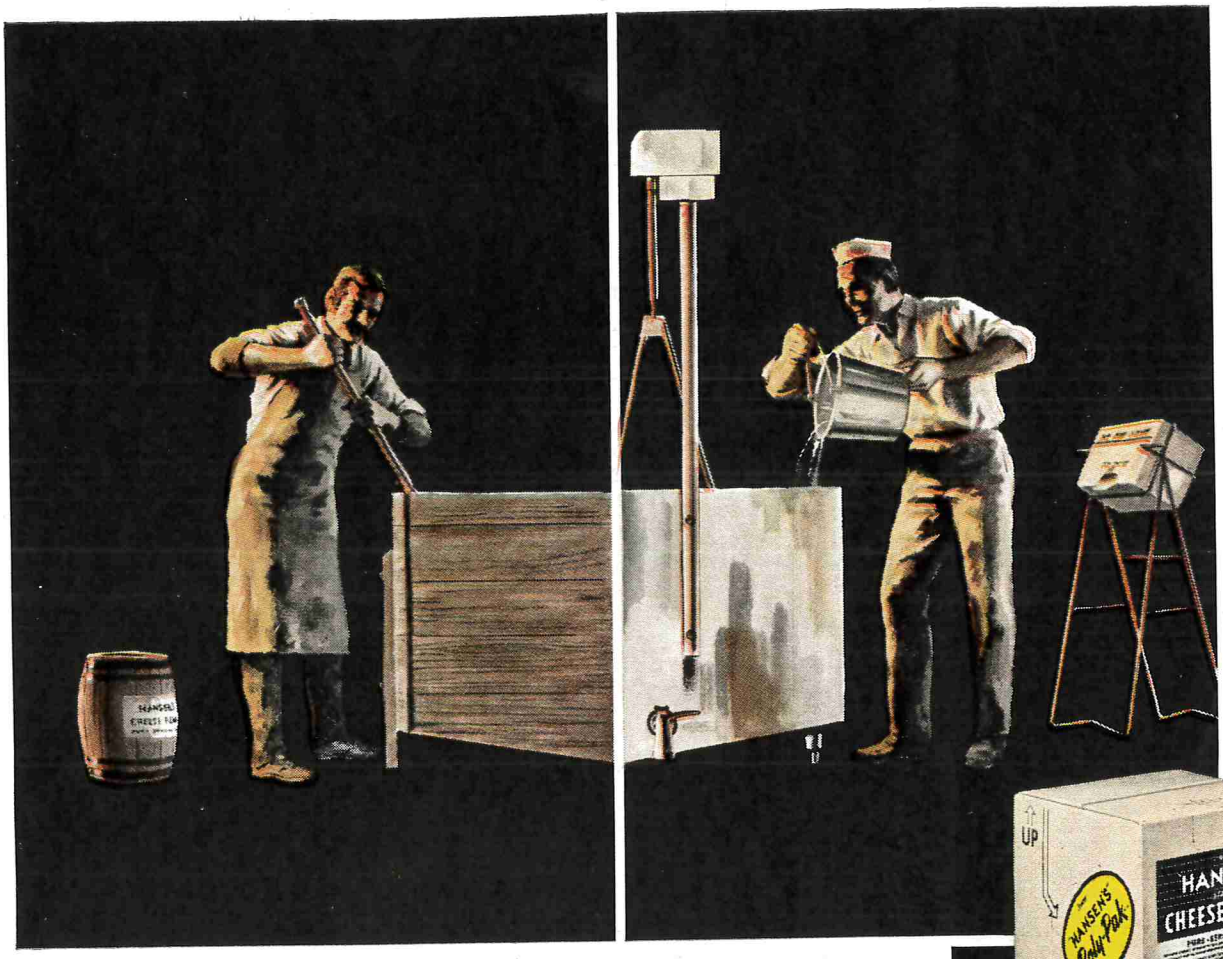

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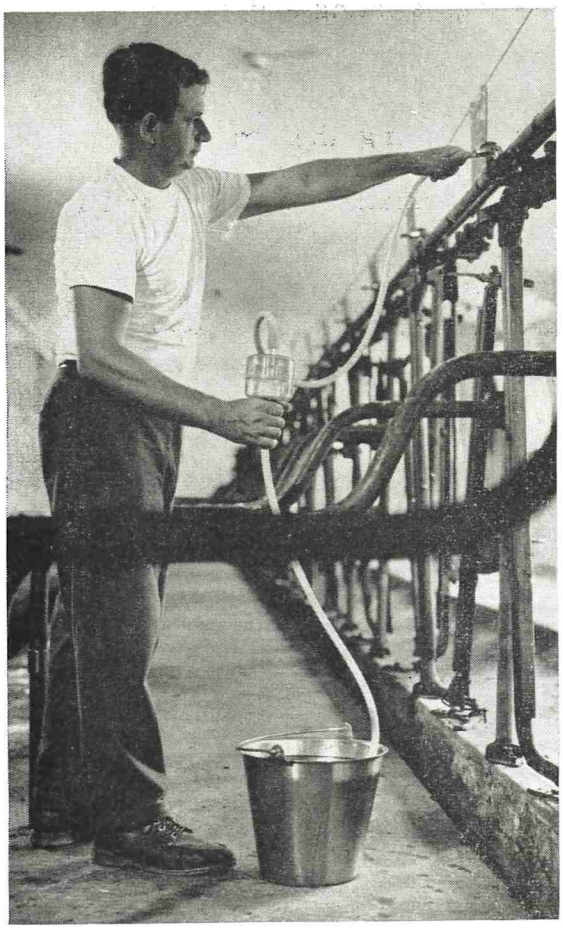

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INDEX TO ADVERTISERS

Sanitarians Need To Participate In The Professional Societies

*George J. Kupchik, Dr. Eng. Sc.**

The recently-published "Health Manpower Source Book on Sanitarians"[1] contains some distressing information. Most sanitarians (63%) are college graduates and almost all have taken many special courses, yet the annual salary is only $5,960 for the "median sanitarian," who is over 45 years of age and has about 12 years of professional work experience!

These data clearly support the conclusions of the "Gross Committee"[2] that there is a need for improvement in the status of environmental personnel by greater recognition of their importance, and compensation more commensurate with their value. The sanitarian is obviously suffering from a failure in public relations. He requires clear-cut identification with a specific kind of work and expanded professional and public visibility.

How is this to be accomplished? To further these ends, the sanitarian must join and participate in the activities of his professional societies. Only through his organizations can he command attention and respect, and obtain the status and influence he deserves and needs.

However, the Manpower Source Book provides information to show that the sanitarian is cavalierly indifferent to his needs. This material was developed by the U. S. Public Health Service from information provided by sanitarians in response to a mailed questionnaire. The basic mailing list consisted of the 9,100 members of the three national professional sanitarian societies, and this was supplemented by lists of sanitarians employed by state, county and city departments of health and by state departments of agriculture.

The eventual master mailing list totaled approximately 16,000 names. Nearly 11,000 persons (almost 70%) responded. Yet only 55% of the members of the sanitarian societies returned completed questionnaires!

About one-fourth of the respondents were not affiliated with any national society. Since some of the larger municipal health departments failed to provide lists of their sanitarians, and most of these employees are not society members, it can be reasonably assumed that at least 50% of all sanitarians are unaffiliated with any national professional society.

The failure of sanitarians to join their professional organizations, and the indifferent response of society members to the survey, clearly indicate the lack of active interest of many sanitarians in their own profession.

Without stating this to be true, I would like to suggest that possibly the lack of interest has been partially due to failure by the organizations to excite enthusiastic participation. The Manpower Source Book comments that the professional organizations "needs to consider their membership requirements and to expand their programs and activities so that larger numbers of those currently engaged in the practice of environmental health will be drawn into organized relationships designed to strengthen the occupations."

But these organizations are the sanitarians' own. Their effectiveness is dependent on the combined efforts of their individual members. No sanitarian who is sincerely desirous of improving his own status can feel exempt from the obligation to become a working member of at least one of them and share in forming their programs and activities. As these expand and become more effective, additional members will be attracted to them, and as their membership increases they will be able to voice their claims for greater recognition and more adequate compensation more clearly and with enhanced authority.

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*Director of Environmental Health, American Public Health Association.

Reprinted From Oct. 1963 Issue of Health Officers News Digest.

DETECTION OF HEATED MILK ADMIXED WITH RAW MILK

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(Received for publication April 17, 1964)

Milk that has been heated to temperatures below that of adequate pasteurization or pasteurized milk that has been mixed with raw milk to make it appear to meet the bacterial standards of Grade "A" raw milk for pasteurization is clearly not acceptable under the "Milk Ordinance and Code" *(8)*.

Numerous tests have been proposed for the detection of heated milk, and most of these have also been studied as tests for pasteurization. These include the peroxidase, lipase, amylase, vanillin, and phosphatase tests. All except the vanillin test are based upon measurement of the activity of a natural enzyme that occurs in milk. In the vanillin test the heated milk cannot be detected unless the heating has exceeded 80 C. This is also true in the peroxidase test. These tests would, therefore, appear to be of little value, for it is desirable to be able to detect milk heated to lower temperatures. The lipase test might be useful at lower temperatures, but no convenient method has been developed for measuring the lipase activity.

The amylase test was made the basis of a method for detecting heated milk by Scharer *(12)* in a procedure designed to yield colors more readily distinguishable than those produced in the phosphatase test. On further study of this method, it was found, as other investigators *(3, 9)* have indicated, that the amylase content of milk is too variable and that not enough is known about the amylases of milk, their temperature of inactivation, or their optimum pH. The type of starch used in such tests is also another variable that needs to be further studied.

Since the phosphatase test can detect as little as 0.05% raw milk and has been used by some to measure the phosphatase activity of raw milk, it now appears that the phosphatase test might be applicable to the detection of heated milk. As Scharer *(12)* proposed for the amylase test, by appropriate dilution of the suspected milk with boiled milk, the phosphatase test should be capable of detecting admixture of 25, 50 or 75% raw milk with pasteurized milk.

Assuming an average phosphatase activity of 2,500 μg of phenol per ml, a 25, 50, 75 or 100% raw whole milk diluted 1:250, 1:500, 1:750 and 1:1000 with boiled milk should have phosphatase activities as indicated in Table 1 when tested by the Scharer Laboratory Method.

On the same basis with the "Scharer Rapid Method," if the above four dilutions of a suspected milk are identified as A, B, C, and D respectively, then the sample is 25% raw milk or less if A is a light blue color and B a tint or no color. If A and B are colored but C is only a tint or has no color, the sample is 50% raw milk or less. If A, B, and C are colored but D is only a tint or has no color, the sample is 75% raw milk or less. If A, B, C, and D all show color, even though D has only a tint of color, the milk is probably completely raw milk. In determining the presence or absence of color, a control using a sample of boiled milk should always be run for comparison.

These procedures have been used on a number of occasions to detect the admixture of raw milk with laboratory pasteurized, as well as commercially pasteurized milk. The indications are that these procedures may also be used to detect milk that has been heated to less than pasteurization time and temperature. By referring to Figure 1, it can be seen that milk heated to 135 F for 30 min (which is sufficient to destroy *(5)* the lipase activity) will have approximately half of its normal phosphatase activity or about 1,000 to 1,200 μg/ml. If this milk is diluted with boiled milk as in the above test, it will test like a milk containing 50% raw milk. A milk heated to 155 F for 5 sec will test like a 25% raw milk, as will also a milk heated to 143 F for 2 min. A milk heated to 143 F for 20 min will have its phosphatase activity reduced to about that of a 1% raw milk and would have to be tested undiluted to be detected as underpasteurized.

Table 1. Phosphatase Activity of Diluted Milk in μg of Phenol Per ml

Dilution	25%	50%	75%	Raw
1:250	2.5	5.0	7.5	10.0
1:500	1.2	2.5	3.7	5.0
1:750	0.8	1.7	2.5	3.3
1:1000	0.6	1.2	1.9	2.5

The curves in Figure 1 for temperatures of 155 F and 143 F were plotted from data published by Hetrick and Tracy *(6)*. The data plotted for the

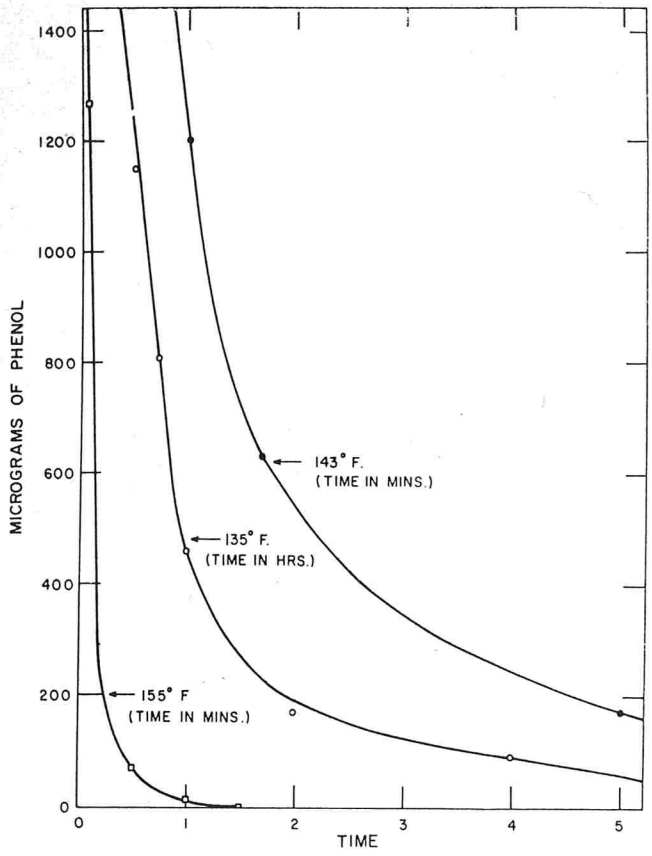

FIGURE I.—THERMAL INACTIVATION OF PHOSPHATASE.

inactivation of phosphatase at 135 F were obtained in this laboratory by heating samples of raw milk in a water bath for various periods of time. For those interested in a quantitative adaptation of the Scharer Laboratory Method and in carrying out such tests at other temperatures to judge the degree of heat treatment, the procedure is given below in detail.

PROCEDURE

Samples of raw milk were heated in a water bath at 135 F for periods of 15, 30, and 45 min and for 1, 2, 3, 4, 5, and 6 hr. Forewarming for 5 min was required for the samples to reach a temperature of 135 F. This 5-min period of forewarming was not included as a part of the indicated holding times, for in comparison with the time required to inactivate the enzyme completely at 135 F, namely 6 hr *(6)* this forewarming time was relatively insignificant.

Phenol standards were prepared according to Scharer *(13)*. It has been found convenient for the purpose of preparing a standard curve to use standards containing 2, 5, 10, 15, 20, and 25 mg of phenol per 5 ml. Color was developed in the standards according to Scharer with allowances, for quantitative purposes, of at least 10 min for color development. Color was developed in ordinary laboratory test tubes (16 x 150-mm) and then poured into selected Coleman 12 x 75-mm cuvettes and read in a Coleman Jr. Spectrophotometer preferably within 30 min. A blank was prepared by adding to 5 ml of distilled water, all of the reagents, other than phenol, which are normally added to the phenol standards to develop a color. The instrument was zeroed on the blank at 100% transmission with the wavelength dial set at 610 mμ. The standards and the blank may be extracted with 5 ml of butyl alcohol and the butyl alcohol extract used for preparing a standard curve.

In the latter case, the wavelength dial should be set at 650 mμ. Wave lengths of 610 and 650 are the wavelengths of maximum absorption for the aqueous and butyl alcohol extracts, respectively, as shown in Figure 2, and must be used for maximum sensitivity. Butyl alcohol extraction is unnecessary in working with milk but may be desired or necessary in working with cheese. A separate standard curve is, however, required for each since standards extracted with butyl alcohol absorb to a greater extent even though a different wavelength is used (Figure 3).

