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Editorials

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Wanted—A Streamlined Milk Control Program

MILK control did not spring like Athena full-orbed from the mind of Jove. It was born in necessity. It developed slowly and painfully, usually by trial and error. It now is a complex structure of laws, regulations, and practices, written and unwritten. Officialdom maintains it, and the public expect it—and the trade (and the public) bear it.

Originally, milk control was instituted as a public health necessity. Seventy-five years ago, abuses in the production and handling of milk forced public health officials to inaugurate protective measures to reduce the health hazard from the consumption of infected milk. This work received a great impetus in this country soon after the turn of the century through the publication of studies on the epidemiology of milk-borne disease. This development has already been traced [1] and will not be repeated here. Suffice to say that the early measures were effective. Disease from milk-borne vectors practically disappeared from those communities that made real effort to improve milk sanitation.

Such success engendered a degree of justifiable satisfaction, maybe a near pride, in the adequacy of the local procedure. This led to a feeling of superiority—certainly a self-sufficiency—over other communities. Each built up its own system of control and boasted that it had the best milk in the country.

The sum total of all these regulatory efforts has operated to surround the production and handling of milk with a great system of physical requirements in farm, plant, and bottle. A glance at the recent compilation [2] of milk control legislation by only the states (municipalities not studied) reveals the extent to which regulation has permeated the milk industry. Specifications for barns, amount of air space per cow, design and equipment of milk house, number of grades of milk, type of score card, bacterial content of milk, butterfat content, date (or not) of production or pasteurization on labels, size and design of cap, size, style and color of lettering, strength of detergents used in plants, etc., etc. This heterogeneity of requirements—all purporting to lie in the interest of protecting the public health—indicate one of two things:

1 This JOURNAL, 4, 161, 181 (1941).
2 State Milk and Dairy Legislation, Vol. 3, Work Projects Administration, U. S. Government Printing Office, Washington, D. C. (1941).

either there is lack of knowledge as to what factors really do govern the public health safety of milk, or we face bureaucracy run wild. Maybe it is both.

About twenty years ago, more or less, we ceased to have milk-borne epidemics in communities where an active health department was empowered to apply widely recognized principles of milk sanitation. Most of the new regulations introduced since then are only hair-splitting distinctions that are difficultly supported by facts and none by epidemiological evidence. Moreover, most of these new control measures do not operate to increase per capita milk consumption, because this has remained about static for the last fifteen years or so. In addition, these new gadgets cost the industry money—which the public pays.

Worse than that: the great scarcity of milk in the newly created and crowded population centers of war industrial areas and military camps forces the local milk industry to resort to the sale of locally designated "sub-standard" milk or to go without cream or ice cream. What is the public health quality of the "sub-standard" milk? Is it really a health hazard, or is it at variance only with regulations which have no greater significance than the measure of bureaucratic energy?

Many milk control officers find themselves in the predicament of being bound by local legislation to allow only certain specified kinds of milk to be sold—and there is not enough available. They cannot "import" milk from distant states because such milk does not comply with these local standards. So now there is frantic haste to correct the difficulty of being bound to ordinances now shown to have failed to make sufficient milk available at a time when it is needed most. Many milk control laws and regulations—not the products—need "purifying." Safe milk, alleged to be such because of its so-called quality, is caught in the law of diminishing returns. The question is being raised:[3] Shall we allow the sale of unclean milk as being better than no milk?

We know that war plays havoc with a lot of our erstwhile ideas. In the public interest we perforce must adjust ourselves to new outlooks. We are jolted into new appraisals of much of what we have been doing. In many instances we recognize that some things we thought were necessities are only frills. Without doubt, the heterogeneity in our milk control, as exercised over the country, is susceptible to revision—not downward in the public health but certainly constructively in the direction of opening the channels to a greater milk supply. Somebody should get busy on this job immedately. The milk sanitarians know the product, know the need, and have the organizations to effectuate a nation-wide remedial program.

J. H. S.

Food Strategy With Guts and Vision

Nor elegant—admittedly—but expressive!

Milk plant machinery, cows, farm labor, plant operators, milking machines, milk powder, butter, plastics, paint, felt hats, rubber, hogs, bread—these are some of the pieces that comprise the jig-saw puzzle of the milk industry today.

When prices of skim for powder bring more money to the farmer than does sanitary milk for fluid consumption, how can we expect to maintain even the present (inadequate) nutritional level? Added to this is the entice-

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[3] See this Issue, p. 359.

Relation of the Number of Leucocytes in Milk to Streptococcus Infections of the Bovine Udder*

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INTRODUCTION

THE significance of body cells in milk has been discussed for a number of years. The fact that the majority of these cells were leucocytes or white blood corpuscles was first brought to the attention of milk sanitarians through the microscopic examination of the sediment obtained from centrifuging samples of milk. It was at once discovered that where large numbers of leucocytes appeared they were frequently accompanied by long-chained streptococci of the mastitis type. Soon after it was shown by direct microscopic examination of dried films of milk that very erroneous ideas of the numbers of these leucocytes were secured where reliance was placed on an examination of centrifuge sediments. This was due to an indefinite and sometimes large percentage of the leucocytes being swept upward by the rising cream when the centrifuge was operated at the speeds in current use.

The use of the Direct Microscopic technic for the examination of milk brought out the fact that there was a relationship between udder infections and the presence of leucocytes in milk; but few of the early workers made comparative studies between the number of leucocytes present and the presence or absence of streptococcic infections.

It was the purpose of the present investigation to gather comparative data that would aid in clarifying the pathologic significance of the presence of these leucocytes in freshly drawn milk.

PREVIOUS INVESTIGATIONS

Many investigations of the number and significance of leucocytes in milk in the period between the time when colostral corpuscles were first discovered in milk by Donne in 1835 and the work of Breed (1914) are reported. This work is well summarized by Breed (1914) and by Baker and Breed (1920), and it is not necessary to repeat this summary here. It may be noted that these studies showed that colostral corpuscles represented detached fat-laden epithelial cells, and that these were frequently discharged with free epithelial cell nuclei during other than the colostral period. It was shown also that while some quarters might discharge very few to almost no white blood corpuscles (leucocytes) over periods of at least six weeks (Breed 1912), other quarters continuously discharged them in appreciable numbers with a tendency to vary in cycles. Differential counts with the use of blood stains in an effort to discover what relationship existed, if any, between definite types of leucocytes and infections of various types have produced little of value. Huddleson reported some evidence that udders infected with the organisms of the genus *Brucella* caused an increase in the discharge of leucocytes, but this evidence was not entirely conclusive as many of these udders were almost certainly infected at the same time with the mastitis streptococcus (Hucker, Reed, and Savage, 1937).

Hucker, Trudell, and Jennings (1932) concluded that there was a direct relation between large number of leucocytes and the presence of mastitis

* Approved by the Director of the New York State Agricultural Experiment Station for publication as Journal Paper No. 497, March 20, 1942.

infection. It was concluded that if 3,000,000 or more leucocytes per cubic centimeter were encountered in quarter samples it should be assumed that an infection of the udder existed. Subsequently Hucker (1932) pointed out that more extensive studies on similar samples indicated that 500,000 or more leucocytes per cubic centimeter definitely indicated pathological changes in the udder. It was further concluded that milk from udders which contain no demonstrable fibrosis rarely showed above 50,000 leucocytes per cubic centimeter.

Shaw, Hansen, and Nutting (1937) found that 87 percent of the samples of milk studied and known to be abnormal contained over 100,000 leucocytes per cubic centimeter while less than 6 percent of samples of milk from cows known to be free of mastitis showed a similar number of leucocytes.

The general conclusion of these studies indicates that there is a certain significance to be attached to the presence of leucocytes in milk as reflecting the condition of the udder from which the milk was secured.

METHODS

Fresh quarter samples of fore-milk were secured from the cows to be examined. The milk samples were iced and the number of leucocytes determined by the method of Prescott and Breed (1910) within two hours after the samples were obtained.

The procedures in determining the presence of streptococci, the reaction to the brom thymol blue test, and other methods have been outlined from the original references by Hucker (1933).

DATA

In a large percentage of the observations, both from the standpoint of determination of the number of leucocytes and other reactions, the results have been obtained from an analysis made only upon one sample from each quarter of one cow. Only in certain instances, where noted, have a number of samples been secured over a period of time from the same individual.

This particular point is of importance particularly from the standpoint of the results as secured from the examination of the milk other than the determinations of the number of leucocytes. The number of leucocytes in milk may remain relatively uniform for a period of time while a positive reaction to brom thymol blue or the presence of streptococci in freshly drawn samples may be very intermittent in nature.

THE DISTRIBUTION OF 30,331 LEUCOCYTE COUNTS

In the routine examination of milk to determine the number of leucocytes per cubic centimeter, no information is available to indicate the relative frequency which any given leucocyte count may be encountered. A study of 30,331 (Table 1) leucocyte counts from 8,000 cows indicated that the largest percentage of leucocyte counts as encountered were less than 100,000 per cubic centimeter. It was found (Table 1) that 68 percent of all samples contained less than 100,000 leucocytes per cubic centimeter. As the number of leucocytes increased, the number of samples containing higher counts decreased proportionately in the higher leucocyte classifications. The greatest decrease in this respect (Table 1) was found to be between the number of samples which contained less than 100,000 leucocytes per cubic centimeter as contrasted to samples which contained from 100,000 to 300,000 leucocytes per cubic centimeter. Only 10 percent of the samples were found to have a leucocyte count between 100,000 and 300,000 per cubic centimeter while 68 percent contained less than 100,000 leucocytes per cubic centimeter. From this observation it is apparent that this great spread which is obvious in the samples as classified as containing more or less than 100,000 per cubic centimeter indi-

TABLE 1

THE DISTRIBUTION OF APPROXIMATELY 30,331 LEUCOCYTE COUNTS AND THEIR RELATION TO MACHINE AND HAND MILKING

Number of leucocytes per cubic centimeter	Samples from cows milked by machine		Samples from cows milked by hand		Samples, histories of which were unknown		All samples	
	number	percent	number	percent	number	percent	number	percent
Less than 100,000	5750	55.00	13,321	77.40	1805	67.12	20,876	68.80
100,000–300,000	1539	14.70	1,279	7.43	441	16.40	3,259	10.74
400,000–600,000	747	7.15	896	5.20	123	4.57	1,766	5.82
700,000–900,000	550	5.26	555	3.22	33	1.22	1,138	3.75
1,000,000–1,200,000	411	3.90	245	1.42	60	2.23	716	2.36
1,300,000–1,500,000	286	2.70	196	1.13	39	1.45	521	1.71
1,600,000–1,800,000	212	2.00	146	0.84	22	0.81	380	1.25
1,900,000–2,100,000	164	1.57	73	0.42	21	0.78	258	0.85
2,200,000–2,400,000	89	0.85	57	0.33	15	0.55	161	0.53
2,500,000–2,700,000	77	0.73	43	0.24	5	0.18	125	0.41
2,800,000–3,000,000	83	0.79	45	0.26	14	0.52	142	0.46
3,100,000–3,300,000	39	0.37	24	0.13	6	0.22	69	0.22
3,400,000–3,600,000	44	0.42	34	0.19	0	....	78	0.25
3,700,000–3,900,000	29	0.278	22	0.12	1	0.037	52	0.17
4,000,000–4,200,000	21	0.200	24	0.13	5	0.180	50	0.16
4,300,000–4,500,000	24	0.220	14	0.08	4	0.140	42	0.13
4,600,000–4,800,000	19	0.180	8	0.04	2	0.074	29	0.095
4,900,000–5,100,000	19	0.180	7	0.04	0	....	26	0.085
5,200,000–5,400,000	25	0.230	6	0.034	1	0.037	32	0.105
5,500,000–5,700,000	20	0.190	12	0.068	2	0.074	34	0.112
5,800,000–6,000,000	11	0.100	7	0.040	3	0.111	21	0.069
6,100,000–6,300,000	15	0.140	8	0.040	1	0.037	24	0.079
6,400,000–6,600,000	8	0.070	3	0.017	1	0.037	12	0.039
6,700,000–6,900,000	10	0.090	3	0.017	5	0.180	18	0.059
7,000,000–7,200,000	9	0.080	5	0.029	2	0.074	16	0.052
7,300,000–7,500,000	11	0.100	5	0.029	5	0.180	21	0.069
7,600,000–7,800,000	7	0.067	5	0.029	2	0.074	14	0.046
7,900,000–8,100,000	4	0.038	3	0.017	0	....	7	0.023
8,200,000–8,400,000	2	0.019	2	0.011	0	....	4	0.013
8,500,000–8,700,000	6	0.057	3	0.017	0	....	9	0.029
8,800,000–9,000,000	3	0.028	3	0.017	0	....	6	0.019
9,100,000–9,300,000	3	0.028	4	0.023	0	....	7	0.023
9,400,000–9,600,000	1	0.009	2	0.011	0	....	3	0.010
9,700,000–9,900,000	3	0.028	2	0.011	0	....	5	0.016
0,000,000 and over	197	1.880	142	0.820	71	....	410	1.350

cated that this number must have some significance and bears some relation to certain conditions in the udder. It should be indicated that the 68 percent of all the samples which contained less than 100,000 cells per cubic centimeter were secured from udders which were as near normal as could be encountered among dairy cattle. When abnormalities appeared the leucocyte count immediately was increased.

It is to be assumed for purposes in the field, however, that the use of 100,000 leucocytes per cubic centimeter to indicate an infection is not practical as such a procedure would be too delicate and classify too large a number of milk samples as unsatisfactory. For more practical purposes it has been arbitrarily adopted in many cases that 500,000 leucocytes or more per cubic centimeter indicates an udder infection. The use of this arbitrary standard has constituted a reliable test for the detection of udder infections when quarter samples are being examined. It will be noted (Table 1) that 20 percent of the 30,331 samples which were examined contained more than 500,000 leucocytes per cubic centimeter. From other and allied investigations it has been assumed that about 20 percent of all cows have udder infections of sufficient magnitude that they should be considered a liability to the health of most dairy herds. The fact that 20 percent of all the samples examined were found to discharge over 500,000 leucocytes per cubic centimeter constitutes further evidence that this figure is of some practical significance in studying quarter samples for indication of udder infections.

In those cases in which it is proposed to remove by the leucocyte count only the most obviously infected individuals, an arbitrary standard of 1,000,000 leucocytes per cubic centimeter has been established, and in certain instances this figure has been increased to 2,000,000 leucocytes per cubic centimeter. It was found (Table 1) that 90 percent of all of the 30,331 samples studied contained less than 1,000,000 leucocytes per cubic centimeter, and 95 percent contained less than 2,000,000 per cubic centimeter. From these observations it can be noted that the use of an arbitrary standard of 1,000,000 or 2,000,000 leucocytes per cubic centimeter will select from 10 to 5 percent respectively of all cows which are to be encountered in any given dairy area.

The Relation of Leucocyte Counts to Presence of Streptococci in Freshly Drawn Milk

It has been pointed out by a number of workers, particularly by Baker and Breed (1920), that there is a definite association between the number of leucocytes in milk and the presence of streptococci. In studying the 30,331 samples in the present investigation it was found (Table 2) that 17 percent of the samples which contained less than 100,000 leucocytes per cubic centimeter contained streptococci while over 50 percent of the samples which contained from 400,000 to 600,000 leucocytes per cubic centimeter contained streptococci. It should be borne in mind that the mere notation of the presence of these streptococci in the data compiled during the investigation does not indicate in any way the relative numbers of streptococci which might be present in the various samples studied. The samples which contained less than 100,000 leucocytes per cubic centimeter contained, however, only a small number of streptococci which were demonstrable in most cases only after the samples are incubated at 37° C. from 18 to 24 hours. In such instances the streptococci were present no doubt in relatively small numbers. Inasmuch as they were not discernible on Burri agar slants, it must be concluded that they were present in numbers of less than 1,000 per cubic centimeter. On the other hand, in the case of the study of 1,766 samples which contained from 400,000 to 600,000 leucocytes per cubic centimeter, the streptococci were generally present in sufficient numbers to be demonstrated on Burri slants which would indicate that they were present in numbers exceeding 1,000 per cubic centimeter.

TABLE 2

The Relation of the Number of Leucocytes in Milk to the Presence of Streptococci and a Reaction to Brom Thymol Blue

Number of leucocytes per cubic centimeter	*Number of samples*	*Samples containing streptococci*		*Samples giving positive brom thymol blue reaction*	
		number	percent	number	percent
Less than 100,000	20,876	763	17.3	230	4.5
100,000–300,000	3,259	443	39.8	178	16.1
400,000–600,000	1,766	275	54.7	101	20.2
700,000–900,000	1,138	275	66.1	67	16.6
1,000,000–1,200,000	716	236	74.2	75	24.1
1,300,000–1,500,000	521	169	73.1	68	29.8
1,600,000–1,800,000	380	141	80.5	55	30.8
1,900,000–2,100,000	258	96	89.7	36	33.9
2,200,000–2,400,000	161	69	75.8	30	33.3
2,500,000–2,700,000	125	41	77.3	21	42.0
2,800,000–3,000,000	142	52	64.1	34	41.4
3,100,000–3,300,000	69	38	90.4	21	52.7
3,400,000–3,600,000	78	27	81.8	11	33.3
3,700,000–3,900,000	52	19	90.4	11	55.0
4,000,000–4,200,000	50	15	88.2	8	50.0
4,300,000–4,500,000	42	16	76.1	12	54.5
4,600,000–4,800,000	29	11	91.6	6	50.0
4,900,000–5,100,000	26	12	85.7	7	50.0
5,200,000–5,400,000	32	11	50.0	9	56.2
5,500,000–5,700,000	34	11	91.6	7	70.0
5,800,000–6,000,000	21	10	43.4	15	65.2
6,100,000–6,300,000	24	13	86.6	8	53.3
6,400,000–6,600,000	12	7	87.5	7	87.5
6,700,000–6,900,000	18	7	87.5	7	77.7
7,000,000–7,200,000	16	6	60.0	5	50.0
7,300,000–7,500,000	21	10	76.9	9	69.2
7,600,000–7,800,000	14	6	85.7	3	42.8
7,900,000–8,100,000	7	5	100.0	4	80.9
8,200,000–8,400,000	4	4	100.0	3	75.0
8,500,000–8,700,000	9	4	100.0	2	50.0
8,800,000–9,000,000	6	1	16.6	2	33.3
9,100,000–9,300,000	7	1	33.3	2	66.6
9,400,000–9,600,000	3	1	50.0	1	50.0
9,700,000–9,900,000	5	3	100.0	2	66.6
10,000,000 and over	410	159	70.6	152	68.1

In all of these cases the observations were made on only one sample. To study further the relation of the number of leucocytes to the presence of streptococci, information was available from a more extended observation (Table 3) of 104 cows. In this group of cows weekly quarter samples of foremilk were examined over a period of two to four lactation periods. It was found by a study of these individuals that in those cases in which milk was secured freshly drawn from a quarter and in which more than 500,000 leucocytes per cubic centimeter were present, 98 percent of these individuals discharged streptococci at some time during the lactation period.

These observations further confirm the earlier conclusions of Hucker (1932) that 500,000 leucocytes per cubic centimeter can be adopted as a practical arbitrary figure to indicate that an infection exists in the udder discharging this number of leucocytes.

