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Editorials

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

Community Cooperation in Public Health Projects

A WIDE-AWAKE, efficiently directed health department is continually meeting new conditions and problems whose solutions require study. Inasmuch as such an organization is always under-manned and insufficiently financed for doing the work that it sees should and could be done in the public interest, it perforce must ignore (or label and pigeon-hole) many an interesting project for sheer lack of facilities with which to study the problem.

The investigation by the American Philosophical Society as to the number of amateur scientific societies and clubs in metropolitan Philadelphia revealed some astonishing figures.* There were 287 such organizations, having a total of 32,000 members. About 40 percent of these societies were devoted to the subjects of astronomy, botany, chemistry, entomology, geology, and ornithology. Among the science clubs, 77 different occupations were represented, including 21 percent in the law, medicine, and ministry, 17 percent in offices, 15 percent skilled artisans, 9 percent students, and 6 percent professional scientists. The American Association for the Advancement of Science is planning to survey amateur scientific organizations in at least 40 communities within the next few months.

Here is a large body of earnest, intelligent citizens who enthusiastically work for the love of the study of some subject. Addressing the British Association for the Advancement of Science in 1939, Dr. Herbert L. Hawkins said:

> "The mere existence of a company of people declaring their interest in matters bigger than the squabbles of the political nursery, preferring to contemplate wider problems and vistas than those of the daily headline, should be enough to insure a nucleus of stability in the quicksands of opportunism."

The cancellation of many of the larger scientific meetings and the slackening in the need for local participation in war-time projects would seem to add to the above persons many who have shown their community interest and their tenacity of sustained interest in technical subjects.

* A.A.A.S. Bulletin, *4*, 44 (1945).

It would seem that these constitute fertile areas for health officers to cultivate with information which the community ought to be given. Meetings constitute good pegs on which to hang "news" for use by the local press. This brings out personnel who are excellently poised to cooperate constructively in furthering projects which the health department needs. Here lies a great wealth of intelligent personnel who are potentially "susceptible", so to speak, to the technical aspects of public health work. The development of such contacts certainly would contribute to the public health-mindedness of the community.

Practical health officers may well fear the intrusion of earnest but misdirected efforts of the laity, many of whom might be impelled to rush in where angels fear to tread. This is possible. Generally, it is easier to get into trouble than to get out of it. However, if a health department has clearly in mind the kind of cooperation it seeks, it can dominate the picture and keep its leadership. (Note the use of local photography people by Robertson in his educational program. This JOURNAL, Nov.-Dec. issue, p. 349, 1944.) It may have to expend some time and energy in heading off runaways and prodding laggards but at the same time it accomplishes far more than could ever be done by the individual attention of these health officers alone. An accomplishment along this line in one field will be reported in a succeeding issue.

J. H. S.

Our Opportunity and Responsibility

THE Association at this particular time has a very great opportunity to serve the dairy industry not only of America, but throughout the entire world. Foreign lands picture us as a land flowing with milk and honey. And well they may with the bounteous hand of our government everywhere evident and the billions of quarts of milk produced during the past five years ranging from approximately 51 billion quarts in 1940 to 56.4 billion quarts in 1944 with other dairy products in proportion.

According to the organization in this country at present, it is the immediate responsibility of our public health departments, municipal, county, state and in some cases Federal, to see to it that this vast quantity of milk is produced in a cleanly manner free from disease. It is the duty of the colleges and universities of the country to furnish these public health agencies with the trained personnel to carry out the work in a scientific and intelligent manner. Some might consider that this is sufficient organization to insure adequate control and sanitation, but such is not the case. In addition, there must be an overall organization to collect, disseminate, and standardize data, procedures, and practices. This organization must be composed of all units of control that will take the best from each and amalgamate it into a workable whole for the benefit of all. Such an organization is the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS. Our Association through its committees should collect the best procedures and practices from the municipal, county, state, and Federal agencies and also from the research work of the institutions of higher learning, standardize them, and then pass them on to all inspectors through our own publication, *The Journal of Milk Technology.*

It has been necessary to do this in other associations. For example, in the laboratory analysis of milk and dairy products, we have *Standard Methods for the Examination of Dairy Products* by the American Public Health Association. Before the advent of Standard Methods, the bacterial analysis was in a chaotic

condition. There were nearly as many different methods of analysis as there were laboratories. We have *Standard Methods of Water Analysis* and will soon have it for various foods. It was necessary for the state and other control laboratories to form the Association of Official Agricultural Chemists and to establish official and tentative methods for the chemical analysis of a great variety of products to bring order out of chaos. We have a most excellent example right in our own Association of the value of such work in the standardization of certain dairy equipment under the direction of the Committee on Sanitary Procedure in cooperation with similar committees from two other associations. This committee made a good start and should continue this most excellent work. However, this is but one phase of dairy sanitation. There are many other phases of dairy sanitation equally in need of standardization. Since the word "standardization" is used frequently, it might be well to define just what is meant by the term as it is used here by the writer. It is simply a collection of the best procedures and practices, based on scientific knowledge and common sense in the dairy industry, accepted by common consent as demonstrated by adoption by the association of workers in the field concerned.

We already have the necessary machinery set up in the various committees of our organization to standardize practically every phase of dairy sanitation. The Chairman of each of these committees is in turn a member of the Coordinating Committee at which place the work should be initiated and supervised.

After the war there undoubtedly will be a great expansion in all sanitary programs and especially the dairy program. Our Association should be ready and willing to assume its responsibility in directing this program along constructive and effective lines. The very best way to do this is to be prepared to give the best known sanitary procedures to those inspectors just entering the field and to those who have not had an opportunity to become acquainted with them. This can best be done by collecting and selecting the best in each field and then making them available to all inspectors through standardized procedures which should be kept up to date by revision as often as necessary. In this way our association can perform a very great service to the dairy industry and to the public, and also do away with confusion and the great amount of duplication which is everywhere evident in dairy sanitation throughout this country. We have a great opportunity as well as a responsibility if we do our duty in this field.

F. W. F.

Seeking a Measure

SOMEONE has said that the rate of progress in the development of a subject is limited by the accuracy of the measuring stick used. Support for this thesis seems to be afforded by the phenomenal advances in the physical sciences (astronomy, chemistry, physics), slower advance in the biological sciences (bacteriology, botany, zoology), and slower progress yet in the social sciences (sociology, economics, history, political science, anthropology, etc.). Ability to measure the result of a given effort enables the worker to gauge the kind and extent of the next move toward the desired solution.

In the field of sanitation, workers use several sciences but possess no measuring stick (unit of measurement). The art has advanced not much beyond the qualitative stage. In milk control, sanitarians early seized upon the (then) new subject of bacteriology as the basis for expressing milk quality. Since sour milk

contained an enormous number of microorganisms in contradistinction to the relatively few bacteria in fresh, normal milk, and since intermediate numbers were present at various degrees of cleanliness, age, and treatment of milk, the idea gained prevalence of using the size of the bacterial content to indicate the degree of sanitary quality. This led to making so-called bacterial counts, using the well-known agar-plate technic, followed later by the direct microscopic method.

These procedures served a useful purpose in guiding sanitary practice, especially in the early days when the general milk supply was at a deplorable (according to present standards) sanitary level. This success in using bacterial counts to stimulate improvement in quality led sanitarians to use these numbers with increasing preciseness. They even wrote bacterial standards into their milk ordinances, and set up premium payments for milk "quality" on the basis of these "bacterial counts".

Advances in bacteriological knowledge soon showed that these counts did not reveal the actual numbers of bacteria present because of the errors in media composition, incubator practice, types of organisms present, manipulative technic, personal equation, etc. Although these errors were being increasingly emphasized as more and more laboratories entered the field of milk control, the use of so-called bacterial counts became entrenched. Great effort has been made to reduce these errors. Yet Brew and Breed write[1]: "Those who have been close to the realities are inclined to feel that it is entirely within the realm of possibility that variabilities in duplicate counts, as made in different laboratories, are about as great in 1944 as they were in 1910 before there were any official standard methods." (This reference is a valuable contribution to the subject of bacterial counts, especially on the origin and establishment of the direct microscopic technic.)

Every qualified bacteriologist knows that bacterial counts by the agar plate method are only rough estimates of only those organisms that happened to grow on that particular batch of agar. In all candor, it must be maintained that the direct microscopic technique is a superior method for quantitative use. The use of the agar plate method as a numerical measure must be bowed into the realm of the out-moded.

The direct microscopic technic has been a boon to industrial milk operations. It gives the production man a quick, direct method for his quality control. Industry wants results immediately, reliably, cheaply. The direct microscopic method approaches this desideratum.

The milk industry needs something more. Today, we see industrial operations controlled by the newer physical chemical methods—photometry, emission and absorption spectrography, diffraction analysis, mass spectrometry, electron microscopy, fluorochemistry, X-ray analysis, and other aspects of applied electronics. It will be a great day for the milk receiving platform to be able to press a button and read the bacterial count off of a dial. Such a method is now being studied. The research laboratories of the universities and federal government could well explore the possibility of developing control methods from the great field of physics. Biochemistry and biophysics also have yielded great rewards to the investigator. The dairy industry—like the other industries—progresses as its measuring devices give accurate and quick information. The other industries are blazing new trails in control procedures. Why not the dairy industry also!

J. H. S.

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An Improved Darkfield Quebec Colony Counter

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THE nineteenth century colony counters were difficult to use and unsatisfactory, judging from Stewart's (12) review, due chiefly to a lack of uniform illumination. He devised an electrically illuminated counter, so arranged that the culture in a Petri dish received oblique illumination and was seen against a dark blue background. His counting box was covered with a piece of glass which could be used to support a tripod magnifying glass and which protected the open plates from contamination during the transfer of colonies. A screw-lever focusing mechanism raised or lowered the culture. Stewart warned against errors of parallax while counting and stated that the built-in electrical illumination saved at least one-third of the time of counting. He also advocated the use of the colony counter for teaching and the viewing of thin pathological specimens. The lamp was below and to one side of the culture dish support and illuminated the culture and the background about equally.

Buck and Swenarton (3) reaffirmed the necessity for standard electrical illumination. They objected to the amount of light transmitted through the plate and having the guide plate above the culture as in Stewart's instrument. They raised the 25 wt. lamp to the plane of the guide plate and built a hood over it to reflect light uniformly onto the top of the agar. The culture dish was placed on a piece of clear glass, under which was a Jeffers plate (7) and below that was a blue, background plate. The following advantages were claimed: uniform illumination, colonies distinguished without eyestrain, and a simple construction with no unnecessary parts to interfere with the rapidity with which it could be used. No focusing mechanism or magnifying glass was provided.

A more elaborate colony counter was described by Buck (4) with a 25 wt. bulb at one side and slightly below the level of the culture and four mirrors so arranged that the light was reflected both above and below the culture to the side opposite the lamp and then back onto the top and bottom of the culture. This form of illumination was devised to show pin point colonies. The Jeffers plate was in a sandwich, as described above, and a magnifying glass was built into the viewing opening at the top. A hood fitted around the head and excluded extraneous light. Buck reported that pin point colonies were more easily and accurately counted, that eyestrain was minimized, and that it was easier to distinguish colonies from debris with this counter. The fixed positions of the guide plate and the lens provided constant magnification.

Graf's (6) colony counter held the culture on the front surface tilted to an angle of about 60° from the observer, to lessen the fatigue from bending the neck which occurred with the previous flat colony counters. The light was mounted in a housing at the top of the counter and a mirror in a rotating mount below the culture provided even reflected light. He stated that pin point colonies could be counted with the aid of a lens, although no lens was mounted on the instrument.

Schacht and Robertson (10) critically examined the sources of error, difficulties, and equipment for estimating bacterial concentrations from colony counts. A simple box with two lights above and at opposite sides of the culture was found satisfactory. They recommended pasteboard, Wolffheugel plates to avoid the glare from glass guides. No light was transmitted through the culture in this instrument.

A colony counter with a built-in amplifying system for automatic recording of the counting was described by Varney (13). The agar was connected to the grid of the electron tube. A tungsten tipped stylus was touched to the colonies in turn which marked them and completed the circuit through the hand and a metal plate on which the hand rested to actuate a counter. A lamp gave oblique lighting to the cultures.

The two chief sources of error emphasized by Archambault, Curot, and McCrady (2) are concerned with magnification and illumination. Their investigations led them to believe that: reflected light was inadequate, a combination of transmitted and reflected light was best, no direct light should reach the operator, lamps on three or four sides were not good, two lamps on opposite sides of the culture was best, and that a mirror could replace the second lamp with practically identical results. Detailed specifications were given to obtain the following advantages: even illumination, magnification, adjustment of the counting surface for comfort, a fixed position of the magnifying lens to eliminate eyestrain, no glare from direct light through the lens to the operator, a long working distance between the lens and the culture, and interchangeable guide plates (Wolffheugel, Jeffers, and Stewart). A 60 wt. lamp was used and dimensions for the box and mirror were given. The bottom surface was blackened and the rest of the inside of the box was finished in aluminum paint. They stated that the bottom surface need not be shielded, but when the Quebec Colony Counter was manufactured it was found necessary to place a baffle across the box to cast a shadow on the surface directly under the culture. The colonies stand out, as stated by them, with an effect similar to that of a darkfield microscope.

Crisp (5) designed a colony counter with a 60 wt. lamp at one end of a pyramidal housing, from which the light was concentrated and passed horizontally to the culture. When viewed from above the light and shadow brought the colony in relief and bubbles were easily recognized by their brighter reflections. Colored light from blue, orange, or yellow filters was found helpful.

Marking methods to show which colony had been counted have been devised by Robinson (9), Simms and Jordan (11), and others. The former used a modified pen with an internal switch and the latter a micro-switch on a lettering pen. Both marked the colony counted with ink and controlled an electric counter.

Thus, the two problems in the development of a successful colony counter are uniform and reproducible illumination and controlled magnification. The latter problem was solved by adopting a magnifying glass of 1.5 diameters magnification and sufficient diameter to cover the culture. When the lens, the guide plate, and the culture are fixed in line with each other, errors from parallax are minimized, eyestrain is greatly reduced, and a standardized magnification facilitates comparable counts with different instruments and operators.