Samples of milk for testing are prepared and color is developed as in the Scharer Laboratory Method *(13)*. A boiled milk sample is developed in the same manner and used as a blank for zeroing the instru-

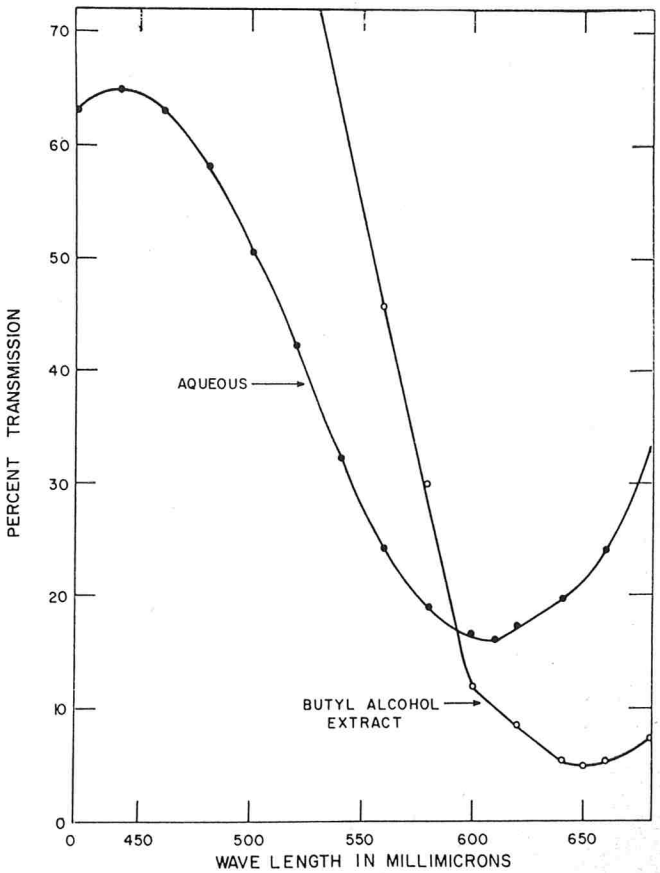

FIGURE II.—SPECTRAL TRANSMITTANCE CURVE FOR INDOPHENOL.

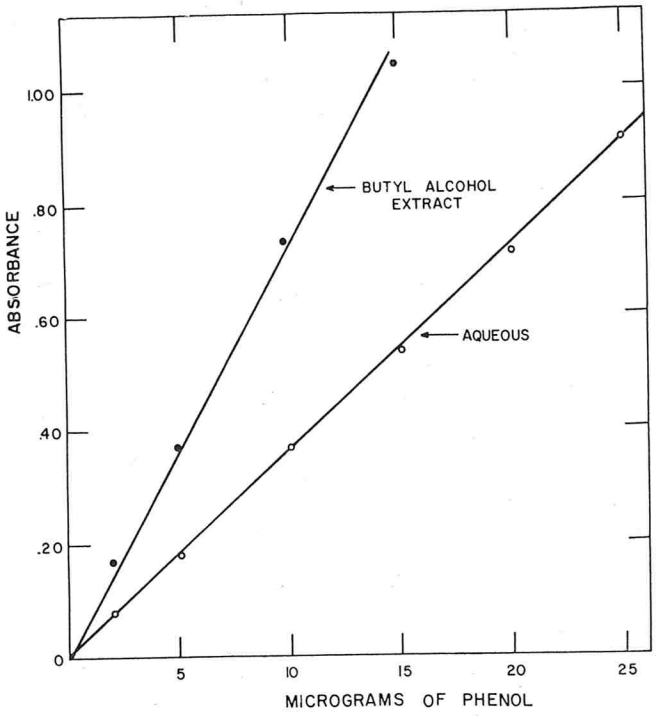

FIGURE III.–STANDARD CURVE FOR DETERMINATION OF PHOSPHATASE IN MILK AND CREAM.

ment at 100% transmission (0 absorbance). Concentration of the indophenol color developed in the milk samples is read from the standard curve prepared as above (Figure 3), and the results are multiplied by 2.3 to account for the dilution of the sample and to obtain the results in μg of phenol per ml of milk.

Discussion

As suggested above, the phosphatase content of milk would seem to be of rather constant value. As early as 1939, however, Burgwald *(2)* reported that milk from cows in early stages of lactation has a relatively low phosphatase activity and milk from mastitic udders usually has a relatively high phosphatase activity. Likewise, in 1939 Aschaffenburg and Neave *(1)* reported that milk in the early stages (10 to 60 days) of lactation was frequently found to be comparatively low in phosphatase activity, and that changes caused in milk by mastitis may increase the phosphatase activity in milk. Sanders *(11)* lists the phosphatase activity of milk obtained from several breeds of cows and from cows' udders that were infected with mastitis in some quarters. Sanders concludes that the phosphatase values are generally greater in Jersey (2,960 to 3,160 μg/ml) than in Holstein (620 to 800), and are strikingly higher in milk from mastitic udders (Jersey 4,500 and Holstein 1,750 to 2,200), and in severe mastitis (from 3,440 to 5,640 μg/ml). Haab and Smith *(4)* likewise found great variations in the phosphatase activity of individual cows, but also reported that during a complete year the phosphatase activity of pooled milk, representing approximately 500 cows, ranged only from 1,800 to 3,400 μg phenol per ml. Similarly, Hetrick and Tracy *(6)* reported that the phosphatase activity of ten lots of raw milk collected between February 20 and July 9, 1947, ranged only from 1,920 to 3,000 μg per ml with an average value of 2,230 μg of phenol per ml.

Actually, as indicated in Figure 4, by data obtained *(7)* from market milks or creams collected over a period of several months in Cincinnati, Ohio, the phosphatase activity varies with the fat content of the milk or cream and may be more directly related to the fat content than to either mastitis or the breed of the cow. In any case, all of these authors agree that the phosphatase activity is not likely to vary greatly in mixed herd milk, but obviously the phosphatase activity in any one cow's milk will make itself felt more and more as the number of animals whose milk is used for mixing decreases.

As is evident from Figure 4, Table 1 is applicable only in working with whole milk. If 30% cream were being tested to determine whether all or any part had been heated, a table like Table 1, but based on an average phosphatase activity of 8,000 μg of phenol per ml of 30% cream, would have to be constructed.

In making the determinations reported here, the raw milk was first diluted with boiled milk and then

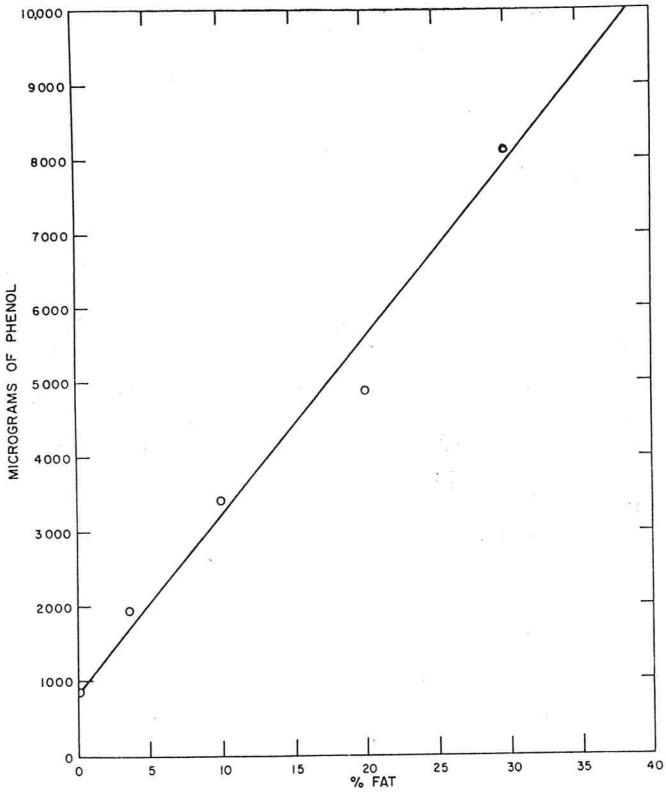

FIGURE IV.–RELATIONSHIP OF PHOSPHATASE ACTIVITY TO THE FAT CONTENT OF RAW MILK AND CREAM.

1 ml of this dilution was used in the regular phosphatase test. The amount of phosphatase activity was then measured quantitatively as outlined above. Alternate procedures would be to dilute the raw milk with buffer or water before or after color development or to use 2 g instead of 1 g of disodium phenylphosphate in the buffer substrate. These alternate procedures do not, however, give values as high or as consistent. Dilution with boiled milk is, therefore, preferred and is the procedure used also by Sanders and others.

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THE EFFECTS OF PROCESSING AND STORAGE OF DAIRY PRODUCTS ON CHLORINATED INSECTICIDE RESIDUE [1,2]

I. DDT AND LINDANE

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(Received for publication January 29, 1964)

Summary

The effects of processing and storage of butter, ice cream, Swiss-type cheese, condensed milk, and dry whole milk powder from milk containing DDT, lindane, and DDT and lindane in combination were studied. The only change in structure occurred to DDT and lindane during drying of the milk into powder. Lindane suppressed the amount of DDT residue in milk when both insecticides were fed together. In general, the finished products other than dry whole milk contained the same amount of insecticide as the raw milk when expressed on a fat basis.

The literature contains many reports on how chlorinated insecticides enter milk *(3, 4, 5)* but there is a general lack of information concerning the effects of processing and storage of dairy products on chlorinated insecticide residues *(5)*. Mann et al. *(2)* reported that pasteurization had very little effect on the amount of DDT in the milk. They also found that DDT followed the fat phase resulting in higher concentration of DDT in the high fat products.

This study was conducted to determine what effects, if any, processing and storage had on the insecticide residues present in milk or milk products and how the residues were partitioned during the manufacture of butter, ice cream, Swiss-type cheese, condensed milk and dry wholemilk powder.

This paper reports results on the effects of processing and storage of dairy products manufactured from milk containing DDT, lindane, and DDT and lindane in combination.

Methods

Milk with the desired concentration of insecticide residues for the manufacture of the dairy products was obtained as follows:

1. Insecticides were incorporated into milk by feeding. Capsules containing the desired insecticide were fed to Holstein cows. Each animal was fed 250 mg technical grade DDT daily (approximately 72% pp' DDT). Technical grade lindane was fed at the rate of 760 mg per animal. The same amount of each insecticide was fed when used in combination. The milk was processed when the concentration of the insecticide residue in the milk was approximately 0.8 ppm. It usually required a week to reach and maintain this concentration.

2. Insecticides were added directly to milk. The desired insecticide was dissolved in 75 ml ethanol and then added to milk in a vat. The milk was heated to 80 F and agitated for 15 min. Both 0.1 and 1.0 ppm concentration of the insecticides were added to milk in this way.

Manufacture of the Products

In the following the term "milk" refers to whole milk containing insecticides.

Butter. Butter was manufactured from cream separated from milk pasteurized at 145 F for 30 min. The cream was churned in 1-gal glass Dazey butter churns equipped with mechanical paddles. The buttermilk was removed through an opening at the top of the churn. The butter was stored at −15 F for 4 months.

Ice Cream. The mix used for the manufacture of ice cream was pasteurized at 165 F for 30 min, homogenized at 2000 and 500 psi, 1st and 2nd stage, respectively, cooled and stored overnight at 37 F. A Cherry-Burrell, Model FR40B batch-type freezer was used to freeze the mix into ice cream. The ice cream was stored at −15 F for 4 months.

Swiss-Type Cheese. The milk used for the manufacture of the cheese was pasteurized at 145 F for 30 min. Starter bacteria and *Propionibacterium shermanii* were added and the milk was ripened for 30 min at 86 F. Thirty min after the addition of rennet, the curd was cut to the size of wheat grains. Next, whey equal to 1/3 of the volume of the original milk was removed and was replaced with hot water to give a final cooking temperature of 102 F. Cooking required 30 min. The curd was placed in hoops, and pressed for 3 hr at 4-5 psi pressure. After pressing, the cheese was placed in a brine solution for 24 hr. The cheese was dried, sealed in Cryovac bags under vacuum, stored at 60 F for 8 weeks and at 45 F for another 8 weeks.

Condensed and Dried Milk. The milk was forewarmed at 190 F for 10 min, and then condensed in a laboratory model Rogers Vacuum pan at 115 F under 25 in vacuum. The milk was concentrated

[1]Published with the approval of the Director of the Purdue Agricultural Experiment Station as Journal Series Paper Number 2284.

[2]Presented at the 145th National Meeting, American Chemical Society, New York City, September 8-13, 1963.

TABLE 1. DISTRIBUTION OF DDT AND LINDANE DURING THE MANUFACTURE AND STORAGE OF BUTTER

Product	Per cent butterfat		ppm (wt basis)		ppm (fat basis)	
	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]
Raw Milk	3.40	3.90	0.90	0.98	26.47	25.13
Pasteurized Milk	3.40	3.90	0.87	0.80	25.59	20.51
Skim Milk	0.02			0.19		
Cream	37.00	33.00	10.70	9.60	28.89	29.09
Butter	86.20	84.80	19.20	20.00	22.27	23.60
Buttermilk	2.30	1.40	0.73	0.71	31.74	50.71
Butter after storage	86.20		21.80		25.29	

[a]DDT added to milk.
[b]Milk from cows fed lindane.

TABLE 2. DISTRIBUTION OF DDT AND LINDANE DURING THE MANUFACTURE AND STORAGE OF ICE CREAM

Product	Per cent butterfat		ppm (wt basis)		ppm (fat basis)	
	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]
Ice Cream Mix	10.85	11.35	0.318	0.190	2.93	1.67
Pasteurized Mix	10.85	11.35	0.372	0.170	3.43	1.50
Mix, 1 day old	10.85	11.35	0.372	0.188	3.43	1.66
Ice cream	10.85	11.35	0.298	0.170	2.65	1.50
Ice Cream, 4 mos. old	10.85	11.35	0.260	0.177	2.39	1.60

[a]DDT added to ice cream mix.
[b]Ice Cream mix which has Lindane added.

TABLE 3. DISTRIBUTION OF DDT AND LINDANE DURING THE MANUFACTURE OF SWISS-TYPE CHEESE

Product	Per cent butterfat		ppm (wt basis)		ppm (fat basis)	
	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]
Milk	4.10	3.50	0.83	0.84	20.24	24.00
Milk plus cultures	4.10	3.50	0.77	0.84	18.78	23.43
Whey		.04		0.34		85.00
Curd	28.50	27.00	6.10	4.30	21.41	15.91
Cheese	28.50	27.00	6.40	4.10	22.46	15.17

[a]Milk from cows fed DDT.
[b]Milk which had Lindane added.

TABLE 4. DISTRIBUTION OF DDT AND LINDANE DURING THE MANUFACTURE OF CONDENSED MILK AND DRY WHOLE MILK POWDER

Product	Per cent butterfat		ppm (wt basis)		ppm (fat basis)	
	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]	DDT[a]	Lindane[b]
Milk	3.50	4.00	0.91	1.00	26.00	25.00
Forewarmed Milk	3.50	4.00	0.91	1.00	26.00	25.00
Condensed Milk	7.71	7.57	1.78	2.00	23.05	26.42
Sterilized Milk	7.71	7.57	1.94	1.94	25.12	25.63
Spray dried	27.97	27.84	2.75	1.22	9.85	4.38
Drum dried	28.11	29.19	12.20	2.71	43.43	9.27

[a]Milk which had DDT added.
[b]Milk from cows fed Lindane.

approximately 2 to 1. A portion of the condensed milk was standardized and sealed in 8-oz cans. The canned condensed milk was sterilized by bringing the temperature to 240 F in 20 min, holding at 240 F for 15 min and cooling under tap water. The remainder of the condensed milk was used for the manufacture of dry whole milk powder. Two methods were used for the manufacture of the dry whole milk powder:

1. Spray drying. The condensed milk was heated to 120 F before being dried in a Swenson Research Spray Dryer with an air inlet temperature of 275 F and an air outlet temperature of 185 F.

2. Roller drying. The condensed milk was dried on a Buflovak double roll dryer under atmospheric pressure with a temperature of 270-280 F in the

rollers.

Samples were removed and analyzed for chlorinated insecticide residue at different intervals during the manufacturing process for all products and also after a normal period of storage. All samples were analyzed by the method of Langlois, et al. *(1)*.

The effect of feeding the cows DDT and lindane in combination on the amount and structure of the insecticides in the milk was also studied. Animals were fed either DDT or lindane for a month and then both insecticides were fed together. Samples of milk were analyzed at weekly intervals and the amount and structure of the residues was determined.

RESULTS AND DISCUSSION

Typical results for the various dairy products manufactured and analyzed are presented in Tables 1, 2, 3, and 4. All results were expressed on a fat basis for easier comparison.

The buttermilk contained more fat than under normal commercial conditions. This was due mainly to the method used to remove the buttermilk from the butter churn and the inefficient churning action of this equipment. This would partially account for the higher concentration of the insecticides in the buttermilk.

More lindane than DDT was found in the whey during the manufacture of the Swiss-type cheese. This helps to explain why the curd and cheese manufactured from milk containing lindane contained less insecticide than that from milk containing DDT. This would suggest that lindane is more soluble in whey than DDT.