The Relation of the Number of Leucocytes in Milk to the Reaction to Brom Thymol Blue

It was found that 45 percent of the samples which contained less than 100,000 leucocytes per cubic centimeter reacted to brom thymol blue. Although care was taken not to include in this survey samples from cows during the first two weeks or the last two weeks of lactation, no doubt a certain number of these samples were unavoidably included, and this type of sample may account for some of the positive reactions to brom thymol blue which were secured on such samples giving a leucocyte count of less than 100,000 per cubic centimeter.

TABLE 3

Relation of Leucocyte Count to Presence of Streptococci and Brom Thymol Blue Reaction

Number of cows with leucocyte counts over 500,000 per c.c.	*Percent showing streptococci in milk during lactation.*	*Percent showing positive reaction to brom thymol blue during lactation.*
104	98	92

It can be noted (Table 2) that from 20 to 30 percent of the samples containing between 400,000 and 600,000 cells per cubic centimeter gave a positive reaction to brom thymol blue. In this case, as was true in the determination of the presence of the streptococci, only one sample from each quarter from each cow was available in this series for study. Observations were also made (Table 3) on 104 cows over two to four lactation periods to secure further information on the relation of the number of leucocytes present to a reaction to brom thymol blue. It was found that all cows which discharged 500,000 or more leucocytes per cubic centimeter gave a positive reaction to brom thymol blue some time during the lactation period.

As in the case of the correlation between the number of leucocytes and the presence of streptococci it again can be noted that the use of 500,000 leucocytes per cubic centimeter as reflected by the brom thymol blue test is practicable to determine the presence or absence of an infection when quarter samples are being studied.

The Effect of Machine and Hand Milking on Leucocyte Counts

A study of the 30,331 samples (Table 1) from the standpoint of the relation of machine- and hand-milking indicated that the samples secured from cows milked by machine showed a larger number of leucocytes than similar samples secured from cows milked by hand. It was found that 77 percent of the samples from cows milked by hand contained less than 100,000 leucocytes per cubic centimeter while only 55 percent of the samples from cows milked by machine contained less than 100,000 leucocytes per cubic centimeter. Twenty-one percent of the samples from cows milked by machine contained between 100,000 and 600,000 leucocytes per cubic centimeter, while only 12 percent of the samples from cows milked by hand contained a similar number of leucocytes per cubic centimeter.

In a study of machine- and hand-milked samples from the viewpoint of the arbitrary standard of 500,000 leucocytes per cubic centimeter, it will be noted that 24 percent of the samples from machine-milked cows contained this number of leucocytes while only 21 percent of the samples from hand-milked cows contained 500,000 leucocytes per cubic centimeter. Only 9 percent of the samples (Table 1) secured from cows milked by hand contained 900,000 leucocytes per cubic centimeter while 17 percent from cows milked by machine contained a similar number of leucocytes per cubic centimeter.

On the basis of the use of the 500,000 leucocytes per cubic centimeter as indicating a practical point at least for research procedures in determining the presence or absence of infection, it can be assumed that there is approximately 5 percent greater amount of infection among machine-milked than among hand-milked herds. This confirms the preliminary observations made by Hucker (1932).

The Relation of Leucocyte Count to the Presence of Streptococci and Reaction to Brom Thymol Blue as Affected by Machine- and Hand-Milking

A study was made of the samples examined (Table 4) to determine if the use of the milking machine had any effect upon the presence of streptococci and a reaction to brom thymol blue. In addition a study was made to determine if for any given leucocyte count a larger percent of samples from cows milked by machine contained streptococci and reacted to brom thymol blue than samples with a similar leucocyte count but from cows milked by hand. It was found that 21 perecnt of the samples containing less than 100,000 leucocytes per cubic centimeter when such samples were obtained from cows milked by machine contained streptococci while only 10 percent of similar

TABLE 4

The Effect of Machine Milking Upon the Reaction of the Milk to Brom Thymol Blue, the Presence of Streptococci and the Number of Leucocytes

	Samples from cows milked by machine			*Samples from cows milked by hand*		
		Percent			Percent	
Number of cells per cubic centimeter	Number	Containing streptococci	Giving positive reaction to B.T.B.	Number	Containing streptococci	Giving positive reaction to B.T.B.
Less than 100,000	5750	21.0	6.0	13,321	10.0	5.0
100,000–300,000	1539	41.0	17.0	1,279	37.0	15.0
400,000–600,000	747	56.0	20.0	896	48.0	23.0
700,000–900,000	550	71.0	16.0	555	38.0	23.0
1,000,000–1,200,000	411	77.0	23.0	245	55.0	35.0
1,300,000–1,500,000	286	80.0	25.0	196	48.0	48.0
1,600,000–1,800,000	212	86.0	28.0	146	60.0	45.0
1,900,000–2,100,000	164	91.0	57.0	73	80.0	30.0
2,200,000–2,400,000	89	88.0	35.0	57	46.0	49.0
2,500,000–2,700,000	77	55.0	50.0	43	55.0	50.0
2,800,000–3,000,000	83	75.0	43.0	45	47.0	39.0
3,100,000–3,300,000	39	100.0	44.0	24	60.0	89.0
3,400,000–3,600,000	44	85.0	29.0	34	60.0	60.0
3,700,000–3,900,000	29	89.0	49.1	22	66.0	100.0
4,000,000–4,200,000	21	100.0	58.0	24	60.0	25.0
4,300,000–4,500,000	24	72.0	45.0	14	75.0	80.0
4,600,000–4,800,000	19	100.0	45.0	8	0	100.0
4,900,000–5,100,000	19	82.0	50.0	7	100.0	50.0
5,200,000–5,400,000	25	48.0	60.0	6	100.0	0
5,500,000–5,700,000	20	100.0	66.0	12	78.0	100.0
5,800,000–6,000,000	11	30.0	85.0	7	50.0	58.0
6,100,000–6,300,000	15	100.0	58.0	8	22.0	25.0
6,400,000–6,600,000	8	100.0	100.0	3	78.0	75.0
6,700,000–6,900,000	10	87.0	77.0	3	.....	.....
7,000,000–7,200,000	9	71.0	58.0	5	22.0	25.0
7,300,000–7,500,000	11	88.0	77.0	5	50.0	50.0
7,600,000–7,800,000	7	83.0	25.0	5	100.0	100.0
7,900,000–8,100,000	4	100.0	75.0	3	100.0	100.0
8,200,000–8,400,000	2	100.0	33.0	2	100.0	100.0
8,500,000–8,700,000	6	100.0	50.0	3	.....	.....
8,800,000–9,000,000	3	33.0	.....	3	.....	75.0
9,100,000–9,300,000	3	100.0	100.0	4	.....	50.0
9,400,000–9,600,000	1	100.0	100.0	2	.....	.....
9,700,000–9,900,000	3	100.0	50.0	2	100.0	100.0
10,000,000 and over	197	66.0	73.0	142	78.0	73.0

samples contained streptococci when the cows were milked by hand. These data would indicate that although certain cows may produce milk with less than 100,000 cells per cubic centimeter and be normal in every respect but if milked by machine will discharge in the milk small numbers of streptococci. Similar cows milked by hand may show no streptococci in the milk.

When more than 100,000 cells per cubic centimeter were found in the samples under study, it was always noted (Table 4) that a larger number of the samples contained streptococci when the cows were milked by machine than when milked by hand.

A study of the relation of the effect of machine milking upon the reaction to brom thymol blue is not so pronounced as the effect of machine milking upon the presence of streptococci in the milk. It was found (Table 4) that the samples from machine-milked cows did not show an appreciably higher incidence of reaction to brom thymol blue than similar samples containing a comparable number of leucocytes from hand-milked cows.

The Significance of Leucocytes in Milk from Cows During the Final Weeks of the Lactation Period

It has generally been assumed that cows may be normal as evidenced by the presence of leucocytes in the milk during the entire lactation period but at the end of lactation the number of leucocytes will materially increase. This increase in number has not been considered to be significant as indicating the presence of an infection.

A study was made of a large number of cows (Table 5) through one lactation period by an observation of weekly quarter samples of fore-milk. One hundred and five of these cows never showed more than 500,000 leucocytes per cubic centimeter at any time during the lactation period. From these results it would be indicated that these 105 cows should be considered as relatively free of any significant infection in the udder. It was found that 80 percent of these cows continued to discharge less than 500,000 leucocytes per cubic centimeter throughout the late weeks of the lactation period until the cow failed of production.

Four of these individuals carried on the lactation for 15 months and one for 21 months and in all cases the number of leucocytes did not exceed 500,000 per cubic centimeter.

TABLE 5

Relation of Number of Leucocytes in Milk During Lactation to Number in Milk After 10th Month of Lactation

Number of cows showing less than 500,000 per c.c.	*Percent showing less than 500,000 per c.c. in milk during 10th or subsequent months of lactation*
105	80

From these observations it appears possible that cows known to be free of infection by a long continued study of quarter samples will in most instances not discharge appreciable numbers of leucocytes during the late stages of the lactation period.

Effect of Dry Period upon the Number of Leucocytes in Milk

There has developed a widespread belief that an infected quarter may clear up during the dry period and when such a cow freshens all traces of the infection will have disappeared. Little information has been available on this particular point due to the lack of material for such a study on the effect of dry periods on infection.

Observations (Table 6) on 67 quarters were made during two lactation periods and the effect of the intervening dry period noted upon the twenty-three quarters known to be infected as indicated by the presence of more than 500,000 leucocytes per cubic centimeter. Samples were secured from these same quarters at the beginning and during the second lactation period. Of these 23 infected quarters, 65 percent were found to be infected when the cow freshened subsequent to the non-lactating period. On the other hand, under similar conditions, 44 quarters known to be free of infection were studied. Of these quarters, only 6 percent were infected when the cow freshened, and 94 percent remained free from any subsequent evidences of infection during the lactation period.

TABLE 6

Effect of Dry Period upon Infection

Condition of quarter when dried off	*Number of quarters*	*Percent which freshened*	
		Infected	Not infected
Infected	23	65	35
Not infected	44	6	94

From this information it would appear that the dry period generally has little effect in clearing up infected quarters. Further information may indicate that dry periods will have some effect upon infections when such infection has not progressed to any appreciable degree. It may be that the 35 percent which appeared to be favorably affected by the dry period were quarters in which the infection had not become deep seated or advanced.

Relation of Leucocytes Present in Milk During First Week of Lactation to Infection

In all studies made to determine the significance of the presence of leucocytes in milk, an effort has been made to disregard samples which have been secured during the first week as well as the last week of the lactation period. It has been assumed that high leucocyte counts during the first week and even the first month of the lactation period may occur in samples from cows known to be free of any infection. These high leucocyte counts during the first part of the lactation period are generally considered as normal and without significance.

One hundred and thirty-five cows were available for study (Table 7) over one lactation period to secure information on this particular point. Samples were secured during the first lactation period of 21 cows which contained more than 500,000 leucocytes per cubic centimeter during the first week of the lactation. By the study of weekly samples from these cows during the entire lactation period, it was found that 90 percent showed other evidences of infection and subsequently were determined to be infected sometime during the lactation period. In addition samples which contained less than 500,000 leucocytes per cubic centimeter were secured during the first week from 114 cows. A similar study was made of weekly quarter samples from each of these 114 individuals and it was found that only 30 percent of these cows were definitely proven to be infected by a study of the milk during the lactation period. It should be noted in addition that those individuals subsequently to become infected did so following the normal expectancy of initial infections.

TABLE 7

Relation of Number of Leucocytes Present in Milk during First Week of Lactation, to Infection

Number of leucocytes in milk during first week of lactation	*Number of cows*	*Percent showing evidences of infection during subsequent lactation*	*Percent showing no infection during subsequent lactation*
More than 500,000 per c.c.	21	90	10
Less than 500,000 per c.c.	114	30	70

These observations would indicate that some significance at least should be placed upon high leucocyte counts

during the first week of the lactation period inasmuch as the present information indicates that a high leucocyte count during the early stages of the lactation period may be indicative of a latent infection which will become more evident as the lactation advances.

It should be borne in mind that these results were obtained by the enumeration of the number of leucocytes; samples which contained a large number of epithelial cells were not included in this investigation. Many workers have determined, and it is generally recognized, that a larger number of epithelial cells are present in the early stages and late stages of the lactation period and to them is not attached any particular significance as indicating the presence or absence of udder infection.

Discussion

Although the number of leucocytes present in milk may be considered as an accurate index of an infection, considerable caution should be used in adopting "leucocyte counts" as a routine control measure. To assume that all cows discharging 500,000 leucocytes per c.c. should be eliminated from the herd may work an unjustified hardship on a dairyman unless rigid methods are desired to segregate all cows with any evidence of infection. The arbitrary numerical standard to be used as an index in routine control measures should be selected to serve the purpose desired. Leucocyte counting on a large scale is not practical and becomes too sensitive a test as a common routine mastitis test on cow or quarter samples.

In general control work it should be recognized that the "leucocyte" test or cell count is at its best as a routine procedure when used to detect in composite samples the addition of milk from grossly infected cows. The farther removed from the cow in the normal handling of milk the cells are noted, the less delicate the test becomes. The test obviously is the most delicate when observations are made in quarter samples and becomes less effective respectively in cow samples, can samples, and weigh vat samples. The test as a general mastitis control measure, however, has its greatest use in examining can samples or small weigh vat samples to detect the addition of milk from infected cows. The segregation of sections of herds by can samples or whole herds containing infected individuals by weigh vat samples makes possible a rapid isolation of cows contributing milk from infected quarters. For this reason cell counts on can and weigh vat samples might well became one of the first and most important procedures for the use of milk control officials in eliminating milk from infected cows.

In those cases in which extreme accuracy is desired to detect abnormal conditions, the cell count procedure, particularly when quarter samples are studied, has its greatest value as a specific test for mastitis.

Conclusions

It is concluded that of the 30,331 samples studied from 8,000 cows, 68 percent contained less than 100,000 per cubic centimeter and 20 percent contained more than 500,000 and 10 percent more than 1,000,000 per cubic centimeter.

A definite relationship between leucocytes and the presence of streptococci was found, and it has been concluded that 98 percent of all cows discharging more than 500,000 cells per cubic centimeter in their milk also discharged streptococci sometime during the same lactation period. A similar relation existed between the number of leucocytes and a reaction to brom thymol blue.

Samples from cows milked by machine gave an increased number of leucocytes over comparable samples from cows milked by hand. In addition a larger percentage of samples from cows milked by machine contained streptococci than similar samples from cows milked by hand.

It is also suggested that high leucocyte counts during the first and last weeks of lactation may be significant in reflecting udder streptococcus infections.

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THE CONSULTANT AND THE WAR

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Iodoform Flavor in Milk

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IODOFORM flavor in milk may be considered uncommon and one rarely detected in milk; it has been detected by the author in a number of samples of milk over a period of eighteen years. Not having seen any reference to this flavor in dairy literature, it seems desirable that it be recorded so that others who may encounter trouble from this flavor will know the source of the flavor and how to prevent it.

The first time that iodoform-flavored milk was brought to the author's attention was when customers complained of a medicinal or chemical taste in the milk. The milk in question was from a single dairy herd that produced approximately 100 gallons of milk daily. The cows were well cared for, and every effort was made to produce a clean, high quality milk. The milk from this herd was received without tasting for flavor, weighed, pumped through a filter, pasteurized, cooled, and bottled under strict sanitary plant practices. Thus when the customers began to complain of a medicinal or chemical flavor in the milk, it was comparatively simple to trace back and find the source of the flavor. The flavor reminded me of a disinfectant detected in some hospitals, and on further thought it reminded me of the odor of iodoform which I had observed while working in organic chemistry where iodoform is produced when testing for alcohol.

As no iodoform had been in the dairy plant, either in the form of washing or sterilizing compounds, immediate inquiry was made at the dairy farm where the milk was produced. The herdsman knew of nothing that he had fed or had done to the cows which could produce the flavor. However, he did recall that a veterinarian had treated a cow that had a retained afterbirth, but he had kept the milk out of the supply for three days as he had been directed to do by the veterinarian. As the three days were up the day before, he had included the milk in the regular supply without tasting it.

In order to be sure that the flavor was in the milk from this cow, the milk obtained from the evening milking was kept separate and sampled for flavor. A pronounced iodoform flavor could readily be detected and a faint odor could be noticed by smelling the milk. In order to avoid a repetition, the herdsman was directed to save out this cow's milk in a separate can, mark the can and send it into the dairy with the other milk until he was told that it was satisfactory to mix with the regular supply. This cow's milk, on arriving at the dairy, was sampled carefully for flavor. The iodoform flavor was rather pronounced for a period of a week, but gradually diminished so that at the end of two weeks the flavor could no longer be detected.

The treatment that the veterinarian had given the cow in question was that of introducing capsules containing iodoform into the uterus to clear up the suppurative inflammation.

In a more recent case, complaints of medicinal flavor in milk were received from two or three customers. The milk was from a two hundred gallon batch pasteurizer. At first the complaints were not considered serious, but on investigating and finding a trace of iodoform flavor in the milk, a search for the cause was undertaken. Again no possible cause for the flavor from the methods of handling the milk or from the materials used in the dairy plant could be found. It was finally traced to one cow that had been treated for retained afterbirth and a suppurative inflammatory condition of the uterus. In this case, an oil suspension of boric acid and iodoform had been introduced into the uterus. While the milk had been kept out from the regular milk supply for a period of a week by order of the veterinarian, yet there was still sufficient iodoform secreted in the milk at the end of the week to impart the flavor to two hundred gallons of milk.

While other cases can be listed, these two, which are typical, are sufficient to bring out the cause of the iodoform flavor occasionally found in milk. Milk from cows treated for suppurative inflammations with iodoform preparations introduced into the uterus must be excluded from the regular milk supply if the flavor is to be avoided.

If veterinarians use this treatment, they should impress upon the herdsman or the owner of the cow the need for keeping the milk out from the regular supply until no iodoform flavor can be detected. Cows so treated should be milked last or else the milker should see to it that hands and milk pail are washed very carefully. The length of time that iodoform will be secreted in the milk by cows so treated will vary due to individual characteristics, and no time limit such as three, seven, or ten days can be relied upon as a sure means of preventing the occurrence of the flavor. Taste alone should be the determining factor.

Williams, in his book, *The Diseases of the Genital Organs of Domestic Animals,* 2nd edition, suggests that the milk can be fed to other livestock. This would indicate that the milk is not harmful as a food. No cases of sickness have been reported in connection with the consumption of milk having this medicinal or chemical taste. However, no milk dealer would benefit from having the flavor in his milk supply and in all probability he would lose customers.

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"It was found that when the usual methods for determining arsenic were applied to the examination of foodstuffs contaminated by war gases the results were extremely unreliable; the recovery of arsenic was usually between 30 and 50 per cent. In the method found most suitable a sample of the foodstuff (1.4 gm. is a convenient weight) is digested with 10 gm. potassium sulphate, 2 ml. of a 10 percent solution of copper sulphate, and 20 ml. of concentrated sulphuric acid. If the sample contains a high proportion of fat it may be necessary to add a further 5–10 ml. of sulphuric acid during digestion. When the liquid is clear it is diluted with about 70 ml. of water and boiled for 2–3 min. to expel sulphur dioxide; it is then cooled and diluted to 100 ml. with distilled water. Aliquot portions of this solution are taken for Gutzeit tests, and diluted to 50 ml. with a solution containing 10 percent potassium sulphate, 0.2 percent copper sulphate, and 10 percent sulphuric acid. After addition of 0.5 ml. of stannous chloride the Gutzeit test is carried out in accordance with the B.P. technique except that a ½-in. pad of asbestos is packed under the lead paper to prevent a spray of acid being carried through. The stains are compared with standards."