To obtain uniform and reproducible illumination is a more difficult problem, not hitherto solved. With one light the colonies nearest to the light are more brightly illuminated than those at the opposite side of the culture plate. Two lights placed at opposite sides of the Petri dish culture provide two regions that are brighter than at the center, and unless the lamps are prop-

FIGURE 1

Improved Darkfield Quebec Colony Counter

erly mounted, one side of the less illuminated central region is often brighter than the opposite lateral side.

Using a mirror in place of the second lamp considerably reduces the illumination on the mirror side, because the illumination decreases with the distance. In fact the difference between the two sides may be as great as 15 to 1. With this inequality some technicians have found it necessary to turn the dish half way around so that the count could be completed at the brighter part of the opening.

The center area of the culture is counted most easily and with least eyestrain and should be the region best illuminated. The simple magnifiers cannot give as good definition at the edges as at the center, yet some magnification has proven necessary for reproducible and accurate counts. The improved Darkfield Quebec Colony Counter, Fig. 1, accomplished this preferred form of illumination with the use of one 40 wt. lamp and a symmetrical, annular reflector. (8) The colonies are seen against a dark field by oblique light coming from all sides so that they may be distinguished easily from any other material in the agar. The illuminating problem is more difficult and different from the darkfield microscope condenser in that instead of concentrating the oblique light at a small focus it must evenly illuminate the entire area of the Petri dish. The reflector arrangement, Fig. 2, accomplishes this with a construction that is adapted to commercial production. The brightness over the central half of the culture plate is about the same as the brightest 15 percent of the field of the original Quebec Colony Counter and the rest of the area is within a 2 to 1 ratio in the model illustrated.

The low wattage lamp does not require ventilation to keep the temperature of the housing down, consequently, the instrument is closed and protected

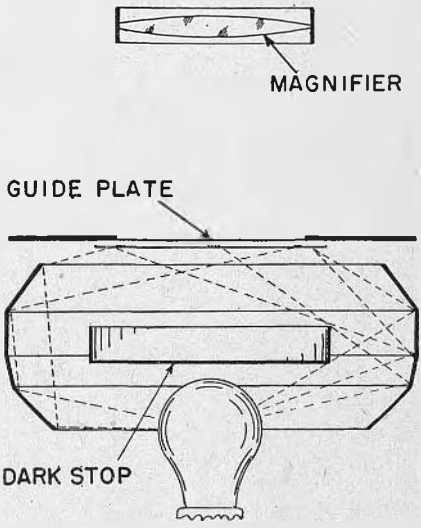

FIGURE 2

Illumination of the counter shown in section

from dust. The culture dishes are supported on a slanting surface at an angle found to be comfortable for most operators. The magnifying glass is mounted on a sliding rod for focusing and when closed is close to the instrument for packing and when it is not in use. A second lens may be placed on top of the regular lens when extra

magnification is required. Centering screws are provided for the Petri dish. A tilting attachment will be available as an accessory. The instrument is compact and pleasingly styled to conform with the modern laboratory (1).

A darkfield counter is not entirely satisfactory for counting colonies of bacteria on highly colored media. Such bacterial colonies can be counted with the new Spencer Counter by either placing a white or colored piece of paper in the dark stop; or, by placing a piece of opal or ceramic finish glass with the diffusing side against the guide plate. This gives a diffuse white background against which the colonies are easily seen and the guide lines show through adequately for counting. Colonies which turn a purple agar (bromphenol blue) yellow are thus readily seen and counted even though they may be very small, because of the discolored areas. The use of colored papers in the dark stop provides color contrast when that is desirable and requires no change in the guide plate.

CONCLUSIONS

The development of colony counters was briefly sketched. The chief problems concerning fixed adequate magnification and reproducible uniform illumination. The Spencer improved Darkfield Quebec Colony Counter described accomplishes proper illumination with an annular reflector which gives uniform oblique lighting so that the colonies stand out clearly against a darkfield. A colored or light field can also be obtained when colored media are used. The instrument does not become hot, is protected from dust, arranged for convenient operation, takes Jeffers, Stewart or Wolffheugel guide plates, has a standard single or double magnifying glass, and is styled in conformity with modern laboratory apparatus.

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Standard Plate Counts on Whole Raw Milk and on the Raw Cream and Raw Skimmed Milk Obtained From It*

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STANDARD plate counts on freshly separated and pasteurized cream from fresh milk (24 hours old or less) over a period of several years, indicated consistently a very low bacterial content. To check on the matter of bacterial content of the raw milk as against the bacterial content of the raw cream obtained from this same milk, standard plates were made of the raw milk, the raw cream, and the raw skimmed milk for comparison. Only seven trials were made but they were scattered over three months of time and may indicate the general trend.

Date 1943	*Raw whole milk* %	*Raw skimmed milk* %	*Raw cream* %
February 27	100	139	84
March 6	100	126	53
March 11	100	125	72
March 13	100	138	63
April 15	100	105	60
April 22	100	131	62.5
April 29	100	115	65
Average	100	125.5	65.6

The raw milk was received in glass lined tanks in railroad cars and pumped directly to the preheater on its way to a DeLaval Air-Tight Separator. The cream was run over a surface cooler into a vat for processing while the skimmed milk was run directly into a vat for cooling or processing directly, as the case might be.

Samples of the raw milk were obtained directly from the tank cars after thorough agitation, the samples of cream and skimmed milk from the pipes discharging into the respective vats. None of these samples were taken right at the beginning of a run. Samples at the beginning and at the end of several runs to note any differences would seem desirable.

The procedure was to make duplicate plates of the three samples at the same time. The standard plate count of the raw whole milk was considered as 100 and the plate counts of the raw cream and the raw skimmed milk calculated as percentages of this 100.

The fat content of the cream might be an important factor as well as the temperature of separation, the length of operation without cleaning, and other factors, but none were considered in this exploratory attempt. The butterfat content of the raw whole milk separated, varied from about 3.9 percent to about 4.3 percent, separation temperature was 90° F. and the fat content of the cream was 25 percent more or less which gave the results indicated above.

The information presented above in-

* "The effect of Coliform Organisms in Milk and Cream," *J. Milk Tech.*, 8 (97), prompted this report. It seemed there was a dearth of information on bacterial content of milk and of the cream obtained from a given milk.

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dicates that clumps of bacteria are broken up in centrifugal separation of milk and that considering the standard plate count of the whole raw milk separated as 100 percent, the skimmed milk portion (in seven trials) contained an average of 125.5 percent as many colonies and the cream portion 65.6 percent as many colonies as did the whole raw milk from which the skimmed milk and the cream was obtained.

To further the sale of War Bonds, STANDARD CAP AND SEAL CORPORATION has developed, for several prominent dairy companies, a unique cap closure with side lettered printing urging the consumer to "Buy War Bonds." This type of printing, utilizing the most valuable space on the closure, is entirely new to the dairy industry and its initial use to further the War Effort is particularly timely.

Mastitis and the Plate Count of Milk

VI. The Contribution of Staphylococcal Mastitis to the Standard Plate Count of Milk, and Some Cultural Characteristics of the Organisms Isolated.

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IN two previous reports (7, 10) it was shown that under average farm conditions, contamination of the milk from sources outside of the udder and poor cooling will usually contribute more organisms to the total plate count of milk than will *Streptococcus agalactiae* or *Streptococcus uberis* present in the milk as it is drawn from the udder. The present report is concerned with the relation of staphylococcal mastitis to the bacterial content of herd milk.

Crabtree and Litterer (2) reported maximum plate counts of 14,000 and 17,500 staphylococci per ml. of milk from two cows implicated in a food poisoning outbreak. A series of periodic samplings revealed a gradual diminution of bacterial numbers followed by a sudden rise. Hansen *et al.* (5) obtained counts from quarter samples of three cows with staphylococcal infections ranging from 0 to 110,000, with one count of 16,000, one of 12,000, and the remainder below 8,000. Shaughnessy and Grubb (11) found a plate count of 70,000 staphylococci, in pure culture, from an infected udder. Halverson *et al.* (4) obtained counts on blood agar of 32,000 and 1,500 colonies from animals with subclinical staphylococcal mastitis and a count of 60,800 from an acute case. The association of high counts with staphylococcal infections has been reported by other investigators (1, 3, 9, 13). Little (6) has observed that milk from staphylococcal-infected quarters lacks the bactericidal properties of milk from normal quarters.

Numerous reports of counts of staphylococci in milk of the "normal" udder appear in the literature. Obviously the common appearance of staphylococci in freshly-drawn milk makes important the criteria used to differentiate the normal from the diseased udder. In the present work animals were chosen on the basis of previous records of staphylococcal mastitis, and the presence of the infection was confirmed prior to sampling. Of 31 samples, two contained less than 500,000 leucocytes per ml. The rest of the counts were 1,000,000 or more, this being the level of an arbitrary standard accepted by many workers as an indication of mastitis. The plate counts of milk from two quarters of an animal suffering from a severe acute staphylococcal mastitis are included.

PROCEDURE

A consideration of the ubiquitous nature of staphylococci makes it clear that the validity of plate counts made on freshly-drawn milk depends on the exclusion of contaminants. To accomplish this and to obtain a fair estimation of the contribution of a given infected quarter to the plate count, a sterile milking machine was used to obtain the complete milking from a test quarter. The details of this procedure have been described previously (10). Samples were held at about 35° F. for a period of 16 hours before plating.

Standard plating methods were employed (12), the medium used being Difco tryptone glucose extract agar to which skimmed milk was added. Plates were counted on a Quebec colony counter. Chi-square tests, applied as a statistical control, revealed good agreement between counts on triplicate plates, which were averaged to obtain values in Table 1.

Several colonies, usually ten, were chosen casually from a counted plate and inoculated into ox-blood broth for identification. After 24 hours at 37° C. streaks were made on ox-blood agar. Hemolytic action in ox-blood broth and ox-blood agar was noted after 24 and 48 hours. Nutrient agar slants, inoculated from broth cultures, were incubated at 37° C. for 24 hours and a

TABLE 1

TESTS ON MILK ASEPTICALLY DRAWN FROM 31 STAPHYLOCOCCUS-INFECTED QUARTERS *

Sample	*Appearance of Sample*	*Millions of Leucocytes*	*Bromthymol Blue*	*Plate Count*
1	Thin, clots	>25.00	+	840
2	Thin	1.00	+	200
3	Normal	11.00	o	1,820
4	"	3.00	o	1,180
5	"	1.00	o	1,250
6	"	2.00	o	850
7	"	1.00	o	2,230
8	"	15.00	s	9,500
9	"	8.00	o	1,450
10	"	1.00	o	21,500
11	"	1.00	o	5,200
12	"	1.50	o	780
13	"	3.00	o	830
14	"	5.00	o	9,700
15	"	.50	o	8,600
16	"	18.00	s	15,200
17	"	.97	o	4,300
18	"	1.00	o	18,800
19	"	2.00	o	14,700
20	"	4.50	o	25,000
21	"	.50	o	470
22	"	5.00	+	11,500
23	"	1.50	o	11,600
24	"	4.00	+	3,000
25	Clots	7.00	+	5,900
26	"	4.00	s	6,800
27	Normal	1.50	+	42,000
28	"	2.50	+	3,500
29	"	5.00	o	1,230
30	Thick, clots	>25.00	None	58,000,000
31	" "	6.00	None	120,000
32	Normal	.06	o	620
33	"	.31	o	380
34	"	.03	o	300
35	"	.03	o	130
36	"	.03	o	270

* Samples 32–36 were obtained from normal quarters.

Bromthymol blue key o—negative
s—suspicious
+—positive

Although colony identifications were made initially only to validate the plate counts, the examination of the cultures was extended to secure cultural characteristics of each organism isolated. portion of the growth was used in the coagulase test as employed in reference (8). After six days at room temperature the slant cultures were examined for pigment production.

Macroscopic examinations of the milk for abnormalities, leucocyte counts and bromthymol blue tests were made on the original samples in addition to the plate counts.

PLATE COUNTS

Samples 1–31 (Table 1) were obtained in two herds from animals having staphylococcal mastitis. With the exception of the animal from which samples 30 and 31 were obtained, none of the animals had swollen or abnormal udders at the time the samples were obtained, although in a few cases the milk was abnormal in appearance. In some instances more than one quarter per animal was sampled. Samples 30–31 were obtained from a case of acute mastitis. Samples 32–36, obtained from animals free of mastitis, were designated a control group.

The counts on milk from the chronically infected quarters ranged from 200 to 42,000 colonies per ml., with a mean count of 6,800. Inspection of Table 2,

TABLE 2

DISTRIBUTION OF COUNTS OF STAPHYLOCOCCI FROM THE MILK OF CHRONICALLY INFECTED QUARTERS

Plate Count	*Number of Samples*
201–400	1
401–800	2
801–1,600	7
1,601–3,200	3
3,201–6,400	4
6,401–12,800	6
12,801–25,600	5
25,601–51,200	1
Total	29

prepared with equal log intervals between class limits, shows that the plate counts were fairly evenly distributed over the range up to about 25,000, only one count falling beyond this point.

A scatter diagram prepared by plotting the plate counts against their corresponding leucocyte counts (values of Table 1) failed to show any clear correlation. On the basis of *a priori* reasoning, this lack of correlation would be expected, for the relationship between these two values may constantly change in an active infection, with first one count, then the other, in the ascendency. Exceedingly high leucocyte counts are sometimes found in sterile or near-sterile samples. Cases of this nature, exemplified by sample number 1 with a leucocyte count of more than 25 million and a plate count of 840, probably represent a stage of infection at which the defenses of the animal are highly mobilized, resulting in an enormous response of leucocytes and a consequent reduction of bacterial numbers. In a successful defense against further infection, this stage may be followed by a gradual reduction in the numbers of leucocytes. A cycle of this type would account for the various bacteria-count leucocyte-count relationships found in a series of samples taken during the course of infection. The report of Crabtree and Litterer (2) concerns a staphylococcal infection of the udder characterized by a cyclic course of this nature.

Sample number 30, from an acute infection, marks a condition of complete breakdown of the local defense mechanisms of the animal, resulting in an unchecked increase of bacterial numbers.

The results of the bromthymol blue test are included only to show its failure to detect more than 35 percent of the cases reported here.

CULTURAL CHARACTERISTICS

A total of 289 cultures isolated from the milk of chronically infected quarters was examined. Of these, 209 were coagulase-positive. Coagulase-positive strains were obtained from all but two (samples 15 and 16) of the quarters affected with staphylococcal mastitis although some of the cultures from these quarters also yielded coagulase-negative strains. None of the cultures from the control quarters (32 to 36 inclusive) were coagulase-positive. The ability to coagulate human or rabbit plasma was shown in a previous re-

port (8) to be more closely associated with pathogenicity of staphylococci than any other characteristic revealed by the usual laboratory tests.