The only significant loss of DDT and lindane occurred during the manufacture of dry whole milk powder. There was loss of both DDT and lindane during spray drying and loss of only lindane during roller drying. Similar results were obtained in duplicate experiments.

Sterilization caused some shift in the structure of DDT. There was some shift from the pp' DDT peak to the DDD (TDE) peak. Except for this one shift there were no other detectable changes in the structure of either DDT or lindane during the manufacture or storage of the dairy products.

In general, the changes in the DDT and lindane residues during processing, and storage of various dairy products suggest that they were essentially stable under the conditions used during this study. Therefore, the amount of residue in the finished product will be essentially the same as that in the raw milk when expressed on a fat basis.

During the feeding of DDT and lindane in combination to the animals, it was observed that the amount of DDT residue in the milk was less than

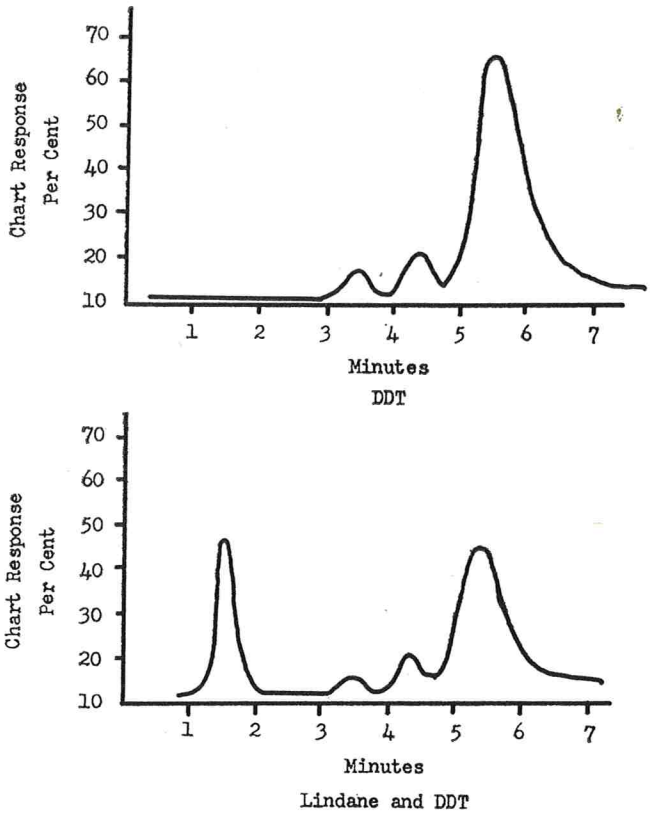

Figure 1. Comparison of chromatograms showing the relative amount of DDT Residue in milk from a cow fed DDT alone and lindane and DDT.

when DDT was fed alone. Four cows, very similar in body weight and milk production, were fed 250 mg DDT per day for one month, then 250 mg DDT and 760 mg lindane daily for the next month, to determine what effect lindane had on the amount of DDT residue in the milk. The amount of DDT residue in the milk was approximately 0.8 ppm when just DDT was fed; however, the DDT residue decreased to 0.3 ppm when lindane was fed in combination with DDT. Figure 1 shows chromatograms of DDT residue in milk from a cow fed DDT alone and also of DDT residue from the same cow after feeding DDT and lindane in combination. The chromatograms differ only in the amount of DDT residue.

The effect feeding DDT would have on the amount of lindane residue in the milk was also studied. Two cows, similar in body weight and milk production, were fed 760 mg lindane daily for one month, followed by feeding 760 mg lindane and 250 mg DDT daily for the next month, to determine what effect feeding DDT would have on the amount of lindane residue in the milk. The amount of lindane residue in the milk was the same throughout the two months. The feeding of DDT with lindane did not affect the amount of lindane residue in the milk.

From these results it would appear that lindane has an effect on the amount of DDT residue in the milk from cows fed both insecticides.

ACKNOWLEDGEMENT

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EVOLUTIONARY CHANGES IN THE CORNELL PHOSPHATASE TEST

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SUMMARY

The Cornell phosphatase test, with its single buffer for milk and all dairy products, has been adopted successfully and widely in the past 15 years. Recent changes in national and state regulations raising temperatures to high levels for acceptable pasteurization, and direct experience gained on the behavior of chemical reagents in phosphatase testing have suggested evolutionary revisions in the Cornell test, leading to greater simplicity without upsetting its demonstrated past high sensitivity and reproducibility. Changes include establishing one hour as the incubation time for the standard test, simplifying color standard preparation, substituting CQC for BQC, reducing time of color development to 5 min, emphasizing butyl alcohol extraction and selecting a lower level phenol value for defining underpasteurization.

The revised Cornell standard 1-hr phosphatase test detects 0.1% raw milk addition to pasteurized milk and a drop of between one and two degrees in HTST milk pasteurization processes. It does the above with less reagents and in a shorter time than formerly.

The Cornell phosphatase test *(3, 4)*, now 15 years old, illustrates uniquely a universal method for determining the extent of underpasteurization of milk and milk products. It applies equally well to all dairy products, whether milk or aged cheese, for only one concentration of buffer and precipitant is required. In addition, prior knowledge of the history of the samples is unnecessary.

Extensive past collaborative testing between 22 laboratories indicated the Cornell test possesses the same degree of accuracy, sensitivity, and reproducibility on milk and ripened cheese as possessed by the multibuffered AOAC standard method *(1, 4)*.

The Cornell phosphatase test has never been modified previously in any detail by the author. However, more recent studies in his laboratory on the high degree of CQC stability and on blue color development attained with sugar-containing dairy products *(2, 5)*, along with greater knowledge of phosphatase reactivation mechanisms and detection *(6, 7)*, have suggested some design changes in the Cornell method.

The changes include: *(a)* a shift from a 24-hour to a 1-hour incubation; *(b)* a simplification of color standard preparation; *(c)* the substitution of CQC for BQC and the elimination of one reagent; *(d)* the development of color at 37 C for 5 min rather than 15 min; *(e)* a preference for butyl alcohol extraction readings rather than aqueous; *(f)* an adjustment downward of the critical phenol value defining underpasteurized milk and milk products.

THE REVISED CORNELL PHOSPHATASE TEST (STANDARD 1-HR)

Principle

Milk, cheese, and other dairy products are individually incubated in a single, high strength carbonate-bicarbonate buffer substrate at about pH 9.5 for a specific period, then the mixture is acid precipitated. The resulting clear filtrate is alkalized and color developed.

Alkaline phosphatase concentration is indicated by the intensity of blue color arising from the hydrolysis of the substrate, disodium phenyl phosphate, and the reaction of the free phenol portion with the stable dye, CQC. The enzyme is inactivated at proper minimum pasteurization temperatures and thus the amount of color that is present directly relates to the degree of underpasteurization.

Materials and Reagents

Cornell standard phosphatase test materials and reagents, except for the organic phenol standards, outlined in following sections, may be obtained through the Whitman Laboratories, Inc., Norwich, New York.

Materials-Apparatus. These are as follows:

Test tubes — Pyrex, 16 x 150 mm.

Pipettes — delivery 1 ml, graduated in 0.1 ml, and 5 ml (or 10 ml), graduated in 0.1 and 1.0 ml.

Weighing balance — Torsion.

Water bath — temperature thermostatically controlled at 37 ± 1 C.

Thermometer — 0-110 C, certified against NBS.

Funnels — size suitable for 11-cm filter paper.

Filter paper — Whatman No. 42 — 11 cm.

Medicine dropper and amber bottle — 25-50 ml capacity — dropper to deliver approximately 43 drops/ml.

Color standards — Organic phenol for determining units phenol produced. Prepared inorganic standards may be used alternatively.

Comparative light plate — To effect better visual color resolution (optional equipment).

Colorimeter (optional equipment) — Bausch and Lomb Spectronic 20, or equivalent. B & L ½ in. test tubes suitable for sample containers.

Specific Reagents (All of Analytical Grade)

1. Carbonate buffer substrate — Dissolve 11.5 g anhydrous sodium carbonate, Na_2CO_3, 10.2 g anhydrous sodium bicarbonate, $NaHCO_3$, and 1.1 g pure disodium phenylphosphate in distilled water and make up to 1 liter.

2. Trichloroacetic-hydrochloric acid precipitant — Dissolve 25 g trichloroacetic acid crystals in 50 ml water, add 50 ml concentrated HCl (approximately 36 per cent), and mix well but carefully.

3. Sodium carbonate solution (8 per cent) — Dissolve 80 g anhydrous sodium carbonate, Na_2CO_3, in distilled water and make up to 1 liter.

4. Copper sulfate-Calgon solution — Dissolve 0.5g copper sulfate ($CuSO_45H_2O$) and 50 g sodium hexametaphosphate crystals, or Medi-Calgon, in distilled water and make up to 1 liter. Calgon solution sequesters calcium which presents turbidity.

5. CQC solution — Dissolve 0.2 g dichloroquinonechloromide, crystalline, in 25 ml absolute ethyl, or absolute methyl, alcohol.

6. n-Butyl alcohol — B.P. 117.5 C. It is not necessary to neutralize the n-butyl

7. Preparation of Phenol Color Standards

a. Stock Phenol Solution
Dissolve 1 g phenol crystals in water and make up to 1 liter. Preferably made up fresh or store at 5 C.

b. Buffer Solution
Dissolve 11.5 g anhydrous sodium carbonate, Na_2CO_3, and 10.2 g anhydrous sodium bicarbonate, $NaHCO_3$, and 0.1 g copper sulfate, $CuSO_4 \cdot 5H_2O$, in distilled water and make up to 1 liter.

c. Diluted Phenol Solution
To 2 ml of stock phenol solution, 7a, add enough buffer solution, 7b, to make up to 500 ml. This solution contains 4 μg phenol per ml.

d. Proportioning Solutions for Standards and Final Development
Pipette into test tubes (16 x 150 mm) portions in the ratios listed in first two colums, Table 1. With one exception, later adjusted, all mixtures are 10 ml volumes before color development.

Add to each of above 10 ml volumes in table 1 exactly 2 drops CQC with quick stirring and make 2 full inversions of test tube. Incubate at 37 C for 5 min. Add 5 ml n-butyl alcohol to each test tube after color development. Invert test tube 5 times to extract color. No Calgon is required in preparing standards. Seal tops with proper stoppers, wax, or with parchment paper and store in refrigerator.

A standard curve may be produced using a colorimeter or spectrophotometer at 650 mμ. Remove approximately 3 ml alcohol from extracted standards and pipette into small size cuvettes or ½ in. dia. test tube. Read directly against alcohol extract from 0.0 μg phenol solution with transmission set at 100%. Plot, on regular coordinate paper, L = 2 — log G, where G = % transmission, against phenol concentrates. Standard curve will result.

8. Controls and Reagent Blanks

Use reageant blanks and negative controls. To obtain a negative control, heat 1.0 ml milk or 0.5 g cheese, or other product under test, in a test tube to 85 C for at least 1 min. Cool. Then conduct procedure as prescribed. Subtract value of control and/or reagent blank from actual test value.

TABLE 1. PROPORTIONING OF SOLUTIONS

Buffer solution (7b) (ml)	plus	Diluted phenol solution (7c) (ml)	After color development 10 ml portions of mixtures give respective phenol concentration (μg/test tube)
10.0		0	0
15.6		0.4	1
(Remove 6 ml mixture and discard. Develop color on remaining 10 ml)			
9.5		0.5	2
9		1	4
8		2	8
7		3	12
6		4	16
5		5	20
0		10	40

PROCEDURE FOR THE CORNELL PHOSPHATASE TEST

Sampling.

For milk, cream, chocolate milk, buttermilk, whey, ice cream mix, and condensed milk. Pipette 1 ml of milk or fluid product into test tube (16 x 150 mm), add 10 ml of warm 37 C carbonate buffer substrate and mix.

For ripened cheese, cottage and cream cheese, butter, and milk powder. Transfer 0.5 g cheese, or solid product, to a test tube (16 x 150 mm). Mascerate the solid thoroughly with a glass rod. Add 1 ml warm (37 C) carbonate buffer substrate and stir the solid into a paste. Then add an additional 9 ml carbonate buffer substrate and stir.

Incubation.

Temper test tube and its contents for 5 min and then incubate at 37 C for 1 hr in same water bath.

Precipitation.

Following incubation remove test tube and carefully add down its side 1 ml trichloroacetic-hydrochloric precipitant. Filter after a few seconds into a clean test tube (16 x 150 mm), preferably of a type calibrated and marked at 5 ml.

Color Development and Measurement.

To 5 ml clear filtrate add 1 ml copper sulfate-Calgon solution. Then pipette into tube 5 ml of 8 per cent sodium carbonate solution and mix. Add exactly 2 drops CQC solution and without delay invert tube twice. Permit color to develop at 37 C for exactly 5 min. Add 5 ml n-butyl alcohol to each tube after color development. Invert tube 5 times to extract color. Read against alcohol standards.

Optionally, in place of visual reading, remove with clean pipette approximately 3 ml alcohol solution from each test tube after extraction step into a small cuvette, or ½ in. dia. test tube. Measure directly light transmission in colorimeter or spectrophotometer at 650 mμ against an alcohol extract from a suitable negative control set at 100% transmission. Determine phenol concentration by reference to standard curve prepared under section 7, Reagents.

Interpretation.

Express values directly without factor multiplication of any type. A value over 1.0 μg phenol per 0.5 ml milk and other fluid milk product, or per 0.25 g cheese or other solid milk product indicates underpasteurization and/or recontamination with raw milk. Use of filtrates at half volume in actual test determined 0.5 ml and 0.25 g units of expression.

RESULTS AND DISCUSSION

Experiments designed to check the performance of the revised Cornell standard phosphatase test were carried out on milks and cheeses of known history.

Fresh raw whole milk from the mixed University herd supply was carefully heat treated in a Cherry-Burrell HTST Unit (5000 lb capacity/hr) at the following temperatures: 161 F, 160 F, 159 F, and 158 F, each for 16.5 sec. Portions of these milks then were removed to small cheese vats and made into Cheddar cheese following standard procedures. For additional comparisons, to other lots of milk properly pasteurized at 161 F – 16.5 sec were apportioned 0.1, 0.2, and 0.5% fresh raw milk. Cheddar cheese also was made from these treated lots. All cheese were ripened four weeks at 50 F prior to testing. Results are presented in Table 2.

It is readily apparent that sensitivity of underpasteurization detection and raw milk contamination is high with the revised Cornell standard (1 hr) phosphatase test (Table 2). A drop of between 1 and 2 C in the HTST pasteurizer or an addition of only 0.1% raw milk is detected in milk or in ripened Cheddar cheese made from such milk. Milk and cheese properly pasteurized essentially produced no color after one hr incubation following subtraction of a negative control value, indicating that the new critical dividing value of 1.0 μg per 0.5 ml milk or 0.25 g cheese is sufficiently high to assure the proper classification of legally minimum pasteurized milk or cheese. These low phenol values correspond to those obtained from earlier comparative laboratory studies on the Cornell phosphatase (1 hr) test *(1, 4)*. Among 22 cooperating laboratories the vast majority reported less than 1.0 μg on properly pasteurized milks or Cheddar cheese made from properly pasteurized milk. The early data and the results from Table 2 show that with properly pasteurized products most phenol values obtained fall between 0.0 and 0.5 μg per 0.5 ml milk or 0.25 g cheese.

TABLE 2. PERFORMANCE OF THE REVISED CORNELL STANDARD PHOSPHATASE (1 HOUR) TEST AGAINST MILK AND CHEDDAR CHEESES OF KNOWN HISTORY

History of milks	Phenol concentration in treated milk	Phenol concentration in Cheddar cheese made from treated milks of Col. 1
	μg/0.5 ml	μg/0.25
161 F-16.5 sec	0.0	0.0
160 F-16.5 sec	0.0	0.0
159 F-16.5 sec	0.2	0.2
158 F-16.5 sec	5.0	3.0
Past. milk—161 F-16.5 sec	0.0	0.0
Past. milk + 0.1% raw	1.3	1.3
Past. milk + 0.2% raw	2.0	3.0
Past. milk + 0.5% raw	3.0	5.0

A value for the revised Cornell standard test, read directly, of over 1.0 μg per the 0.5 ml milk or 0.25 g cheese indicates underpasteurization or raw milk contamination. Values above obtained by visual butyl alcohol comparisons.