D. M. M.

Valuation of Dairy Animals

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DAIRYMEN breeding and raising dairy animals are confronted with the question "what is the cost of a productive animal."

Under income tax regulations, a dairyman may report on the cash or accrual basis. If accrual basis is used, net income may be computed with the aid of inventories.

A dairyman reporting on the accrual basis (in which an inventory is used to determine profits) finds the question of the value of dairy live stock vital where income is mainly derived from the sale of market milk and surplus animals.

Income tax regulations are vague as to what actually is "cost" in inventory of dairy cattle. A dairyman is not gifted in accounting and abhors the thought of "bookkeeping." The regulations state: ". . . . All live stock raised or purchased for sale shall be included in the inventory at their proper valuation, determined in accordance with the method authorized and adopted for the purpose. Also live stock acquired for draft, breeding, or dairy purposes and not for sale, may be included in the inventory instead of being treated as capital assets subject to depreciation, provided such practice is followed consistently by the taxpayer. . . ."

From a dairyman's standpoint, what is "cost" for inventory purposes? Or, if inventoried at "market or cost" whichever is lower, what is "market"? Definitely difficult questions for the dairyman to answer.

For the accountant, the question is, "How may we arrive logically at 'cost'"? Little has been written outlining a method of procedure which would consistently record "cost" of dairy cattle.

A short resumé of the activities involved in breeding and raising dairy cattle for market milk production and sale of surplus animals would outline the accounting difficulties involved in preparing a simple method of procedure of obtaining "cost."

Dairy animals must be fed. This means purchase or raising of feed, buying concentrates of various types for feed mixtures, necessary housing, labor, etc.

If feed is grown, the cattle-raising expense is the cost of the feed consumed. The growing of feed is a separate department, and all expenses, direct or indirect, are charged against the feed harvested. Feed used is charged at cost to the various consuming departments.

A cow reaches productive stage at about 33 months when it may be bred to produce its first calf and enter the milking herd.

The question immediately raised is, "What is the cost of the calf?"

To answer this question involves a method of cost valuation which would value the animal from birth to production. On the basis of 33 months, there are three yearly inventory periods before the animal reaches the productive state.

In large dairy herd practice, the calf is separated from the cow at birth and established in a separate raising section of the farm operation. This part of its life may be termed the "calf period." It usually remains in the calf department for nine months.

The calf department, operated as a distinctly independent entity of the dairy operation, lends itself admirably to a "cost" program. Cost of labor, feed, equipment, rental of land occupied, depreciation of equipment and building, etc., are charged to the calf department. Record of the number of calves housed in this department, number of months each animal remained (including time of calves which died) give a total of calf months with which this department should be credited. The total number of calf months divided into the total charges of operation and maintenance gives the unit of "cost" termed "calf month." If a calf had been in the calf department for nine months, its cost would be 9 times the unit of "calf month." If a calf died during the year, the loss is the cost it had accumulated upon the basis of its "calf month" charge. When a calf is transferred to the "heifer" department, it carries its accumulated cost over to that department.

In the heifer department, all costs of operation and maintenance are charged to "heifer department." A record is maintained of the number of months each animal is housed in this department. The total number of months accumulated is divided into the total cost of operation and maintenance, and a unit of cost, termed "heifer month" is obtained. To arrive at the cost of a heifer at the end of a fiscal period, the number of months the heifer remained in this department during the year is multiplied by the "heifer month" unit, resulting in the heifer cost, which, added to the accumulated calf cost, gives a total heifer cost of the year for each age group. If a heifer died during the year, its calf and heifer cost is the loss suffered.

The heifer cost is increased until the animal reaches breeding age at about 33 months. At breeding, its accumulated calf and heifer cost is its cost or inventory value as it enters the productive herd.

If the inventory is based upon "cost or market" it is a simple matter to compare "market values," if obtainable, at various age groups, using the figure of "cost" or "market," whichever is lower.

Market milk production is an element of dairying that can be quite unprofitable if not carefully checked. It involves not only the maximum production in market milk, but also the disposal of surplus animals.

To illustrate the method of cost outlined, assume the calendar year is the business year. Inventories are taken on December 31st each year. On March 31st a calf is born and enters the calf department. Calf department has yearly maintenance and operation charges of $37,500. The total accumulated months of calf life at the end of the year was 12,500 months. The formula to obtain calf month cost is

$$\frac{\text{Calf Cost}}{\text{Calf Month}} \text{ or } \frac{37{,}500}{12{,}500} \text{ or } \$3.00 \text{ per month.}$$

A calf born March 31st would have a record of nine months in the calf department. Its cost for inventory is

Calf Months × "Calf Month" Cost, or
9 × $3.00, or $27.00.

If cost is used at inventory, this calf is valued at $27.00 as it enters the heifer department.

If "cost or market" is used, the lower figure is its value as it enters the heifer department.

If, at the end of the year, the total heifer department costs were $36,000 and the total number of accumulated heifer months was 18,000, the formula of cost divided by heifer months results in the "heifer month" unit, or,

$$\frac{\text{Cost}}{\text{Heifer Months}} \text{ or } \frac{36{,}000}{18{,}000} = \$2.00 \text{ per heifer month.}$$

The calf entering the heifer department on January 1st spent 12 months as a heifer. Its heifer cost is 12 × $2.00 or $24.00. Added to its calf cost at entrance of $27.00 makes a heifer cost at the 21st month of $51.00.

Again if it is valued at "cost or market," market at its age is compared to cost and the lower of the two is used.

The heifer cost at the beginning of

the year is its value at 21 months. The heifer has another 12 months' cost added to it before it enters the productive herd at 33 months.

This method of arriving at the cost of a dairy cow reflects the fluctuation in cost of feed, labor, etc. It also eliminates the arbitrary valuation of a calf. Consistently followed it gives a dairyman data for comparative purposes year after year, enabling him to discover the reason for increasing costs.

The important base from which to establish the method of cost of "calf or heifer month" is the identification of each animal to keep its individual record. In dairy practice, dairy animals are closely confined and therefore easily identified. A system of identification through ear numbering, is followed. In addition, calves may be photographed to show markings. The photograph is additional identification in the event an ear tag is lost.

While the cost system outlined has proven satisfactory in the operation of a large dairy, it will not be satisfactory in beef raising operations.

In dairies, individual animal identification is simple. In beef raising, individual animal identification is impossible for the reason that beef animals range over wide territory.

FLUID MILK SHIPPING CONTAINERS

Conservation Order M-200, War Production Board, covering fluid milk shipping containers, provides that after October 1st fluid milk shipping containers or covers shall not be manufactured unless they comply with the following specifications:

1. Capacity — containers shall be manufactured only in the following sizes:

4-quart 10-quart 20-quart 40-quart
8-quart 12-quart 32-quart

2. 20-quart shipping containers—to be constructed of the following maximum U. S. Standard guage steel:

Breasts and necks, 20-gauge steel
Cylinder, 22-guage steel
Bottoms, 18-guage steel

Subject to normal operating tolerances, neck diameters of 20-quart containers are to equal 6⅛ in. or 7 in.

3. 32 and 40-quart milk shipping containers—to be constructed of the following maximum U. S. Standard gauge steel:

Breasts and necks, 18-gauge steel
Cylinder, 18-gauge steel
Bottoms, 16-gauge steel

Neck diameter of 32-quart containers are to equal 6⅛ in. or 7¼ in. and 40-quart containers are to equal 6⅛ in., 7 in. or 7¼ in.

4. Covers of 20-quart, 32-quart and 40-quart shipping containers are to be the sunken-cup type without umbrella, to be constructed of 20-gauge steel. Containers and covers are to be so constructed that they may be used interchangeably on all containers of the same neck diameter.

5. Handles are to be stamped steel upright, not tubular in form and shall be manufactured and used for 20-quart, 32-quart and 40-quart fluid milk shipping containers.

A Milk-Borne Epidemic of Brucellosis

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BRUCELLOSIS is a matter of common occurrence in Iowa. Several scattered cases are reported weekly. The disease does occur, however, in epidemic proportions. Such was the case in the village of Marcus, population 1,200, in the fall of 1941. Marcus is a typical Iowa small town with no industry of consequence, surrounded by agricultural territory and numerous feed lots.

The first cases appeared in mid-August and continued at intervals up through December at which time the total number of cases diagnosed and confirmed by either agglutination or skin tests was seventy-seven. Early in September when the first cases were reported to the State Department of Health, steps were taken to determine the source of the infection. It was immediately apparent that the cases were far too numerous to be attributed to chance contact with the organisms and that a common source of infection was responsible.

While it is known that many of our sporadic cases of Brucellosis come through direct animal contact, as in the case of veterinarians, farmers, and packing house employees, a large number of cases among those not in contact with animals and carcasses would indicate a common focus and most likely in raw dairy products.

Four dairies supplied the town with milk, none of it pasteurized. Investigation revealed that all patients regularly or intermittently used milk from one particular producer. As a precautionary measure, however, all dairymen were required to take their milk to a nearby community to be pasteurized. Furthermore, all four were asked to have their herds tested for Bang's Disease. The results showed three of the herds to be free of Bang's Disease while the fourth, the one suspected, had three reactors out of a total of forty-three animals. A survey of the farm revealed that twenty-four hogs were running in the cow yard and that more than half of these harbored the infection. Our Department of Epidemiology isolated the porcine strain of the organism from the milk, from the blood of those ill, and from the animals.

In order to find as many reactors as possible, a majority of the children in both public and parochial schools were given skin and agglutination tests. The procedures uncovered about a dozen school children who had not previously been under treatment.

Although some of the cases were of a mild type and some apparently of sub-clinical nature, others were stricken with moderate severity. There were no fatalities. However, one woman did abort. The age range was from seven months to seventy years.

The fact that many new cases were reported long after the source of infection was removed does not indicate a long incubation period. Close questioning disclosed that many of the cases had been in poor health for weeks but had not consulted a physician. In many instances, the patients believed that they had the "flu," a common name for some of our mild and usually undiagnosed conditions. As the disease progressed and did not abate, many of these people found their way to the physician. It causes us to wonder if there were not others who had the disease in mild form and who did not seek medical attention. In fact, we wonder if this does not happen all over the country and, perhaps, is the cause of

some of our "below par health" that is without definite explanation.

The duration of the illness among those infected ran from several weeks to several months. However, two of the old cases recently flared up anew. This suggests that there might also be others who may yet have relapses. Observations in this direction will prove interesting for the future.

While our records list the total number of cases officially as 77, substantiated by agglutination and skin tests, Dr. M. J. Joint, sole physician in the community, feels that 100 would be more nearly correct.

The dairy involved supplied approximately forty percent of the milk sold in the village. Theoretically, 480 persons were exposed. On this assumption, about twenty-one percent of those exposed were infected.

One or two side lights will be of interest. During the progress of the epidemic, one of the dairymen sent a postal card to each family in town stating that he contemplated installing modern pasteurization equipment and asked if they would use pasteurized milk. Sixty percent replied in the negative. The most frequent objection was that pasteurized milk "is gathered up from any old place."

Recommendations were made to the town council that it pass a milk ordinance and join other near-by small towns in a full-time inspection unit at a cost of $145 per year. This the council rejected on the grounds that the cost was excessive.

Considering the loss of time, including earning power, doctor bills, hospital bills, and other expenses, it seems conservative to estimate that the cost to each patient would be on the average, not less than the above figure. At any rate, the cost to the community, in monetary terms alone, was many thousands of dollars.

While the total number of cases officially reported in Iowa for 1941 was 354, more than double this number of positive blood specimens was received by our State Hygienic Laboratory. These were not listed officially because of incomplete information sent in with specimens by reporting physicians.

Analysis of 251 of these cases, exclusive of the Marcus epidemic, proves interesting.

Number of cases	251
Number using raw milk	188
Number using pasteurized milk	36
Number using both	14
Number not reporting	13
Females	58
Males	193
Farmers	86
Housewives	34

Of the 34 housewives, all except one used raw milk, and this one was urban with no animal contact. Of the 34, 18 were rural and 15 had animal contact.

Of the 251 cases,

133 were rural
129 used milk from their own cows
172 had contact with animals
36 were packing house employees
4 were veterinarians
6 were dairymen

Of the 36 who reported using pasteurized or evaporated milk, 29 were packing house employees, 1 a veterinarian, 1 a stenographer who also visits her family on the farm, 1 a dairyman, a salesman who travels, an urban housewife reporting no animal contacts, and 1 a cafe owner who cuts his own meat.

Of the 6 who reported using no milk, 1 was a packing house employee, 4 were farmers, and 1 a laborer who had a sick sheep which he considered the source of infection.

The urban family cow appeared to be the source of 16 cases.

Nine of the 251 cases were under ten years of age.

From records available, certain presumptive conclusions may be reached. There were 78 cases in which the patient had been using raw milk, but reported no contact with cows, hogs, or carcasses. These are listed as presumptive milk-borne cases.

In 36 cases. the patient had used pasteurized or evaporated milk, but had been in contact with cows, hogs, or carcasses. These are listed as presumptive animal contact cases.

There were 136 patients who had been users of raw milk but who had also been in contact with either hogs, cows, or carcasses. Within this group, with the information available, it would be impossible to determine the source of infection.

From the foregoing, it seems necessary to conclude that both pasteurization of dairy products and eradication of the disease among cattle and swine are the important factors in the control of the disease.

PREVENTIVE MAINTENANCE OF TRUCKS

OFFICE OF DEFENSE TRANSPORTATION

Great Britain has had nearly three years of war, but most of her trucks and buses are still running. Despite far less ample supplies of spare parts than operators had at their command in this country when the United States entered the war, and despite the fact that many vehicles and stores of spare parts were destroyed in air raids, Britain has kept her highway transport facilities in operation.

In the belief that some knowledge of how this has been accomplished would be of real value to truck and bus operators in the United States, the Transportation and Maintenance Activity Section of the Society of Automotive Engineers made a study of maintenance methods being used in England.

This study was made to further the preventive maintenance program of the Office of Defense Transportation and has been approved and distributed by the Vehicle Maintenance Section of the ODT's Division of Motor Transport.

The SAE found that, as might be expected, the British have developed many methods for reclaiming and rebuilding available used parts in order to make the most of existing equipment. The salient features of preventive maintenance as used in England follow:

Pistons. Pistons are removed at predetermined periods for inspection. Worn ring grooves are turned out for oversize width piston rings. Worn or broken ring lands including top land in aluminum pistons are welded solid and re-turned. Skirts are expanded by any one of several American processes. Tin plating has been used to prevent seizure of cast iron pistons. Badly worn piston pin holes have been bored out and fitted with phosphor bronze bushings and in some cases, pins have been oversized by chromium plating.

Crankshafts. Both chromium plating and metal spraying have been used. There is one complaint that journals are not reliable to less than .002 in tolerance which presents difficulties in line boring. This would indicate that British machining is not up to American standards. Some operators use standard undersizes before building up the crankshaft while others keep shaft to standard to eliminate the necessity for several undersize bearings.

Camshafts. One firm reports that it applies stellite to worn cams and then grinds them with a machine of its own design.

Valves and Valve Mechanism. Large valves have been turned down and used to replace those of smaller size. In

some cases, valve stems have been brought up to standard size by chromium plating and in others, the valve guides have been filled with bronze welding rod and rebored. Some valves have been refaced with stellite. Similar treatment has been successful on valve tappets. Chromium plating has also been used on tappets. Chrome plating has also been found useful on rocker arm shafts.

Clutches. Clutch faces on the flywheel have been repaired by stellite deposition. There is a record of one operator straightening buckled clutch plates by heating them with a gas ring and subjecting them to pressure between two cast iron plates. Chromium plating has been used successfully on clutch discs. Electric welding has proved successful on toggle levers. Nickel and chromium plating, as well as deposition by electric welding, has been successful on a number of transmission shafts and other parts such as shifter forks.

Differential. Metal spraying has been used to rebuild differential yokes at the surface that holds the differential bearings. This is difficult to machine so that the ring gear remains square with the carrier but it has been done. Some firms have been successful in building these surfaces up with electric welding. Sleeves on the inside of differential cases have been built up by oxy-acetylene welding and then bored out. Spring pads have been built up by electric welding.

Springs. Broken main leaves have been converted into intermediate leaves where breakage has occurred adjacent to the spring eye. Shackle pins have been chrome plated. In addition to building them up to standard size, this has doubled the life of the pins by providing increased resistance to wear and prevention to rusting. Some pins have been machined down and fitted with undersize bushings.

Wheels. Where ball or roller bearings have become loose in front wheel hubs, bronze welding has been used to build up the internal areas so they can be rebored. Some hubs have been chrome or nickel plated.

Front Axle. Chrome plating has been used to build up king pins while one operator has machined his king pins down and fitted undersize bushings. Another grinds king pins down to a standard undersize and then builds them up to the regular standard with welding material after subsequent use.

Axle Shafts. Axle shafts splines are built up and filled in with welding. The splines are then milled into the shaft in such a position that the driving face is of parent metal. Splines have also been built up with chromium plating. Keyways have been reclaimed with bronze welding.

Cylinder Heads, Cylinder Blocks and Crankcases. Cylinder heads have been salvaged and leaks stopped by welding, metal spraying and cold welding. Welding and cold welding has also been successful on cylinder blocks. Valve seats have been built up by welding stellite onto the worn valve seat. Both cast iron and aluminum crankcases have been successfully welded. Minor cracking of blocks and heads as a result of leaking head gaskets has been cured with bronze welding.

Roccal In The Dairy Pasteurizing Plant

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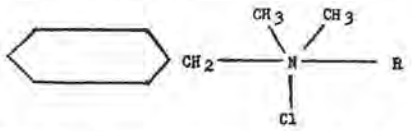
PREVIOUS studies of ROCCAL have demonstrated its effectiveness as a sanitizing agent for eating and drinking utensils. Subsequent experience in various commercial establishments demonstrated this chemical's bactericidal efficiency and economic status in the food dispensing industry. Predicated upon the results obtained in this field, it was decided to evaluate the potentialities of ROCCAL as a bactericidal agent in milk processing plants.

DESCRIPTION

ROCCAL is a 10 percent solution of alkyl-dimethyl-benzyl-ammonium chlorides. The organic quaternary ammonium compound has the following chemical structure:



The alkyl-radical represented above is a mixture comparable to the alkyl-radicals found in the fatty acids of coconut oil, and ranges between C_8H_{17} and $C_{18}H_{37}$. The product has a phenol coefficient, as determined in accordance with the F.D.A. specifications, of 40.0 against *Eberthella typhosa* and *Staphylococcus aureus,* and 35.0 against *Escherichia coli.* It is non-toxic, virtually tasteless and odorless in concentrations utilized, non-corrosive to metals and rubber, and comparatively stable over long periods of use. In addition, the chemistry and bactericidal efficiency of ROCCAL in sanitizing concentrations is constant at various temperature ranges.

EXPERIMENTAL

The purpose of the experimental procedure in the milk plant was to determine the effectiveness of ROCCAL against the normal bacterial count commonly associated with the milk processing equipment. Bacteriological samples were taken from designated stations prior to the use of ROCCAL, in order to determine the normal bacteria count of the milk plant equipment for control purposes. Preliminary controls were also taken each day during the period when ROCCAL was in use. These control samples were obtained after the equipment had been disconnected, cleansed in the usual manner, and reassembled, but prior to sanitizing with ROCCAL.