Of the total isolates, excluding those of the control animals, 156 were hemolytic in one or the other blood medium, 99 in blood broth alone and 104 in blood agar alone. Eighty-one were hemolytic in both.

No pigment production was evidenced in 166 of the cultures. Thirty-five produced a deep yellow pigment, and grades intermediate between yellow and white were found in the remainder. Some of the highest plate counts obtained, notably samples 18, 19, and 20, were of milk from which isolated colonies were non-pigmented but coagulase-positive. Table 3, in cross-tabulated form, gives the various combinations of these cultural characteristics.

TABLE 3

CROSS-INDEX OF CULTURAL CHARACTERISTICS OF 289 STAPHYLOCOCCUS CULTURES FROM CHRONICALLY INFECTED QUARTERS

	Coagulase+	*Hemolysis Blood Broth*	*Hemolysis Blood Agar*	*Pigmentation*
Coagulase+	209	...	...	...
Hemolysis Blood Broth	97	99	...	...
Hemolysis Blood Agar	95	81	104	...
Pigmentation	90	52	70	123

DISCUSSION

It has been a matter of conjecture whether the bacterial content of the milk might be altered to a considerable extent by bacteria released from the udders of chronically infected animals.

In a comparative sense the plate counts (Table 1) are not high; it may be expected under average farm conditions that contamination of the milk from other sources will contribute more to the plate count than will staphylococci present in the milk as it is drawn from the udder. Samples 25 and 26, both of abnormal appearance, did not have excessive counts although they were considerably higher than the controls. Samples 10, 16, 18, 19, 20 and 27 in particular among the remaining milks, were most eligible for rejection on the basis of bacteria count and yet were normal in appearance. Animals producing milk of the latter quality, particularly in a small herd or in a herd with a high percentage of infected quarters, would conceivably handicap the producer of low-count milk. The bacterial contribution of infected quarters to the plate count of milk will depend of course, in any herd, on the number of such quarters and the total volume of milk produced by these quarters.

Although the counts reported here may represent average circumstances, the possibility remains that exceptional conditions involving the increased virulence of a particular strain of staphylococci, or the increased susceptibility of the host at such times as calving, will result in significantly higher counts in milk as it is drawn.

SUMMARY

1. Samples of milk drawn aseptically from quarters affected with chronic staphylococcal mastitis and plated in standard agar gave counts ranging from 200 to 42,000 staphylococcus colonies per ml. The arithmetic mean was 6,800.

2. Milk from quarters with acute staphylococcal mastitis may at times contain exceedingly large numbers of bacteria.

3. Of 289 isolations of staphylococci from infected quarters, 72 percent were coagulase-positive; about 36 percent were hemolytic in blood broth or blood agar; and 44 percent produced some pigment.

4. No correlation between the leucocyte counts and the corresponding plate counts of the samples examined was demonstrated.

5. The producer of low-count milk may be confronted with difficulties in meeting bacterial standards, arising from the presence of staphylococcal-infected animals in his herd.

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LABORATORY OF HYGIENE METHOD FOR THE DETERMINATION OF THE WEIGHT AND VOLUME OF ICE CREAM BRICKS

Care of the Sample

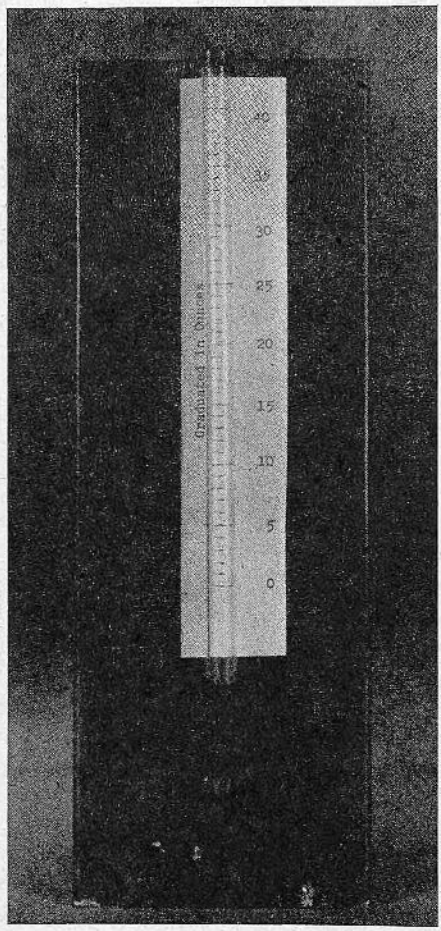
The sample (brick) should reach the laboratory in a hard-frozen condition (preferably packed in dry CO_2 ice). The labelling of the carton is recorded with especial reference to manufacturer, pasteurization, declaration of net contents and flavor.

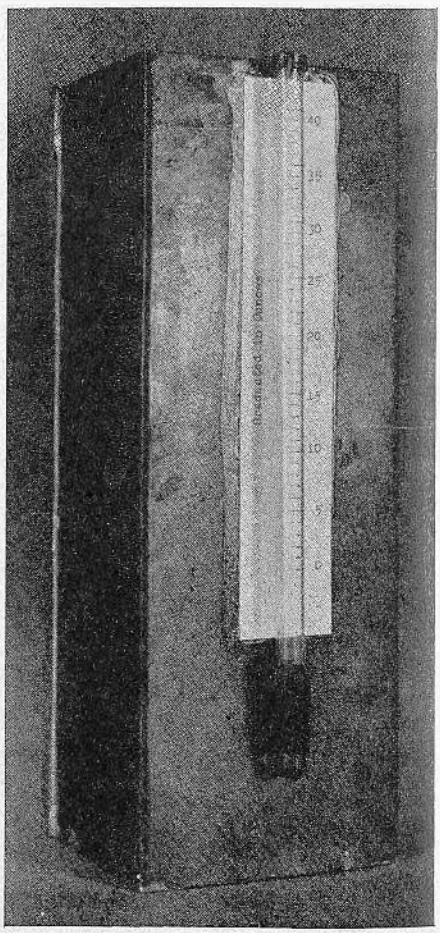
Determination of Weight and Volume of the Sample

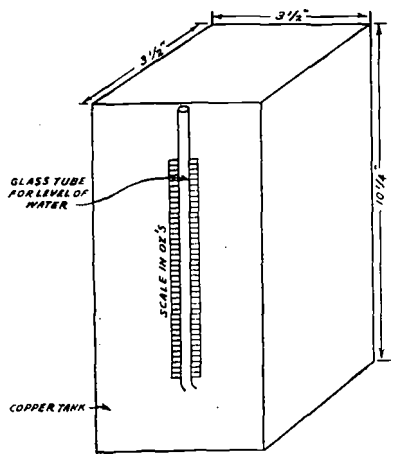
A. *Bricks in cartons without complete parchment wrapper, and not readily removable from carton.* The package is wiped dry and weighed on a balance that will weigh a pound with an accuracy of one-eight of an ounce and the gross weight recorded.

The volume is then quickly measured by completely immersing it in clean cold water in the special measuring can.

The can is placed on a level part of the bench and filled with water up to the "0" mark on the graduated tube. The brick is completely immersed in







the water by means of a glass rod or pair of long forceps and the gross volume read from the graduated tube. It is very important that the graduated tube be kept grease-free; frequent cleaning and the addition of a drop of "wetting" solution (such as soap) to the water in the graduated tube will facilitate accurate readings.

The volume can be determined only when the brick is frozen hard.

The paper carton and any other interliners previously weighed and measured with the brick are well dried and their weights and volumes similarly determined in order to ascertain the net weight and net volume of the ice cream in the carton.

B. *Bricks in carton with complete parchment wrapper, and readily removable from carton.* The outer cardboard carton is removed, elastic bands are placed around the brick in the immediate wrapper and the weight and volume determined. No further determinations are necessary as the weight and volume of the paper wrapper is negligible.

The weight per gallon should be calculated and recorded.

(This article was written by Mr. James Gibbard, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, Canada.—EDITOR.)

Progress in the Control of Mastitis*

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THE background for my discussion of this topic is the accumulated results of many years of study of mastitis detection, treatment, and control, carried out under actual field conditions.

Is mastitis a controllable disease? Yes, it certainly is. We have made progress in the control of mastitis, and to those of us who have studied control programs the future is encouraging but the extent of progress is far from satisfactory.

Why has progress been so limited and unsatisfactory? Primarily because of poor logic, lack of imagination, failure to face realities and to accept new philosophies. There are four principal groups of individuals directly or indirectly concerned with such a program, all of whom have contributed to the causes for failure.

Who are the four groups of individuals?

(1) The herd owners.
(2) The plant operators and milk distributors.
(3) The public health officials.
(4) The practicing veterinarians.

(1) The herd owner and dairy farmer year after year have been exploited, resulting in lowered morale and skepticism. They have not been convinced that the disease is controllable or that it reaches into their pocketbooks through the medium of lowered production and poor quality, or that abnormal milk, whether from mastitis cows or from other causes, is a constant potential menace to the health of their families and to the milk consuming public. In many instances it has caused them to lose their markets.

(2) The plant owner has not looked far enough into the future to realize that high quality milk will be his principal factor in increasing the sales of pasteurized milk and bringing milk consumption up to a volume believed necessary for the essential requirements of consumers of milk and milk products.

(3) The health official should learn that quality milk production and safety factors must work side by side. He must also face the facts that, even though pasteurization will make a contaminated milk safe, it has not improved the qualities conducive to good flavor. He must also realize that the dairy farmer's and the producer's purse strings can only stretch so far. The dairyman and plant owner should receive consideration when officials are formulating rules and regulations. Even though it may not be his duty, it is my conviction that the health official should assume the responsibility for promoting cooperation between the farmer, plant operator, and veterinarian.

(4) The veterinarian and veterinary science have made many noble contributions to public health and community welfare by complete elimination or control of diseases which were destructive to our animal populations and which caused serious illness and death to human consumers of meat and dairy products. However, even though the veterinarian has been fortified with

* Given before Massachusetts Milk Inspectors' Association, January, 1945.

many new and effective means of early detection of mastitis and causes for abnormal milk, he has placed far too much emphasis upon curative treatments. In mastitis control, prevention should be the slogan.

PROGRAM FOR CONTROL

Before we go into detailed discussion of a program for the control of mastitis, let us first review a few definitions:

(1) Progress: "To make progress or improvement; to develop to a higher, better or more advanced state." (Webster)

(2) Control: "To check, test or verify, by counter or parallel evidence or experiments; to verify by comparison or research; to exercise restraining or directing influence over; to dominate; regulate; hence, to hold from action; to curb; subject; to overpower." (Webster)

(3) Mastitis: The vetreinarian and veterinary research workers define mastitis as being a disease, injury, or infection of the mammary gland.

To be of value to health officials, mastitis must have a definition of far broader and more generalized meaning and capable of more flexible interpretation, similar to the latitude permitted in nearly all health codes. We as health officials should think of mastitis as being a disease, injury, or abnormal condition of the udder, teats, or milk characterized by abnormal secretion with or without acute or chronic manifestations of injury, inflammation, or bacterial invasion.

In New York State we have made progress in the control of mastitis and I shall discuss it from the standpoint of actual field experience. This experience indicates that the program has satisfactory results.

The herd owner, the plant operator, the health official and the veterinarian should each know their limits of responsibility. Unless they work together it would be better not to start such a program.

The results so far have proven that success lies in early detection of mastitis or symptoms of abnormal milk, segregation of diseases or suspected cows, improved milking and sanitary methods, elimination of sources of injury to the cow, and raising replacement heifers.

Following is an outline of a workable set of rules:

(1) Plan your program before starting and stick to your plan.

(2) The owner and his employees should be taught to detect early symptoms of abnormal milk or indications of mastitis.

(3) Classify and immediately segregate diseased and suspicious animals.

(4) Develop a systematic program for milking. Go from normal to the suspicious and then to the diseased cows in the same order at every milking time.

(5) Upon removal of suspected or diseased animals, thoroughly wash the stall before a new cow is allowed to occupy it. Never fail to do this.

(6) The entire barn floor and cow beds should occasionally be thoroughly scrubbed with lye solution or treated in some equally effective manner.

(7) Test all fresh or deplacement cows before admitting them to the milking line. If at all abnormal, keep them out of the milking line, and retest later.

(8) Raise replacement heifers. These heifers can make the difference between success and failure.

(9) Do not feed raw milk from diseased or infected cows to heifers raised for replacements.

(10) Absolutely prevent calves from sucking each other.

(11) Employ modern sanitary measures in the barn at all times. Develop good milking habits in the cows.

(12) Clean cows' udders and teats before each milking.

(13) Learn how to use a strip cup properly and use it at every milking.

(14) If hand milking, wash hands before milking each cow.

(15) Absolutely prohibit wet hand milkers.

(16) If milking by machine, rinse teat cups between milking each cow.

(17) Institute improved and more rapid milking methods.

(18) Eliminate sources of injury to cows.

(19) Improve stabling conditions. Larger stalls and partitions between each cow are usually needed.

(20) *Thoroughly rinse, wash,* and *sterilize* milking machines immediately *after each milking,* and keep the milk-machine and parts in first class condition at all times. These steps cannot receive too much attention. Develop a twice daily routine and practice it.

The above set of rules if treated as minimum essentials will save time, cows, increase profits, and improve the quality of milk.

DIAGNOSIS—PROGNOSIS AND TREATMENT

In the herds where we have made progress in the control of mastitis, I have proceeded with the same degree of care that is practiced when conducting examinations of herds involved in suspected milkborne outbreaks of septic sore throat, scarlet fever, and gastroenteritis.

Diagnosis

Herds are examined, commencing one hour after they have been milked and while the udder is at its most rested state. At this stage the cow's hormone stimulants, physiological and psychological mechanisms, all excitants of organic activity at normal milking time, have subsided. The most satisfactory results may be obtained if the herd is examined after the morning milking. At this stage the udder is flaccid and can be properly examined, consequently rated with satisfactory results.

(1) Draw 5 c.c. of milk from each quarter into individual clean test tubes and examine for any evidence of abnormalities, such as watery, bloody, pus, flakes, stringy or other abnormal variations.