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THE WISCONSIN MASTITIS TEST – AN INDIRECT ESTIMATION OF LEUCOCYTES IN MILK[1]

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Summary

A simple, rapid screening test for mastitis in bulk samples has been described. The test is based on the observation that an increase in leucocytes is accompanied by an increase in viscosity when a detergent reagent is mixed with a milk sample. The viscosity is determined by measuring the height of a column of milk-reagent mixture remaining in a test tube after a 15-sec outflow through a cap having an orifice 1.2 mm dia. The results of this method correlate well with the square root of the leucocyte count (correlation coefficient equals 0.91).

The problem of the detection and control of abnormal milk has received increased attention in recent years. In 1963 the National Mastitis Council *(2)* the Public Health Service *(4)* and the National Conference on Interstate Milk Shipments *(3)* recommended that states develop mastitis control programs. Recently many municipalities have accelerated their programs for the detection and prevention of abnormal milk.

The screening test generally considered to be the most acceptable yardstick for detecting abnormal milk has been the direct microscopic counting of leucocytes in milk. This test is tedious, time consuming and requires well trained personnel.

The California Mastitis Test (CMT) is a simple and rapid screening test that has gained wide acceptance. Schalm and Noorlander *(5)* reported that the total cell count in milk is related to the amount of gel formed when the CMT reagent is mixed with milk. A visual judgment is made of the amount of precipitate and thickening as the milk-reagent mixture is rotated in the shallow cups of the white plastic test paddle. Later, Carroll and Schalm *(1)* concluded that only the nucleated body cells contain the gel forming material.

The Wisconsin Mastitis Test (WMT) described in this paper adapts the principle of the CMT to a quantitative laboratory screening procedure for herd milk samples. It permits more precise quantitative measurements and is based on the measurement of viscosity as determined by the rate of flow of a mixture of milk and reagent through a standard orifice. The data presented here compares the WMT values with the leucocyte counts (total cell counts).

Materials

(a) The special equipment needed for the WMT consists of plastic test tubes[3] measuring 12.5 x 125 mm with a 3-mm (approx.) diameter air vent and with a polypropylene cap[4] 1 mm thick having a 1.15 mm diameter orifice in its center. The air vent was made 62 mm from the inside bottom of the tubes with a 3-mm diameter nail heated in a bunsen flame (see Figure 1). The holes in the caps were drilled with a 3/64-in. bit in a hand drill. The loose plastic "flaps" and protrusions produced during the drilling of the holes were removed with a razor blade and a piece of a razor blade held with a cover glass forceps having bent spade points. A dissecting microscope was used to facilitate this removal.

(b) The racks used to hold the test tubes were made from single sheets of .040-in. thick aluminum measuring 18 1/2 x 8 in. The finished rack is 3 in. wide; the legs were made by bending down the ends of the bottom support 2 3/8 in. from each end. The distance between top and bottom supports is 2 in. The holes made with a punch and die are 1/2 in. in diameter and are in two rows of 10 holes each, with centers at 1 1/4 in. intervals and 1 1/2 in. between centers of the front and back rows. The rows are 3/4 in. from the hole centers to the edge of the support. Each end of the top support was curled upward in a 1 1/4 in. diameter half circle. A snug fit of the tubes in the holes holds them in place during inversion.

(c) Milk pipette, 2.2 ml (APHA); or 2-ml Corn-

[1]Supported in part by a research grant (EF AJ 00370) of the Division of Environmental Engineering and Food Protection of the U. S. Department of Health Education and Welfare. Published with approval of the Director of the Wisconsin Agricultural Experiment Station NS-426.

[2]Official laboratory for the Wisconsin State Board of Health.

[3]Manufactured by Lermer Plastics Inc., Garwood, N. J., described as "flexvials" with nat. "flex-caps".

[4]Suitable metal caps were not commercially available at this writing.

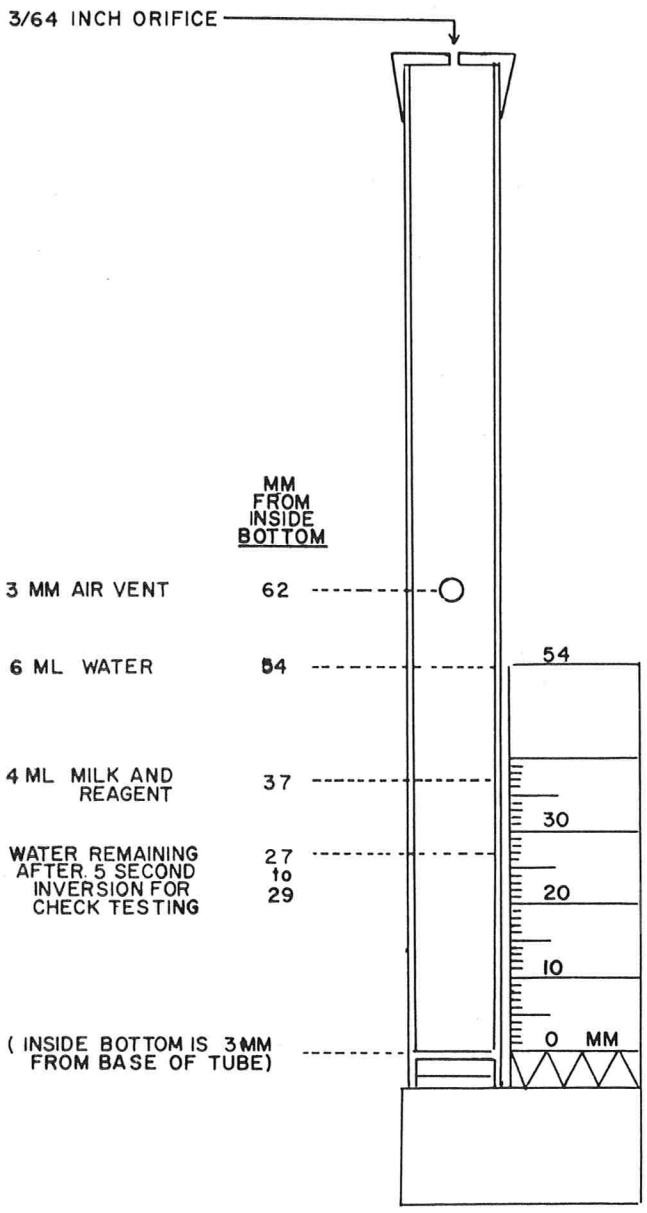

Figure 1. Diagram showing 12.5 x 125 mm test tube and measuring square. Test tube has air vent in side of tube and is equipped with a cap having a 3/64 in. orifice in its center. Measuring square is calibrated in mm. Data for checking accuracy of caps and tubes are shown.

wall syringe and metal pipetting holder, B-D Nos. 1250 S and 1250 MH, equipped with a 2-in. long 14-gauge cannula.

(d) Measuring square made from 1/8-in. thick clear plastic having graduations in mm. The length of vertical arm is exactly 54 mm from the zero line. (See Figure 1).

(e) Cornwall continuous pipetting outfits, 2 ml and 10 ml size, B-D Nos. 1251 and 1271, and one 14-gauge, 4-in. cannula.

(f) Stopwatch or equivalent timing device.

(g) CMT reagent[5] diluted one plus one with distilled water. (Detergent content in the diluted reagent was 1.25%, calculated as alkyl benzene sulfonate. The pH was 7.1). Reagent should be standardized since it has been found that supplies from different sources vary.

EXPERIMENTAL PROCEDURES AND METHODS

The accuracy of the caps was checked before each experiment in the following manner: 6 ml of distilled water at 24 ± 2 C was pipetted accurately into the 12.5 x 125-mm plastic test tubes with a 10-ml adjustable Cornwall continuous pipette. The tubes were capped and the rack was inverted rapidly but smoothly, held in a vertical position for 5 sec and returned upright. The caps were considered to be acceptable

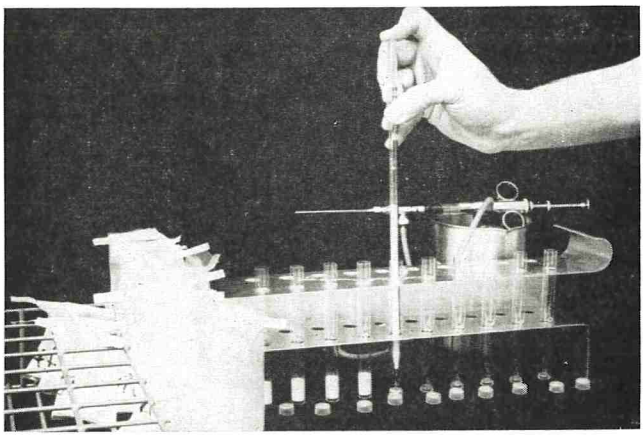

Figure 2 Step 1: Two ml portions of milk sample are pipetted into test tubes.

when the length of water column remaining in the tubes measured 27-29 mm to the top of the meniscus. Check tests for each cap were made in triplicate. This procedure may be used also for developing and maintaining uniformity in technique of inverting and of timing accurately. Jerky movement of rack during inverting or returning upright should be avoided.

The milk samples used were herd samples from farm bulk tanks collected from predominently Holstein herds during December and January[6]. The samples were kept cold (0-4 C) and WMT values were run on the day of collection. (WMT values decreased as much as 5 to 10 per cent after storage for 24 hours). Three smears were made with a .01-ml pipette (APHA) from each sample on slides having circular areas of 1 cm^2. The films were stained with Levowitz and Weber stain *(6)*. Forty microscopic fields were counted on each of the 3 milk films using the oil immersion objective. A binocular microscope having a 400,000 factor was used.

The WMT values were determined in the following manner: 2-ml portions of milk samples were

[5]Mfgd. by Norden Laboratories Inc., Lincoln, Nebr. Under U. S. Patent No. 2,998,392. Control No. P 728.

[6]Months of above average milk production.

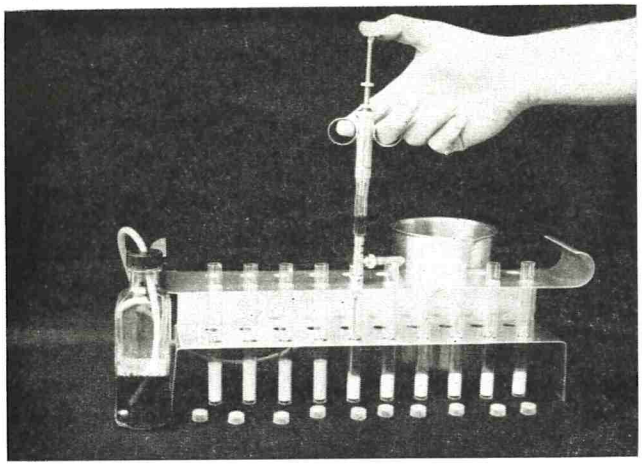

Figure 3 Step 2: Continuous pipetting outfit is used to measure 2 ml of reagent into tubes. Cannula is inserted below the milk surface to prevent foaming.

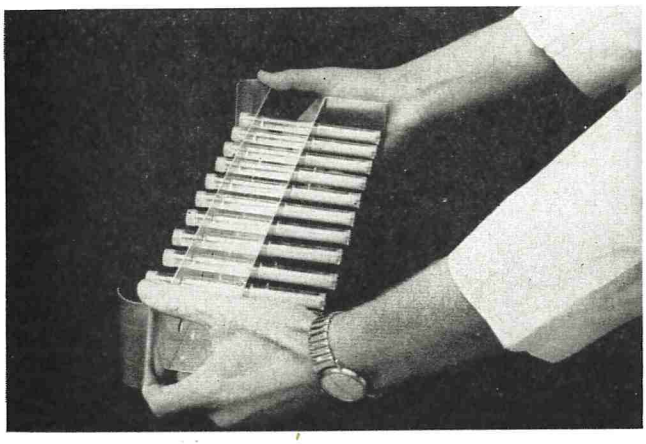

Figure 4 Step 3: The tubes are capped and their contents are mixed by tilting back and forth 10 times in about 10 seconds in a nearly horizontal position. Air vents are placed upward to avoid accidental spillage.

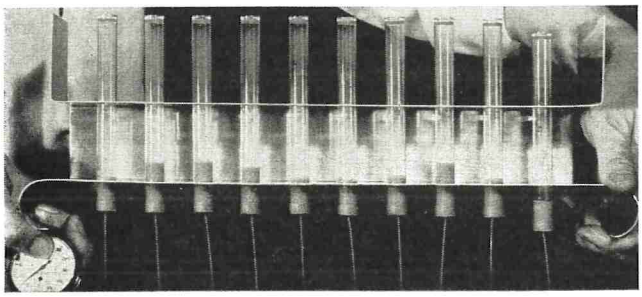

Figure 5 Step 4: Stopwatch is used to time inversion of test tubes for 15 seconds.

pipetted into test tubes (see Figure 2). Then 2 ml of diluted CMT reagent was added to the tubes with a continuous pipetting outfit (see Figure 3). The tubes were then capped with the polypropylene caps with the 3/64 in. orifice. The contents of the tubes were mixed by tilting tubes back and forth 10 times in about 10 sec in a nearly horizontal position (see Figure 4). Tubes were allowed to stand for 20-30 sec. The tubes were then inverted to a vertical position to permit outflow. The inversion time here was for 15 sec timed with a stopwatch (see Figure 5). The temperature of the milk-reagent mixture at the time of inverting was 24 ± 2 C. Temperature

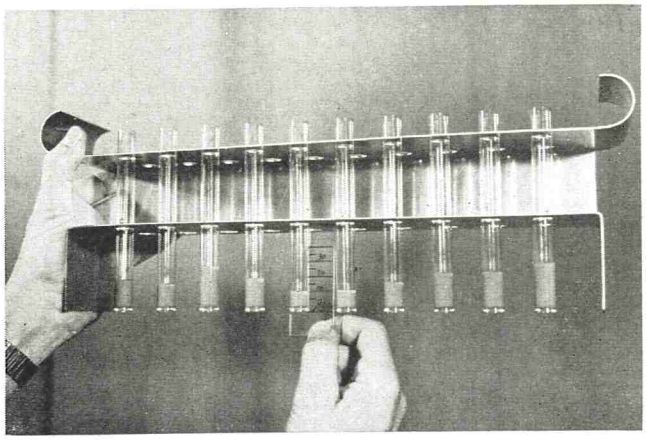

Figure 6 Step 5: Length of liquid columns remaining in tubes in measured in mm with measuring square.

may be adjusted by warming the reagent. The tubes were allowed to stand upright for at least 1 min after the inversion. The WMT values were then recorded in mm as the length of the liquid column remaining in the tube (see Figure 6).

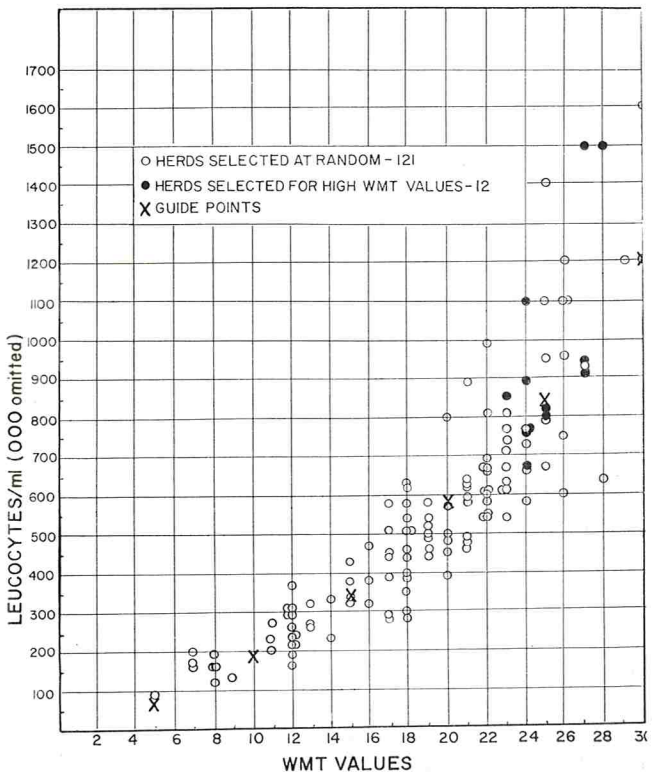

Figure 7. WMT — Leucocyte comparisons.