After determining the average count, ROCCAL was introduced into the procedure. Solutions of various concentrations were made up in 40-quart milk cans and dumped into the weigh tank, on different days. After holding in the weigh tank for five minutes, the solution was run off into the dump tank, allowed to stand there for five minutes, and then pumped directly through the filter into the pasteurizer. Pumping time approximated 5 minutes between the dump tank to pasteurizer. The solution was retained in the pasteurizer for five minutes and then slowly pumped over the cooler from

which it flowed into the bottle filler, where it was retained for five minutes. Samples were taken at the end of the system for ROCCAL concentration determinations.

Technique

These studies were conducted in a modern milk plant having a daily capacity of approximately 25,000 quarts. Various sections of the milk handling and processing system from the weigh tank to the bottle filler, outlined in Table 1, were selected

TABLE 1

Key Area Bacteriologic Swabbing Station Identification

Swab No.

1. Upper left-hand corner of weigh tank, receiving screen.
2. Screen in weigh tank.
3. Weigh tank gate valve—porcelain edge.
4. Outlet of dump tank.
5. Dead-end plate on pipe cap connecting dump-tank pump with filter.
6. Dead end on filter outlet—interior of pipe.
7. Outlet valve threads on pasteurizer.
8. Core of outlet valve on pasteurizer.
9. Inside pasteurizer outlet valve.
10. Hole and channel baffle plate of pump, delivering from pasteurizer to cooler.
11. Pump between pasteurizer and cooler—20 teeth on inside gear.
12. Dead end plate cap of spreader on cooler.
13. Cooler coil.
14. Outlet of cooler at bottom trough.
15. Plate of T-joint on bottle filler.
16. Inside channel valve stem of bottle filler.
17. Channel guide hole in filler reservoir.
18. Screen on bottle filler float.

and designated as stations from which all bacteriological evaluations were obtained.

Bacteriological sampling was accomplished through the use of sterile cotton swabs on wooden applicator sticks. The cotton swabs were moistened at the sampling stations in 10 ml. of sterile water, contained in a 25 ml. screw cap vial. After moistening, the swab was removed from the vial by rotating and pressing gently against the vial side to remove excess water. The cotton was then swabbed over the sampling area surface a given number of times and the swab returned to the vial. The vials were kept under refrigeration during the sampling period and returned to the laboratory packed in ice.

In the laboratory, the samples containing the swabs were shaken for five minutes in a Kahn shaker, plated in accordance with A.P.H.A. standard methods on tryptone glucose extract agar, enriched with powdered skim milk, incubated at 37° C. for 48 hours, and counted.

Discussion

From the data assembled, it is demonstrated that ROCCAL has a definite application in the sanitization of milk-handling equipment.

As can be noted in Table 2, on fourteen different days, there was an appre-

TABLE 2

Comparison of Bacteria Count Before and After Treatment with ROCCAL

Average Colonies for 14 Days Per Station

Swab Station No.	Control Before ROCCAL	Bacteria Count Immediately After Using ROCCAL	*Percent of Kill*
1	3,200	700	78
2	2,600	1,000	61
3	12,700	900	93
4	26,200	1,500	94
5	9,400	1,100	88
6	37,800	2,000	95
7	2,500	1,000	60
8	8,000	900	88
9	17,600	1,000	99
10	14,200	900	92
11	42,000	700	98
12	100,900	20,900	79
13	18,900	500	97
14	49,300	1,000	99
15	41,100	6,000	85
16	4,100	800	80
17	15,900	300	98
18	56,100	1,200	98

ciable decrease in the bacteria count of the equipment after using ROCCAL at the concentration recorded.

The data in Table 3, indicates that ROCCAL placed in the system for 33 percent. Subsequent treatment with 4 ounces of ROCCAL in 200 pounds of water (1 : 5000) further reduced the bacteria population 47 percent for a total of 80 percent. From this data it

TABLE 3

Comparison of Bacteria Count Before and After Treatment with ROCCAL Under Controlled Conditions

Date 1942	*Average No. Colonies per Station* Before ROCCAL	After ROCCAL	*Percentage of Reduction*	*ROCCAL Conc. at Start*	*ROCCAL Conc. at End*
Jan. 12	35,500	3,700	89	1 : 6000	1 : 7000
Jan. 13	68,800	6,100	91	1 : 6000	1 : 7000
Jan. 19	3,200	800	75	1 : 7000	1 : 7000
Jan. 20	4,000	1,300	68	1 : 6000	1 : 6000
Jan. 21	5,600	500	91	1 : 6000	1 : 6000
Jan. 22	7,300	700	90	1 : 5000	1 : 6000
Jan. 23	6,200	1,300	79	1 : 5000	1 : 8000 *
Jan. 26	7,700	560	93	1 : 5000	1 : 7000 *
Jan. 29	11,600	2,100	81	1 : 8000	1 : 8000

* Dilution factor due to flush in pipes.

Controlled Conditions
4 oz. ROCCAL to 20 gallons of water.
Holding time 10 minutes.
150 lbs. rinse water.
pH ROCCAL solution 5.6 to 6.8.

sanitizing is approximately the same concentration after it has been pumped through the system and recovered at the bottle filler. Therefore, its bactericidal effectiveness is fairly constant during each application.

In one series of experiments (Table 4), various ROCCAL concentrations and weights of rinse water were used to ascertain the effect that the mechanical action of rinse water might have upon the total bacteria remaining after cleaning. On January 6th, 700 pounds of rinse water and a 1 : 50,000 concentration of ROCCAL resulted in a 92 percent kill of the bacteria present in the equipment. Three other daily experiments were conducted (Table 5) in an attempt to demonstrate the removal of bacteria by the action of rinse water alone. On January 23rd, 300 pounds of water pumped through the system reduced the bacteria population

is evident that the reduction of bacteria was greater when ROCCAL was used in conjunction with the washing procedure than when not used.

In addition to its chemical stability and bactericidal efficiency, ROCCAL has a number of other characteristics which enhance its value as a sanitizing agent for milk-handling equipment. It is a non-toxic compound, as demonstrated by Carl W. Walter. It is relatively free from taste and odor in the dilutions recommended and it is no more corrosive than water to metal. A report by the Saginaw City,* Michigan, Health Department Laboratories has demonstrated that ROCCAL is relatively non-corrosive to rubber.

The basic solution upon storage retains its stability indefinitely and is not affected by any range of ordinary temperatures, and its chemical structure is not affected by actinic light. The

* Communication received from Laboratory Director of Saginaw City Health Department.

TABLE 4

RESULTS ON FLUSH EXPERIMENTS

Date	Average Col/station Untreated	Average Col/station Flushed	Average Col/station Treated	ROCCAL Conc. at Start	ROCCAL Conc. at End
Jan. 23, 1942	6,200	4,100	1,300	1:5000	1:8000 *
Jan. 26, 1942	7,700	3,500	560	1:5000	1:7000 *
Jan. 29, 1942	11,600	8,900	2,100	1:8000	1:8000

TYPICAL BREAKDOWN ON SWABBING STATION BACTERIA COUNTS AS RECORDED ABOVE

Swab Station	Normal Bacteria Count	Bacteria Count After Flush	ROCCAL Bacteria Count
No. 1	5,200	6,000	900
2	1,100	1,100	300
3	6,600	5,000	800
4	10,500	2,200	2,100
5	5,800	2,900	700
6	13,300	12,700	1,400
7	3,800	2,000	1,200
8	1,900	1,200	700
9	5,700	4,200	1,700
10	5,800	6,600	700
11	2,200	1,700	800
12	29,600	23,000	12,500
13	7,500	4,700	700
14	20,800	5,600	700
15	17,100	12,600	1,500
16	10,700	1,200	500
17	2,800	900	900
18	3,800	3,200	600

* Dilution factor due to flush in pipes.
Standard Conditions
Preliminary Rinse—300 lbs. flush water.
Holding time—10 minutes.
Sanitizing Rinse—4 oz. ROCCAL to 20 gals. of water.

fact that it is a wetting out agent also increases its value in cleansing milk-handling equipment. Laboratory tests indicate that the milk-stone precipitation potential of the chemical is not as great as other acceptable chemical sanitizing agents usually employed in dairies.

TABLE 5

COMPARISON OF BACTERIA COUNT BEFORE AND AFTER TREATMENT WITH ROCCAL UNDER VARIOUS CONDITIONS

Date	Average Colonies per Station: Before ROCCAL	Average Colonies per Station: After ROCCAL	Approximate Concentration	Approximate Wt. of Rinse	Percent of Kill
Dec. 30, 1941	30,500	5,100	1:5000	350 lbs.	83
Jan. 5, 1942	40,100	6,800	1:24000	350 lbs.	80
Jan. 6, 1942	53,300	4,300	1:50000	700 lbs.	92
Jan. 8, 1942	77,500	1,860	*1:4000	150 lbs.	97
Jan. 8, 1942	50,700	1,360	*1:4000	150 lbs.	97

* Water at temperature of 120° F. when ROCCAL was added.

CONCLUSIONS

From the foregoing, the following conclusions are drawn:

1. ROCCAL exerts a definite bactericidal action on the bacterial flora associated with milk-handling equipment.
2. The chemical is definitely stable when used to sanitize properly cleaned pasteurizing systems.
3. ROCCAL is no more corrosive to metal and rubber than ordinary water.
4. Rinse water contributes to the reduction of bacterial population of milk handling equipment through its flushing action. However, such action is not sufficient to render milk plant equipment satisfactory from a bacteriological standpoint.
5. ROCCAL imparts no taste or odor to milk products when used as a general sanitizing agent, and can be used with safety, due to its low toxicity.

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Sewage Treatment. Karl Imhoff and Gordon M. Fair. Book Review. John Wiley & Sons, Inc., 1940, 370 pp. *Pub. Health Eng. Abs.* xx, S. 94.

This is a joint effort of the authors to present briefly and simply the considerations and calculations which enter into the design and operation of modern sewage-treatment plants, the disposal of industrial wastes, and the disposal of effluents in streams. The table of contents gives:

(1) General considerations.
(2) Composition of sewage.
(3) Screening and skimming.
(4) Chemical precipitation and rapid filtration.
(5) Sedimentation.
(6) Principles of biological treatment.
(7) Treatment on natural soil.
(8) Treatment on coarse-grained beds.
(9) The activated-sludge process.
(10) Chlorination.
(11) Sewage sludge.
(12) Sludge digestion.
(13) Sludge gas and its utilization.
(14) Sludge treatment, disposal, and utilization.
(15) Water-carried wastes from unsewered habitations and industrial establishments.
(16) Origin and treatment of common industrial wastes.
(17) Self-purification of receiving waters.
(18) Disposal of sewage in receiving waters.
(19) Sample calculations.

The book is an interesting attempt to give a world-wide viewpoint on procedure and practice in concise form. It is of value to readers who are experienced enough to recognize the differences in German, British, and American practice, and for those who wish to supplement a general knowledge of sewage disposal and stream pollution by special studies of design or, for instance, oxygen relations in stream studies.

The experienced sanitary engineer, familiar with the care and discrimination of the authors in the selection of design and research data, will derive helpful stimulation and enjoyment from a careful study of this book, including the design problems and oxygen balance computations, which provide excellent mental discipline. In short, it is a "different" book.

LANGDON PEARSE

Wisconsin's Quality Improvement Program*

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Two different lines of thinking exist as to the approach that may be used to bring about improvement in the quality of milk. One is to place the responsibility on the state and have state officials carry out the work. The other is by means of an educational program to keep all branches of the industry aware of their needs, putting the responsibility on the producers and plant operators, with the state lending its support through a good enforcement program. Wisconsin favors the second approach and has put it into practice with good results.

WISCONSIN PLAN

Laying a firm foundation with sound reasons why quality needs to be improved is the first requisite in improving the quality of dairy products. The problem is not so much one of enforcing a set of rules and regulations as it is a matter of proving to all concerned the value of a program which will bring results. A sound, sensible program of quality improvement can be sold to the American farmer on its merits but it cannot be forced upon him. The big majority of the farmers are sufficiently intelligent to realize the need for quality milk. With well-organized preliminary work, giving everyone a chance to understand the program with sound reasoning to justify the procedure, it is easy to develop favorable public opinion which law enforcement officers need to support their activities. Dairy leaders in Wisconsin do not believe that quality milk can be achieved by means of legislation and law enforcement alone.

The quality improvement program in Wisconsin is organized in such a way that producers and plant operators work together on quality, with the state and other agencies interested in the industry lending their support and cooperation to the good producers and efficient operators who are helping the program go forward.

The plan is carried out by counties. When the program is under way, every plant in the county as well as every farmer who hauls to those plants, regardless of whether he lives in the county or not, is under the program. This plan was adopted because in the past, whenever anyone suggested that plant operators put on their own quality program, they invariably replied that they would not do so unless everybody else in the surrounding area did, because they were afraid of losing patrons. Nothing could convince them to change their attitude.

Consequently, plans are made to hold a meeting on a given day in every schoolhouse in the county presided over by two farmers from each school district. They lead a discussion on simple and easy methods of producing quality milk, the material for which is prepared for them in question and answer form.

SELECTION OF LOCAL LEADERS

In preparation for the schoolhouse meeting, a launching meeting, to introduce the program, is held two weeks prior to the schoolhouse meetings. The county agent and the state dairy inspectors contact two men in every school district, 80 percent of whom are usually members of the school board, and invite them to attend the launching meeting, where the need for quality is discussed and the plan for improvement is explained.

Among the reasons set forth to show the need for quality are the following:

First, to meet competition and retain its markets, the dairy industry must continue to keep ahead in quality.

Second, the dairy industry's advertising program, to be effective, must be based upon acceptable quality with dependable uniformity.

Third, after the war is over, the plant that has the best quality products will be in the most favorable position to hold its markets and meet the strong competition which is sure to result when government buying is discontinued.

Fourth, the Federal Food and Drug Administration is actively engaged in checking dairy products for composition and fitness for human food and must in line of duty condemn and seize products containing extraneous matter. Furthermore, boards of health are passing stringent regulations with reference to dairy products that fail to meet sanitary standards. The state department of agriculture is in a similar postion. Its aim is to keep standards high so that when these agencies make inspections, they will find no cause for action and no reason to write rules for sanitary production.

Fifth, consumers are becoming more and more interested in the conditions under which food products are produced and are rapidly increasing their demand for food produced under clean, sanitary conditions.

It is usually agreed at the launching meeting that these are valid reasons and that the program merits support. When the farmer leaders are asked whether they believe this program should be inaugurated in the county, the vote is always enthusiastically in the affirmative, many expressing the opinion that it should have been started 20 years ago.

The same men are then asked to attend a local leaders training meeting where a representative of the dairy industry department of the college of agriculture discusses with them the material on quality milk production which his been prepared in a booklet in question and answer form and put into the hands of every local leader. Even with the tire shortage, these men are eager to return for a second meeting, first because they have become convinced that this is one of the most important programs in the state, and second, because they want to be thoroughly prepared to conduct the meetings in their schoolhouses.

If a personal contact is made before the meetings, the local leaders are very willing to accept their responsibility and take advantage of this opportunity to serve the industry. A visit to the farm to explain all the details of the plan is extremely important. If a farmer receives a letter which merely mentions the quality improvement program without giving complete facts he invariably imagines that he is being asked to serve on a program which compels the use of white suits when milking and similar impractical requirements.

SCHOOLHOUSE MEETINGS

The need for farmers to hold a meeting in every schoolhouse in the county is established by the fact that farmers are more likely to express their opinions when meetings are kept small. Furthermore, this plan takes the meetings away from the so-called white-collar influence, giving farmers a chance to discuss the matter among themselves without outside interference. Another very important reason for the schoolhouse meeting is that it places the responsibility of making the program succeed upon the farmers. Whenever a farmer gets up on a platform and boosts the quality program, he puts himself on record in its favor. As a result, two fighters are created in every school district and these fighters

* Presented at meeting of the American Dairy Science Association, East Lansing, Michigan, June 24, 1942.

are evenly distributed throughout the county.

The big significance of the schoolhouse meetings is that a quality consciousness is developed among all farmers and a notice is given to everyone concerned that a quality improvement program has been launched in the county. Fieldmen report that it is much easier to work with farmers after the schoolhouse meetings. Having information on the plan and procedure and the reason for the program, they are more willing to listen to suggestions for improvement.

The manuscript for use at the schoolhouse meetings is designed to center the entire discussion around production methods. Ideal equipment is mentioned but under no circumstances is there any compulsion to buy this equipment. By using this procedure, farmers replace old, worn-out equipment of their own volition because they see the need for it and not because some state official with authority said they must have it.

This approach, with the emphasis on methods and the use of examples and illustrations, has proved very effective in encouraging the use of efficient production methods and has brought about many improvements which make it easier for farmers to carry out the principles of the quality program.

For instance, the program stays away from telling farmers they must have a milk house. However, they are encouraged to build proper cooling facilities by being told that a milk house is a necessity and convenience to which every farmer is entitled and they are asked to compare its cost and usefulness with that of other equipment used on the average farm.

For example, a tractor costs from $500 to $1,000 and is used from 30 to 60 days a year. Binders cost about $250 and are used from five to ten days a year. A milk house that will meet the requirements of any market costs from $200 to $350, is used twice a day for 365 days a year and if properly arranged saves time, eliminates drudgery, and provides a place to keep the product which furnishes from 50 to 75 percent of the farm income.

The income from milk furnishes the money to build a garage to house the car, a machine shed to house the machinery, a barn to house the hay, grain and cattle. Therefore, since milk pays all the bills, certainly a little additional time and expense would be in order to build a milk house and take care of the milk to preserve its quality.

Plant Collaboration

Immediately following the schoolhouse meetings, where these methods and procedures are discussed, the plants begin to make sediment tests and methylene blue tests, and to return the results to the farmers, keeping a record at the plant. The plants are further asked to make farm visits and help those farmers who are having difficulty. Wisconsin dairy leaders further believe and point out to plant operators that it is to their advantage to call on all their patrons to build up confidence, good will, and loyalty to the plant.

State inspectors help every plant operator to begin making tests, keeping records and calling on patrons. It is made clear to them that they are being held responsible for the quality of the milk they accept. The policy then, after all have been given the same opportunity to make a good start, is to spend more time with the operators who carry out the work efficiently.

Plant operators must be convinced that better results can be obtained by attacking their problems from a positive standpoint, planning with the good producers, who constitute from 90 to 95 percent of their patronage, how the greatest benefits for the industry can be achieved. The general tendency on the part of plant operators has been to put too much emphasis on the danger of losing patrons. It must be emphasized that they are really doing the good producers an injustice when they accept poor quality from the minority.

The contention in Wisconsin has always been that the best competition one can give a competitor is to let him have the poor producer, because the operator who refuses to cooperate and does nothing to improve the quality of his products will sooner or later eliminate himself from the industry. As far as the state is concerned, he will be allowed to eliminate himself and as far as the industry is concerned, the sooner he does the better it will be for the industry.

It has been proven that plants which have a well-organized quality program and a clear understanding with their patrons as to what is expected of them have no difficulty maintaining volume as well as quality. In fact, in many instances, these plants have attracted good patrons away from competitors who are not rejecting poor milk.

The reluctance on the part of plant operators to do quality work with their patrons comes as a result of their experience in years past, when there were plants whose goal was volume rather than quality and who were ready to take any kind of milk. The follow-up on the part of the state inspectors now dispels that difficulty.