(2) Make a bromthymol blue test of each quarter sample.

(3) Make a detailed physical examination of the teat orifice, teat canal, milk cisterns, and grandular structures by palpation. It is very important to detect variations from normal or evidences of injury. If practical laboratory aid in diagnosis is available, more rapid progress would be the result, but I cannot overstress the fact that such aid must be practical and within the reach of the owner's pocketbook.

(4) Record the results of examination for permanent record and for future comparisons.

Prognosis

A satisfactory prognosis can be made only in proportion to the accuracy of diagnosis.

Scrub cows and all hopelessly diseased or infected cows should be sent to the butcher. Pure bred and grade cows, with good milk production records or capable of raising a valuable calf and with one quarter diseased or seriously injured, may be salvaged by temporarily drying off the diseased or injured quarter or the quarter may be permanently destroyed and the cow converted to a satisfactory three teated cow.

Treatment

Far too many quarters are treated by one or more of the many methods now being publicized and the poor results observed generally occur because of failure to have made a complete and proper diagnosis. Another factor which has discouraged many owners is the treatment of animals without consideration of their economic value.

Veterinarians and herd owners are about equally guilty of this infraction. There is great value to be obtained by veterinarians in treatment of properly selected cases. The owner is not qualified by education to make a

proper diagnosis, or to prescribe satisfactory medicinal aid. Treatment should only be attempted by a qualified veterinarian.

After we had learned how to detect evidence of abnormal milk, mastitis, or infection, we discovered it would be disastrous to the owner and consuming public if all such animals were segregated or condemned.

We learned that many pure bred and grade cows with good production records, capable of producing a valuable calf, would be highly profitable to the owner, providing they could be treated or in some manner made safe for the production of milk. Under such conditions they would not have to be condemned because of health department regulations. Many animals, we learned, would make a complete recovery, if more than 60 days time for treatment and recovery were allowed. In the New York City health regulations, cows not fully recovered at the end of 60 days after diagnosis must be condemned and disposed of.

As a consequence of our slowly developed plan for a program to control mastitis, it became necessary to add another step.

For the want of a better name or to give it descriptive meaning, it got the title of "Converting Cows Condemned for Mastitis to Useful Three Teaters."

Before we felt safe in recommending this program, we first had to satisfy ourselves that normal three teaters could produce milk satisfactory for human consumption and which in no manner would be a menace to herd health or to the economic welfare of the owner. This task was difficult and slow, as we first wanted to confirm our results by a variety of laboratory tests. For confirmation, we used the Hotis, resazurin, rennet-resazurin, pH, direct microscopic examination of smears of incubated milk, and cultural examinations of milk from suspicious, diseased, and normal quarters.

The difficult hazard involved in the program is the selection of satisfactory animals for treatment, and should not be attempted unless:

(1) The cow is a pure bred or grade cow, capable of producing enough milk, or a calf to make the owner a profit above costs of food and labor.

(2) Where a careful diagnosis and prognosis indicates only one quarter is abnormal, diseased, or infected and that 60 days is too short a time for complete recovery or that complete recovery will not occur before the cow is to be dried off.

(3) Where the disease has partially destroyed a single gland and the quarter remains active and continues to secrete a small volume of normal appearing milk, or milk containing blood, pus, or is watery, stringy or contains flakes or is otherwise abnormal. This type of cow is always a menace to the health of other cows, dangerous to the quality of milk. Such cows in my own experience, when infected with organisms from human sources, have been the cause of severe outbreaks of septic sore throat, scarlet fever, and gastroenteritis. You and I as health officials have many times known the veterinarian or herd owner to classify such cows as being dry or three-teated, yet the quarter was milked and the milk sent to market.

DRY-OFF PROCEDURE

For several years I have recommended temporary dry-off or permanent destruction of the single diseased or suspected quarters of valuable cows in many herds. The treatment can be successfully carried out at any time during the lactation period, and to date there has never been a serious complication or fatality.

Temporary dry-off of the quarter is only applicable under the first two conditions. Permanent destruction of the quarter is for animals in the third group.

It is important to know and remem-

ber that animals in the first two groups sometimes become Group 3 animals from failure to recover after long periods of rest or treatment. They will then need to be disposed of or the quarter should be permanently destroyed.

The treatment necessary for drying off diseased quarters is very simple, inexpensive, and does not require the use of any elaborate equipment or difficult surgical technic. To be successful, the owner and veterinarian should have a mutual understanding of their purposes and responsibilities.

There are three procedures to follow in the conversion of segregated or condemned cows to satisfactory three-teated cows.

Procedure (#1): Temporary drying off of the abnormal quarters. Discontinue milking the suspected quarter for four weeks. *This is very important.* Continue to milk the normal quarters as usual. Do not use local applications, massage, or other treatment. The rest period seems to be one of the keys to success.

Procedure (#2): Another very important step is to milk the quarter free from all exudate at the end of the four week period. Always keep in mind that the intent of the treatment for temporary drying off is to give the diseased and infected tissue a chance to recover and to prohibit the contamination of milk or stables.

The suspected quarter which has been temporarily dried off will make up when the cow again freshens. Therefore, as a safety factor before being readmitted to the milking line, to determine if complete recovery has occurred, she should be re-examined by a veterinarian. Re-examination should not be made before 10 days after freshening.

Procedure (#3): Permanent destruction of the quarter. When the veterinarian has determined, and the owner has agreed, that a quarter is to be permanently destroyed, there are several procedures which may be followed; complete abalation by surgery, or destruction by chemical irritants in the form of liquids or gases.

I prefer infusion of the quarter with ether gases. This treatment is easily carried out and to date has been totally free from unsatisfactory complications, is not expensive, and if properly carried out will surely destroy the gland.

Equipment necessary:

One extra long self-retaining test tube.

One piece of rubber tubing 3 to 4 inches long.

One short piece of pipette or metal tube long enough to pierce the bottle cork or stopper.

One 6 to 8 ounce graduated bottle (wide mouth preferred) with a rubber stopper or cork.

Slip one end of the rubber tube over the shoulder of the teat tube, and the other end over the pipette or metal tube, push the pipette or tube through the rubber stopper or cork into the bottle. If treating only one quarter, have available about ½ to 1 pint of warm water (150° F.). If more than one cow is to be treated, provide a corresponding amount of water.

Have the equipment clean; thoroughly cleanse the teat and quarter which is to be treated; insert the teat tube into the teat and into the cistern if possible; place the bottle of ether into the cup of hot water. Almost instantly the warm water will vaporize the ether and the gases will immediately penetrate deep into the entire quarter. Complete penetration can be determined by feeling the crepitation of gases into the glandular tissue as high up as the supermammary gland. The injection or infusion treatment is now completed, and no after treatment is necessary.

A few minutes after treatment the cow will show some indication of uneasiness for a few minutes and within

24 hours the quarter will be swollen and hard. The swelling of the quarter will begin to recede in 10 days to 2 weeks and complete atrophy will have occurred within 30 to 60 days. Do not milk, massage, or apply local treatments. Let nature take its course.

A word of caution for permanent destruction of quarters:

Don't treat sick cows.

Don't treat cows with more than one quarter involved unless the cow is to be used only for breeding purposes.

Don't inject quarters for permanent destruction while filled with fluids.

Let me remind you that this program, as outlined, is only one of a number of extensive programs that can be made to succeed, but success cannot be assured with less than a sound program conscientiously carried to its conclusions.

ACCOUNTING FOR MILK FAT *

Creameries receiving milk and selling milk, cream and skimmilk and using the Babcock test should be able to account for 99 per cent or more of their total milk fat intake. The alleged losses of milk fat in such plants are often due to over-reading of the tests, an observation confirmed in one plant and observed in others. Over-readings are usually due to the latitude inherent in the measuring of the upper meniscus.

Cream tests can be and usually are read more accurately than are the milk tests, since a 0.5 percent variation on 40 percent cream and a 0.1 percent variation on 4 percent milk amount, respectively, to 1.25 and 2.5 percents of their milk fat contents.

Order No. 4 of the Surplus Marketing Administration allows more 40 percent cream in 10-gallon cans than can be contained in many which now are in use.

* Bulletin 512, June, 1944, Vermont Agricultural Experiment Station, Burlington, Vermont, by E. O. Herreid, D. W. Whitman, and R. O. Slack.

A Food Official Views the Dairy Industry

WENDELL VINCENT

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UNDER Federal law, food is defined as adulterated "If it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food": again, "If it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health": or again it is adulterated "If it is, in whole or in part, the product of a diseased animal. . . ." Penalties are prescribed for the interstate shipment of adulterated food. . . .

The Notices of Judgment issued during the past five years reveal too many seizures of cream, butter, cheese, dried skim milk and other items. Loss of badly needed food products has resulted. These Notices of Judgment in no sense reveal all the loss that has occurred because in some states their Food and Drug officials have been engaged in similar condemnation work. When loss is mentioned the average person considers only the monetary angle, but you gentlemen know that it goes further: Think of the aggregate hours of wasted labor—think of the grain and mill feed consumed—think of the discomfort suffered in producing that product by folks, too old in many cases, for that hard work. . . .

As a consumer of your products with by own economic difficulties, I am interested in this: Are you selling clean and properly pasteurized milk, fit for consumption by my family? By clean milk I do not mean "cleaned milk"—that product which one judge recently stated was still "impure milk no matter how clean it appears." He felt the harm done by allowing foreign material to get into milk could never be undone —I subscribe to that opinion. If you sell me a pound of butter (with 24 ration points against me to start) I want one pound with at least the legal minimum of 80 percent fat present. I want it made from clean materials. I can dispense with the salt employed in its manufacture if it was stored under improper conditions and rodents have excreted upon it. You do not remove the solids in their urine to my satisfaction. Oh yes, I want that butter made from well pasteurized cream. I am not of a trusting nature.

Today if I can get a piece of cheese I want the same precautionary measures observed as in the case of butter. Again I would like to be certain that the cheese had been produced in a sanitary plant. Time does not permit me to discuss cheese plant sanitation—but just one thought. A cheese-maker or other employee with sores on his hands or forearms has no place working over a cheese vat. I can forego the sickness of staphylococcus poisoning that such cheese-maker can give me.

Here I must say something of importance to you. I, a consumer and a health official charged with definite responsibility for public welfare, have recently acquired some information that gives me thought. Certain statistics, recently reviewed and dealing with American-type cheese production for selected states show, in 1943, a total production of 692,000,000 pounds. In

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Excerpts from an address delivered before the State Dairy Meeting, Denver, Colorado, January 29, 1945, sponsored by the American Dairy Association of Colorado and the Extension Service, Colorado A & M College.

those states only 42 percent of the factories, producing 50 percent of the volume, were equipped to pasteurize their milk. I have not had opportunity to check figures portraying the incidence of Bang's Disease amongst the cattle of those states. I think, if we exclude one or two states, we can safely conclude that in the balance some sick animals are contributing to the milk supply. The milk from those animals is going into cheese. Some of it carries the Brucella organisms responsible for the cow's illness. When the organisms survive the cheese-making process and remain alive when we eat the cheese, they are capable of making us sick. I have the proof, gentlemen, that they do sometimes survive because recently bacteriologists in the Food and Drug Administration have found the living organisms in unaged cheddar cheese. Bacteriologists in the Bureau of Animal Industry (and I understand other investigators) have recovered the organism from test animals inoculated with cheese which was produced for us and for Army consumption and which was aged for several weeks.

I have been doing a little reading on the subject of brucellosis or undulant fever. Articles have recently appeared in both popular magazines and medical journals. It is disturbing to be informed that 9 percent of 7,122 school children tested in Kansas City are carrying an active infection of brucellosis. The medical magazine informs me that brucellosis is "an Unrecognized Menace" and the writer states that he believes 10 percent of the population have brucellosis but that only about 1 percent of infected persons are detected and treated. He states that "Improved State and Federal laws are necessary in the control, marketing and distribution of dairy products. . . ."

In October, 1941, I ventured a statement that our Agency had before it a real project in connection with cheese made from unpasteurized milk. What has happened since? Three serious outbreaks of typhoid fever with numerous attendant deaths have been traced to cheese. These outbreaks occurred in in Indiana, California and the Province of Alberta, Canada. It is my conclusion that so far we have not dealt vigorously enough with the problem that confronts us. If we delay very much longer to do what is necessary to insure safe cheese products for the people of this country, I think the writers serving the popular magazines will begin to handle the situation in perhaps not the most effective manner, but in such a fashion that will leave its economic mark upon you. Why should not the legal standards for cheese require at least safety for the consumer by requiring manufacture of cheese from only pasteurized milks.

Getting back to my subject—what do I want in ice cream? You are already advised of the fundamental considerations. I dislike to be told as I frequently am by informed people that certain manufacturers generally divert much of their poorer cream to this outlet. Generally speaking, they mean off-flavored cream. I think I know what makes for some of those off flavors. Your ice cream goes into the American home to be served to children, the weak and the sick. Every time I review a factory inspection report that shows an ice cream plant using rodent contaminated materials, the premises over-run with flies and in many cases, cockroaches, I am displeased. Personally I would rather have just a little bit of good ice cream than a whole lot of questionable stuff. In this I don't think I am different from the majority of people.

Now for the evaporated milk so extensively consumed by babies—while manufacturers have made it safe by sterilization, there are some places that I know of where the quality of raw milk used in that product needs much improvement. Sterile or not, barnyard dirt or other filth is still repulsive.

Gentlemen, serving in the capacity

that I do, a Station Chief in a division of the Food and Drug Administration, I am called upon to do some unpleasant things. Probably the least pleasant is to appear in a United States Court and inform the judge that certain men (frequently acquaintances), leading citizens in their respective communities, are the operators of dirty or otherwise insanitary establishments.

Where reason prevails, those adversely affected realize that we in the Food and Drug Administration have a job to do—in fact, are under oath to do it. Be assured that to the best of our ability we are going to satisfy the obligation of that oath. Sometimes our seizures and criminal actions reflect on the law enforcement operations of states and municipalities. The individual who was prosecuted believes himself to have been injured by the Federal Court action. He gets to thinking about the matter and in many cases feels he is not wholly to blame. Collectively speaking, he is a big taxpayer. Why didn't the local officials keep him and his associates out of trouble and avoid this stigma on his reputation? There, gentlemen, you perhaps have food for thought. I have heard Federal judges say when assessing penalties that it should not be necessary for the Federal Government to be instructing in the details of good housekeeping. If State and City food control organizations had the personnel and funds necessary to perform the obligation imposed upon them and if you insisted upon their continuing attention to your problems, there would be few if any insanitary food factories. Yours is a great industry. Are your local officials getting the support they should from State Legislatures and other agencies that should be interested in your welfare? Continued apathy will reap a poor harvest.