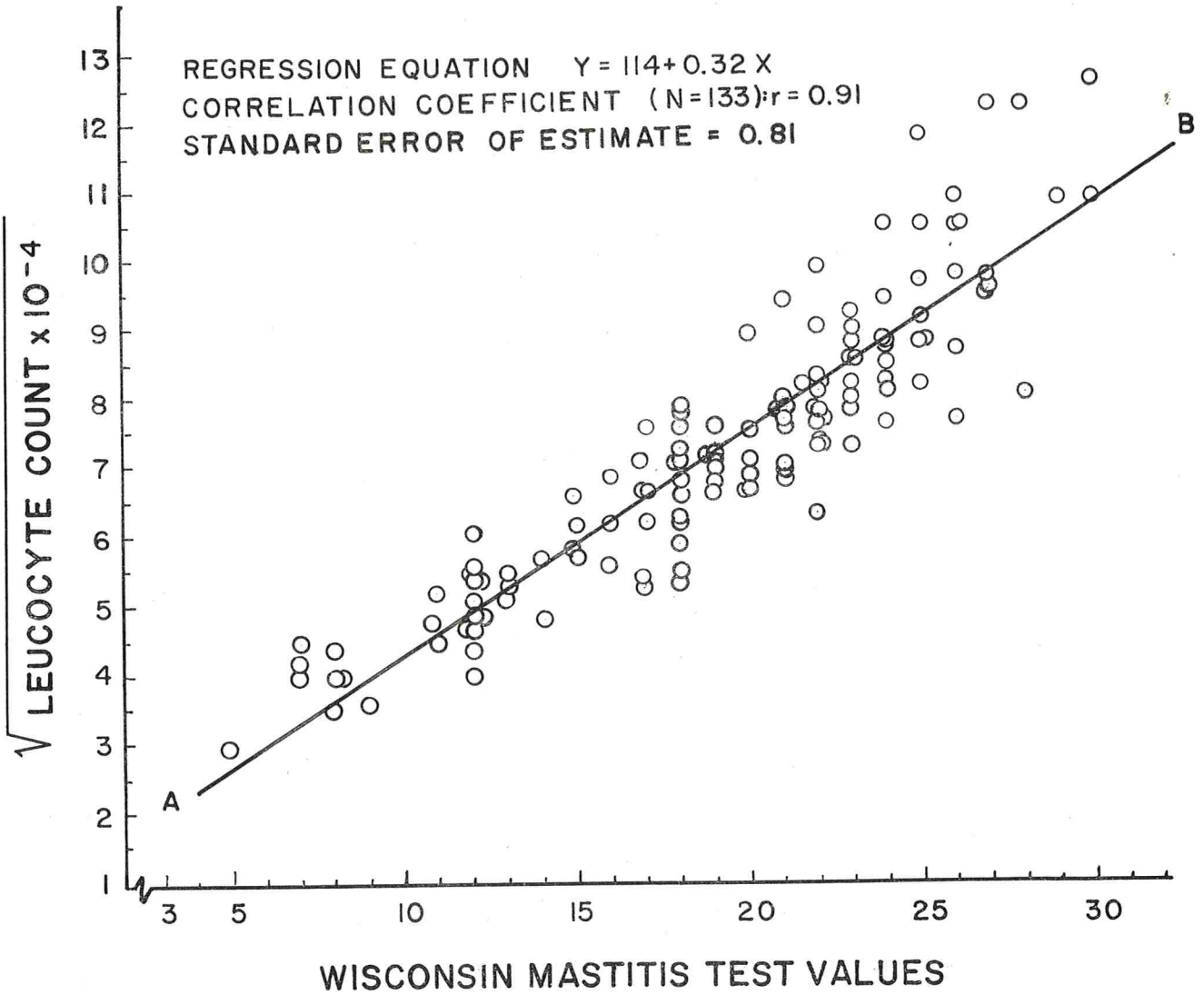

Figure 8. Statistical Data — Square Root of Leucocyte Count vs WMT Values.

For this investigation batches of 10 samples each were run in triplicate using 3 racks with 10 tubes in each rack. It may be advantageous to use all 20 spaces in each rack for routine work with large numbers of samples.

Ten calibrated caps were selected for each day's experiments in a manner previously described. The caps were rinsed immediately after each use by holding upside down in a stream of warm tap water. This was done to remove the slimy deposit that collects around the orifices. The plastic tubes were rinsed 2 or 3 times in warm tap water (not over 45 C) after each use. Hot water may distort tubes. Excess water was removed by shaking the inverted rack before the next use.

Results and Discussion

The leucocyte count of samples from 133 bulk tanks was determined and compared with the WMT values. All the determinations were plotted in Figure 7. These results show that the WMT values increase as the leucocyte count increases.

All of the WMT values were also plotted against the square root of the leucocyte count in Figure 8. This graph shows that a more direct relationship exists between the square root of the leucocyte count and the WMT values[7]. This relationship may be used to predict the average leucocyte count from the WMT value. Data from points along the regression line AB were used to locate guide points in Figure 7. The guide points may be used to determine the average leucocyte counts from representative WMT values. For example the average leucocyte count

[7]A possible explanation for the closer relationship between WMT values and the square root of the leucocyte count is: the square root takes into account the hydraulic principle that for liquids of a given viscosity the rate of flow is proportional to the square root of the head (pressure).

for a WMT value of 20 is 570,000 (range 390,000 - 800,000).

Figure 7 presents an easy way to obtain the following information: *(a)* the number and percentage of herds (those selected at random) that fell above a given WMT value or a given leucocyte count; *(b)* the range of leucocyte counts obtained for a given WMT value; and *(c)* the relationship of representative WMT values to the leucocyte count (from the guide points).

A reproducibility study with 30 replicate WMT determinations for each of 3 samples (90 tests) showed the Standard Deviation to be 1 mm. One sample each of low, medium and high leucocyte count was used.

ACKNOWLEDGEMENTS

Appreciation is hereby expressed to the following University of Wisconsin staff members: Dr. C. W. Burch, Professor Evert Wallenfeldt and Dr. G. W. Lawton for their helpful suggestions; to Dr. J. H. Torrie for his assistance with the statistical analysis; and to Miss Elaine Koepp, State Laboratory of Hygiene.

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FIFTY-FIRST ANNUAL MEETING OF IAMFES

AUGUST 18-21, 1964

OUTSTANDING ANNUAL MEETING SPONSORED BY OREGON ASSOCIATION

Under the direction of Mr. A. E. Parker and Mr. Ken Carl, Co-Chairman of the Oregon Association Local Arrangements Committee, some 400 members and guests of IAMFES were provided most excellent facilities and arrangements for International's Fifty-first Annual Meeting at Portland, Oregon.

Keynoting the convention, Dr. J. J. Jezeski, Department of Dairy Industries, University of Minnesota, pointed up the continuing and future role of the sanitarian. The necessity of continued and increased development of professional competency in broad general areas of environmental sanitation and in specialized fields was emphasized throughout his address. Dr. Jezeski cited the great need for a depth of awarness of the biological concept on the part of all sanitarians and especially on the part of those with principal training in the engineering fields. Lacking an appreciation of the biological concept often provides a distinct handicap to many of those engaged in advanced training and graduate study in environmental sanitation.

Government agencies sponsoring advanced training of their professional personnel would do well to recognize this and provide for additional time, if necessary, for persons deficent in the biological sciences to supplement their training in this area before or concurrently with graduate study. Lack of such opportunity due to rigid time schedules of graduate programs often may result in unwarranted reflection upon an otherwise highly competent and basically well prepared individual.

J. H. Fritz gives Presidential Address at opening session.

Ken Carl and A. E. Parker (left to right) Co-Chairmen of Oregon local arrangements committee.

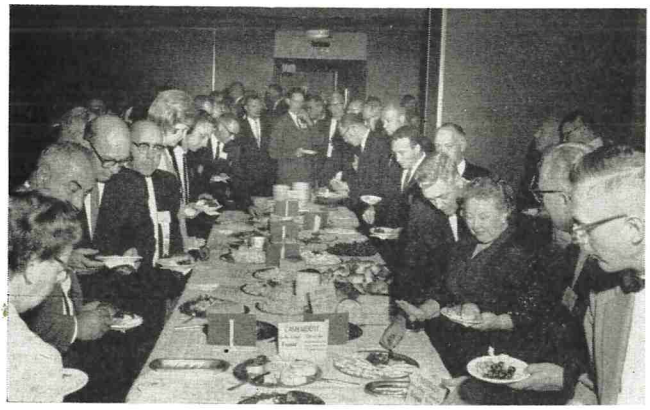
In his Presidential Address retiring President J. H. Fritz, Milk and Food Branch, U. S. Public Health Service, reviewed the Association's activities of the past year. He emphasized the progress made by the Sanitarians Joint Council toward implementation of the plan for certification of sanitarians which was endorsed by the Association at its meeting last year. Certain to assist in keeping IAMFES members more fully informed of Association affairs, was Mr. Fritz's statement that additional personnel will be added to the editorial staff of the Journal primarily to increase the Journal's coverage of Association activities and to increase the number of papers in the general area of environmental sanitation. Mr. Fritz emphasized that the Journal has attained a highly respected status as a professional periodical with its greatest strength in the area of dairy and food sanitation and technology. He further emphasized that this attain-

Dr. J. J. Jezeski, keynotes convention opening.

ment must be maintained, for the Journal is the principal tangible evidence of the professional nature of the work of sanitarians and of the International which represents over 4,000 of them.

During the year Mr. H. L. Thomasson, Executive-Secretary, in addition to his other activities has been serving as Secretary of the National Labeling Committee. This committee evolved from initial efforts of the International toward the attainment of more uniform labeling laws and regulations throughout the country. Mr. Thomasson in his report indicated that this temporary arrangement would be terminated January 1, 1965 when the National Labeling Committee would maintain its headquarters in the offices of the Milk Industry Foundation in Washington, D. C. The Foundation's staff will then take over the Committee's business affairs.

The Annual Banquet on Thursday evening again was the occasion for presentation of the Association awards. Particularly fitting was International's recognition of the many years of service in behalf of sanitation and the Association by C. B. and A. L. Shogren. Many sanitarians will recall the most informative Klenzade Seminars which have been held over the years. This seminar was the brain-child of the Shogrens and the benefits derived will be long lasting. Life membership in International were awarded to both Shogrens. Now that both have retired from active service with Klenzade, the Association hopes that both will enjoy many interesting and fruitful years in activities of their choosing.



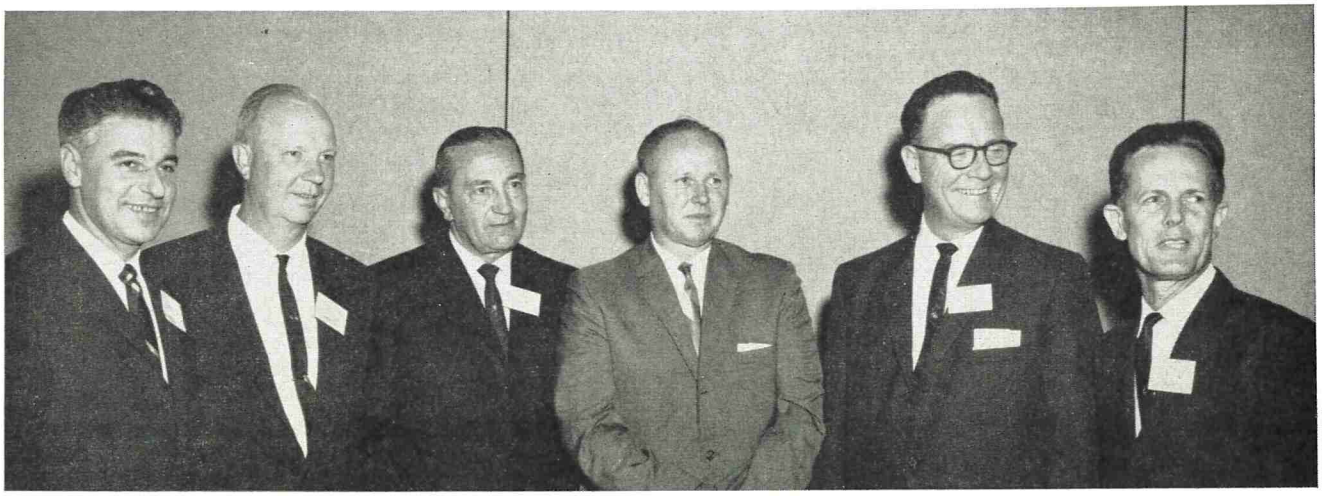
Evening Cheese Smorgasbord sponsored by Oregon Association.

Hospital and Rest Home sanitation programs discussed by Dr. T. L. Meador, Portland Health Officer.

Annual Awards Banquet.

The Citation Award this year was presented to Dr. W. K. Moseley, Moseley Laboratories, Indianapolis, Indiana. This award is presented annually to one whose contribution to sanitation and the International over the years has been outstanding. Dr. Moseley's services to organizations and individuals in the dairy and food industries has effected great benefit. His selection for this award was hailed as richly deserved by all who know him.

Under the Associations new procedure election of officers will be done by mail ballot. The nominating committee has been appointed and consists of the following: Arthur Parker, Kelley Saunders, Richard March, Benj. Luce, James Boyd, Richard Whitehead and Frank Kelley. It will be the Committee's responsibility to select nominees, prepare suitable biographical material about each nominee and see to it that this material is made available to the editorial office of the Association for publication in the Journal for the information of the membership. The recent experience on the mail balloting in connection with the change in our constitution indicated that much must be done to improve the manner of conducting a mail ballot. Merely inserting a ballot in the Journal as a "tear-out" sheet certainly is inadequate as indicated by the small vote response. Apparently, many overlooked the presence of the ballot. On such important matters, a much more business like procedure for voting seems to be needed. The Association might well take a tip from other professional associ-



IAMFES Executive Board—1965. Left to right: Dr. A. N. Myhr, 2nd Vice-President; Dr. P. R. Elliker, 1st Vice-President; F. E. Uetz, President-Elect; Dr. W. C. Lawton, President; J. H. Fritz, Junior Past-President; K. K. Jones, Secretary-Treasurer. Senior Past-President, R. A. Belnap was absent.

W. F. Bower discusses evaluation of food service sanitation procedures.

ations such as the American Dairy Science Assoc., the American Society for Microriologists, American Public Health Association and others with respect to the manner by which these Associations conduct their mail ballots.

As usual the Executive Board was in almost continuous session Sunday through Tuesday prior to the opening session on Wednesday. Undoubtedly the membership will be made aware of significant actions through the pages of the Journal as soon as the official minutes of the meeting have been assembled and edited by Secretary Karl Jones.

Again the Affiliate Council met with Mr. Orlowe Osten, Secretary of the Minnesota Association being elected chairman. The minutes of the Council meeting will be published soon in the Journal.

The ladies program during the meetings was a full and interesting one. Tuesday evening the local committee was on hand to get acquainted with the visiting ladies and to assist them in planning their week's activity. The formal program began Wednesday at a brunch where Mrs. Ivan Parkin shared her experiences that she enjoyed on a recent round the world trip with her husband Ivan. A visit to Bonneville Dam and the beautiful Columbia River drive was the principal activity on Wednesday. Stops at the Dam and numerous spectacular waterfalls along the way as well as at the Salmon hatchery were included. Thursday's program included a tour of the World's largest shopping center, the Lloyd Center, followed by a luncheon and style show at the Sheraton Motor Inn. In the evening the ladies joined their husbands at the cocktail hour prior to the awards banquet and, of course, later attended the banquet.

Mrs. Ivan Parkin recounts world trip experiences at ladies brunch.

Friday evening indeed marked a pleasant event enjoyed by all for this was the occasion of a salmon bake held at Alpenrose Dairyland. This is a truly remarkable place owned by the Alpenrose Dairy of Portland. If ever there was a children's paridise this is it. Numerous farm animals are located on the beautiful grounds including ponies that are available for rides. The beautiful grounds and immaculate barns were a most enjoyable sight. Well over 500 attended this event and it was a fitting climax to a busy, enjoyable and informative annual meeting.

Salmon bake at Alpenrose Dairyland.

Announced at the banquet was the election of Dr. Allan N. Myhr as 2nd Vice President. Dr. Myhr is Professor of Dairy Technology at the Ontario Agricultural College, Guelph, Ontario. Thus after a lapse of many years a Canadian is represented on the Executive Board of the Association. Karl Jones was re-elected Secretary-Treasurer. The other officers advanced automatically to the offices of President, President-Elect and First Vice-President. Leading our Association as President during 1965 will be Dr. W. C. Lawton, Director of Laboratories and Quality Control, Twin City Milk Producers Association, St. Paul, Minnesota; President-Elect, Mr. Fred Uetz, The Borden Company, New York; First Vice President, Dr. Paul R. Elliker, Head of the Department of Microbiology, Oregon State University, Corvallis; Second Vice-President, Dr. Myhr; and Secretary-Treasurer, Karl Jones.