Furthermore, farmers who are producing good quality milk are encouraged to reverse the situation and say to the plant operator, "If you continue to take insanitary milk from a few farmers and spoil the good milk we are producing, we will haul to another plant that is more interested in quality."

State Followup

State inspectors follow through with any farmers who cannot or will not improve. If a patron leaves a plant because his milk is rejected and makes no effort to improve but takes his milk to another plant, he is reported to the state inspector who has strict orders to follow him to the next plant. If he is still selling poor quality milk, both the farmer and the plant operator who accepts his milk are taken into court.

The plant operator is held responsible for the quality of the milk he accepts first of all because he sees the milk every day. The state inspectors see it only occasionally. If plant operators are not willing to assume their responsibility but would rather tell the farmers that the reason they cannot take their milk is that the state or federal government will throw them into jail, they are only breeding antagonism against the state and federal agencies. Therefore, if they really want good milk, they should have the courage to tell the farmer so.

They can take the stand that if the farmer expects them to receive top prices for the finished product and in turn pay him top prices for his milk, they must have good raw material to work with. Every time they take poor quality milk from any patron, they are penalizing the many farmers who are using clean, sanitary methods of production. Since the majority of farmers are delivering good milk, it is important that their interests be protected. Consequently, if the farmers want to continue to haul to this plant, they must deliver good quality milk.

If all the milk that was accepted was as poor as the poorest milk, it would be impossible to make a good finished product. On the other hand, if it was all as good as the best milk, a top quality would result. It is a fact that poor milk never does good milk any good but good milk always does poor milk some good and it is the good milk that plants receive that is carrying the load in the dairy business. This means that the good producers shoulder all the responsibility. How long are they going to allow this to continue?

If the state assumes full responsibility for the quality of the milk produced, it merely leads to evasion of the law and resistance to authority. The responsibility must be placed on the plant operators and producers and they must be shown the need and value of such a policy. To prove this point, one can find several plants in Wisconsin

that went on a sensible quality improvement program individually 10, 15, or even 20 years ago. They went to their patrons, laid the plan before them, and explained everything in detail. These plants have increased their volume in spite of the fact that everybody predicted they would go bankrupt and lose every patron they had.

Public Support

The quality program has succeeded in Wisconsin because it has had the support of every agency interested in the welfare of the dairy industry. Three to six months after the launching meeting, rejuvenation meetings are set up in the county by the plant operators, who furnish lunch and door prizes. The attendance at these meetings has run from 200 to 1,000 people. Newspapers, dairy journals, and radio stations carry news about production methods and keep dairymen informed about the progress of the work. County agents, teachers of agriculture, home agents, and representatives of various rural groups have assisted at meetings where quality was discussed. Efficient farmers and aggressive plant operators have lent their support and served as inspiration for good work on the part of other producers. This summer, the lumber dealers cooperated with the newspapers in a campaign for milk houses, and the bankers are expected to cooperate in a similar fashion this fall.

All these things have been accomplished because these agencies have been convinced that this is a program that merits support and that will result in benefits for everyone concerned. It is necessary to capitalize on every opportunity and put to good use every situation that may arise. In short, the program needs all the energy, drive, and enthusiasm that can be mustered.

Results

What are the results? Tabulated reports on the methylene blue and sediment tests show a decided improvement. Aggressive producers and plant operators who have carried out the provisions of the program as outlined for them have had definitely good results, as may be expected in all educational and promotional work. Today that group is extremely happy. On the other hand, those plant operators who did not follow the principles of the program and have been told by buyers that there is no longer a market for their product are regretting their lack of vision. There is still a great deal of work to be done, but there is no doubt that the Wisconsin quality improvement program as outlined is the proper approach to the problems facing the industry.

Because of the correlated efforts of dairy leaders and through steady, patient and consistent effort and teamwork on the part of all concerned, a quality consciousness such as never before existed has been developed among Wisconsin producers which has laid a solid foundation for the future security of the dairy industry.

A Paratyphoid Outbreak Due to Food Poisoning. W. Nikolenko. J. Microbiol., *Epidemiol. et Immunobiol.*, Moscow, 1940, No. 5; *Bul. Hyg.*, **16**, 342 (July, 1941); *P. H. Eng. Abs.*, xxii: Mi: 15.

"The author records an outbreak in which 35 persons were attacked and from a certain number a blood culture resulted in growth of Schottmuller's organism, *Bact. paratyphosum B.* The probable source of infection was said to be infected curds (lait caille). The incubation period ranged between 3 and 12 days."

L. K. P.

California's Manufacturing Milk and Cream Grading Program*

O. A. Ghiggoile

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

The problem of quality in manufactured dairy products is largely a production problem, and is recognized as such in practically all of the important dairy sections in the United States. The problem of high-quality dairy products is, therefore, one of obtaining high-quality raw materials.

In other words, first grade milk and cream are necessary for the manufacture of first grade products. The grading of milk and cream for manufacturing purposes has in late years received nation-wide attention. This move to secure better raw materials which enter into the manufacture of dairy products is commendable. However, all systems of grading are not entirely satisfactory. Fortunately, great strides have been made in recent years toward a well-defined, uniform system of grading.

In many states the grading of milk and cream for manufacturing purposes is mandatory by statutes with penalties for those who fail to cooperate with regulatory officials for not grading properly. The grading of milk and cream for manufacturing purposes in California is not compulsory by law and no provision is made in our law for such grading. It is true that definitions for manufacturing milk and manufacturing cream together with standards for such products are mentioned by law.

In the absence of legislation for compulsory grading and in the absence of available funds to do the grading, manufacturers in California undertook the grading of milk and cream on a voluntary basis. This is accomplished by manufacturers within a competitive area entering into an agreement with the Department of Agriculture, whereby they will make voluntary contributions sufficient to defray the cost and expenses of maintaining a certain number of inspectors, not only to grade the product as received at their plants, but also to do the dairy farm inspections on those dairies in need of such inspections.

The grading of manufacturing milk and cream in California is not new. California perhaps was one of the first states in the Union to undertake an intensive program for the grading of milk and cream used in the manufacture of dairy products.

The first group of plants to undertake the grading of milk and cream under a voluntary trust fund agreement is located in what is known as the west side of the San Joaquin Valley in Central California. The operators entered into an agreement during the year 1925 and have supported the program ever since.

A few years later this was followed by an agreement with plants on the east side of the San Joaquin Valley, and each area was maintained as a separate grading project, which a few years later was combined into one grading project. This is given as an illustration to show that the operators in one of our largest dairy-producing sections have supported a voluntary program all of these years and have repeatedly requested additional inspectors at the expense of such operators.

* Presented before the Manufacturing Section of the American Dairy Science Association, East Lansing, Michigan, June 24, 1942.

When the two projects were combined into one, a total of six inspectors were doing the grading and field work for twenty-two plants. With the desire of the plant operators to produce high-quality products, and realizing the necessity of a more intensive program, these operators voluntarily increased their contributions so that today they are supporting eleven full-time and one half-time inspectors.

Our manufacturing milk and cream grading program rapidly expanded since 1925 to such an extent that today every section is covered by our voluntary grading projects.

Plant operators are cooperating to the extent of contributing approximately $70,000 a year purely voluntarily for the maintenance of our manufacturing milk and cream grading program. They are financially supporting 29 inspectors.

The value of a program which first looks to the quality of the product itself has readily impressed the trade with its possibilities to such an extent that several groups of manufacturers, including entire competitive units, have signed agreements with the Department of Agriculture providing for the grading of manufacturing milk and cream by the state on a self-supporting basis in accordance with certain definite standards and grades. Present day scientific methods of quality determination of manufacturing milk and cream have been revolutionary in their scope and accomplishments.

Under the former program of routine dairy inspection, at the best only a few dairies could be visited daily by the inspector. With approximately 30,000 manufacturing milk and cream dairies in California, it would take the entire staff of this bureau several months to make a single inspection on each of the premises. We maintain a personnel of 29 dairy inspectors on the grading program, which allocates approximately 1,000 dairies to the inspector. Since the value of inspection is determined by the follow-up work and the effect it has on the actual quality of the product, it is apparent that the accomplishments of routine dairy inspection by themselves are negligible.

Manufacturing milk grading in California is accomplished principally by means of the simplified Breed direct count microscopic method, which combines into one operation and one solution, the fat extraction, fixation, and staining. The direct count method which began in 1925 as an adjunct to the inspection of milk and cream at the receiving platform was adopted as an official method for grading manufacturing milk after a thorough investigation and comparison with other methods. This comparison included the reductase, alcohol, acidity, and sediment tests. The direct microscopic test combines the merits of definiteness, reasonable accuracy under all conditions, speed, and simplicity, and in addition it applies equally well to all classes of micro-organisms which contribute to the deterioration of milk.

While its value as a control agent was at once recognized, it also became apparent that the speed of the operation must be greatly accelerated if it were to become practical for this purpose or for extensive commercial application. The first step in increasing the rapidity of technique was to place five smears on a glass slide instead of one. A rack was also designed to hold 12 slides with staining trays sufficiently large to accommodate them, which made it possible to prepare samples from 60 different patrons at one time. The next effort was to hasten the individual steps in preparing the slides for observation, among which is the process of combining into one solution the extraction of the fat, the fixing of the smear, the staining of the field, and the decoloration of the background, which also reduced the equipment carried by the grader, an important item in field operation. The technique has been developed to the extent that one man is now able to smear, stain, read, and record the results of from 250 to 400 samples a day as a matter of routine.

The microscope not only reflects the number of bacteria present, but also the type, thereby aiding the inspector in locating the source of high counts and the cause of inferior grades of product. Colostrum milk may also be readily detected in this way, and mastitis may be recognized even in the early stages as a result of microscopic examination greatly aiding in the immediate control of the disease.

Considering the large number of milk films which must be examined, the matter of illumination for a microscope is of considerable importance. Most of the preparation is done on the platform during the day, and the microscopic work often extends into the night. It follows that even with the best of eyes, considerable eye-strain necessarily results.

The source and quality of light is an important consideration. It must furnish adequate illumination so controlled as to insure maximum definition and correct color values of the stained object. It should be of such nature that it enhances or emphasizes those criteria useful in the rapid recognition of bacteria. With this in mind, recourse was had to the substitution of "white" light or some colored light other than yellow.

The light which is given off by the ordinary filament lamp is quite yellow and is very unsatisfactory for the microscopic examination of milk films stained with methylene blue. To approximate daylight it is necessary to remove the preponderance of red light given off by these filament lamps and to re-establish the balance which is characteristic of daylight. In practice, we accomplish this by inserting a disc or a square of blue glass between our yellow artificial light and the microscope. The result is a practical approximation of "white" light, giving a pleasing, even, soft illumination to the stained milk films and which approximates the same "true" color effects that are obtained with "daylight."

The direct microscopic count is supplemented by the sediment, flavor, odor, and temperature examinations in the grading of manufacturing milk.

Until a few months ago, samples of milk for sediment determination were taken from the bottom of milk cans after the milk had been stirred. The results, however, were not very satisfactory in that milk containing sediment would qualify as being acceptable. However, sediment was found in the manufactured products indicating that our method of taking sediment samples was not entirely satisfactory. We then adopted a policy of taking samples from the bottom of unstirred cans feeling that it was our responsibility to find sediment if it was present in milk regardless of what legal means may be resorted to to locate the sediment. As the result of this method, the quality of milk was not only greatly improved, but it had a very decided effect on the quality of the manufactured product and acted as a stimulant for dairymen to take better care of the milk on the farms.

Manufacturing cream is graded principally by means of a standardized alkaline solution so that a given amount of the solution will neutralize exactly three-tenths percent acid in an equal amount of cream. Phenolphthalein is used as an indicator, and when equal amounts of the alkaline solution and cream result in a permanent pink color, the cream contains less than three-tenths percent acid and is placed in first grade. If the color fades out, the cream contains an excess of three-tenths percent acid and is treated with another measure of the alkaline solution. Should the color remain pink the cream contains less than six-tenths percent acid and is placed in second grade. If the color again fades out, the cream contains an excess of six-tenths percent acid and is third grade. The equipment used in the acidity test consists of a bottle of alkaline solution, two dippers, one for the solution and one for the cream and a white cup.

In one of the grading projects organ-

ized in 1934, the cream grading results were shown to be 1.1 percent first grade; 20.8 percent second grade and 78.1 percent third grade; whereas for the corresponding month in 1939, the results were practically reversed between first and third grade, showing 70.2 percent first grade; 28 percent second grade and 1.8 percent third grade.

In the tasting of cream, we are able to detect bitter, salty, sweet, and sour flavors. The other flavors that we recognize are really odors. When grading cream, the grader smells the cream as soon as the lid is removed from the can. In order accurately to grade the cream, the can is stirred so the sample tested is representative of the entire content. A glass rod or rod made from lucite, which is lighter and will not break when dropped, is more satisfactory for this purpose.

There are four general sources of flavors and odors in cream; first, bacteria, yeast, molds, enzymes; second, feeds and weeds; third, absorbed flavors and odors; fourth, the physical condition of the cows. In general, bacteria and contamination are the principal causes of poor cream.

We find, however, there are factors in cream quality programs over which we do not have complete control. I refer particularly to rapidity of transportation which has a tremendous effect upon the quality of the cream as it reaches the plant.

We have heard it claimed that "transportation is our best inspector." While this will be generally regarded as an over statement, it bears repetition since we cannot emphasize too strongly the importance of quick delivery of the milk or cream from dairy to plant. In addition it should be properly protected from the weather and other unfavorable influences.

Another factor shown to have far reaching effect upon the quality of cream is its purchase by the plants on the basis of its quality. It has been recognized that the full benefits of a quality grading program cannot be realized unless the product is purchased on the basis of its quality. Many dairymen will not adopt essential methods of clean milk production unless there is financial incentive for their doing so.

In one project the operators are paying one cent less per pound milk fat between first and second quality cream and a three-cent differential between second and third quality cream. In two other projects where the purchase of cream is a major item the operators have established a differential of two cents a pound for fat between first and second grade cream. The response on the part of the dairymen to the purchase of cream on the basis of its quality was immediate and conspicuous in its nature.

Returning to a consideration of the dairy as related to the grading program, we wish to call attention to a very obvious fact; namely, that dairying is a business. It is amazing that so large a number of those engaged in this business do not recognize this fact in that they are not willing to make the necessary preparation with respect to buildings and equipment before engaging in this business.

If one engages in the business of selling peanuts, shoes, automobiles or what not, he expects to have suitable equipment and buildings for the conduct of his business. From the business angle alone, it does not seem unreasonable to expect the dairyman to have the equipment and buildings necessary to conduct his business properly. Consider further that the dairyman is not only conducting a business but is also producing our most important food product, one of the most susceptible to contamination as well.

The health factors are important enough to demand that dairymen have equipment and buildings of sanitary design so as to safeguard the public from all danger. Elaborate expensive buildings and equipment are neither required nor recommended. It is, however, required and expected that dairymen producing manufacturing milk or cream will at least meet the minimum requirements in this respect. This includes a fly-proof milk house of tight, sound, and cleanable construction with ample light and ventilation, facilities for washing and sterilizing equipment, and for cooling the milk or cream. While milking barns are not legally required for manufacturing milk and cream dairies, they are recommended from the standpoint of sanitation and convenience and ease in milking. Properly constructed milking sheds are quite satisfactory.

Aside from any consideration of sanitation or safety factors, we should not overlook the aesthetic features involved; that is, the effect the general appearance of the dairy has upon the conscious or unconscious appreciation of the consumer.

During the horse-and-buggy days, the average consumer had very little opportunity to observe dairies or dairy conditions. Today with modern highways and transportation facilities, thousands are daily traveling up and down the highways having the opportunity frequently to observe dairy conditions on a large scale.

We do not believe that the consumer will relish the thought of using dairy products obtained from milk or cream produced on insanitary dairies or from dairies improperly or incompletely equipped.

Nowhere are we able to detect any conflict between consumer and industry interests. They are identical insofar as the quality of the product and condition of the dairy is concerned.

Many people believe that dairying is a prosaic business; yet, it is definitely a scientific one based upon the laws of chemistry and physics, and the principles of bacteriology and sanitation. The dairyman who does not recognize this fact is tempting the gods of fate and is setting the stage for the operation of the law of diminishing returns.

Summary of Grading Benefits

Plant operators in the grading projects have indicated in support of the work that the state can conduct the work cheaper, more efficiently, and with less grief to all parties concerned; by decreasing the vat acidity as a direct result of cream grading, the percentage of overrun has been increased and the percentage of top grades of butter has been considerably increased in a number of instances; that a smaller portion of skim milk powder is degraded because of acidity and color; better flavored milk for evaporation is achieved and loss due to spoilage is eliminated; losses due to gassy cheese have been eliminated; increased separator efficiency is obtained, resulting from less sediment, lower acidity and less sweet curd; that a saving in plant labor is effected, not only in grading, alcohol testing, direct counting, etc., but that the entire crew will work fewer hours because receiving is speeded up; once-a-day hauling may begin sooner in the fall and continue later in the spring each year, which results not only in saving in hauling expense, but the plant operations can be cut down to one shift, effecting a material saving in operation costs; less field help and time spent in the field is necessary in trouble-shooting and working with dairymen on quality; there is less friction with patrons and controversies over quality are largely eliminated; voluntary grading of the product gives the plant more voice in how inspection should be conducted, not possible under strictly police methods; it is possible to get work stressed at particular times and places and on particular products when and where it will do the most good commercially.

The results of the manufacturing milk and cream grading program can probably best be judged by the fact that while work is voluntarily supported financially by the industry, it has con-

tinued to grow and develop of its own momentum until it comprises all intensive dairy sections in this state.

The manufacturing milk and cream grading program has proved to be a most potent influence in the stabilization of the dairy industry. Many factors are responsible for a stable dairy industry such as cost of production, supply and demand and so forth, but the keynote of stability in the dairy industry is quality; namely, the quality of the raw and finished product. That is where regulation enters the picture since quality is not haphazard or acquired by chance. To standardize is to stabilize and regulation standardizes the quality of our manufacturing milk and cream supply and our manufactured dairy products.

FOOD STRATEGY WITH GUTS AND VISION

(Continued from page 322)

ment of farm labor away from the farms by the higher wage scale of war industries. And then along comes Conservation Order DA-1 earmarking 90 percent of spray-dried milk powder for government use. This will rob the baking industry of a needed ingredient for milk bread, certainly our staff of life. Yet much skim milk goes to manufacture casein plastics, glue, paint, and felt hats; now new researches are struggling to divert even more to rubber-substitutes and lacquers.

Restrictive and conflicting milk control ordinances add their weight to an over-burdened industry. On top of these are the orders of the price control boards. Then too, some milk pasteurizing plants are operating on a greatly increased tempo with equipment which is fast wearing out and a critical labor problem, facing diminishing profits—jeopardizing the veritable backbone of our public health program as related to milk. And so we have been advised to use fortified oleomargarine in lieu of butter because of the latter's diminishing back-log.

A food administrator is needed who has perspective on these widely scattered and diverse conditions. He will have to be strong enough to keep milk in food channels and prohibit its diversion to technical fields. He will have to regulate the industry from start to finish, and do it in relation to the other branches of the food industry—as well as to the metal trades and the war ordnance needs. And he must make us like it.