Now, coming closer to home—In this cow country of the west, dairying in many places is largely incidental to beef production or general farming. We have many shippers of one, two or five cans of churning cream per week. It is that weekly cream check that provides their daily necessities. On that type of cream we have done a lot of work and unfortunately found too much which is offensive for various reasons, including the presence of barnyard manure, insects or insect fragments, rodents and their excreta, decomposition by mold and other organisms. When we encounter offending material it is sometimes dumped under the supervision of State or City officials or it may be seized under Federal law. Frequently I take occasion to send communications to shippers of bad cream pointing out that the product examined under the supervision of the Food and Drug Administration and which was shipped in interstate commerce, has been found adulterated for one or several reasons thereafter set forth. A mixed response occurs. Some letters reflect resentment —perhaps because of pride in production or ownership. Frequently I must conclude that the writer's esthetic sense as to what is proper food is at variance with majority opinion. As a rule those writers are ignorant, or uninformed, or unequipped for proper cream production and sale. Again, I receive apologetic letters written by the farm wife and she is chagrined to have her government take exception to their cream. You feel that here is a conscientious, hard working farm woman and you want to give her good advice and help in every way possible. It is the Dairy Industry's responsibility to educate this person.

In the cream business is to be found another class of individual—I refer to the cream station operator or independent cream buyer. He is interested only in what he believes the best market open to him. My letters to him seldom if ever get a response. When I extend him a formal invitation to visit the office and show cause why the Federal Government should not prosecute, then—and what happens? In the majority of cases this shipper signifies

he will withdraw from interstate operations. He does not need to inform me that he has a creamery close by in his own state who will consider his product acceptable. Gentlemen, I here present you a problem. What are you going to do to eliminate the insanitary, the careless, or the uninformed cream buyer or station who is guided solely by the profit motive?

When similar invitations issue to butter, cheese and ice cream manufacturers charged with operating insanitary establishments, the excuse of inadequate or unskilled help is all too frequently made. From this I must conclude there are too many people employed in the dairy industry who are uninterested in cleanliness. Believe me, I appreciate there is a labor shortage, but I know lots of laboring people and some of them work in dairy establishments. I know none who are uninterested in themselves, their families and their friends. All are interested in what they eat. Most of these people have a little appreciation of proper sanitation and I am certain that many of them observe conditions wherein they work that are often offensive. I have even received information from some individuals who were working under conditions that they believe needed correction. I believe all men in my position must discount excuses which undertake to shift to employees, responsibility for continued use of dirty equipment and improper storage and handling of raw materials. Thirty years of observation in this field lead me to believe that the character of the boss plays a dominant part in the activities of the help. Any dairy establishment with a good "esprit de corps" amongst its employees will be found to have a man at the head of it who appreciates his responsibilities to the public. He is clean himself, and he insists upon cleanliness throughout plant operations. . . .

May I suggest to all members of the Dairy Industry, just a few minutes of introspection. Why contribute vast sums to a cream improvement program if only "George" is to do the improving? There are few people in your industry who cannot find needed work to be done right at home and in cooperation with a near neighbor. Even though he be a competitor, you both share the common need—a better supply of raw material.

Has your industry made it known to all of its members that your friend the cow is subject to a lot of diseases that are transmissible to man and that these any many other diseases can be transmitted through milk and its products. Some of these are tropical diseases, but among the common ones we all know are brucellosis, diphtheria, enteric fevers, scarlet fever, septic sore throat and tuberculosis (bovine)—a frightening list, if you should ask me.

What would be the result if pasted on every milk shed and barn in America, on every pasteurizing vat in every plant, was a large poster bearing the picture of a small child pointing its accusing finger at you—asking, "Would you inflict these diseases on me?", and then follows that list I have enumerated.

Ignorance must be dispelled—apathy eliminated.

The pasteurization of milk and cream has, of course, been a godsend to the public and all factors in the Dairy Industry. In a number of instances I feel pasteurization has also made for more careless production, handling and buying—entirely too many people depend solely upon pasteurization to eliminate the health hazard incident to the handling of their product. In numerous places it has served to relegate cleanliness and sanitation to a place of secondary importance.

Returning to our regulatory operations incident to dairy products—Engaged in somewhat similar duties are to be found municipal and state authorities. Frequently there may be some overlapping of activity and responsibility. Theoretically it could be argued that if all states had adequate

food, drug, and health legislation and were staffed with sufficient individuals to police the traffic, there would be little or no need for Federal activity.

As I analyze our work of the past four years, I find we in the Federal Government are occasionally taking on what I call rather small game. Notwithstanding this, I recently had to recommend prosecution against the operator of a small cream station supplying creameries with churning cream in adjacent states—he had been shipping filthy cream and was operating an insanitary establishment. As I wrote the prosecution recommendation, I recalled a story of the crack shot, a fellow from the east who came west to visit a mountain friend of his. He brought his squirrel gun, so a hunting trip was provided. It was fall. They might get some birds. They might get some big game. The mountaineer and his son took the visitor into some pretty wild country. The easterner had his .22 squirrel gun—the boy, a shotgun for the birds: the old rancher took along his bear gun. Luck wasn't good, however, towards evening they espied a couple of squirrels in a small pine tree ahead. At last some game! The easterner took aim—let the first shot go—missed. One squirrel ran away—the other one began to jump about and squeal in active fashion. Two more shots yielded the same results. Finally the squirrel who apparently had gone berserk, more or less charged the easterner. Three more shots were used and still the squirrel kept coming. The squirrel hunter jumped aside and the boy with the shot gun took a hand. Well, sir, he had a double-barreled gun. He fired, missed, got buck fever and couldn't pull the trigger again. By this time the squirrel showed signs of taking on the boy, so the father yelled for each to run aside. He then drew a bead with the old bear gun. Well, sir, he got the squirrel—it was a broadside and he damaged him badly—in fact, he ruined him. Folks, sometimes I wonder if your industry hasn't a few berserk squirrels in it.

Gentlemen, it has been a pleasure to be here. If I have left with you any thought sufficient to prompt you and your associates and your patrons in doing better some of those elementary things that will make your final product more acceptable to consumers, then our time has not been spent in vain. One large drug firm uses a slogan, something about "The Priceless Ingredient"— they are selling the integrity of the maker. Where better than in the Dairy Industry could that principle be applied?

State Versus Municipal Milk Inspection

(To throw some light on the mooted question of the relative advantages and disadvantages of state vs. municipal inspection, the Editor requested comments on this subject by some representative milk sanitarians who have had experience in one or both fields.)

State Versus Municipal Inspection

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Considerable interest is being shown in bringing about the modernization of dairy farm regulations, methods of inspection, and enforcement. Among the problems under discussion is the question of whether dairy farm inspection should be done at the local or state level. Under municipal inspection there has been considerable concern about lack of uniformity in regulations and enforcement, and about multiple inspections. The aim in farm inspection should be to insure the delivery by every dairyman of milk of good sanitary quality with the minimum of effort in enforcement and without undue interference with the prerogative of the dairyman to do things as he pleases. The question is whether this can be best accomplished under municipal or state inspection.

The answer may well vary with local conditions. In states in which municipalities are well scattered, where milk sheds are compact and where local authorities are intelligently active and cooperative, the work may be done to advantage by municipal authorities. Also in places in which the inspection work is being done well and without friction by local authorities and the state authorities are inexperienced and not inclined to take an intelligent and active interest in the work, better results may be secured by continuing municipal inspection. However, assuming that we have the same degree of intelligence, experience, activity, and freedom from political influence on the part of municipal and of state officials, there is every indication that the inspection of dairy farms by state agencies is desirable and practical.

The system of inspection of dairy farms outside municipal limits by the municipality in which the milk is sold dates back to the origin of milk control. Municipal authorities desiring to protect the people from milk-borne diseases gradually developed this system of sending their representatives out to inspect the sources of milk supply. When this practice originated, the milk was consumed raw and most of the dairy farms were very close to the municipal boundary lines. It soon developed that this protection was insufficient and pasteurization was required as a factor of safety. As populations grew, more and more distant sources of milk supply were tapped and the milk sheds of various municipalities overlapped each other in many directions. Plants selling milk in several cities had to place their tributary dairy farms under the inspection of more than one municipality. Differences in

local regulations became points of contention and some times ridicule. In one instance a municipality had required that the interiors of milk houses be whitewashed and another municipality prohibited whitewashing. Differences in the interpretations of identical regulations by different municipal inspectors and in enforcement procedures also became apparent to dairymen and led to confusion. Furtherfore, when one inspector tried to enforce reasonable requirements, the shiftless type of dairyman would transfer to some other plant with a view to getting under easier inspection.

The lack of any effective work in dairy inspection by many small municipalities reflects on the effectiveness of work attempted on neighboring farms by larger municipalities. If the work is necessary for the protection of the health of the city dwellers, it should be essential to the health of persons in small communities. Generally the city people have the added protection of pasteurization whereas the rural folks may have to depend for their health protection on dairy farm inspection alone.

State inspection offers the answer to most of these difficulties. All farms producing fluid milk would be subject to the same inspection. Uniform regulations throughout the state enforced with uniform interpretations and procedures would do away with the unfavorable condition of one dairy farmer having to meet certain requirements at considerable cost, his neighbor having to comply with less rigid standards, and still another neighbor getting by without any enforcement of health regulations. Also under state-wide control, dariymen could not get under easier regulations or more careless inspection by shifting from one plant to another or by setting up routes in small villages. State inspection also offers the possibility of having all farm producing milk intended for edible purposes under the same inspection. There is some basis for the claim that if milk to be consumed in its fluid state must be under inspection, milk entering into other products intended for human consumption should be under similar inspection. State inspection also holds out the possibility for neighboring states to reciprocate in accepting each other's inspections instead of sending their inspectors across the borders to inspect the farms shipping milk to their states. Of course there needs to be some assurance that each state is securing equivalent enforcement which could be accomplished either through biannual surveys by the U. S. Public Health Service or by a technical commission set up by interstate agreement.

The advocates of home rule are not likely to feel that the state inspection of dairy farms is an infringement on local authority in sections where the problem has become acute through much overlapping of local milk sheds. They are more likely to take the attitude that this is a responsibility of which they should be relieved by the state. Municipalities should retain authority over the pasteurizing plants within their boundaries, over the examination of the raw milk delivered at such plants, and over the handling and distribution of milk within municipal limits.

Some objections have been raised to state-wide inspection on the grounds that it upsets economics. This argument generally comes from the people who feel that each municipality should protect its local milk market by building a fence consisting of peculiar local health requirements. There is considerable doubt as to the actual economic advantage of such requirements. There is no reason to believe that economic barriers are any more necessary or desirable in the case of fluid milk than of any other commercial product. As usual such barriers tend to lead to retaliation. For instance one city was urged by interested parties to pass an ordinance requiring the pasteurization of milk within the city limits. A large milk

dealer in a neighboring city who would be shut out by this requirement, threatened to stop buying his milk bottles from a plant in the first city which was all that was necessary to stop the passage of the ordinance. If health officials are to maintain the confidence of the public in their work, they cannot defend such arguments as the one that milk which has been demonstrated to be perfectly safe for consumption in one city is not safe for consumption in another because the farms producing it do not comply with some regulation peculiar to the other city.

Where municipalities are scattered, the work may well be done efficiently either by the municipality or the state. However, in many localities the overlapping of milk sheds has resulted in such a multiplicity of inspections of dairy farms as to deprive dairymen of reasonable latitude in the operation of their farms. In such instances unification of inspection under a single agency such as the state is highly desirable.

State *vs.* Municipal Control of Milk Supplies

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The question of the State versus municipal control of milk supplies has been considered pro and con in Indiana for many years. Naturally, the personnel employed by the State for inspecting farms is limited. Unfortunately, Indiana is not one of those states which has milk houses, barns with floors of impervious material, satisfactory water supplies, and approved sewage disposal facilities for every farm. Many farmers producing milk, even for fluid uses, have equipment consisting of a strainer, a pail, a shipping can, and a milk stool.

Up until July 1, 1941, the State made inspections of pasteurization plants and dairies distributing raw milk throughout the State. When the question of passing ordinances for local milk improvement was discussed, the city councils were under the impression that a State inspector checked their supplies three or four times per year so local inspection and control were unnecessary. Even the consumers had a sense of false security under such a system. The only way which we have found to remedy this condition was to discontinue completely the responsibility for the inspection of any local fluid milk supplies. We have assigned certain dairy sanitarians the task of working with local health departments in recommending a uniform milk ordinance, training local enforcement personnel, and unifying their work on a state-wide basis. Milk is produced, processed, and distributed in a local community. The local community should shoulder the responsibility for the cleanliness and safety of its milk supply.

Since discontinuing the responsibility for local inspection, the majority of the twenty-two cities in Indiana which are either selling or preparing to sell Grade A milk, have passed milk ordinances since 1941. We feel that the State, as well as the local community, has certain responsibilities. Milk and cream going into manufacturing channels, to be made into butter, cheese, evaporated milk, or milk powder, the bulk of which is not sold in a community, are definitely the responsibility of the State. And here the State personnel is not adequate to inspect all farms shipping into manufacturing plants. The responsibility for inspecting producing farms must rest upon the fieldmen of these plants. The State can be of assistance to the fieldmen in the coordination of the work of the various plants in the same manner as in the coordination of

work between local communities. Our activity should be confined to the inspection of the manufactured milk plants and to surveys of the farm supplies.

Naturally, we would have more uniformity if all farms were inspected from the State level. By the same token we would have more uniformity throughout the Nation if farm inspection were carried on from the Federal level. Inspection from the Federal level would not be tolerated by many states, and many local communities feel the same way about interference by the State in their local affairs.

If we expect to have uniformity and eliminate duplication of effort, work of the local communities should be coordinated by the State, and work of the states should be coordinated on a National basis by some Federal agency.