Advance information from Dr. Richard Parry, Chairman of the local arrangements committee of the Connecticut Association, sponsors of the 1965 Annual Meeting, indicate that plans are well underway. The 1965 meeting will be held September 13-16 at the Hotel America in Hartford, Connecticut. Again the annual meeting will afford an excellent opportunity to combine an enjoyable family vacation in New England with attendance at the meeting. It is not too early to make your plans to be present.

AFFILIATES PRESENT DOOR PRIZES AT ANNUAL MEETING

The following door prizes were presented at the Annual Meeting held in Portland, Oregon. The Donor, Type of Gift and Recipient is as follows:

Wisconsin, Wisconsin cheeses, Joe Suiter, Washington Dept. of Agriculture, Seattle.

Quebec, Canada, Two glass swan figurines, Miss Muriel Thompson, Washington State Dept. of Health, Seattle.

Mississippi, Assortment of canned goods, canned milk, candy, lingerie, Vernon Chock, Oregon State Dept. of Health, Portland.

Florida, Bushel of Florida oranges, James A. Ingalls, 1409 Alder Drive, Twin Falls, Idaho.

South Dakota, Cuff Links, Jack Glenn, City of Portland Milk Inspection Service, Portland, Oregon.

Rhode Island, Ladies Jewelry, Fred Tumm, Vancouver, Washington.

Georgia, Barometer, Franklin Barber, Grangeville, Illinois.

Missouri, Fishing Reel, James Smathers, Virginia.

Indiana, Fishing Tackle (gift certificate), John Liston, U. of Washington, Seattle, Washington.

Dr. W. K. Moseley (left) receives coveted Citation Award from Awards Committee Chairman C. E. Walton.

DR. W. K. MOSELEY RECEIVES IAMFES CITATION AWARD

Dr. W. K. Moseley, owner of Moseley Laboratories, Indianapolis, Indiana was presented the Citation Award of IAMFES at the 51st Annual Meeting August 20, 1964 in Portland, Oregon.

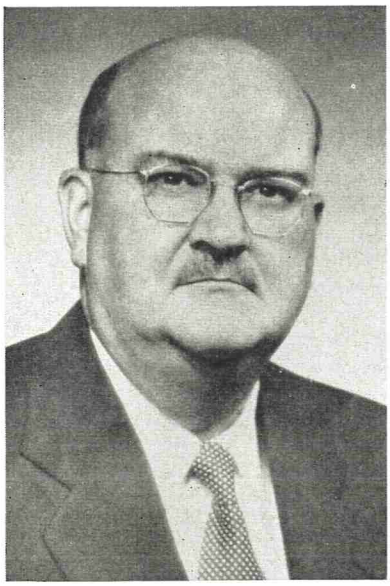
A framed certificate is given annually by the Association to one whose service to sanitarians and the Association has been especially outstanding. Dr. Paul R. Elliker, First Vice-President, speaking for the Association read the following citation at the award presentation:

"It is a real privilege for me to participate in the presentation of this year's Citation Award. The winner of the Award was born in Manes, Missouri. He received the Bachelor of Science degree in Dairy

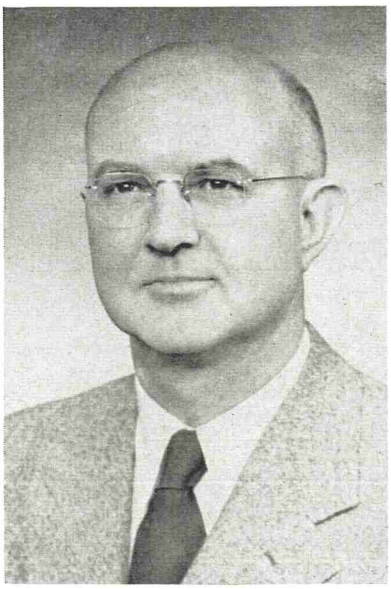
Science from the University of Missouri in 1923. He worked at Swift and Company Creamery in Portland, Oregon during 1924. Then he returned to the University of Missouri where he received the Master of Arts degree in Dairy Science in 1926. During the period 1926 to 1927 he worked for the Indiana State Department of Health and during the following year for Schlosser Brothers Creamery of Indianapolis, Indiana. In 1928 he started his own commercial laboratory. He now works with several hundred dairy and food plants on quality control problems with special emphasis on sanitation. He has contributed as much to dairy and food sanitation improvement in the United States as any other single individual. Many persons in the industry have learned a great deal of what they know about dairy and food sanitation from him. He has a modest, unassuming, home-spun Missouri approach with a keen ability to solve farm and plant problems. I am indeed happy to announce Mr. W. K. (Bill) Moseley as the winner of this year's Citation Award."

In behalf of R. A. Belknap, "Dusty" Miller (left) receives Past-President's Plaque from Senior Past President Charles Walton.

SHOGREN BROTHERS RECEIVE LIFE MEMBERSHIP FROM IAMFES



C. B. Shogren



A. L. Shogren

In recognition of longtime service and affiliation with IAMFES the Association at its annual meeting in Portland voted to present C. B. and A. L. Shogren, Klenzade Products, Inc., Life Membership in the Association. Unfortunately, the Shogrens were unable to be present, and in their absence their Associate of many years Bill Dixon acknowledged the award in their behalf.

C. B. Shogren has had a long and active interest in the Association. Though a top executive and manager of a company engaged in modern day business enterprises, he has been a sanitarian at heart and has actively supported the Association in all its endeavors. While his business responsibilities have required his attention in other fields, this has always been his favorite organization and he counted among his closest friends many members of the Association. Until recent years he was a regular attendant of the annual meetings, and his advice and council was valued in consideration of the many problems confronting sani-

tarians. C. B. is retired in Florida and is no longer engaged in business activities. It can be said that among the many honors which have come to him in his very active life, his recognition and acceptance as a sanitarian has given him one of his greatest pleasures.

Arthur L. Shogren has been called the "silent" Shogren. He is not as well known to many members of the Association primarily because his business responsibilities in the Klenzade organization has limited his travel. Consequently, he has been unable to attend Association meetings regularly. Nevertheless, Arthur's support of the sanitarian's activities has always been a constant and substantial part of the Shogren contribution. Arthur, too, has retired to a busy life of fishing and hunting and other of his favorite sports, but should be long remembered for his solid though perhaps "behind the scene" endorsement of the cause of sanitation.

SUMMARIES OF PAPERS GIVEN AT THE 51st ANNUAL MEETING, INTERNATIONAL ASSOCIATION OF MILK, FOOD, AND ENVIRONMENTAL SANITARIANS

Clostridium botulinum Food Poisoning, E. M. Foster, Dept. of Bacteriology, University of Wisconsin, Madison — Last year's outbreaks of botulism in the United States have stimulated renewed interest in this food-borne disease, primarily because commercially prepared foods were involved. Three of the outbreaks were caused by *Clostridium botulinum* type E in fishery products. Two of these resulted from the consumption of smoked fish from the Great Lakes. A survey has been started to see if *C. botulinum* type E is common in fish from the Great Lakes. Toxin neutralization tests have shown the organism to be present in cultures from nine of ten locations sampled in Lake Michigan. The organism was found more frequently in the intestinal tract than on gills, livers or the external surface of the fish. Over 75% of the cultures prepared from the intestines of fish caught in one large bay of Lake Michigan proved to contain type E. toxin. The incidence of the organism in fish from the main body of the lake has been much lower than this.

Evaluation of Food Service Sanitation Programs, W. F. Bower, Milk and Food Branch, U. S. Public Health Service, Washington, D. C. — The author points out the need for and principles involved in the evaluation of food-service sanitation programs, and discusses some of the criteria included in the proposed *Public Health Service Procedure for Evaluating Food-Service Sanitation Programs.* The differences between this procedure and previous methods used are outlined and the point is made that evaluation is not an end in itself, but is the beginning of planning and operating better food-service sanitation programs.

Water Quality Control Problems in the Pacific Northwest, Curtiss M. Everts, Pacific Northwest Water Laboratory, Corvallis, Oregon — The Pacific Northwest consists of some 250,000 square miles of land in Idaho, Montana, Oregon and Washington. Its climate and rainfall are as varied as its topography with semi-arid areas east of the Cascade Mountains and lush fertile farm lands to the west and along the Pacific coast. Major resources are timber, agriculture, tourism, commercial fishing and mining, all of which are strongly supported by water for hydro-electric power, irrigation, industrial and domestic use, and recreation. These assets are accompanied by the liabilities of disposal of industrial and domestic waste waters. Except in a few areas, pollution of surface waters have not yet reached serious proportions and most of the control effort has been devoted to prevention rather than correction. Forecasts indicate that the present population of 6,000,000 may be expected to double by the year 2,000. New industrial development coupled with expansion of existing industry, particularly pulp and paper production and food processing have aggravated some old problems and created some new ones. Water quality control needs of the region include extension of the research effort, the development of comprehensive water quality management plans for each major river sub-basin, and better state financial support for the water quality control effort.

Sanitation in Seafood Production And Distribution, J. Liston, Food Science, College of Fisheries, University of Washington, Seattle, Washington — The seafood industry is concerned with a wide variety of products and processes which include both ancient and modern practices, and the individual catching and processing units range from very small to large. Sanitation practices reflect this variety ranging from minimal procedures to sophisticated and highly effective systems. The peculiar nature of the harvest process introduces unique problems of sanitation on board vessels at sea where, because of the construction of fish holds, good cleaning practices are almost impossible. Molluscan shelfish represent a separate problem since, unlike other seafoods, they may be intrinsically contaminated with dangerous bacteria. However, this problem is well controlled through State and Federal action. Because of the manual operations involved in primary processing of seafoods, contamination in filleting plants is extensive. This is controlled in practice by the use of low temperatures and abundant washing. However, relatively few plants make use of in-plant chlorination which has been shown to be highly effective in keeping bacterial contamination at a low level. Practices in fish canneries subsequent to primary processing operations are similar to those in other food canning operations and reasonably good sanitation programs are common. The principal problems in freezing establishments occur in the production of precooked ready-to-eat items. These have been found to acquire organisms of public health significance which are mainly derived from exogenous contamination. Generally, rather poor sanitation practices are common in traditional processing operations such as salting and smoking since it is erroneously assumed that these are highly bactericidal. Retail handling of seafoods leaves much to be desired. They are usually accorded the same treatment as much less perishable meat products and their quality suffers accordingly. Though sanitation practices in the seafood industry are improving, a vigorous program of education at the plant operator level is needed to provide the necessary understanding of the reasons for and principles of modern sanitation operations in the food industry.

Environmental Sanitation In National Park Service Areas, George F. Whitworth, National Park Service, Western Regional Office — The National Park Service of the United States Department of the Interior administers some 201 areas with a total of 26,465,000 acres, and a total of 102,710,600 visits during 1963. On a greater or lesser scale nearly every problem met in environmental sanitation occurs in one or more of these areas. The Public Health Service of the Department of Health, Education, and Welfare assists the Park Service

in environmental sanitation. Water supply requirements vary from small individual ranger outposts and small high mountain camp areas to facilities similar to those found in a medium-sized city. Untreated waters are being eliminated as rapidly as possible within the limitations imposed by available funds. Sewer systems vary from ordinary pit toilets in backcountry areas to septic tanks with subsurface absorption systems to larger systems such as activated sludge, high rate trickling filter or extended aeration plants. Insect and rodent control consists primarily of adequate sanitation. The use of insecticides and rodenticides is approved only after the most careful study and analysis for each individual proposed use. Periodic inspections are made by the Public Health Service, assisted by the Park Service, of all concessioner food-serving facilities in areas administered by the National Park Service. The National Park Service and the Public Health Service are exercising constant vigilance to insure that health standards are maintained at all times. Constant inspection is being undertaken so that substantial improvements can be made in environmental sanitation to the end that the health of the visitor will be protected at all times.

Sanitary Design and Evaluation of Food Service Equipment, Charles A. Farish, National Sanitation Foundation Testing Laboratory, Inc., School of Public Health, University of Michigan, Ann Arbor — The sanitary design and evaluation of food service equipment must be based on criteria and standards that have received mutual agreement of all parties concerned, the user, the designer, the manufacturer, the public health official. The National Sanitation Foundation Standards and Seal of Approval Program is developed on the philosophy and under the methodology that involves all the above parties. There are 10 NSF standards and criteria covering food service equipment being used by over 500 manufacturers on over 12,000 items of equipment or products. Standards and evaluation programs are effective only if they are used by manufacturers, designers, operators, and by official health agencies, as well as by the agency controlling the Seal being used on the equipment or products. Re-examination of equipment at the point of manufacture at least annually is essential. Such revisits should be made without prior notification of the manufacturer. Original evaluation as well as re-examination should include performance testing if indicated. The NSF Seal of Approval identifies equipment or products meeting high standards of sanitary significance. It should be accepted by health agencies when they have evaluated the equipment at the point of installation and found it to be in compliance with the NSF Standards. Otherwise notify the NSF Testing Laboratory so that the manufacturer can be contacted to obtain compliance with Standards. There are many other programs being promoted by the National Sanitation Foundation, including plastics for potable water and drain, waste and vent applications; swimming pool equipment and products; and research of significance in the field of public health. The NSF program is as broad as the entire field of environmental health.

Biodegradation of Synthetic Detergents, G. M. Cook, Oronite Division, California Chemical Company — The consumption of synthetic detergents increased rapidly during the period of the late 1940's and early 1950's, and now totals about 4 billion pounds per year. Alkylbenzene sulfonate (ABS) constitutes the largest single surface active agent in detergent formulations. Although ABS exhibits excellent detergent properties and is nontoxic, it is decomposed slowly by the micro oganisms in waste water-treating systems. The detergent industry is converting from ABS to linear alkylate sulfonate (LAS). This new surface active agent offers the same outstanding detergent qualities as ABS but in addition it is degraded much more rapidly after use than ABS. The data presented show the faster rate of decomposition of LAS compared to ABS under various treating conditions, including activated sludge sewage treatment, oxidation ponds, river dieway and septic tank-drain field systems.

Hospital and Rest Home Sanitation, T. L. Meador, Health Officer, City of Portland, Oregon — Hospital sanitation is not a new subject and much study, investigation, and research has been done and results recorded. An intelligent and thorough survey of the situation will reveal many of the problems. The recognition of the tremendous potential for microbiological contamination and cross infection must be recognized and appreciated. Overcrowding, increased susceptibility, lowered resistance, and intimate intermingling of medical and sanitary procedures results in a situation requiring intensive study, definitive action, and close and continous surveillance to reduce and control nosocomial infections. A major sanitation safeguard is the proper use of germicides which are effective when applied in specific relation to the potential danger. All wastes which are potentially dangerous, must be treated with extreme care in order to reduce this danger to a minimum. Proper floor cleaning is important in decreasing the spread of contaminated material. Control of ventilation and air currents aid markedly in the control of cross infections. Basically sound principles of surgical, isolation, and ward techniques must be instituted and followed. Food preparation, service, and waste disposal are potential contributors to the spread of infectious disease and must be adequately supervised. All departments must be evaluated for microbiological contamination and all hazards defined and corrected. This can be done through a cooperative plan between the infection committee, the hospital laboratory, staff, and other personnel. Health authorities should take all precautions possible to assure hospitals that the water, food, and milk supplies are both wholesome and safe.

A Practical Control Program for Mastitis, Roy T. Olson, Spokane Health Department, Spokane, Washington — The City of Spokane Health Department's program for the control of mastitis was first started in 1948, using the resazurin test and was successfully followed until 1957. The advent of the farm bulk tank ended this program as the resazurin test had to be used on fresh milk, not over 24 hours old. In May, 1962 to November, 1962 the modified Whiteside test was used as an indicator of mastitis. In this period of running farm bulk tank samples, 42% of producer's samples were positive to this test. Following the National Mastitis Council Plan and with the help of many agencies, the mastitis control program was continued. In January, 1963, the direct microscopic method was used on bulk tank milk samples. One sample from each producer was tested every 6 weeks. Excellent progress was made and the 30% of the producers who continuously had over 1,000,000 leucocytes per ml in April, 1963 was reduced to 4% by July, 1964. A warning level was placed at 1,000,000 leucocytes per ml or over and plans made to penalize producers who continued having infected herds. It is expected that the warning level will be lowered to 500,000 or less in the future. Extensive improvement has been made in milking methods, installation and condition of milking machines, housing, cowyards and eliminating infected cows. There are still handicaps, however, such as, a reluctance of some dairymen to cull their herds because of the low price of beef, some veterinarians not showing interest in mastitis control, and reluctance of milk plants to inform their producers that they want the program, and also the

absence of laboratory checking. The program has been successful, but progress has been slower than anticipated.