J. H. S.

Milk Supply Problems in the Present Emergency

(The following series of statements were submitted by the respective authors upon request.—*Editor.*)

California

The problems encountered with the procurement of market milk supplies in California are perhaps no different from those in other parts of the United States. Such problems become more acute in states where troop concentrations are large and defense industries expanding. This is the situation confronting us in California and as the result of such large concentrations a shortage has been created in our market milk supplies.

While the per capita consumption may not have increased over the past year, total consumption of milk has increased in some of our markets thirty percent during August as compared with August of 1941. Milk which normally went into our market cream supply has been drawn upon for use as market milk, thereby creating a severe shortage of market cream. Practically all of the milk and cream sold in California for human consumption in its fluid form must meet with grade A requirements which are the lowest grades permissible under state law.

As the result of such shortage a real inspection problem arose in that certain milk distributors were substituting cream for manufacturing purposes for grade A cream. Every inspection agency in the state is rendering its efforts and support to the inspection and supervision of cream supplies. Strict enforcement of our laws will be maintained which means that if the industry cannot develop a market cream supply, it would need to cease the distribution of market cream which many of us in California agree is a luxury as compared to milk which is a necessity.

Problems in this connection will continue to increase unless some adjustment is made on our dairy farms. The drafting of large numbers of milkers and milkers entering employment in defense projects has resulted in the sale of thousands of dairy cows, many of which go for slaughter. This together with other labor problems, feed costs and transportation problems will force more dairymen out of business unless some assistance is given to them. Inability to replace certain worn out equipment, inexperienced help and other factors reflect on the quality of the product. To maintain the high position our market milk has attained greater vigilance must be exercised over its production and handling, placing upon the inspector considerably more work and responsibility.

Efforts on the part of people within the dairy industry to have regulatory officials lay aside certain legal requirements for the production of milk are constantly made. California has taken the position that enforcement agencies have no authority to waive any provisions of our laws. Therefore, the stand has been taken that there will be no relaxation in standards and sanitation, but some relaxation would be made with respect to the construction of buildings on market milk dairies, which is covered by regulations promulgated by the Director of Agriculture. There is no question but what attempts will be made to streamline our laws to meet war time conditions during our 1943 session of the State Legislature; however, those of us interested in the preservation of high standards and protection of public health and safety should see to it that the principles and fundamentals of sanitation and existing standards are not lowered.

M. A. HEINZMAN
(Information furnished by
G. A. Ghiggoile)

Oklahoma

The fluid milk supply situation in Oklahoma is little different, perhaps, from that of most of our neighboring states. The South West and Middle West areas are faced with a serious fluid milk shortage, if one is to believe reports emanating from the various sources.

The reason for the shortage is two fold. First we have an unnatural demand as a result of the shifting of population. This is brought about primarily by the location of many defense plants as well as Army camps and naval and Aviation training schools within the area. The second reason for this shortage is the fact that many dairies are discontinuing operation while others are decreasing the size of their herds. Labor is the fundamental cause for this condition. This can be supplemented by the high prices being offered for cattle for beef purposes. For this reason many dairy cows are going to the stock yards for slaughter. Since labor is the primary factor in the decrease of milk production, just what has been the contributing cause of dairy farm labor shortage? Of course the draft has taken its toll and no doubt will continue to be a factor to contend with, but there seems to be a tendency recently to defer more and more of this type of man power. I feel that this is a necessary procedure and definitely has its place in the war effort.

Perhaps the greatest amount of dairy farm labor here has been lost to defense plants. High wages, shorter hours, and seemingly better working conditions has attracted much of this type of labor to the defense plants, and there seems to be little that can be done about this. The National Service Act, if passed by Congress, could be a solution and perhaps the only satisfactory solution available at this time. Many ways are being discussed to solve the milk shortage problem. The question of rationing is being seriously considered in some sections. This takes various forms. Discontinuing the distribution of certain products such as whipping cream and high test milk is being put into practice. Lowering the butterfat content of all milk is being given consideration. Diverting manufacturing milk to fluid milk purposes is being done in some areas. However, this may necessitate the lowering of control standards of production, and involves the necessity of ordinance changes and changes of other control regulations. Frankly no satisfactory solution has been reached as yet. To make matters even worse, we have not yet reached our normal lowest production period for the year. I believe we are all more or less reconciled to the fact that existing conditions are bringing about sanitation problems affecting milk quality and that milk control in general will suffer to some extent.

There is a tendency of certain members of industry to want to bring about the lowering of sanitation standards, particularly those affecting production. This may be necessary in the existing emergency and may be one of the sacrifices we will be called upon to make.

I am certain that milk control officials are willing to make any sacrifice vital to the winning of this war. However, I am just as much convinced that we should not unnecessarily discard any phase of milk control that is based upon sound reasoning and has been proven as practical. Let's apply our best judgment in meeting these situations as they arise and dig deep into our storehouse of common sense. This is no time to allow selfishness to enter into our reasoning.

R. G. Ross

Florida

The population of the City of Jacksonville, Florida, is probably about 200,000. This is a large increase in the normal civil population, causing a great demand for milk which did not exist three years ago. In addition to the increased civil population is the population at the several Army camps which are supplied from the Jacksonville market. It is impossible to give a figure for these camps because they fluctuate.

In August a year ago, our department realized that there was going to be a tremendously increased demand for milk and did the utmost to get the three plants, which are the main supply of the Jacksonville area, to increase their production by their patrons. In this we were partially successful. The condition of the plants at that time were very good, because we had insisted on the equipment being kept up.

A year ago all of the milk that was consumed in Jacksonville was locally produced. At the present time we are getting milk from New York State, Tennessee, Pennsylvania, and we have had one shipment from Minnesota. This milk does not compare in quality with our locally produced milk.

Although our dairymen responded nicely to the need for increasing their herds and production, they have not been able to keep up with the demand. Furthermore, at the present time they are very much discouraged because they cannot pay the price for farm labor that such labor may receive by going to the shipyards and other war industries. In consequence, three of our herds have recently been disposed of in spite of our dire need for milk, and it is likely others will be sold out before the end of the year.

The increased demand for milk has been occasioned in part by the fact that the output of bottle drinks has been limited; the customers have turned milk drinkers. At the present time we have no surplus milk in our market, and have not had for many months.

I think that the fact that the Army and Navy are issuing regular rations of milk is the best advertising the industry has ever had. The reaction of the public is that if milk is good enough for the Army it is good enough for us. This is increasing the use of milk.

I feel that the future of the milk supply of Florida is jeopardized by the fact that it is impossible to secure much farm labor, and such as may be had is next to worthless. Had the Federal Government frozen labor on the farms, there would have been a different story to tell. Another effect this has had on the Jacksonville market has been to decrease the quality of the milk offered the public on account of inadequate and inefficient labor on the dairy farms. It has been impossible to maintain the standards of sanitation that obtained a year ago. Also, the same is true of the milk plants; they have lost their best men and are employing labor that once would not have been considered.

One of our greatest troubles is with refrigeration. Milk has got to be kept cool in the South from the time it is drawn from the cow to the time it is delivered to the consumer. As dairy farmers have increased their production they have needed more refrigeration. Since mechanical refrigeration is used on most of our farms there is need to get additional refrigerating equipment. The Federal Government has not helped us to do this. It has been suggested that ice might be used by the dairies, but unfortunately this past summer there has been an ice shortage in Jacksonville and the suggestion was impracticable. Our dairy plants have extended beyond their capacity and have overtaxed their capacity; pasteurizing machines are

overworked, there is not enough refrigeration, and there is not enough time to properly clean up. Our plants are almost on a twenty-four hour operation basis.

From a financial point of view, I think all hands have made money until recently. Now there are the high cost of labor and its scarcity, combined with high cost of feeds, entailing reduced profits. I think the dairymen and plants are still operating at some profit but are not doing as well as usual.

Jacksonville's war industries have complicated the labor problem: they all pay high wages. One of our shipyards employs 5,000 men, and by the first of the year will double this number. Another yard employs 500 men. Other war industries in the city have absorbed our labor at fancy prices.

HORATIO N. PARKER

New York

With hundreds of thousands of men in Army camps throughout the country, Army authorities are making a commendable effort to supply them with pasteurized fluid milk. This is in contrast with the reconstituted milk of World War I. An apparent shortage of fluid milk for this purpose in southern states is indicated by a number of requests received by the New York State Department of Health from milk companies or health officials for certification of sanitary conditions at certain receiving stations and on tributary dairy farms in the New York milk shed.

The raw milk is being shipped by tank truck from points in southern New York and Pennsylvania to points as far south as Miami, Florida. The milk is pasteurized and bottled at approved local pasteurizing plants in the vicinity of the camps where it is consumed.

Most city health officers in the south appear to be willing to accept the certification of the New York State Department of Health. This seems reasonable inasmuch as they have the opportunity of examining the milk for bacteriological quality before it is pasteurized and have the pasteurizing process carried on under their own observation.

However, there appears to be a tendency on the part of some cities having the United States Public Health Service Milk Ordinance to raise technical objections to permitting local milk pasteurizing plants to handle this milk for the Army. These health officers have called upon the United States Public Health Service to make ratings of dairy farms and receiving stations in the New York milk shed. As is customary, the United States Public Health Service Code requirements were used in rating the farms and the farm ratings ran as low as 49 percent. Of course if rated on local regulations the ratings would have been higher. Records of compliance of these milk supplies with bacteriological standards were very satisfactory. The low rating could have been predicted in advance and the time used in making these ratings could have been saved.

Because the milk does not meet United States Public Health Service inspection requirements, some health officials have held that it cannot be pasteurized in a plant handling local milk meeting those regulations.

Distributors, dairymen, and officials in the New York milk shed cannot see the object in making additional investments in equipment and in remodeling otherwise satisfactory barns and milk houses to meet United States Public Health Service regulations when the milk over a long period has been shown by tests to be of excellent quality and has satisfied critical metropolitan consumers.

W. D. TIEDEMAN

Chicago

AVOIDANCE OF SABOTAGE

The dangers of sabotage to the milk supply were recognized long before the attack on Pearl Harbor. The first step was to require that milk plants and receiving stations be kept locked, even during operation, so that casual visitors might not enter without the knowledge of the operator. This necessitated the construction of new entrances to some receiving stations to provide direct entrance to the offices from the exteriors of the buildings.

In July of this year the Board of Health adopted regulations prescribing that all milk plant and receiving station personnel, and every person engaged in the transportation and vending of milk, provide a complete personal history, on a form devised in cooperation with the Office of the Provost Marshal of the United States Army, be finger-printed, and wear at work a badge or button bearing his photograph. This program has been organized, and the taking of histories, finger-prints, and photographs, and the development of an index file including the names and code numbers of 10,000 or more persons, is in progress.

ASSURANCE OF AN ADEQUATE SUPPLY OF MILK TO MEET CHICAGO NEEDS

Chicago is unique in that the dairy farms and receiving stations under routine inspection supply the fluid milk needs of the city and of many of the adjacent communities, and also that from which all the cream and solids for ice cream and fluid milk beverages consumed in the city are obtained. The surplus over the demand for these purposes has usually, for the past several years, been considerable. This situation has constituted an invitation to other communities to seek to obtain their seasonal needs of cream and milk solids from the inspected supplies of this city. Under the impact of the War the withdrawal of milk from inspected sources, to supply war industry communities and Army camps, has become constant instead of seasonal, with the result that a shortage of the normal supply of milk is impending.

This situation has necessitated the development of a close check of daily receipts and sales. To date a small working surplus has been maintained.

MAINTENANCE OF MILK QUALITY

The exodus of labor from dairy farms and the labor turn-over in milk plants and receiving stations, the difficulties and delays in obtaining repairs and replacements of damaged or worn-out dairy farm and milk plant equipment, and the unrest created by widely publicized suggestions for the modification of public health requirements, have tended to make the maintenance of milk quality increasingly difficult.

Chicago milk plants, receiving stations, and dairy farms were in the favorable position of being well equipped when priorities became effective. Consequently, the Health Department has found it necessary to make no modifications in its requirements.

MAINTENANCE OF AN EFFECTIVE INSPECTION STAFF

The greater proportion of the civil service dairy inspection staff of the Chicago Health Department consists of experienced men, over forty-five years of age. Consequently, losses of personnel to the armed forces have not yet materially affected the organization of the inspection program. The pension benefits accruing to long-term civil service have tended to discourage resignations to accept more remunerative positions of a relatively temporary nature.

A certain number of ultimate losses of personnel to the armed forces is inevitable; these have been anticipated, and arrangements have been made for the training of replacements.

C. A. ABELE

Iowa

The war effort is having a very definite effect upon our milk control problem. There are two major influences:

First, and foremost is the labor situation. The farm boys have gone to the Army, and other farm labor finds employment in defense plants at double the wages received on the farm.

Our second big problem is the competition offered by other farm products. Iowa is a big hog-producing state. The price of hogs has almost doubled in the past year and a half. Since March, when the milk price was frozen, the hog price has increased 7.09 percent; cattle 19.08 percent; poultry, 34.9 percent; eggs 19.2 percent; lambs 19.05 percent; butterfat 21.6 percent.

The dairy farmer finds it just as patriotic and much more profitable to produce other products. Without complying with sanitary regulations, he can get eleven cents more per hundred at the powdered milk plant than at the bottled milk plant. He finds it more profitable to feed the milk to "hogs than to humans."

An example will be of interest. In a certain small town, the creamery offers 52¢ per pound fat as sour cream. His skim is worth $1.08 per hundred for hog feeding. (Semi-solid buttermilk for hog feed sells for $3.25 and it takes 3 pounds of skim to make 1 pound of semi-solid.) Since the milk price is frozen at 10¢ per quart, the pasteurization plants pay $2.00 per hundred for 3.5 milk. The price formula for the sour cream producer is as follows: 52¢×3.5=$1.82+$1.08 =$2.90 per hundred. This is a 90¢ per hundred advantage for the sour cream producer over the market milk producer. The market milk is under inspection. The sour cream is not. The market milk producer is not interested in complying with sanitary regulations. He uses a separator and feeds hogs.

In a larger community where the price is frozen at 12¢ per quart, the plants pay $2.45 per hundred. In this area, however, semi-solid buttermilk sells for $4.50 per hundred and much of it is used. Here the price formula is as follows: 52¢×3.5=$1.82+$1.50 =$3.32 per hundred for the sour cream producer. This is a premium of 87¢ per hundred over the market milk producer. In this community, a military establishment has increased the demand for milk nearly 20 percent. Uninspected milk is being brought in from any place they can find it. Of 126 cows sold (4 farms) this week, 114 went into sour cream production.

This brings us to the question—should we accept milk of poor sanitary quality or go without?

A milk producer made the statement a few days ago that he expects $18,000 for his 450 hogs. Another farmer reports that he received $12,000 net for his hogs.

The War Production Board has put priorities on milking machines, but none on separators. Which does our country need most—hogs or milk?

In many of our communities we are faced with the problem of accepting milk of known poor quality or go without.

We have met with the Office of Price Administration on a number of occasions, but we find only indifference and hostility. We have asked, not that the ceiling on milk be raised, but that a more equitable ratio between milk and competing influences be established. We have pointed out that the present policy of the O.P.A. is actually putting a premium on dirty milk. The public is becoming the victim of lower health standards as measured by the sanitary quality of the milk supply.

J. R. Jennings

BUTTER COULD BE MADE IN TROPICS FROM BUTTEROIL AND DRY SKIM MILK

Pure butteroil and skim milk powder—two dehydrated dairy products that contain all the food nutrients found in butter—could be shipped to tropical countries, held for a year or more if desired, and then be made into good butter with the aid of a little cold water, according to the Bureau of Dairy Industry. Butter usually contains 80 percent fat (butteroil), about 1 percent skim milk constituents. The rest is water and salt.

Dr. George E. Holm, who is in charge of the Bureau's fat-spoilage research, recently perfected a method of preparing the pure butteroil and packaging it so that it will keep almost indefinitely under extreme conditions. Skim milk powder is already produced and packaged satisfactorily by the industry.

The Bureau has successfully packaged butteroil in 2-pound tin cans for demonstration purposes. Metal oil drums would be ideal containers for large-scale shipments, but because tin cans and metal drums are both made of critical materials, the Bureau is now testing the possible use of wooden kegs.

Dr. Holm long ago established the fact that fats do not spoil unless a certain amount of oxygen is present to combine with the fat. Recently he found that the usual procedure in packaging butteroil did not exhaust all the oxygen from the container. Using the proper physical conditions of agitation, temperature, and pressure to remove all the oxygen and other gases, and then sealing the oil in gas-tight containers will prolong keeping quality, he found.

Butteroil properly prepared is a delicately flavored product that can be used in many of the ways that butter is used. It can be used in liquid form in cooking or baking, or even as a liquid spread in the same way that some people use olive oil. In any place where water cold enough to harden butter is available it would be feasible to make a butter-like spread, merely by mixing a little water and salt with the oil and cooling it. Under such conditions a supply could be made daily as needed.

Butteroil retains all the valuable nutritive properties of the butterfat in the original butter, and therefore practically all the food value of the original butter. Although the oil itself would serve all practical purposes of butter as a food, it would only be necessary to incorporate a small quantity of skim milk constituents, salt, and water with the butteroil to make butter of the usual composition.

Charles S. Trimble, butter-manufacturing specialist of the Bureau, has demonstrated the practicability of making a complete butter from butteroil, powdered skim milk, water, and salt. Powdered skim milk and water are stirred into the butteroil and the emulsion is poured slowly, or run in small streams, into ice-cold water, which causes the formation of butter granules that may be worked into butter in the usual way.

Butteroil was made commercially in the United States some years ago, principally for the baking, ice cream, and candy industries. But competition among the manufacturers resulted in the use of low-grade butter as a source of the oil, and the inferior quality of the product soon ruined the demand for butteroil in these industries. At least one company in the United States is now making butteroil for export.

One of the important factors in pro-

ducing a butteroil of pleasing flavor and long keeping quality, the Bureau explains, is to use butter made from fresh cream—pasteurized and churned on the day the milk was produced. The butter may be held in storage at low temperatures until ready for use. Or the fresh churned butter may be melted when it is in the granule stage. The melted fat is floated off the water and serum, centrifuged to remove excess water and curd, and then vacuum-dried with agitation to remove the final traces of water and also the oxygen and other gases that would cause spoilage. The oil is allowed to flow slowly into the final container under vacuum. The vacuum is then broken, the head space of the container is filled with nitrogen, and the container sealed.

ABSTRACTS OF FOOD AND NUTRITION RESEARCH

Biological Abstracts announces the establishment of a new (seventh) section, "Specially Assembled Abstracts of Food and Nutrition Research" to be initiated in January 1943. This section will consist of an assembly and reprinting of all the abstracts contained in *Biological Abstracts* that deal with human and animal nutrition and metabolism, vitamins, diet and diet-deficiency diseases, food composition and values, food processing and food microbiology, beverages, storage and conservation of foods, food spoilage and, in short, all of the biological literature that pertains to foods and nutrition.

Biological Abstracts has covered this literature ever since its establishment in 1926. In previous volumes the abstracts pertaining to foods and nutrition have been dispersed throughout the entire volume, hence research men and teachers whose special interests lay in the foods-nutrition field were able to obtain the abstracts pertaining to this literature only through the purchase of the complete edition or all of the five original sections. The segregation of the foods and nutrition abstracts into this new independently published section will provide, for the convenience of these workers and biologists generally, an abstracting service at greatly reduced cost.