State Versus Local Milk Control

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If the question of state versus local milk control is considered from a public health viewpoint, the first question which arises is—which form of control will extend the benefits of milk sanitation to the greatest number of people? In theory, state agencies would seem more likely to accomplish a complete coverage. In practice, however, it is too often the case that state agencies, laboring under personnel inadequacies, are not able properly to administer their responsibilities. Since enforcement is as important as the law itself in a milk sanitation program, state control under existing conditions frequently creates a false sense of security among consumers and a reluctance on the part of local officials to enact ordinances and appropriate funds for a problem supposedly covered by state law.

It is generally conceded that frequent inspection and sample examination of milk supply are absolutely necessary to an efficient milk control program. This requires both adequate personnel and laboratory facilities. Yet it is not unusual to find states providing a single laboratory to serve an entire state. This condition makes it extremely difficult to transport milk samples from outlying areas with the result that an inadequate number of samples is obtained.

Since the disadvantages of state control are largely a matter of funds, development of an adequate milk control organization appears unlikely except by integrating the milk program with other public health activities. For example, the number of laboratories can be increased and the area served by them thereby reduced if other laboratory services are performed with the same facilities. In many areas, sanitarians are either gainfully occupied only part of the time or spend a disproportionate part of their time in travel unless other sanitation activities are included in their duties. If milk control is to be combined with general public health and harmonious relations are to prevail therefore, milk control should follow the general pattern of public health organization.

It is generally agreed among public health authorities that the best service can be rendered by local agencies. The advantages of this system to milk control are: Administration is local, necessary action can be taken without undue delay, the sanitarian has the backing of a local agency whose head is readily available to lend support, and adequate personnel and laboratory facilities usually result. Another great advantage of local control is the creation of local interest in milk sanitation. When the

authority for milk control is local the problem becomes local in nature and people, generally, are more interested in local affairs.

This does not mean that state agencies have no place in milk control. Milk sanitation programs show the most progress where a state department has given leadership and guidance to local officials. The problems arising from duplicate inspection and variance in requirements can be substantially avoided by a proper state program. In addition, state laws are desirable which strengthen a local ordinance without obligating the state agency to assume control. One such a law, for example, is the labelling requirement designed to preserve the integrity of grade designations in order to prevent unfair competition at the limits of a city and to protect the consumer from label misinformation resulting from maladministration of a milk ordinance by recalcitrant local officials. However, state laws which govern every phase of milk control, which are not accompanied by funds adequate for enforcement, too often serve as an obstacle in providing a safe milk supply.

It is believed that, in most areas and at the present time, the optimum development in milk sanitation results from the cooperative efforts of both state and local agencies with direct enforcement performed on a local basis.

A Discussion of Local Versus State Milk Control

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Theoretically, control of all milk supplies in a state under state laws or regulations, with all inspection done by state inspectors, should result in a greater aggregate and average improvement than local control. The advantages to state milk control include:

1. Inspectors may be selected for their technical knowledge of milk sanitation, and their work may be more nearly standardized than is possible with local inspectors.
2. State laws or regulations uniform throughout the state provide some protection to consumers in areas or communities too small to enforce local regulations; and permit freer interchange of milk between areas during milk shortages.
3. The cost of supervision per unit may be less.

The disadvantages include:

1. Loss, at least in part, of local interest and support. This is important in many communities and with most court officials. No law is enforced for long unless the public wants it enforced.
2. State laws and regulations must of necessity contain only minimum requirements which are practical for the least advanced areas of the state. They do not encourage more progressive communities to require additional things desired by local consumers, even when such additional requirements have direct public health significance.
3. Milk control has less appeal generally than many other more visible governmental functions such as highway buildings, schools, welfare work, etc. As a result, the funds appropriated for it are likely to be those left after the more popular and better organized groups have secured all they can. These funds may be inadequate for effective control. Even when they are a part of a general health department appropriation, it may be difficult to convince the State Health Officer of the need for adequate funds since only a small portion of milk-borne diseases are ever shown as such in morbidity or mortality reports. Other unweighable factors form a consider-

able part of the reasons for milk inspection.

4. State inspectors, particularly in less densely populated areas, are likely to have such large inspection districts that they are not readily available for contact by the consumer. This may be of little significance in large cities, but its importance increases with decrease in size of the community. Also, it is difficult for a particular dairyman to get in touch with the inspector when he wishes special aid or advice.

In many states, including Alabama, state laws of long standing definitely place authority for many regulatory powers, including milk control, in local governing bodies. In Alabama, the public health laws make the county health officer responsible for all health activities in his county, subject to general policies of the State Board of Health and State Health Officer, but more specifically to the policies and regulations of his county board of health. Other sections of the public health law authorize cities to adopt milk ordinances, but the enforcement of these comes under the health officer, in whose selection the city officials have no part. Health officers (until the recent acute shortage of doctors) are required by State law to devote their full time to health work, and many of them have had graduate training in public health. Milk control under this system has a number of disadvantages. These include:

1. Legislation for milk control is left to the discretion of the city officials. That this has not been a real problem is shown by the fact that practically every municipality in the state of 5,000 population or more, and many with smaller populations have adopted milk ordinances. With each group of city officials authorized to adopt whatever milk regulations they see fit, a wide diversity in requirements between cities might be expected. Actually this has not occurred since every milk ordinance in the state except three or four in the metropolitan area of a single county, are the milk regulations recommended by the State Health Department.

2. In rural counties, the person charged with milk inspection is usually selected for qualifications other than in milk sanitation since only part of his time is devoted to this activity. However, because he works under the immediate direction of a full-time health officer who has basic knowledge in the general public health phases of milk control, an inspector with less technical training can do reasonably efficient inspection, particularly when he has technically qualified state inspectors available for consultation when needed.

3. A rather wide variation in the quality of inspection sometimes occurs. Despite rather frequent milk ratings and checks by state inspectors, it has not been possible to reduce these variations to a satisfactory figure in a good many instances.

Some advantages of local milk control have been indicated above. Others are:

1. Cheaper cost of inspection per unit in smaller communities where a full-time health department employee who lives in the county does inspection.

2. More protection for progressive communities than would be probable under state regulations and inspection.

3. Retention of local interest in and responsibility for the program. Many persons and officials think this important.

4. Support of the inspector by the health officer and county medical association through the county board of health.

5. Ability to concentrate on any special milk problem to whatever degree needed.

6. Assistance of other health department employees in such things as promoting use of pasteurized milk, teaching nutritional value of milk, etc.

Milk Control in Vermont

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Nearly four decades ago the control of milk supplies in Vermont was placed in the hands of the local town health officers. Prior to 1908 sanitary supervision of milk was of a general nature. The fourteen counties in the state were subdivided into about 250 townships, each having its characteristic New England form of town government. The town officers included the Board of Selectmen, Town Clerk and Treasurer, Road Commissioner and the Local Board of Health with the Health Officer as its chairman. The local board of health in the towns and cities consisted of the selection of the town, or the city council, and the local health officer. The latter was appointed by the State Board of Health upon recommendation of the selectmen of the town or the city council.

The 1908 law, which was amended in 1912, required a local milk dealer to obtain a license for the sale of milk and cream. The law provided for sanitary inspections by the local board of health or the state board but appropriations were frequently insufficient or entirely lacking to carry out the requirements of the law. It was therefore quite common information that dealers sold milk without either a license or inspection. The majority of the health officers were laymen and had very little training or equipment to carry out a milk control program.

In 1919 the state was divided into ten sanitary districts with a physician as health officer in each district. Each physician was given the powers of the local boards of health in his district with such duties as were formerly carried out by the local town health officers. Jealousy on the part of the towns continually increased under this "Centralized Health Scheme" as it was called until in 1923 when township control again came into power and replaced the district system. The fault was not so much with the system as with the lack of system that took its place.

For sixteen years following the district health officer experiment, Vermonters "enjoyed" comparative freedom of sanitary milk control. No city or town had a full-time milk control official and only four cities had such officials on part-time employment. Less than half of the townships in the state did active milk control work in the way of taking samples for analysis and many retail milkmen sold "dip milk" from the can without a license or any inspection whatever. Many of these milkmen began selling their own milk when their products had been excluded from such city markets as Boston or New York because farm conditions did not pass the sanitary inspections from those cities. Milk that was excluded from large city markets did not make an entirely satisfactory grade of milk for consumption within the state. All samples taken went to the State Laboratory of Hygiene at Burlington for analysis. Transportation facilities were not satisfactory for shipment of all samples to a single central laboratory.

The present uniform state inspection law was enacted in 1939 and the township milk control laws were repealed. The state law was then and still is a uniform minimum law. Any city can adopt more rigid requirements than those in force by the state but cannot adopt less rigid regulations. All state regulations are made by the Commissioner of Agriculture subject to approval by the State Board of Health. The latter board is composed of three practicing physicians and a physician-secretary who is located in the state board of health office in Burlington. The enforcement of the present law and regulations is under the jurisdic-

tion of the Commissioner of Agriculture. Active control work is carried on by the six district inspectors and a supervisor who are all employees in the Department of Agriculture. Close cooperation is maintained with the state health office at all times. Samples are analyzed in the two state laboratories at Montpelier and Burlington and in half a dozen widely separated laboratories that are operated by private milk companies. Tests by private companies are made on a fee basis and include plate count, butterfat, phosphatase, coliform and milk serum agglutination of raw samples.

Improvements during the first year of state inspection included more than a hundred new milk bottling rooms, and as many more completely remodeled, more than 200 sanitary bottling and capping machines purchased to replace the cups, pitchers, and galvanized tanks formerly used to fill bottles, and thirty electric compressors placed in service about half of which were used to cool the nineteen walk-in coolers that were built. Thirty-nine new tubular coolers were installed, also thirteen new boilers and six hot water heaters. Thirty-nine new pasteurizers installed during the first fifteen months after the state law was passed indicates the trend toward pasteurization. In July 1939 when the law was enacted, 24 percent of the retail milk in the state was being pasteurized and the percentage is now slightly above 70. The number of licenses issued has decreased from 1,334 to 348 at the present time. An active campaign is in progress to obtain either pasteurized milk or in the small villages, raw milk from blood-tested, healthy herds.

There is at present practically no opposition to state milk control except in some small communities where there are a few people who still insist that pasteurized milk is inferior milk that has been "treated" and that raw milk is superior in every respect to the pasteurized. The present state control law has been in effect six years. The public in general accepts and supports the plan and consequently the purity and safety of the supply is constantly being improved. Increased pasteurization in the larger communities and herds free from Bang's infection for raw milk in small towns are the two major projects in the present Vermont milk control program.

Which Shall It Be—Local or State Inspection?

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The placing of the milk inspection service under local or state inspection is not the most important fact to be given consideration. The major item to consider is that we have a progressive milk inspection program. The success or failure of the program will not be determined by whether it is under local or state supervision but be more dependent upon the soundness of the program and the qualifications and ability of those enforcing the program. Uniformity has its merit, and a sound state standard enforced either locally or by state authorities would tend to work toward the uniformity that we all desire.

There can be no doubt, but that the protection of the milk supply of any community is one of the important functions if the health of the community is to be properly safeguarded. Whether the work be done by local people or by state employees is immaterial. The program for the community must be sound and it must satisfy the three major fundamentals essential to any milk program. It must provide an abundant supply of milk at a reasonable price, a price that will encourage

adequate consumption, and must also be a supply that will be properly safeguarded—100 percent pasteurized. Any attempt to enforce exceptionally high standards in the production or handling of milk that would be reflected in a high cost of the product to the public will naturally result in a lower consumption of milk. Any lowering in the consumption of milk over a period of time will be reflected in the general health of the community. Similarly any laxity or failure to provide proper safeguards around the production and handling of the milk is very apt to lead to the spread of disease through the community. Unless the supply of milk is sufficient to care for the nutritional needs of the community the general health would obviously be impaired.

It is evident that the provision of a safe, adequate milk supply that is reasonably priced, would not solely be dependent upon local inspection; nor in turn solely upon state inspection. Either type would be able to provide a milk inspection service that would meet the needs. The personnel engaged in the inspection of milk will determine the efficiency with which any well prepared and organized program is advanced. The type and number of persons engaged in the work become the vital factor—if insufficient persons are employed the program is a farce and merely a lot of words enacted to fool the public. Similarly, inefficient, improperly trained personnel will result in the failure of the milk inspection project. Personnel, that is, the number, is regulated merely by the amount of money available for the activity which of course is determined by the appropriation delegated to the milk inspection activity. The type of personnel is determined by the methods of their employment. If they are hired under true Civil Service they will without question be qualified from an educational standpoint and usually equipped with the proper background for the work. The standards of education, training, and experience, as well as physical requirements, can easily be set up under any Civil Service operation. These can be improved or changed as experience indicates. A minimum standard for those to be engaged in milk control work could well be promulgated and fostered by the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS and could serve as a guide for the employment of milk inspection personnel. The usual custom of a probation period for new employees will enable the elimination of personnel who, while properly trained, are not adapted for the work from a psychological standpoint, or those who have personal traits that would render their work inefficient or unsatisfactory.

The question of whether the inspection work of the qualified personnel is controlled locally, by the state, or for that matter by the Federal Government, is as previously stated, inconsequential. The problem is one of an adequate, properly trained personnel, efficiently enforcing a progressive, well-rounded, economically sound program of milk control for a prolonged period of time. Either type of control is successful and satisfactory when it provides the consuming public an abundant supply of safe, desirable milk, at a reasonable price.

State *vs.* Municipal Milk Control

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In considering the relative merit of state *vs.* municipal control of milk supplies, one is reminded of the old question as to which is the prettiest color for a horse. The answer is a fat horse. Good milk control is best, whether state or municipal. Either agency is only as good as the quality

and character of the personnel. Neither is satisfactory when political aspects are given first consideration. Unfortunately this has too often been the greatest difficulty with both agencies.

There is, of course, the old argument concerning centralized *vs.* local control. Hamilton and Jefferson fought over the issue and our politicians have been arguing about it ever since. To a large extent one complements the other. Neither may ever yield to the other completely. Perhaps neither should.

However, there are some aspects that bear consideration. When the state department is strictly under the merit system communities with population of less than about twenty thousand are usually handled much better by this agency. Smaller communities are unable to employ competent, full-time personnel. It has been aptly said that "a part-time anything is a full-time flop." This appears to be true in all but exceptional cases.

Both agencies have usually been at a disadvantage by appropriations too small to make adequate control possible. This has been especially true of state governments.