Variations in Bacterial Count in Commercial Corn Freezing, E. R. Wolford, Fruit and Vegetable Products Laboratory, Western Washington Expt. Station, Puyallup, Washington — High bacterial counts arose from washers, from conveyor belts which were inadequately cleaned or disinfected, from the distributor at the entrance to the freezing tunnel, and, generally, from points where corn accumulated on guides, reels, or other equipment along the processing line. Accumulation of corn even at one point can contaminate the rest of the line and raise the count on the final product to more than a million/g. In-plant chlorinated water, continuous rinsing of conveyor belts with chlorinated water, and split blanching with the second blanch as close to the freezer as possible lowered count. Continuous attention to the cleanliness of the line is essential.

The Sanitarian's Responsibility in Total Environmental Health Programs, V. C. Reierson, Environmental Sanitation Division, Oregon State Board of Health, Portland — Since man will always be dependent upon his environment, environmental health programs must be effected through sound planning, inspection, education, consultation, enforcement and evaluation. This requires close cooperation and understanding, not only with other public health personnel and members of related industries, but with others involved in environmental planning, maintenance, modification and control as well as with governing bodies, voluntary agencies, official boards, and commissions, news media, schools, civic groups, and the general public. Today's Sanitarian, to succeed, must prescribe to this multi-disciplinary approach in environmental health. As professional Sanitarians, we must perform these responsibilities with courage, dignity, fairness, and accuracy. This means the Sanitarian must, through education, training, and experience, develop skills essential in public heath administration in order to cope with modern environmental health needs. We must apply scientific procedures in lieu of trial and error if we are to achieve or maintain man's survival in today's physical, chemical, and biological hazards.

Air Pollution Control, P. W. Hildbrandt, Air Sanitation and Radiation Control Section, Washington Dept. of Health, Seattle — Air pollution is an integral part of the contamination present in the total human environment, and control of atmospheric quality is becoming essential in many areas of the world. The problem of air pollution is complex, involving innumerable sources, economic and health effects that are difficult to document and meteorological variables that complicate the establishment of specific source and effect relationships. Preventative air pollution control programs are often forestalled by a lack of public concern, an apathy that has allowed other community problems to develop to the point that remedial action is an urgent and expensive necessity. Leadership is needed to prevent further degradation of the nation's atmospheric resources, and to improve air pollution conditions in areas with serious existing contamination levels. The sanitarian's professional experience in solving environmental problems provides him with both the opportunity and responsibility of accepting this challenge. Leading an uninformed populace toward an air resources management program is a delicate and difficult task, but one that will prove its worth by obviating future demands of an outraged public for cleanliness in the air they breathe.

Sanitary Design of Food Processing Equipment, Edwin S. Doyle, National Canners Association, Western Research Laboratory, Berkeley, California — Management is concerned about the sanitary design and construction of food processing equipment. The cost of cleaning equipment is a factor in profit or loss. Cleanliness is an espect of sanitation and influences consumer confidence in the company's products. The sanitary design and construction of food processing equipment is necessary, but should be accompished without unnecessary and unwarranted "standardization" that defeats development, ingenuity, and creativity. The National Canners Association Committee on Sanitation of Canning Equipment utilizes the canning industry's technical knowledge production experience, and planned research to prepare "recommendations" concerning sanitary design and construction of canning equipment. The recommendations for post-processing can handling are discussed in the light of the specialized research and background knowledge necessary.

NEWS AND EVENTS

NOTICE TO MEMBERSHIP

In accordance with the recent change in our Constitution and By-laws which requires our 2nd Vice President and Secretary-Treasurer to be elected by mail ballot beginning in 1965 you are hereby notified that President W. C. Lawton has appointed A. E. Parker, City Health Department, City Hall, Portland, Oregon as Chairman of the Nominating Committee. Nominations for the offices of 2nd Vice President and Secretary-Treasurer are now open and any member wishing to make a nomination should send a picture and a biographical sketch of his nominee to Mr. Parker not later than February 1, 1965.

KARL K. JONES, *Secretary-Treasurer*
International Association of Milk,
Food and Environmental
Sanitarians, Inc.

WISCONSIN TO OFFER SHORT COURSE IN CHEESE MANUFACTURE

A special four week Winter Dairy Course in Cheese Making will be offered by the University of Wisconsin department of dairy and food industries, October 19 through November 13.

The lecture portion of the course will cover principles of cheese making, milk composition and testing, dairy mathematics, dairy mechanics, dairy bacteriology, starter management, and dairy sanitation.

Special laboratory sessions will cover starter-making and testing, analysis of milk and cheese, and grading of cheese. Students will gain experience in the manufacture of domestic and foreign cheese, as well as cottage and other soft types of cheese.

An examination for a Wisconsin cheese maker's license will be given by the Wisconsin State Department of Agriculture for qualified students at the end of the course.

The course is open to both residents and non-residents of Wisconsin who have completed high school or its equivalent. For further details, write to H. E. Calbert, Chairman Department of Dairy and Food Industries, University of Wisconsin, Madison, Wis.

MICHIGAN SANITARIANS PREPARE FOR REGISTRATION EXAMINATIONS

Fifty-one inspectors of the Michigan Department of Agriculture's Foods and Standards and Dairy Divisions, gave eight Monday evenings of their time to take a refresher course for examinations to become registered sanitarians. Examinations were held Aug. 29 at Lansing and Escanaba. Those passing will receive registration. The eight-week course was given at Michigan State University under sponsorship of the Michigan Association of Sanitarians.

The course included studies in communicable diseases, food sanitation, milk sanitation, housing, water, vector control, wastes and sewage, swimming pools, and studies in bacteriology.

The Foods and Standards Division has jurisdiction of state law enforcement in places where food is prepared, sold, or stored.

J. L. LITTLEFIELD ELECTED PRESIDENT OF AFDOUS

The first Michigan man ever to achieve the honor, J. L. Littlefield, chief of the Michigan Department of Agriculture's Foods and Standards Division, recently was elected president of the Association of Food and Drug Officials of the United States.

Mr. Littlefield was elected at the organization's 68th annual conference held at Denver. The organization is made up of the chief regulatory officials in each of the states and major municipalities. Also in the association are representatives of various Federal agencies responsible for food and drug work.

EFFECTIVE DATES SET FOR 3-A STANDARDS FOR SIFTERS AND PLASTICS AMENDMENTS

The 3-A Sanitary Standard for Sifters for Dry Milk and Dry Milk Products, Serial #2600, will become effective July 9, 1965, with publication set for the April 1965 issue of The Journal of Milk and Food Technology.

Similarly, nine amendments to other published 3-A Standards, supplying cross references to the recently completed 3-A Plastics Standards, will also become effective July 9, 1965, with publication also set for the April 1965 issue of The Journal of Milk and Food Technology.

The above is announced by D. H. Williams, Secretary of the 3-A Sanitary Standards Committees, who pointed out that both the sifters standard and the plastics amendments were approved at the May 1964 meeting of the 3-A groups in Florida. A Standard does not become effective, however, until twelve months after it has been signed by representatives of all participants in the program — and it was not until July 9 of 1964 that all participants affixed their

signatures to the agreed-upon standards.

By special action, Williams announced, an amendment to the 3-A Accepted Practices for Supplying Air Under Pressure became effective July 26, 1964, four months ahead of the normal schedule. Reason for advancing the effectiveness of the amendment was that it was published in the July 1964 issue of the Journal of Milk and Food Technology, and 3-A participants felt that it was both practical and desirable to make it effective on the same date as that of the parent standard which it amends.

Authorization for use of the 3-A Symbol on equipment complying with the new standard and amendments may be made after the effective dates of the new 3-A documents.

3-A Sanitary Standards for dairy equipment are the result of cooperation among three groups: (1) dairy processors, the users of dairy equipment; (2) dairy industrial suppliers and equippers, the manufacturers and sellers of dairy equipment; and (3) public health officials and sanitarians, the regulatory officials under whose jurisdiction the equipment is installed and used.

The 3-A program, which is supported by every national dairy trade association, is an entirely voluntary undertaking which has resulted in standards being issued for 26 items of dairy industrial supplies or equipment.

Generally speaking, 3-A standards are acceptable in public health jurisdictions in nearly every town, city, or state in the United States. The 3-A Sanitary Standards are cited in the recommended Milk Ordinance and Code of the U. S. Public Health Service.

WATER SUPPLY AND WASTE DISPOSAL

The relationship between fishkills and polluted water is explained in the Public Health Service publication "Be a Pollution Detective". The booklet is designed to help water districts enlist the aid of fishing enthusiasts as "pollution spotters". The U. S.-P. H. S., Division of Water Supply and Pollution Control, Washington, D. C. 20201, will supply copies on request.

A new non-toxic coating treatment to prevent rust, corrosion, and scale formation in water pipes and containers has proved successful in 65,000 worldwide tests, according to its developers. The coating, called Aqua-Clear, is said to prevent deterioration where water passes through pipes at velocities as high as 10,000 gallons a minute. For information, write to Berdell Industries, 28-01 Thomson Ave., Long Island City 1, New York.

Domestic water savings of up to 20,000 gallons annually are said to be the main feature of a newly patented toilet tank ball which operates on a combination of air pressure and water release to cut conventional flushing water amounts in half. The unit, Control-O-Flush, is marketed by the B/G/S Sales Company, P. O. Box 268, West Hartford, Connecticut, and costs $2.98.

"*Natural Resources of Massachusetts*", a 63-page illustrated booklet, is the fifth publication in a Department of the Interior educational series on state resources. The publication includes a description of the state's physical characteristics, water and power resources, geology and Federal resource programs. Copies cost 45 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

"*Managing California's Snow Zone for Water*", by Henry W. Anderson, is a new publication covering seven years of research on snow zone hydrology and management. Details of 15 different projects are included. Requests for the publication (Research Paper PSW-6) should be addressed to the Pacific SW Forest and Range Experiment Station, P. O. Box 245, Berkeley 1, California 94701.

Tests of a flash distillation method to purify waste water for re-use will be made for the U. S. Public Health Service under a $50,000 contract awarded to the Maxim Division of the American Machine and Foundry Company, Waterford, Connecticut. In the tests, heated waste water will be passed through a number of chambers successively at slightly lower pressures and temperatures. In each chamber, part of the water is evaporated and then condensed.

The use of waterways, ponds and dugouts for land improvement are discussed in a new publication from the Caterpillar Tractor Co., — "An Alternative to Waste". The low-cost projects described illustrate the benefits of scientific water management. Free copies of Form D234 are available from the company in Peoria, Illinois.

The accumulation of sewage phosphates and nitrates leading to the rampant growth of water polluting algae in channels designed to service marinas along the shores of Long Island Sound will be the subject of a U. S. Public Health Service study. The Service recently awarded a grant of $22,700 to Professor John P. Barlow of the N. Y. State College of Agriculture to investigate and suggest remedies for the problem.

Polish scientists are testing a new electrolytic method of handling hydrogen cyanide and its compounds in effluents from non-ferrous metal foundries (copper, zinc and cadmium plants, and from hardening and electroplating plants). Present indications are that the treatment produces wastes which are absolutely harmless and do not pollute rivers.

A four-phase program of graduate study in water resources is offered by the University of Pittsburgh. Emphasis will be on: hydrology; fluid mechanics and hydraulics; physics, chemistry and the biology of water and waste water; and legal, economic, and administrative planning aspects. Professor C. C. Kisiel, Civil Engineering Department, 325 Engineering Hall, University of Pittsburgh, Pa., 15213, will supply registration and financial assistance details.

The history of the relationship between the Federal Government and the development of water resources in the western states is covered in a compilation of papers read at the 1963 Western Water Law Symposium. The publication, edited by Richard W. Dickenson, counsel for San Joaquin County, California, clarifies many of the issues involved in present day western water controversies. Inquiries for copies should be addressed to the National District Attorney's Association, 1155 East 60 St., Chicago 37, Illinois. Price is $3.90 including tax in California, and $3.75 to other areas.

Navigation details such as river depths and the location of locks and dams are included in a new map of Kentucky's waterways and reservoirs. More than 1,700 items of "water interest" are marked on the 22 by 48 inch two-color publication which costs 83 cents from the Department of Commerce, Capitol Annex, Frankfort, Kentucky.

"PVC Pipe for Drinking Water", is a new 16-page booklet detailing various installations of plastic piping in the water industry, including sea water conversion projects, waterworks, and well construction. Copies are free from the Advertising Department, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland, Ohio 44115.

Reprinted From Water Information Center, News.

"FOOD IN THE FUTURE" FORUM TO HIGHLIGHT LAST TWO DAYS OF OCTOBER 4-9 EXPOSITION

An historic seminar, Food in the Future: Concepts for Planning, will occur on October 8-9, the final two days of the week-long Dairy and Food Industrial Exposition in McCormick Place, Chicago, Ill.

Designed for the guidance of major executives, planners and researchers, the seminar will relate to the major problems of technological change, the possibilities of chemical synthesis of food, probable paths in microbiological studies and their effect on the processing environment, and management's responsibilities to consider all these factors.

Four papers — two each day — will be presented by a major expert in each of the fields under discussion, and an equally distinguished moderator will direct audience questioning at the close of each day's sessions.

KENNETH G. WECKEL

Dr. Kenneth G. Weckel, Professor of Dairy and Food Industries, University of Wisconsin, will serve as chairman of the forum, "Food in the Future: Concepts for Planning," to be held October 8 and 9 at Chicago's McCormick Place, under the sponsorship of Dairy and Food Industries Supply Association.

Each session will occur from 10 a.m. until noon, in meeting rooms at McCormick Place. Admission will be free, but by badge only. The badges which admit visitors to the Dairy and Food Industrial Exposition will also admit them to the seminar.

(In order to provide for all who wish to attend, several meeting rooms, each seating more than 200, have been reserved for the forum. They will be interconnected by public address communication systems so all may freely participate.)

The speakers and their subjects for Thursday morning, October 8, will be:

James R. Bright, Professor of Business Administration at Harvard Business School, "The Eight Directions of Technological Change in the Food Industries: The Most Critical Factors in Management's Planning Function." (Professor Bright, whose landmark study "Automation and Management" appeared in 1958, is the developer and now teacher of the course in Technological Innovation at Harvard.)

E. M. Foster, Ph. D., Professor of Bacteriology, University of Wisconsin, "Food and Microbes of Today and Tomorrow." (Dr. Foster, author of more than 35 scientific papers, is currently pursuing research in *Clostridium botulinum* type E and its relation to fishery products, as well as studies in the microbiology of meats and fermented foods and the production and preservation of cultures for fermented foods.)

On Friday morning, October 9, the speakers and their subjects will be:

NOT A MOON PROBE—BUT DAIRY HISTORY

The large metal object perched on an antique churn is a Champion Automatic Milk Cooler, patented in 1892, and discovered in Arthur's Dairy in Waynesboro, Pa., during a recent remodeling. The Arthurs had the antique retinned and presented it on July 29 as a gift to Dairy and Food Industries Supply Association. It will be on display in the 3-A Sanitory Standards booth at the forthcoming Dairy and Food Industrial Exposition in Chicago, October 4-9, to help dramatize 20th century advances in design and sanitation. Left to right are Joseph S. Cunningham, DFISA Executive Vice President; Ray Arthur and his father William H. Arthur, a partner in the dairy.

A. T. McPherson, Ph. D., Assistant for International Standards to the Director, Institute for Applied Technology, National Bureau of Standards, "Food, Chemistry and Civilization." (A leader in development of synthetic rubbers, Dr. McPherson believes that one day, food produced by direct chemical synthesis may feed much of the world's peoples. He is also widely known in the scientific community for his research in organic and gas chemistry and in other fields as well.)

Ralph G. H. Siu, Ph. D., Chairman of the Army Research Council and Scientific Director of the Research Division of the Army Materiel Command, "Food Processing and Nutritional Nuances." (Dr. Siu's books include "Radiation Preservation of Food," "Microbial Decomposition of Cellulose," and he is also author of numerous professional publications. With all his technical competence, Dr. Siu is also a management expert and philosopher whose book "The Tao of Science" is being re-issued by the MIT Press this fall.)

The distinguished moderator who will chair sessions on both days is Kenneth G. Weckel, Ph. D., Professor of Dairy and Food Industries at the University of Wisconsin. Dr. Weckel is one of the most widely-known educators and researchers in the United States, having been active either as President or holding major committee assignments in such organizations as International Association of Milk, Food and Environmental Sanitarians, Institute of Food Technologists, American Chemical Society, American Dairy Science Association, and the Food Technology Committee of the National Research Council.