In line with the general policies of *Biological Abstracts* every possible effort is being made to insure completeness in coverage of the world's literature. Efforts to obtain abstracts of publications from continental Europe, now mostly unavailable to workers in this country, are continuing. In spite of the very great restriction in diffusion of research information, occasioned by the war, journal coverage in *Biological Abstracts* has steadily increased until, at present, more than 1,700 periodicals in the biological field are being abstracted. The new abstract section will therefore, from the beginning, afford a very complete coverage of the world's research literature.

Each volume will consist of ten abstract issues; subscribers will receive the index to the complete edition of *Biological Abstracts*. The subscription price will be six dollars per year (plus 50 cents postage outside the United States).

Inquiries should be addressed to *Biological Abstracts*, University of Pennsylvania, Philadelphia, Pennsylvania, U. S. A.

DESCRIPTION OF LACQUER FOR COATING FOOD CANS

DIVISION OF DAIRY RESEARCH LABORATORIES
BUREAU OF DAIRY INDUSTRY
U. S. Department of Agriculture, Washington, D. C.

A lacquer which appears to be suitable as a coating on iron food containers to take the place of tin coatings during the present emergency has been developed by the Bureau of Dairy Industry. The basis of this lacquer is dehydrated lactic acid which is combined with vegetable oils to form a resin.

The dehydrated lactic acid is obtained by a dehydration process in which the free and combined water is removed from the aqueous lactic acid by distillation with a high boiling liquid such as xylene, the water-withdrawing liquid being continuously returned to the still after the water has separated out. The product is a soft pale yellow balsam, which upon hydrolysis with an excess of sodium hydroxide, has an acidity of about 120 percent calculated as lactic acid.

This product is combined with vegetable oils such as castor oil, dehydrated castor oil, linseed oil, or soya bean oil by heating to a temperature of approximately 265° C. to 280° C., preferably in the presence of a catalyst, until a brown, soft, and elastic resin is formed. The proportion of dehydrated acid to oil may be varied over a considerable range. The heating requires several hours, depending upon factors such as size of reaction vessel, volume of product, speed of stirring, etc., which affect the rate at which volatile products are removed during the heating process. A higher yield is obtained if the ingredients are blended by heating at a temperature below 200° C. for a preliminary period. A very insoluble product is obtained if the heating process is not stopped when the product first begins to resinify as this resin is of the thermosetting type.

Various catalysts may be used such as metals, metallic salts, and oxides. A small amount of fumaric acid or maleic anhydride improves the resinous product.

The resin may be dissolved in solvents such as xylene, acetone, benzene, and butyl alcohol, and driers added to form a baking lacquer. For use on food containers, non-toxic driers should be used, based on zinc, cobalt, iron, or manganese.

The lacquer bakes fairly hard in 20 minutes at about 160° C., but to obtain a very resistant coating about 40 minutes or more of baking at a temperature of 210° C. or over are required. The well-cured coating is quite resistant to steam, acids, alcohol, water, and to dilute alkali. It may be applied directly to iron, steel, tin, and aluminum without the use of a primary coat. However, a better coating on iron is obtained when iron is first subjected to a hot dip phosphate treatment.

A typical formula for the preparation of this lacquer is as follows:

Dehydrated lactic acid...	2 parts
Castor oil	1 part
Fumaric acid	1% by weight of above mixture
Bauxite granular (activated by heating).....	1% by weight of above mixture

The soft brown elastic resin is dissolved in xylene to a solids content of 30 percent resin, and 0.2 percent zinc napthenate and 0.4 percent cobalt napthenate driers added to make up a lacquer.

The process of dehydrating lactic acid by boiling in contact with a water withdrawing liquid has been published and is not limited by patent restrictions to our knowledge. Application for a public service patent covering the process of making the lacquer has been made.

Legal Aspects

Keeping Swine *

Swine—keeping—permit from local board of health.—(New Jersey Supreme Court; *Lichtman* v. *Board of Health of Deptford Township et al.*, 26 A.2d 503; decided June 3, 1942.) In a mandamus proceeding to compel a township board of health to issue a permit to the relator to keep swine on his farm it appeared that his application was refused because he had previously been convicted of keeping swine without a permit and because the board of health did not intend to issue more permits. These grounds were held by the Supreme Court of New Jersey to be without merit because the conviction involved no moral turpitude and because all the adjoining farms were operated as piggeries, there being 85,000 pigs in the township. The exclusion of relator, said the court, from this prevailing business was arbitrary and could in no way promote the public health, safety, and welfare.

* *Pub. Health Repts.*, Sept. 4, 1942, p. 1362.

City Milk Ordinance *

Milk—city ordinance—provisions regarding producer's permit fee and tuberculin testing upheld.—(Kansas Supreme Court; *Dorssom et al.* v. *City of Atchison et al.*, 124 P.2d 475; decided April 11, 1942.) In 1938 the city of Atchison enacted an ordinance regulating the production and sale of milk. The plaintiffs, who were farmers engaged in producing milk which was sold to distributors in the city, instituted an action for a declaratory judgment to determine the validity of certain parts of the ordinance.

Section 3 of the ordinance made it unlawful for any person not possessing a permit from the health officer to bring into the city or offer for sale or sell any milk product and further provided that each producer of milk sold or distributed within the city should pay annually a permit fee of $2 for two cows or less and 50 cents for each additional cow, the payment thereof to include the right to distribute milk or milk products. The question was presented as to whether the city had authority to enact an ordinance which charged producers a permit or license fee, the plaintiffs directing attention to a statute which provided that the powers of first-, second-, and third-class cities to impose license or occupation taxes upon peddlers and venders should not be construed so as to apply to or create the power to impose license or occupation taxes upon producers and growers engaged in the sale of farm or garden products or fruits grown within the State. It was contended that under this statute the city was forbidden to impose any license or occupation tax. The holding of the Supreme Court of Kansas was that the fee imposed by the ordinance was neither a license tax nor an occupation tax within the purview of the said statute and that the section of the ordinance referred to was not to be stricken down on account of the grounds asserted. The court noted that power had been granted by statute to first-class cities to enact ordinances in order to secure the public health and to prevent the introduction and spread of contagion and stated that in its judgment the statute relied on by the plaintiffs was never intended to prevent enforcement of health regulations. "Here," said the court, "there is no claim made that the fee is unreasonable, or that it is a device for revenue and not to meet expenses of inspection. It is also clear from the ordinance the fee is not fixed on the right of the producer to peddle or vend his milk, it is a measure calculated only to meet expense of determining that the product he sells complies with specified conditions to insure its fitness for human consumption."

Another portion of the ordinance complained of was item 1-r of section 7, under which item it was required that, before milk was sold, the herd should, at least once every 12 months, be given a tuberculin test by a licensed veterinarian approved by the State livestock sanitary commission. Respecting this, the questions presented were whether the ordinance required the producer to provide at his own expense a certificate that his cows had been tuberculin tested and whether the city had authority to delegate its inspectional powers to third persons.

The supreme court noted a statute which, among other things, provided that the livestock sanitary commissioner should, whenever he deemed it necessary, formulate the rules under which the tuberculin test should be applied and that no person other than one indicated by the commissioner should inject any tuberculin into any animal. This statute also gave a city power by ordinance to require the owner of any dairy herd offering for sale any milk within the city to first subject the cows to examination and test for tuberculosis under the direction of and in accordance with the rules prescribed by the livestock sanitary commissioner. The court said that it appeared that the city had power to require tuberculin testing and that compliance with the requirement was a condition precedent to the right to sell milk in the city. The city's mere silence in not providing that the cost should be paid by the applicant did not, according to the court, make that part of the ordinance bad. "A fair interpretation of the ordinance is that the applicant must meet the conditions precedent at his own expense."

Neither could the court agree with the plaintiffs that the city had attempted to delegate a delegated power in providing that the tuberculin testing should be by a licensed veterinarian approved by the livestock sanitary commission. The court said that it appeared from the statute above noted that such a person would be the only person authorized to make the test. The provision was held to be a proper exercise of the city's legislative power.

* *Pub. Health Repts.*, Sept. 11, 1942, p. 1395.

Poultry *

Poultry—slaughter—cancellation of permit—action of local board of health upheld.—(New Jersey Supreme Court; *Kurinsky* v. *Board of Health of Lakewood Tp. et al.*, 24 A.2d 803; decided March 2, 1942.) A 1930 ordinance of a township board of health provided: "No person . . . shall slaughter . . . any chickens, ducks, geese, pigeons, and any other domestic fowl, except for domestic or family use, and not for hotel or commercial use, within the limits of the town, unless a permit is first had and obtained from the board." In addition the board had adopted in 1932 other and more detailed regulations concerning the slaughter and housing of poultry. In an action by the prosecutor whose poultry slaughtering permit had been cancelled by the township board of health, there was brought before the New Jersey Supreme Court for review (a) the action, orders, and resolutions of the board in cancelling the permit and (b) the above quoted ordinance. It appeared that the prosecutor had been engaged in the poultry business in the township for about 17 years. In 1933 he obtained a permit after having been advised that he was violating the ordinance in slaughtering poultry without one. The permit was issued for a period of 1 month and was renewed monthly until September 1941 when further renewal was denied after due notice of the contemplated action had been given. The renewals had not been continuous, there being at least 2 periods, 1 for about 6 months and another for about 4 months, when the renewals were denied, apparently due to prosecutor's failure to comply with the sanitary requirements.

The supreme court said that the proofs abundantly supported the action of the board of health in cancelling the prosecutor's permit because of his failure to observe the provisions of the ordinance and regulations. It was pointed out that local boards of health were given wide powers to safeguard the public health generally and, among other things, were specifically authorized to regulate, control, or prohibit the keeping or slaughtering of animals. The licensing of poultry markets and slaughterhouses, said the court, rests in the sound discretion of the boards of health. "We find that there was no abuse of sound discretion in the case at bar." Tested by the rule that the action of a board of health in adopting measures for public protection would not be set aside by the court where the board had acted reasonably upon evidence which might satisfy a reasonable man, the court was satisfied that the action complained of was reasonable under the facts and was not arbitrary or capricious but, on the contrary, was fully justified.

The court held that there was no merit in the prosecutor's contentions (a) that the above-quoted ordinance was void because not setting up a standard to govern the board in passing upon applications for permits and (b) that the board's action in refusing a permit was illegal as being an unlawful restriction of prosecutor in the use of his property by arbitrary action without a comprehensive plan of zoning the entire community. According to the court the standard governing the board was not only the ordinance in question but also the regulations of the board and the sanitary code of the State department of health, all looking to the preservation of the health of the community. "The repeated failure to comply with the law by the prosecutor is sufficient to withhold from him a license to continue in the business without the necessity of adopting a zone within which no permits could be granted."

* *Pub. Health Repts.*, Sept. 11, 1942, p. 1397.

New Books and Other Publications

What's New in Farm Science. Part I, Fifty-eighth Annual Report, Wisconsin Agricultural Experiment Station, Madison, Wis., 1941. 88 pages.

This is a popularly written report of progress in farm science as conducted by the Wisconsin Experiment Station workers. Seven pages are devoted to the subject of milk. Copies may be obtained at 15 cents each while the supply lasts. Remittance should be made to the Bulletin Mailing Office, College of Agriculture, Madison, Wisconsin.

Modern Bread from the Viewpoint of Nutrition, by Henry C. Sherman and Constance S. Pearson. New York. The Macmillan Company. 1942. Pp. 118. Price $1.75.

Anyone interested in the ways and means by which a staple food can be and has been greatly enhanced in dietary values, or "nutritionally modernized," should consult this book. It describes the procedures and results of the enrichment of modern white bread with vitamins and minerals natural to whole wheat. It also tells about the improvements in modern bread due to the liberal use by bakers of non-fat dry milk solids. As a consequence of these significant improvements, and certain other advantages of bread, the authors recommend that enriched bread should now comprise at least 40 percent of the calories in the American diet, provided that due prominence is given to other protective foods in the balance of the dietary.

Milk plant operators and dairy officials who are concerned about the static condition of market milk, which has achieved considerable hygienic improvement but has made no significant progress in increased nutritive properties, may find this book provocative. It was prepared as the result of an American Institute of Baking research fellowship at Columbia University in New York.

JAMES A. TOBEY

Industrial Waste Treatment Practice, by E. F. Eldridge, Research Associate, Engineering Experiment Station, Michigan State College. McGraw-Hill Book Company, Inc., New York, 1942. $5.00.

This book is the culmination of years of work on the part of the author in the field of industrial waste treatment and disposal. Many of the problems which arise in connection with the various industrial wastes are of very diversified nature and become complicated when the wastes must be handled through domestic sewage systems. More pressure is being put upon industrial plants to diminish or to entirely eliminate the pollution of bodies of water which are used either as sources of municipal water supplies or for public recreational purposes. The dairy industry is pointed out to be one of the outstanding sources of wastes from its milk processing and manufacturing plants. For example, a milk condensery or a cheese factory may have a waste disposal load equivalent to that of the sewage from a population of 1,500 to 3,000, the number of people in a small town. On the other hand, the combined effluents of a large city's milk plants and ice cream plants can be the source of a heavy waste load on the municipal sewage disposal system.

The chapter listing is as follows: I, Stream Pollution; II, Characteristics of Industrial Wastes; III, Standard Treatment Methods, Structures, and Equipment; IV, Wastes from the Beet-Sugar Industry; V, Milk-Products-Factory Wastes; VI, Canning-Factory Waste; VII, Tannery Wastes; VIII, Pulp-and-Paper-Mill Wastes; IX, Textile Wastes; X, Meat Packing and Slaughter-House Wastes; XI, Laundry Wastes; XII, Wastes from the Metal Industries; XIII, Gas-and-Coke-Plant Wastes, and Other Phenolic Wastes; XIV, Wastes from Fermentation Industries; XV, Wastes from Oil Fields and Refineries; XVI, Treatment of Combined Industrial Waste and Domestic Sewage; XVII, Methods of Analysis for Industrial Wastes.

In Chapter V, Milk-Products-Factory Wastes, the subjects taken up are, Manufacturing Processes and Source of Wastes, Composition of Milk Waste, Preventing Milk Losses, Segregation of Clean Water, Volume and Strength of Waste, Treatment Processes, Standard Biological Filter, Continuous Recirculating Filter, Fill-and-Draw Recirculating Filter, Biochemical Process, Mallory Process.

This book is recommended as a reference for dairy manufactures and dairy technology students, and to dairy plant executives and milk sanitarians as an authoritative source of information on dairy waste treatment and disposal.

L. M. DORSEY

The Principles of Dairying, by Henry F. Judkins, revised by Merrill J. Mack. Third Edition. Published by John Wiley & Sons, Inc., New York, N. Y. 1942. 315 pages. Illustrated. $3.00.

This book is a revision of the 1931 edition of this well-known textbook on the elements of dairying. The entire text has been reset, increasing the contents about thirty percent but actually decreasing the number of pages by seven. The result has been the production of a much better-looking book that has been brought up to date in treatment (insofar as an elementary text allows) and in appearance (modish buck binding). The general arrangement is the same as that of the previous edition.

Among the new material is a chapter on "The Bacteriology of Milk," replacing the chapter on "Acidity and Its Relations to Dairy Products" which is now included in a new chapter on "Quality Tests for Milk." The new laboratory tests are given, together with new material on goats' milk, cream separation, ice cream, whey by-products, process cheese (not included in the index), and packaging. Many new Questions replace a few of the former ones. The Problems seem to be the same as formerly. Additional references support the broader scope of this newly revised, excellent text.

Food and Drug Regulation, by Stephen Wilson. Introduction by Walton H. Hamilton. Published by the American Council on Public Affairs, 2153 Florida Avenue, Washington, D. C. 177 pages. Cloth $3.25. Paper $2.50.

This is an excellently written and interesting account of the conditions which led to the enactment of the several Federal food control acts. The subject matter is well documented and shows extensive research. However, it gives earmarks of being written by someone who is an outsider to the food industry, relying upon "the record." Some of its presentations savor of the technique of the columnist with human interest proclivities. In spite of this somewhat biased championing of the cause of the public against the food manufacturers, there is a large amount of information on the pros and cons of food legislation that should get before the public in a pleasantly readable manner. This book does this very well from the standpoint of the officials of the United States Food and Drug Administration. It omits entirely the food and drug regulation conducted by the states and municipalities, probably greater in amount by far than the Federal activities in this field.

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INDIANAPOLIS DAIRY TECHNOLOGY CLUB

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Assistant Secretary, W. K. Moseley, Moseley Laboratory, 315 N. DeQuincy St., Indianapolis, Ind.

IOWA ASSOCIATION OF MILK SANITARIANS

President, Dr. M. P. Baker ..... Ames
Vice-President, M. E. Held ..... Sioux City
Secretary-Treasurer, J. R. Jennings, State Department of Health, Des Moines, Ia.

KANSAS ASSOCIATION OF MILK SANITARIANS

President, Dan Van Gundy ..... Wellington, Kan.
Vice-President, Wesley Coblentz ..... Topeka, Kan.
Secretary-Treasurer, W. J. Caulfield, Kansas State College, Manhattan, Kansas.

MASSACHUSETTS MILK INSPECTORS' ASSOCIATION

President, John T. Manning ..... Boston, Mass.
Vice-President, M. G. O'Connor .. Springfield, Mass.
Secretary-Treasurer, Robert E. Bemis, Cambridge, Mass.

METROPOLITAN DAIRY TECHNOLOGY SOCIETY

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Vice-President, A. B. Quencer .... New York, N. Y.
Secretary-Treasurer, F. C. Button, New Brunswick, N. J.
Sergeant-at-Arms, F. L. Seymour-Jones, New York, N. Y.

MICHIGAN ASSOCIATION OF DAIRY AND MILK INSPECTORS

President, F. E. Holiday ..... Detroit
1st Vice-President, A. C. Miller ..... Lansing
2nd Vice-President, Dr. C. S. Bryan .. East Lansing
Secretary-Treasurer, Harold J. Barnum, Health Department, Ann Arbor.

MISSOURI ASSOCIATION OF MILK SANITARIANS

President, C. P. Brandle .... St. Louis County, Mo.
Vice-President, W. S. Feagan .... Kansas City, Mo.
Secretary-Treasurer, Glenn M. Young, Jefferson City, Mo.

NEW YORK ASSOCIATION OF MILK SANITARIANS

President, Iver Mikkelsen ..... Pleasantville, N. Y.
Vice-President, Samuel Abraham, New York City, N. Y.
Secretary-Treasurer, W. D. Tiedeman, New York State Department of Health, Albany, N. Y.

PACIFIC NORTHWEST ASSOCIATION OF DAIRY AND MILK INSPECTORS

President, A. W. Metzger ..... Salem, Ore.
Vice-President, E. W. Soper ..... Arlington, Wash.
2nd Vice-President, R. D. Bovey ..... Boise, Idaho
Secretary-Treasurer, Frank W. Kehrli, Portland, Ore.

PHILADELPHIA DAIRY TECHNOLOGY SOCIETY

President, Col. A. P. Hitchins .... Philadelphia, Pa.
Vice-President, E. J. Roberts ..... Philadelphia, Pa.
Secretary-Treasurer, W. S. Holmes, 158 North 20th Street, Philadelphia, Pa.

TEXAS ASSOCIATION OF MILK SANITARIANS

President, Taylor Hicks ..... San Antonio, Texas
1st Vice-President, F. C. Armstrong, Fort Worth, Texas.
2nd Vice-President, R. N. Hancock, McAllen, Texas.
Secretary-Treasurer, G. G. Hunter, Lubbock, Texas.