While it appears wasteful to have two agencies of government doing the same job—often under conflict—it does have its advantages. If a city fails to do the job properly there is the state to fall back on. If the state fails to exercise adequate control the city may do it under its own prerogatives.

Probably the best system would be to leave the smaller communities to the state. The state should then match funds with the cities, the latter doing the control work. The state should appraise the work of the city health department, withdrawing financial support if satisfactory standards are not maintained.

There is also another system working out exceptionally well in small communities. Several such communities within a fifty-mile radius associate themselves together, each contributing its proportionate share in employing a capable man and in maintaining the laboratory. The state may then give financial aid to help the unit and give it guidance.

The Public Health Control of Milk Supplies Through the Adoption of Local or City Milk Ordinances

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Administrative methods for the improvement of milk supplies are subjects of continuing review. Outbreaks of milk-borne disease occur chiefly in small communities where there is little or no milk control work and where the consumption of raw milk is the rule rather than the exception. Decreased incidence of diseases traced to milk and dairy products has followed the increase in pasteurization and the improvement of methods and programs of sanitary control of pasteurization plants and of dairies supplying milk for pasteurization.

In the administrative public health control of milk supplies, it would appear that health officials, including Federal, state, and local, have a coordinated function to perform and should incorporate in their program three major objectives: (1) to promote the proper pasteurization of as large a per cent of the total milk supply as possible, (2) to promote the proper sanitary production of that part of the milk supply which is to be pasteurized, and (3) to promote the safeguarding of the remaining part of the milk supply as far as raw milk can practicably be safeguarded. The full realization of these three objectives would materially reduce the number of milk-borne disease-outbreaks and would do much to

increase the consumer acceptance of milk and dairy products.

To accomplish these objectives, several approaches have been suggested and/or used in different parts of this country, compulsory national milk laws, compulsory state milk laws, and voluntary local adoption by the municipalities and local health districts of milk ordinances and regulations recommended by national and state health officials. It would appear at once that in a discussion of the relative advantages and disadvantages of a state system of milk control work in comparison with a municipal one, we are overlooking the very important need for a cooperative effort between the three government agencies, Federal, state, and local. It is believed that the above-mentioned objectives can best be accomplished through a coordinated Federal, state, and local program with each agency performing those functions best suited to its particular level. Briefly and in general, it seems logical that the Federal agency develop a uniform ordinance and code and undertake essential research activities; the state agency actively promote the adoption and enforcement of the ordinance by local communities; provide routine supervision of the local milk inspection program and lend advisory assistance to the local agency in relation to particularly difficult problems; the local agency assume responsibility for inspection of dairies and plants and enforcement of the provisions of the ordinance. The advantages of this type of program are as follows:

1. Our theory of Government assumes that we will promote the maximum practicable degree of local self government and local responsibility and self dependence. If centralization of other governmental activities is not desirable, then centralization of milk control work, or milk control work by state and Federal law should be discouraged.

2. It is very doubtful that state legislatures would appropriate sufficient funds to employ enough state milk inspectors to insure adequate enforcement of a complete state milk sanitation law covering both plants and dairy farms. The number of state milk inspectors required, in most states, would be entirely out of proportion to the rest of the state public health personnel.

3. If the state law was so worded that it could be enforced by both state and local inspectors, conflicts between the two would be very likely. Under such a setup, the local dairymen and plant operators would be at the same time responsible to two authorities who might and frequently would disagree.

4. If the milk control were primarily based upon state law enforcement by state inspectors, state political changes might threaten the entire milk sanitation program of the state. This danger does not exist where there is a program of local enforcement of uniform milk programs by local and city milk control officials.

5. Mandatory minimum state milk laws are apt to represent at least partly political compromise and thus be less perfect than a uniform milk ordinance recommended by the state for local adoption by cities.

6. Local health departments are apt to take a more direct interest in the enforcement of local milk control programs. The local milk control officials are centrally located and are familiar with every dairy under their supervision and can help solve the many problems that arise.

7. In Missouri, as well as in many other states, milk control work except on a local level, with advisory assistance from the state, would be contrary to the entire administrative plan for public health development, which is fundamentally designed to decentralize all public health work.

The first activities of the State Board of Health of Missouri directed toward the improvement of municipal milk sanitation were inaugurated in 1923

under the direction of the Division of Sanitary Engineering. Endeavors in this direction were deemed warranted principally for the following reasons:

1. A high infant mortality rate.
2. Requests from several unofficial civic organizations, such as commercial clubs and parent-teachers associations, for information regarding the quality of their respective city milk supplies.
3. Requests from city officials for assistance and advice relative to certain problems in milk sanitation.
4. Information from various sources indicating unsatisfactory or no city milk ordinances in many instances and ineffective enforcement of existing ordinances in practically every city investigated.

The program which the State Board of Health developed to improve city milk sanitation was fundamentally a plan for advisory assistance to the cities in controlling the sanitary quality of their milk supplies. To this end the assistance of the State Board of Health was made available to those cities that requested it. Following such a request a complete sanitary survey of the milk supply was made. This survey included an inspection of the dairies and milk plants serving a given city, together with bacteriological examinations of the milk. In conjunction with the survey, meetings with dairymen and other interested organizations were held for the purpose of discussing milk sanitation. Following the surveys, a report setting out in detail conditions found and making recommendations for their improvement was submitted to the city officials.

In general these early efforts in milk control work emphasized to the State Board of Health the following well-defined requirements of a satisfactory state milk sanitation program:

1. Frequent advisory assistance to the cities;
2. An ordinance that could be adopted and enforced by the city, and one so designed that the sanitary quality of the milk supply could be gradually improved without placing undue burdens on the individual dairyman, and so that it appeals to the average city official as being fair to all concerned;
3. An ordinance that may be adequately enforced with minimum recourse to the courts;
4. Adequate state personnel to advise and assist the local milk control officials.

In 1925 a Standard Milk Ordinance, fulfilling the above requirements was prepared with the idea of recommending it for adoption by cities. The plan of procedure did not vary from the former work except that the program was expanded and more careful supervision was possible. This program included, in general, three main features: first, the passage by a city of a milk ordinance known as the State Board of Health Standard Milk Ordinance; second, the appointment of a satisfactory local enforcement officer; and third, active assistance of the State Board of Health in the operation and enforcement of the ordinance.

Prior to March, 1930, 19 Missouri cities had adopted the State Board of Health Standard Milk Ordinance and provided for local enforcement of its provisions. Since 1930, 24 additional cities, or a total of 54 cities have adopted the milk ordinance up to the present time, in an effort to unify their milk control work and to improve the sanitation status of their milk supplies. The percentage of the total population in cities of over 1,000 population in the state served by the State Standard Milk Ordinance in 1937 was 22.3 per cent, in 1938, 62.2 per cent, and at the present time is 81.6 per cent.

The percentage of the total milk supply in State Standard Milk Ordinance towns protected by pasteurization was 58.8 per cent in 1937, 79.8 per cent in 1938, 80.5 per cent in 1939, and at the present time it is 93.3 per

cent. In 1939 the percentage of the total milk supply pasteurized in State Standard Milk Ordinance towns in the population group of 1,000 to 5,000 was 14.2 per cent. At the present time it is 75.3 per cent. In the 5,000 to 10,000 population group it was 37.2 per cent; at the present time it is 71.6 per cent. In the over 10,000 population group it was 83.6 per cent; at the present time it is 94.3 per cent.

In addition to the work with the State Sandard Milk Ordinance towns, considerable work has been done in the small cities, unincorporated towns and resort areas, where the number of dairies involved does not warrant the establishment of a milk sanitation staff in each of the communities. This work has been done through making milk control a function of the local county health unit. Such a plan of local milk control makes it possible to provide adequately for the public health supervision of milk supplies in all communities in the state however small or however large.

SUMMARY

The results of milk control work in Missouri through the coordinated efforts of the Federal, state, and local milk control agencies may be summarized as follows:

1. There are 54 cities having a population of 1,826,986 operating under the recommended milk ordinance.
2. The sanitary quality of the milk supply has shown a gradual improvement following the adoption of the program.
3. The increase in the percentage of the total milk supply pasteurized has steadily increased.
4. The voluntary adoption by the municipalities of local uniform milk ordinances places the responsibility of the enforcement upon the local health department, where it rightfully belongs. For this reason the local health departments and the local people are more apt to take a direct and conscientious interest in the enforcement of a local milk ordinance than they would in regulatory state provisions that are not dependent upon local supervision.

State vs. Municipal Dairy Farm Inspection

(The author is a nationally-known milk sanitarian.—EDITOR)

Dairy farm inspection, at the state level, is not a completely abstract ideal, as has been implied in discussions at meetings of the American Public Health Association and the New York State Association of Milk Sanitarians which have been held within the past two years. A number of state health departments include Divisions of Milk Sanitation, the staffs of which maintain so close a degree of supervision over the dairy farm inspection activities of the local health departments that it is difficult to visualize a state dairy farm inspection service of wider application or greater frequency. In some states a type of milk producer educational program and dairy farm inspection service, particularly for milk intended for evaporating, condensing, or drying, or for cheese, is maintained by the State Department of Agriculture. Although such programs do not completely fulfill the idealistic specifications visualized by proponents of the centralization of dairy farm inspection, the frequency of inspections by the state personnel is, in some states, considerably higher than are those in many milk sheds in which all dairy inspections are made by the personnel of municipalities.

There is, therefore, a considerable reservoir of experience from which to draw conclusions concerning the advantages and disadvantages of the proposal that ALL dairy farm inspection activities should be conducted

EXCLUSIVELY at the state level. It is, of course, obvious that a system which has been successfully developed to meet conditions in one section of the country might not be practically applicable in another section; conversely, a program which has failed in one area might, with slight modification, prove successful elsewhere. Consequently, the following analysis is confined to broad principles and generalities, it being conceded that certain of the advantages or disadvantages enumerated might prove to be the very reverse in specific localities.

The most frequently advanced reason for the centralization of dairy farm inspection at the state level is the frequent confusion resulting from multiple inspections of a certain number of dairy farms so situated as to be within the overlapping sheds of a number of markets. It must be presumed that the basic cause of any serious confusion resulting from multiple inspections is most probably a degree of conflict in specific requirements in the municipal milk ordinances enforced by the several milk sanitarians involved. The advocacy of centralization of dairy farm inspection implies an acknowledgement of the desirability of uniformity in milk production requirements; for a prerequisite of state-conducted inspections would necessarily be uniform, statewide, milk production requirements. The implication that such uniformity of requirements is obtainable only by centralization of inspection powers in the state indicates that the desire to "save face" is not solely an oriental characteristic. It would appear to be a quite proper function of a state health department to undertake the unification of the milk ordinances of municipalities within its borders. That having been accomplished, differences of emphasis upon detailed items of production requirements would subsequently necessarily be of a personal nature, not difficult of correction and elimination. If a milk producer is subject to inspection by municipalities in two or more states, with differing milk ordinance requirements, it is clear that complete clarification of any confusion due to conflict necessitates either a close similarity of state milk production laws or regulations, or a thoroughly cooperative understanding between the milk control agencies of the states concerned.

It is charged that existing localization of dairy farm inspection powers in municipal health departments makes possible the erection of artificial barriers to the flow of milk from new sources, whenever the receipt of such milk supplies would adversely affect the economics of the local dairy industry. Demands for the erection of trade barriers, predicated upon arbitrary technicalities of interpretation of the milk ordinance, generally originate in the local dairy industry. That such requests for protection, when occasion arises, will not be made after dairy farm inspection is centralized in the state, is hardly conceivable. Of course, such requests would not then be made of the local health officer and milk sanitarian. It would probably be unjust to insinuate that some advocates of state dairy farm inspection seek to shift demands for local protection from themselves to the state control agency, although such an impression might not be far-fetched.

The statement is made that considerable duplication of effort, and corresponding unwarranted expense, results from multiple inspections of a certain number of dairy farms, milk from which is sold in several communities. No data have been presented (in published discussions heretofore appearing), however, to indicate the proportions of the effort and dairy inspection costs of representative communities which actually fall into the category of "duplications." It is freely granted that there are, in many municipal milk sheds, numbers of such duplications, the numbers varying seasonally, and with agricultural, eco-

nomic, and population fluctuations. But, that such duplications constitute so large a proportion of the activities and cost of the dairy farm inspection service of any representative municipality as to be a dominant factor in the total effort or cost is subject to factual demonstration.

One argument advanced for dairy farm inspection at the state level is the need for control of the subsequent sale of milk supplies rejected because of poor quality or non-compliance with production requirements, which supplies now find markets in other municipalities, or in rural or vacation areas. This argument appears to be an indictment of the effectiveness of the milk control of the municipalities in which such rejected milk can find a market, or emphasizes the lack of milk control activities in certain areas, or indicates obliviousness (on the parts of those who make such charges) to the fact that a short interval frequently marks a major change in the quality, or improvement in production conditions, of a milk supply which has recently suffered rejection.

Reference has been made to the desirability of effecting sanitary control of the sources of the milk used in the manufacture of ice cream, butter, and cheese. The first step in an objective of such vast proportions should be the control of the sources of the milk from which the sweet cream used in ice cream is separated. This is currently being done in a number of states, usually under the direction of the State Department of Agriculture. In states in which programs for the improvement of the quality of milk for cheese-making are under way, the projects are generally activities of the Department of Agriculture. Advocates of centralization of inspection of dairy farms producing market milk urge, or suggest, that the activity be a function of the State Health Department. The assumption that the organization for dairy farm inspection at the state level, to control the quality of market milk, could readily be expanded to cover dairy farms producing milk for separation into sweet cream, for butter cream, and for cheese, is obviously predicated upon a lack of realization of the vast numbers of such farms which are involved—at least in a number of states, including New York, and takes no cognizance of the existing differences in the levels of production sanitation between dairy farms producing market milk and those producing milk for cheese or butter. Inspection of the latter types of farms presents a separate problem, of very considerable magnitude.