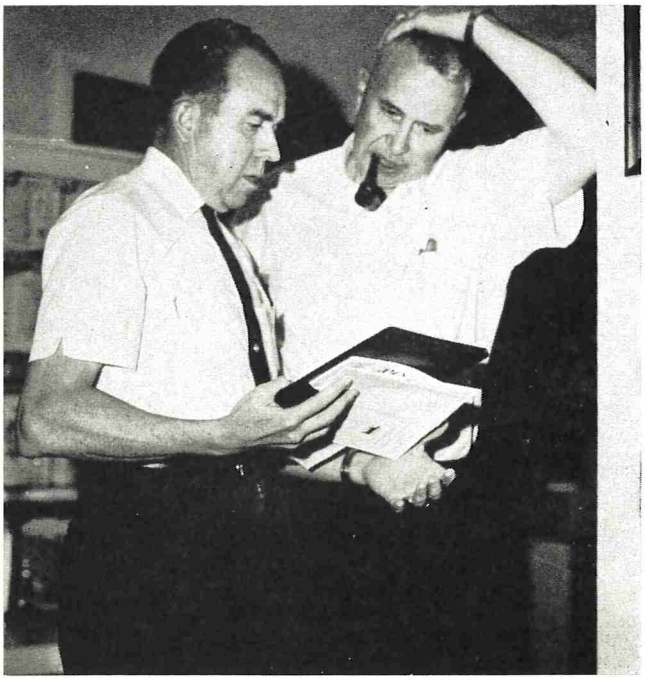
The Dairy and Food Industrial Exposition which occurs October 4-9, as well as the "Food in the Future" seminar on October 8-9, is sponsored by Dairy and Food Industries Supply Association.

DFISA is the same organization which in the past has sponsored 23 Dairy Industries Expositions, one of the largest industrial shows in the world, which have been held every two years since 1946.

The present Exposition is the first to which processors of foods other than strictly fluid milk and foods based on milk have been welcomed. The seminar, as well as the Exposition, has been designed, after months of consultation, to offer ideas and intellectual stimulation for major executives in every field of dairy and food processing.

WYOMING-COLORADO DAIRY INDUSTRIES AND MILK AND FOOD SANITARIANS CONFERENCE

The three-day Wyoming-Colorado Dairy Industries and Rocky Mountain Milk and Food Sanitarians Conference was held at the Holiday Inn, Laramie, July 16-17, and at the University of Wyoming Recreation Camp, July 18.



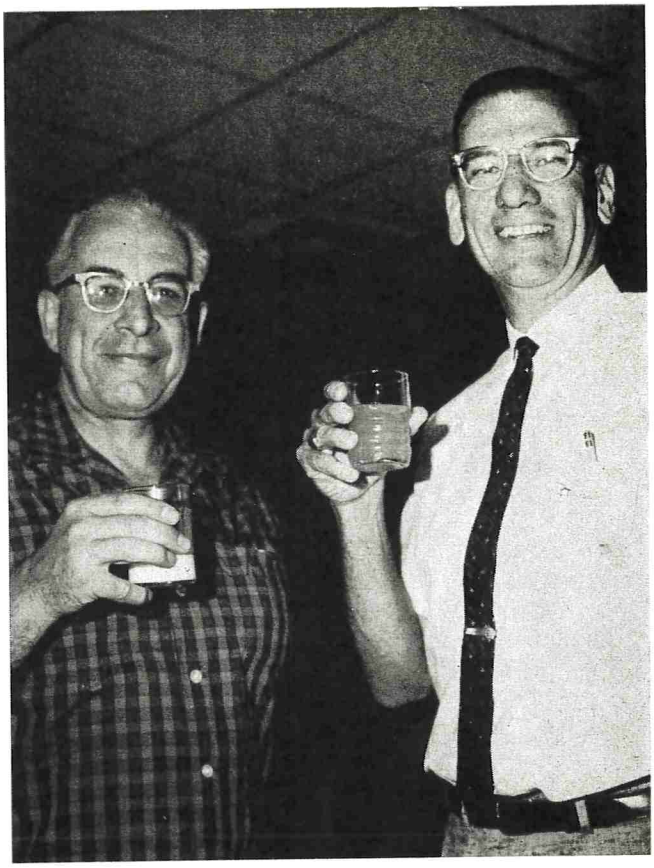
Dr. Darrell Deane, University of Wyoming, Laramie. Charles Dunlap, Executive Secretary, Colorado Dairy Products Association, Denver, Colorado.

Ken Mori, Snow Brand Milk Processing Co., Tokyo, Japan. Lloyd Hahn, Denver Department of Health, Longmont, Colorado.

At the banquet which high-lighted the program, Charles Dunlap, executive secretary of the Colorado Milk Products Association, Denver, was toastmaster and George Weigold, managing director of Dairy Society International, Washington, D. C., the keynote speaker. Mr. Weigold discussed and illustrated with color slides, the nature and scope of the program of Dairy Society International on behalf of the dairy industry.

During the sessions Dr. D. H. Jacobsen, research director of the American Dairy Association, outlined the research program for new dairy products supported by A.D.A. Dr. George Reinbold, Iowa State University, reviewed the methods of determining milk quality at the dairy plant and discussed studies being made of enterococci as a possible index of milk quality. Information concerning the newer aspects of off-flavors in milk was presented by Dr. G. Malcom Trout, Michigan State University, who also reviewed the benefits of good housekeeping and how to obtain them.

Visiting industry speakers included Neil Angevine, Meyer Blanke Company, St. Louis, who spoke on new developments in the manufacture of cottage cheese and the direct acid method of making sour cream. Dr. Milford Bonner, Krim-Ko Corporation, Bensenville, Illinois, talked about the uses of chocolate in milk drinks and also outlined for the group the technical aspects of fruit drink products in the dairy industry. The versatility of nonfat dry milk solids and its uses in other dairy products was discussed by Dr. Douglas Braatz of Consolidated Badger Co-operative, Shawano, Wisconsin. Of particular interest



George Weigold, Managing Director, Dairy Society International, Washington, D. C. Dr. George Reinbold, Iowa State University, Ames.

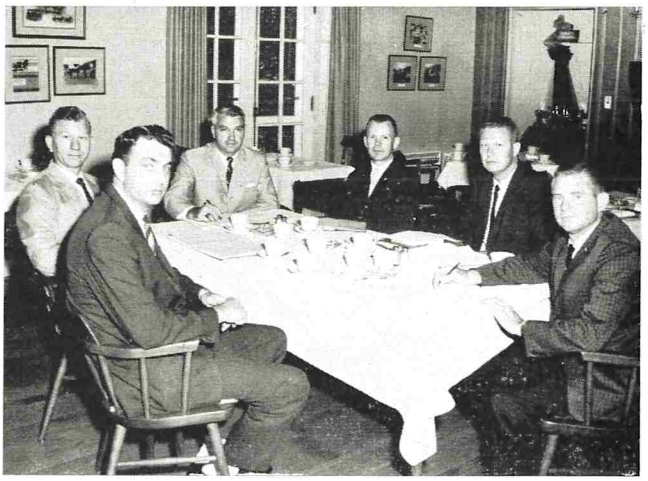
Dr. Malcolm G. Trout, Michigan State University, East Lansing, Michigan. Rodney Knox, Research Engineer, C. P. Division, St. Regis, Fort Atkinson, Wisconsin.

to many was a presentation by Rodney Knox, C. P. Division, St. Regis, Fort Atkinson, Wisconsin, describing the equipment being designed for the continuous manufacture of cottage cheese. Recent developments in ice cream processing were outlined by Dr. Morrison Loewenstein, Crest Foods, Ashton, Illinois. Dr. Loewenstein also discussed the relationship of ice cream formulation to cost and quality of the final product.

The last day of the meeting was held at the University of Wyoming Recreation Camp at the edge of the Medicine Bow National Forest near Centennial, Wyoming. The activities included a family outing and the opportunity to participate in work shops and informal discussions of mutual interest to the dairy industry and the milk and food sanitarians. These included mastitis and public health, milk sediment testing, and the control of dairy products in restaurants.

The new officers of the Rocky Mountain Association of Milk and Food Sanitarians are: President, E. O. Cruz, Los Animos-Huerfano County Health Department, Colorado; President-elect, Dr. W. R. Thomas, University of Wyoming, Laramie; First Vice-president, William Trobaugh, Denver Department of Health and Hospitals, Colorado; Second Vice-president, Larry Whitmore, Wyoming Department of Agriculture, Casper; and Secretary-Treasurer, Frank Yatckoske, Colorado Department of Agriculture, Denver.

EXECUTIVES OF EASTERN AND WESTERN NORTH CAROLINA DAIRY TECHNOLOGY SOCIETY MEET



The Executive Committee of the Eastern North Carolina Dairy Technology Society. They are: (L to R) Bernie McQueen—past President, Pine State Creamery, Raleigh; Audie Elrod—Sgt.-at-Arms, Farmers Dairy, Winston-Salem; Bert Brown—President, Stein-Hall Company, Raleigh; John Hancock, Treasurer, Guilford Dairy, Greensboro; Dr. M. E. Gregory—Corresponding Secretary, N. C. State, Raleigh; and Allen Spears—Vice-President, Coble Dairy, Lexington.

The Executive Committee of the Western North Carolina Dairy Technology Society. They are: (L to R) Charles Colvard, Sgt.-at-Arms, Pet Dairy, Hickory; Bill Beheler, Secretary, Carolina Dairy, Shelby; Bill Craig, President, Sunrise Dairy, Gastonia; Dr. M. E. Gregory, Corresponding Secretary, N. C. State, Raleigh; Sam Rich, Vice-President, Charlotte Health Department, Charlotte; and Tom Aardema, Treasurer, Biltmore Dairy, Asheville. Not pictured is Joe Brown, Past President, Sealtest Foods, Charlotte.

RHODE ISLAND ASSOCIATION HOLDS SID SHEPARD DAY

The Annual Outing of the R. I. Association of Dairy and Food Sanitarians was held at Wright's Farm August 19. The day was designated as Sid Shepard Day in recognition of his long years of service as secretary-treasurer of the Association. There was a record turn out and he was presented with a watch as a memento of the occasion.

UNIVERSITY OF MARYLAND TECHNOLOGY SHORT COURSES AND CONFERENCES

20th Annual Dairy Technology Conference, November 12, 1964 University of Maryland.

Ice Cream Short Course, January 18 through January 28, 1965, Department of Dairy Science, University of Maryland.

Cottage Cheese Conference, March 10, 1965, University of Maryland.

For further information contact Wendell S. Arbuckle, Department of Dairy Science, University of Maryland, College Park, Maryland.

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Send resume to Charles H. Young, Jr., Acting Director; Department of Public Health and Welfare; City Hall; St. Joseph, Missouri.

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Sanitarian—Department Head Status—Position open immediately. Salary Range $5664-$6864, starting salary dependent on experience and qualifications. Generalized sanitation program, including experience in milk, food and general environmental inspection work. Graduation from a recognized college or university with major work in biological services or public health or an equivalent combination of experience and training. Car furnished, Social Security, ten days paid vacation, seven paid holidays, Credit Union and hospitalization insurance available. Write: City Manager, City of Laramie, Box C, Laramie, Wyoming.

INSTITUTIONAL SANITARY FOOD SERVICE TRAINING COURSE

The training course, *Institutional Food Service,* will be presented December 14-18, 1964, by the Public Health Service at the Robert A. Taft Sanitary Engineering Center, Cincinnati, for supervisory sanitarians and administrative personnel responsible for food service operations in institutions, especially schools and hospitals. Instruction enables the trainee to apply the fundamentals of food service sanitation and to design and conduct an efficient food service program. It is conducted by personnel of the Division of Environmental Engineering and Food Protection.

The course is described in detail in the new *Bulletin of Congress* which is available on request. Applications or requests for information should be addressed to the Director, Training Program, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati, Ohio, 45226, or to an appropriate Regional Office.

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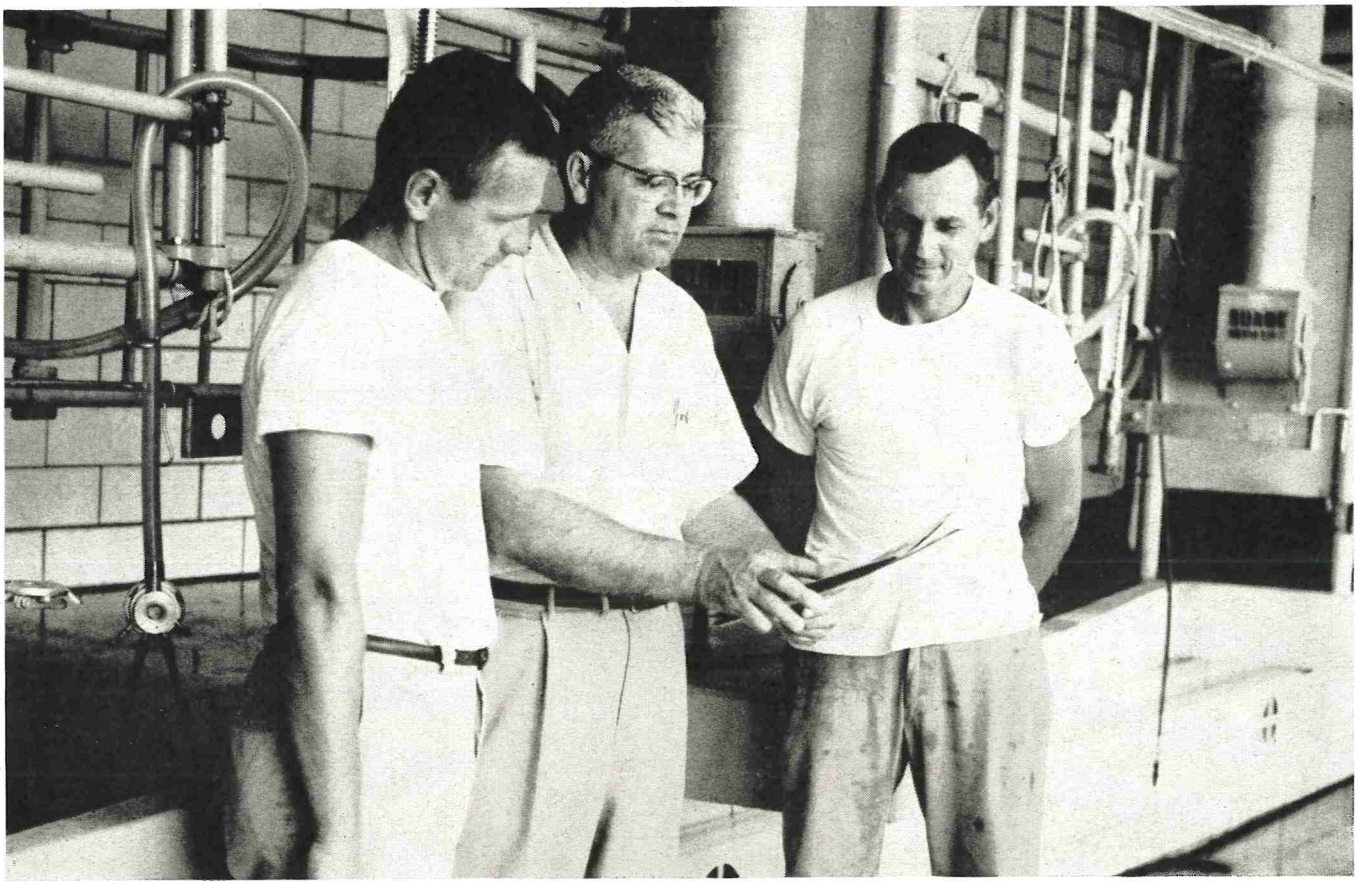

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Bob and Paul Ety of Lancaster, Ohio are two young dairymen who wanted a dairy that not only was more productive, but clean and safe for their 102 cow herd. They put in a double 4-stall Picture Window Milking Parlor equipped with separate TONGANOXIE Milking Systems. Result after just six months: good, high-quality, clean milk with production way up by 12,240 gallons per year. James D. Taylor, Fairfield County Agricultural Extension Agent, shown above between the Etys, reports they run one of the most successful dairy operations in the county.

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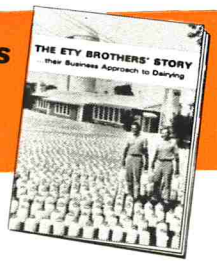

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