WEST VIRGINIA ASSOCIATION OF MILK SANITARIANS

Chairman, F. D. Fields, Berkeley County Health Dept.
Secretary-Treasurer, J. B. Baker, Department of Health, Charleston, W. Va.

Association News

California Association of Dairy and Milk Inspectors

The twenty-fifth annual meeting of the California Association of Dairy and Milk Inspectors was held at the Hotel Clark, Los Angeles, California, September 21–24, 1942. Arrangements for the program were made by the committee consisting of Dr. Floyd Wilcox, *Chairman*, Los Angeles County Health Department, Los Angeles; Al Reynolds, State Bureau of Dairy Service, Sacramento; Dr. R. P. Gingerich, State Bureau of Dairy Service, Los Angeles; Jack Covert, Los Angeles City Health Department, Los Angeles; and Fred H. Lucas, Kern County Health Department, Bakersfield. The committee arranged a program which fitted into the war situation. Outstanding speakers addressed the delegates. A large group was in attendance. Milk and dairy inspectors who attended the first meeting were special guests of honor.

This convention is considered the outstanding one in the history of the organization, and celebrated a quarter of century of progress since the first small group organized for the purpose of accumulating existing scientific knowledge of sanitary milk production, handling, and processing, promoting study, sharing information, and making it available to those connected with the dairy industry. For twenty-five years the Association has had an uninterrupted career of usefulness. Its service to the dairy industry is well recognized but the safeguard of public health has always remained its primary objective.

MAX A. HEINZMAN,
President

Chicago Dairy Technology Society

Mr. M. G. Vanbuskirk, Secretary of the Illinois Dairy Products Association, discussed the subject: "What is Ahead for the Dairy Industry?" at the November 10th meeting.

GUS B. ULVIN, *Chairman,*
News and Publicity Committee.

Connecticut Association of Dairy and Milk Inspectors

The forty-eighth convention of the Connecticut Association of Dairy and Milk Inspectors was held October 13, 1942, at the Hotel Garde in New Haven, with the following program:

"Romance and Enforcement of the Drug Laws" by Herbert P. Plank, Supervisor, Division of Drugs and Cosmetics, Connecticut Dairy and Food Commission.

"Role of Housekeeping in Dairy Products Processing" by W. A. Cordes, Sealtest, Incorporated, New York, N. Y.

Announcement of Prize Winning Papers.

Presentation of Papers by the Respective Authors.

Presentation of Prizes.

In preparing for this program, we solicited papers from our members covering any subject of their own choice with the understanding that any paper worthy of merit would receive a prize. There were only seven papers submitted, five of which received prizes, and two of which were submitted for publication. The entire scheme created more interest than would appear from the number of papers received, and we will undoubtedly try this scheme again in the not too distant future. All of the writers of the prize winning papers read their material at the afternoon session. The prize was $5.00 in defense stamps.

H. CLIFFORD GOSLEE,
Secretary-Treasurer.

Massachusetts Milk Inspectors' Association

The Fall meeting of the Massachusetts Milk Inspectors Association was held on October 27th at the Hotel Vendome, Boston, Massachusetts. Considering the transportation difficulties, the meeting was well attended. Men came from the western part of the State and several were there from out of State.

The program as made up consisted of talks pertaining to problems confronting all milk sanitarians at the present time.

President John T. Manning of the Dairy Division of the Boston Health Department gave an interesting paper on some practical experiences in the country end on the transportation of milk to the creameries. This paper created considerable discussion.

We were fortunate in having Dr. J. H. Shrader on the program who talked on "The Safe Milk Problem in the Present Emergency." Dr. Shrader mentioned in his paper conditions that were affecting different sections of the United States and causing milk officials much concern. He recommended a streamlined milk inspection all down the line and to eliminate the legal frills on inspections. There is a shortage of milk being felt already throughout the country. Reasons for this are: (1) The use of whole milk by the armed forces of the United States; (2) More milk being put into powdered milk; (3) Shortage of beef and dairy cows being slaughtered bringing a good price; (4) Labor situation on farms very alarming. With all this happening, Washington is now taking up the solution of the milk situation by the establishment of a Board consisting of representatives from the Army, Navy and other people not too familiar with the problem. Therefore the Association went on record by sending a telegram to the committee handling the matter of the International Association now meeting in convention at St. Louis, Missouri, urging the Association to inform the Washington authorities of the special knowledge and interest of official milk sanitarians in all prospective new milk control procedures.

Harry E. Bremer, Milk Co-Ordinator for the State of Vermont also presented a paper on the problems presenting themselves in his State. He also suggested letting up on rigid adherence to inspection requirements.

Nomination of officers took place at the business session. Voted by the Association to hold its annual two day convention in Worcester, Massachusetts, on January 6 and 7, 1943, at the Hotel Bancroft.

ROBERT E. BEMIS,
Secretary-Treasurer.

Michigan Association of Dairy and Milk Inspectors

The Michigan Association of Dairy and Milk Inspectors held their annual meeting at Michigan State College on November 5 and 6, 1942. In past years the annual meeting has been held in February or March of each year.

The meeting time was shifted this year in order to be able to meet at the time of the Dairy Department's Annual Dairy Manufacturer's Conference on November 4, 5 and 6. The Michigan Allied Dairy Association also held their annual meeting at the same time instead of in February as in past years.

The entire program was geared to war time problems in the dairy industry. As in past years one day of each of the three was devoted to butter, market milk, and ice cream problems respectively. The business meeting of our Association was held on Friday morning, November 6th.

HAROLD J. BARNUM,
Secretary-Treasurer.

New York State Milk Sanitarians Meet

As would be expected, milk sanitation in war-time was the theme running through the program of the Twentieth Annual Meeting of the New York State Association of Milk Sanitarians

held at Albany, N. Y., September 23–25, inclusive. An attendance of over 490 and the active and serious discussions of unusual problems arising from war conditions proved the wisdom of the decision to hold the meeting notwithstanding travel restrictions.

Clyde Beardslee, of the Dairy Products Section, War Production Board, Washington, speaking on The Milk Business and War Production, explained why practically all materials used in manufacture of milk-plant equipment are now largely unavailable. He emphasized the now familiar advice that existing equipment will have to be made to serve for "the duration" and that enforcement of laws and regulations will have to be tempered accordingly. Answering a question as to what a plant operator should do if a "boiler tube burned out" Mr. Beardslee said: "Wire our office. We will see what we can do."

Closely supplementing the Beardslee thesis was a practical paper by C. W. Weber of the New York State Department of Health, on ways and means of prolonging the life of equipment. Drawing on his own observation and experience Mr. Weber pointed to numerous ways in which equipment is ordinarily mistreated. Friction, corrosion and shock, said Mr. Weber, are "diseases" which, by application of care and common sense, may be prevented and controlled. It pays, he said, to take the time to thoroughly instruct a new and inexperienced employee in the care of equipment.

Discussing the role of milk in nutrition, Dr. Gilbert Dalldorf of Grasslands Hospital described vitamin D milk as a useful product in child feeding but characterized the current efforts to add "every possible nutritive element" to milk as unnecessary and undesirable. Dr. Ralph B. Little, Rockefeller Institute, Princeton, N. J., reported success in treatment of mastitis due to *Streptococcus agalactiae* with gramacidin. Answering a question in discussion, Dr. Little said that he had had no experience in treatment of infections with hemolytic streptococci of Lancefield's Group A—the "human type," but would not advocate attempting to treat animals with such an infection, considering them "too dangerous."

Dr. Edward S. Godfrey, Jr., New York State Health Commissioner, pointed to the importance of milk sanitation but emphasized the fact that it is only one part of the whole public health program. The activities of the milk sanitarians, Dr. Godfrey said, must be coordinated and balanced with other public health activities.

Features entertaining as well as instructive were Dr. Robert S. Breed's talk, illustrated by colored movies, on agricultural conditions in Cuba and Mexico, and R. C. Borden's talk and demonstration on how to get willing cooperation. In this category, also, was the Annual Question Hour in which George J. Hucker acted as ringmaster while alleged authorities tried to answer questions alleged to have been sent in by members of the audience.

Other program features: Precision Timing of High-Temperature, Short-Time Pasteurizing Equipment, A. C. Fay, Boston, Mass.; Milk Filtration with Cotton Media, H. L. Davis, New Brunswick, N. J.; Protecting and Maintaining Milk Supplies in War Time, Sol Pincus, New York City; Transportation Problems, Charles H. Milburn, New York City; Investigation of an Outbreak of Streptococcal Infection, C. S. Leete, Albany, N. Y.; Causes and Reasons for Rejected Milk, R. L. Furnia, Chateaugay, N. Y.; Effect of Alkaline Detergents on Water Hardness, C. W. Rink, Pittsburgh, Pa.; Acid Detergents in an Unchanged Can Washer, F. M. Scales, New York City; and Milking Machines, Materials and Men, by Lawrence Beville, Buffalo, N. Y.

P. B. BROOKS,
Deputy Commissioner of Health

Philadelphia Dairy Technology Society

The first meeting of the 1942–43 season of the Philadelphia Dairy Technology Society was held in Houston Hall, University of Pennsylvania, on Tuesday, October 13. The speaker was Mr. F. M. Scales, Director of Research for the Sheffield Farms Co. He gave an interesting talk on the use and effectiveness of acidulated washing compounds in can washers.

The November meeting was held on Tuesday, November 10th, at the Robert Morris Hotel, 17th and Arch Streets in Philadelphia. This was a dinner meeting at 6:30 P.M. The speaker was Mr. F. A. Faust, Field Engineering Department, Bristol Company, Waterbury, Connecticut, speaking on the subject of "Temperature Control in the Dairy Plant."

Through a typographical error, the name of the speaker for the June meeting was printed as Bernard Shaw whereas the correct name was Bernhard Spur. (We regret this error.—Editor.)

W. S. HOLMES,
Secretary-Treasurer

Texas Association of Milk Sanitarians

Mr. T. H. Butterworth has been appointed as Associate Milk Specialist, U. S. Public Health Service, attached to the 4th District Office in New Orleans. His new address is 36 Fontainbleau Drive, New Orleans, Louisiana.

DAIRY TECHNOLOGY SOCIETY OF KANSAS CITY

The Dairy Technology Society of Kansas City held their first Fall meeting on the evening of September 22nd at the Lucerne Hotel to discuss the very timely topic: "Tips on How to Increase the Life of Milk Products Equipment During the War."

The speaker of the evening was Mr. Rush Damuth, Divisional Manager of Cherry-Burrell Corporation, with offices in Kansas City, Kansas. He pointed out that it was the first duty of top management in dairy plants today to supervise personally and know what is being done to care for and lubricate their operation equipment.

The meeting was attended by operators of about sixty plants in the Kansas City area, and in addition, members of the Kansas City Health Department and the National Dairy Council.

ANNUAL REPORT OF THE SECRETARY OF THE INTERNATIONAL ASSOCIATION OF MILK SANITARIANS 1942

The record of the past year indicates that there has been a continued growth and expansion of the Association. Membership figures confirm this, showing a total of 1,253, of which 304 are active, 921 associate, and 183 new members. Of more significance, although no numerical value can be given, is the interest in the Association and its work by members and by others in the industry who are concerned with maintaining, at least, the status quo of milk sanitation during war times. We are all concerned, both personally and as an organization, in doing the utmost to carry on.

Correspondence reaching your Secretary has indicated that there is a problem now, and one which will become more acute during the war, in making available adequate supplies of safe milk to all parts of the country, both for our armed forces and the civilian population. As an organization, we are vitally concerned. Immediate steps should be taken to work out some plan whereby those communities which are now, and will be, short of milk, can secure satisfactory milk in an adequate quantity, without too much "red tape" and consequent delay.

During the past year, at the request of the Chief of the Dairy Section, Food Supply Branch, War Production Board, Dr. Fabian appointed a Committee to confer with that organization relative to matter pertaining to milk sanitation. This Committee met in Washington with government officials during October. A report of the activities of the Committee will undoubtedly be made to President Fabian.

Early in the year a representative of the Army requested your Secretary to secure, from outstanding milk sanitarians, opinions, comments, and criticism of the proposed specifications for milk for the Army. This was done, and approximately twenty men, located throughout the country, sent in their suggestions.

At the request of the Inter-American Committee for the Dairy Industries, Dr. Fabian appointed an Advisory Committee for the Committee on Public Health of the Inter-American Committee.

Our official publication, THE JOURNAL OF MILK TECHNOLOGY, is a property of the Association, of which we are all proud and jealous. It has reached its enviable position because of several factors. There was a need for such a publication. Its success has been due to the untiring efforts of its Managing Editor and Editor. Many have helped, and their efforts are appreciated. But your Secretary cannot let this opportunity go by without again, and with just as much enthusiasm as in past years, expressing gratitude for the work of Bill Palmer and Doc Shrader.

To the individuals, committees, organizations, the officers of the Association, and to the Editors of the JOURNAL who have furthered the work of the Association, your Secretary is deeply indebted.

May I express to Dr. Fisher, Chairman of the Committee on Local Arrangements, the Association's sincere appreciation for his work. The responsibility for arrangements was given to him at the last moment, even after he undoubtedly had assumed other obligations, due to the meeting of the A.P.H.A. This last-minute decision was due to the cancellation of the Dairy Industries Exposition at Memphis, Tennessee. His Committee really made it possible for us to meet here.

Because this Association is closely related to the war effort, we are justified in holding our annual meeting this year. However, we must face the fact that as the war continues transportation becomes a greater problem. Indications are that all conferences such as ours will be out for the duration. In our deliberations this morning we should recognize the fact that we may be making decisions and taking action which will hold until after the duration. This, however, should not curtail our activities. The JOURNAL will become even more a medium by which we can officially speak as an Association.

Under adverse conditions, President Fabian has done much constructive work for the Association. It has been a pleasure and an inspiration to work with him.

Respectfully submitted

C. S. LEETE, *Secretary*
International Association of Milk Sanitarians

New Members

INTERNATIONAL ASSOCIATION OF MILK SANITARIANS

ACTIVE

Blackburn, Paul, Public Health Sanitarian, Indiana State Board of Health, 512 W. Marshall St., Decatur, Indiana.
Carter, Philip R., Veterinary Officer, U. S. Army, APO 862, c/o Postmaster, New York City.
Failing, Dr. George S., Dairy Inspector, 469 West 7th St., Winona, Minn.
Garner, Dr. William Glen, Bacteriologist, Ogden City Health Department, 329 Eccles Building, Ogden, Utah.
Lescanec, Frank E., Sanitation Supervisor, State Health Department, Shubuta, Miss.
Marlow, D. R., Public Health Sanitarian, Indiana State Board of Health, 800 N. 6th St., Lafayette, Indiana.

ASSOCIATE

Adams, John S., Laboratory Technician, New England Milk Producers' Association, 12 Atkinson Court, Lawrence, Mass.
Atkinson, L. A., Chief Bacteriologist, Fraser Valley Milk Producers' Assn., 425 W. 8th Ave., Vancouver, B. C.
Beattie, Miss Margaret, Associate Professor, Department of Hygiene, University of California, Berkeley, Cal.
Biddle, Edward S., Assistant Bacteriologist, Haskell Research Foundation, Department of Bacteriology, University of Delaware, Neward, Del.
Callard, Robert L., Industrial Division, Corning Glass Works, Corning, N. Y.
Ferreira, Howard H., Laboratory, Dean Milk Co., 505 Fourth St., Harvard, Ill.
Glazier, Lynn R., Dairy Consultant, The Plaudler Co., 89 East Ave., Rochester, N. Y.
Hartsook, Dr. Frank M., Health Commissioner, Morrow County Board of Health, Court House, Mt. Gilead, Ohio.
Havens, Harold F., Dairy Manager, Harenshire Farms Dairy, 406 Arlington St., Fremont, Ohio.
Jagermann, Kendon A., Sales Engineer, Cherry-Burrell Corp., 330 W. 42nd St., New York City.
Johnson, Dr. T. L., Assistant Professor, Department of Bacteriology, A. & M. College, Stillwater, Okla.
King, Milt, Sales Manager, Sediment Testing Supply Co., 20 E. Jackson Blvd., Chicago, Ill.
Kirsch, Nathan C., Assistant Head of Sterile Production Laboratories, Schering Corporation, Bloomfield, N. J.
Laubly, Sgt. Charles S., Assistant to Post Sanitary Officer, Station Hospital, Tyndall Field, Fla.
Leonard, J. C., Div. Mgr., Oakite Products, Inc., 1002 Wrigley Bldg., Chicago, Ill.
Louthan, Howard S., Assistant Milk Sanitarian, 408 N. 11th St., Herrin, Ill.
Overman, Orton, Jr., Quality Control Supervisor, Red 73 Creamery, Rohr Apartments, Union City, Indiana.
Rutledge, Jr., Campbell, Sales Engineer, Corning Glass Works, 94 East 3rd St., Corning, N. Y.
Sotier, Alfred L., Bacteriologist, Research Department, J. B. Ford Co., Wyandotte, Mich.
Stebnitz, V. C., Director Chicago Dairy & Food Laboratories, 6930 North Clark St., Chicago, Ill.
Wingate, Harold F., Sanitary Bacteriologist, Rochester Health Bureau Laboratory. 260 Crittenden Blvd., Rochester, N. Y.

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Authors

Subjects

"Dr. Jones" Says—*

WELL, I see by *Health News* (the June 29th number, it was) they traced another outbreak of gastroenteritis to hollandaise sauce. This was a dinner party at a New York City hotel: sixteen guests and the only one that didn't get it didn't take any hollandaise sauce. Somebody at the hotel that wasn't at the party—they got some of this sauce and had the bowel trouble afterward. No—it ain't anything particularly against hollandaise sauce. It's a matter of *food handling*. Presumably somebody with a staphylococcus infection got some of the germs into this stuff and then they kept it setting for several hours at a warm temperature. Of course the germs multiplied and gave off their toxin and that's what the guests got: the poison. It's the same old story. If they can't learn to avoid that sort of thing maybe, these dinners and things—it'd be a good idea to have a dose of caster oil as the last item on the menu. That might help.

But what I was thinking: that just goes to show the sort of thing they ought to be guarding against in these public eating places—hotels and so on. I saw a record of the gastroenteritis outbreaks in one recent year and a lot of 'em were luncheon and dinner parties at hotels and restaurants. It ain't usually dangerous, the molly-grabbels isn't, but it ain't really an ideal way to end up a dinner party and it don't help the reputation of the restaurant any. Going to considerable trouble to prevent such things happening—I'd think it'd pay, at that.

When you get right down to it you can put your finger on a certain few things that're dangerous. Some places they make food handlers have a blood test for syphilis. Well, having a Wassermann test is a fine idea but whoever heard of anybody getting syphilis from food? And a gob of egg on your knife: it ain't appetizing but you won't get disease from it. But an unsafe water or milk supply—there's plenty you can get from them and it's something it's possible to regulate. An unknown typhoid carrier in the kitchen: they aren't easy to detect but there aren't so many of 'em as there used to be. You take them and these folks with boils and other staphylococcus infections, if they wouldn't ever touch the food without washing their hands first, probably nothing'd happen. Then there's this matter of refrigeration: keeping stuff so cold that if there's germs in it they won't grow. No, if you can't cover everything—well, it's like the government taking the cuffs off'm pants: it's the pants, not the cuffs, that're important.

PAUL B. BROOKS, M.D.

* *Health News*, New York State Department of Health, Albany, July 13, 1942.