Advocates of centralized dairy farm inspection propose the absorption into the state inspection staff, without loss of seniority or pension rights, of those municipal milk sanitarians currently engaged—or mainly so—in dairy farm inspection activities. If instances of duplication of inspections are as numerous, in any areas, as is implied by some discussants, all of the transferred municipal milk sanitarians will not be needed in those areas, and some will have to be assigned elsewhere. Such re-assignment might or might not prove acceptable or convenient to individuals so affected. The transition from one system to the other would inevitably result in some disappointments and major readjustments. Furthermore, the aforementioned reflection upon the effectiveness of those milk sanitarians who permit the marketing in their jurisdictions of milk rejected by other milk sanitarians appears to have been overlooked or ignored in the recommendation that the state control agency absorb all municipal milk sanitarians engaged in dairy farm inspection. If the reflection is justified, the efficiency of the state inspection program will be decreased, or its administrative difficulties increased, in direct proportion to the percentage of such inefficient milk sanitarians employed by municipalities when the change is effected. If the number of such inefficient municipal personnel is sufficiently large to neces-

sitate the inauguration of a major change in the organization and direction of dairy farm inspection activities, the failure of the agency which is required to absorb such personnel is foredoomed.

There is evidently some modicum of effectiveness in municipally-sponsored dairy farm inspection, as currently practiced, else it would long ago have fallen into disrepute, and would have been discarded in favor of a more effective system. It is even possible—in spite of the derogatory charges leveled at it by discussants of this question—that municipally-sponsored inspection of dairy farms has certain advantages over inspection at the state level. (Throughout this analysis, references to municipally-sponsored inspection include services maintained by county health departments.)

Whenever a milk-borne outbreak of communicable disease occurs within the jurisdiction of a health department—or of an independently organized milk control agency—the responsibility for its occurrence and for its prompt control rests upon the administrative officer. It is only logical to reason that, if he is held responsible for failure to protect milk consumers, he should also be vested with control authority over the sources of the milk supply. The proposal to vest full authority over all dairy farms in a state agency would necessarily divest municipal health departments and other local milk control agencies of control powers over a very important segment of their total milk safety problem. (The situation would become most complicated were all dairy farm inspection powers vested in an agency other than the State Health Department.) Experience of the last decade indicates that most occurrences of milk-borne disease develop elsewhere than in municipalities with full-time milk control organizations. This record of local milk control—including dairy farm inspections—hardly warrants the divestment of dairy farm inspection powers which has been proposed.

In the more rural states market milk control has been a development of relatively recent years. In the more urban states milk control has spread, since about 1900, from the larger municipalities, where it first was applied, through those of intermediate size, until virtually all cities, and many towns and villages, enforce some degree of milk control. As a consequence, the principles of the sanitation of milk production are more deeply ingrained in those milk sheds in which dairy farms have longer been subject to inspection. Dairy farm inspection, at the state level, can not be inaugurated without a state law, or control agency regulation, applicable to all dairy farms, irrespective of the markets in which the milk is sold. Such a law or regulation must be enforced uniformly, whether or not the producers in a given area have previously been subject to sanitary regulation. There is serious question as to the ability of the state inspection agency to fix the level of production requirements, for all farms, as high as have been those of municipalities with a long history of milk control. Such an eventuality would undoubtedly result in the potential deterioration of the quality of the milk delivered to such municipalities, to the embarrassment of their health departments.

Except for a relatively small number of citizens who own and operate dairy farms in the environs of municipalities, dairy farm operators do not enjoy suffrage in municipal elections. Consequently, their aggregate influence upon city aldermen or members of the council or city commission is relatively slight, and their control over the milk production requirements incorporated in milk ordinances, and the manner of the ordinance enforcement, is insignificant. On the contrary, the reverse is the case with respect to the state legislature or assembly, and the state dairy farm inspection agency. Whether or not it is conceded by discussants of this question, up-state or down-state (as the case may be) agricultural in-

terests will inevitably exercise some degree of control or influence over the manner in which dairy farm inspection, at the state level, is conducted. Any experienced milk sanitarian can visualize the ultimate effect thereof.

Discussants of this question have referred to the absence of control over the quality of the milk sold for fluid consumption in some rural and semi-urban areas, as an added reason for the centralization of all dairy farm inspection in a state agency. The desirability of safe milk for all consumers, irrespective of place of residence, cannot be denied. But the proposal that the state should undertake the inspection of ALL dairy farms in order that those which supply rural and semi-urban areas may be controlled—incidentally, as it were—pictures the remedy for this particular problem as an undertaking of far greater magnitude than it need be. The control of these small and scattered milk supplies is definitely a distinct phase of the state-wide milk control problem. Would not the inspection of the relatively limited number of dairy farms supplying milk to such areas be a justifiable undertaking of the State Health Department—directly or through district health departments—without involvement in the mass inspection of all dairy farms?

Only brief or passing reference has been made to the manner of financing of the proposed increased inspection activities of the state, and it is not clear whether the proponents of centralization intend that the state legislature or assembly should appropriate the funds needed, or whether that state inspection agency should bill the municipalities or other local governing bodies for the services rendered, on a proportionate basis. Assuming that the former method of financing is preferred (being more advantageous to cities, towns, etc.), and the funds appropriated in some succeeding administration are insufficient to maintain the service efficiently (an economy administrtaion, or widespread producer dissatisfaction with the inspection policy, might have such an effect), it is not difficult to visualize the situation of a municipal health department which desires to maintain its milk control program at its normally effective level. The milk control budget will have been adjusted to state inspection of the dairy farms, and no funds will be available for the resumption of inspections which the state is unable to continue.

Milk quality control has developed to its current stage in this country as the result of evolution. Further developments and improvements will continue to be made by milk sanitarians now in service, and by succeeding generations. The most permanent—and least painful—progress will always result from evolution, and the consolidation of successive progressive steps. Too many of the hard-won benefits of current practice are likely to be sacrificed in revolutionary changes adopted without careful study.

A Review of the Milk Quality Program in Sheboygan, Wisconsin

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In 1931 following the establishment of a State Cooperative Laboratory of Hygiene as a unit of the Sheboygan Health Department, a milk control program was established, and a milk ordinance was drawn up and adopted. The control program consisted of dairy and farm inspection, sediment tests, and methylene blue reduction tests on producer milk samples taken at the dairy intakes and tested in the Laboratory. Standard plate counts, butterfat and solids-not-fat determinations were made on all bottled milk samples. Later coliform and phosphatase tests also were made on all pasteurized milk.

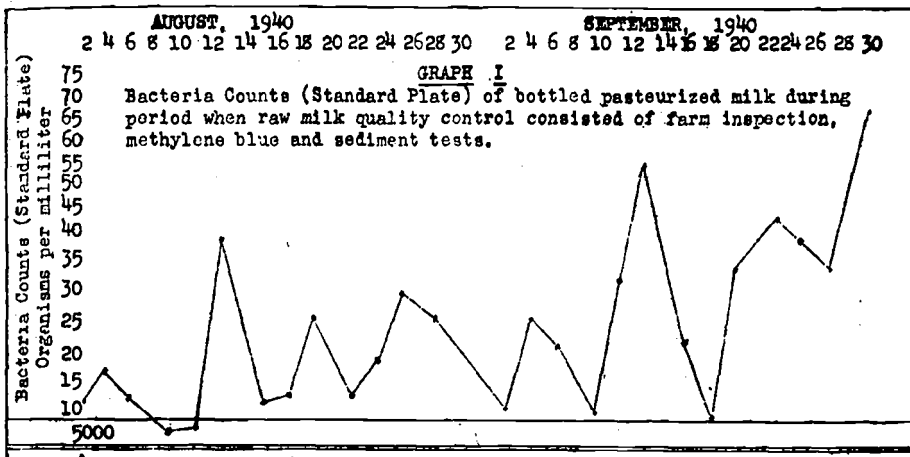
The program thus established resulted in a gratifying improvement in the milk supply during the next few years, but by 1940 this seemed to have reached a stand-still as measured by the standard plate count. In spite of satisfactory methylene blue and sediment test results of the producers milks, many standard plate counts made on the milk after pasteurization continued to be excessively high. Conditions at the plants as determined by inspections, and negative coliform and phosphatase tests indicated that the offending organisms were thermoduric, originating on the farm. As direct routine microscopic examinations and plate counts on the raw milk failed to demonstrate the presence of thermoduric bacteria satisfactorily, it became apparent that a culture control test of pasteurized producers' milk samples was needed to supplement the measures already in use. Since the milk was received from approximately 700 farms, frequent inspections were impossible.

The table following shows more conclusively than words, the value of culture control of producers' milk, and is the result of a four months study made at one of the large dairies in the city. At 2–3 day intervals standard plate counts were made of the pasteurized bottled supply prepared for local distribution. During August and September 1940 raw milk quality examination consisted only of routine farm inspection, sediment and methylene blue reduction tests. Graph 1 shows the results of the counts of bottled pasteurized milk made during these months. Early in October, standard plate counts also were made on pasteurized samples of producer milk and all milk showing an excessively high count was excluded from the fluid supply used for bottling, until faulty practices were corrected. Graph 2 represents standard plate counts on the bottled pasteurized milk during October and November 1940 and shows the results achieved. The standard plate count procedure was not satisfactory for this work since it required far more equipment, incubator space, and time to test the large number of samples that had to be examined.

The simple Meyers-Pence technique described in the *Journal of Milk Technology*, January and February 1941, seemed to fit our requirements best, and was adopted by the department as part of its control program. This procedure in brief consists of the inoculation of oval tubes containing about 4 ml. of melted media with .01 ml. producers' milk sample pasteurized in the laboratory. The inoculation is made by means of a calibrated platinum loop. After inoculation the media is slanted, cooled, inverted and incubated at 37° C. for 24 hours and the colonies counted under the Quebec counter. The maximum number of samples collected and tested at one time is 200 which can be pasteurized and cultured with our present equipment in about 1½ hours. The culturing alone takes two operators about 45 minutes.

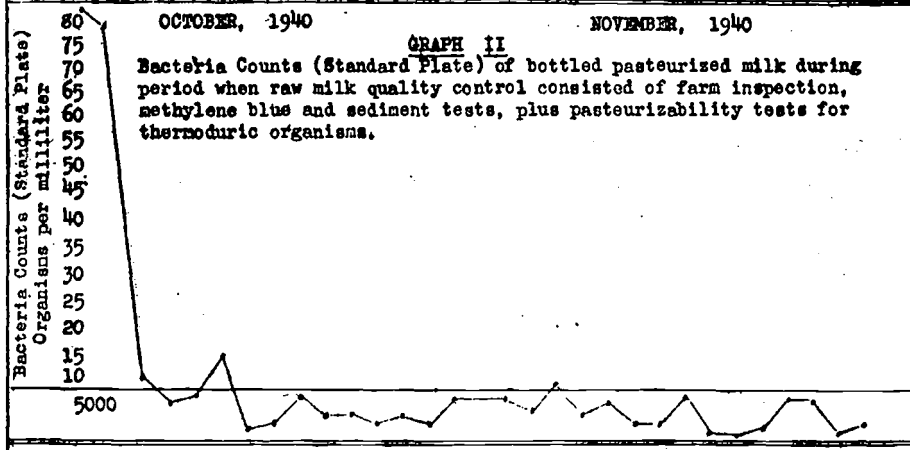
A tube colony count of 10,000 after 24 hours incubation has been set as the maximum for an acceptable producer milk for both the bottled and manufactured supplies. This count is not too low and easily can be reached by the conscientious producer. The majority of the counts of producers' milks fall well below this figure, most of them being less than 1,000. The producer having milk with a count of over 10,000 in the oval tube is notified by a special card which indicates the count and a list of probable causes. After a reasonable time a retest is taken and if this is still high, a visit of inspection is made to the farm, and recommendation made for correction of the condition found to be unsatisfactory.

Thermoduric bacteria while not dangerous in themselves, are nevertheless an index of insanitary production methods and their presence cannot be ignored. High thermoduric counts of the producers' milk points almost conclusively to some flaw in production technique, most often improperly cleaned equip-



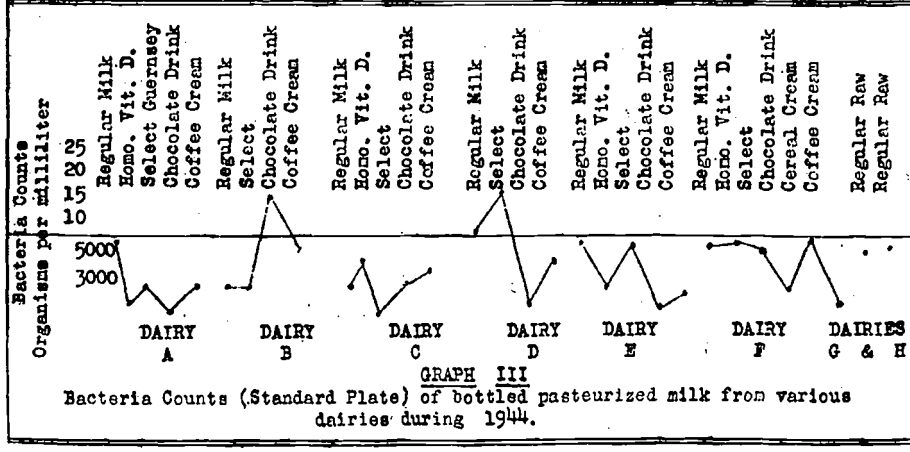
GRAPH I

Bacteria Counts (Standard Plate) of bottled pasteurized milk during period when raw milk quality control consisted of farm inspection, methylene blue and sediment tests.



GRAPH II

Bacteria Counts (Standard Plate) of bottled pasteurized milk during period when raw milk quality control consisted of farm inspection, methylene blue and sediment tests, plus pasteurizability tests for thermoduric organisms.



GRAPH III

Bacteria Counts (Standard Plate) of bottled pasteurized milk from various dairies during 1944.

ment. Proper sanitizing of equipment was often found to be the only corrective measure necessary. Many instances of wet hand milking were disclosed. Some of the producers having difficulties in meeting standards, upon recheck were found to have much higher counts on the morning's milk than on the evening's milk—thus exposing the fairly common practice of slighting the clean-up following the evening milking.

Since the producer can smell sour milk and see the dirt on a sediment disc, he can understand and appreciate the importance of proper cooling and necessity for physical cleanliness in its production. However, since he cannot see bacteria, he does not always accept the relation of careful handling and sanitization of equipment to a consistantly satisfactory supply. It must be proved to him through demonstration and explanation that conformity to production requirements will result in uniformly good milk.

The dairies serving in Sheboygan are now responsible for the conducting of the methylene blue and sediment tests on producers' milks. One of the largest dairies uses the direct microscopic examination semi-monthly on all incoming raw milk. The results of these tests are avaliable to the sanitarian. Periodic platform inspections, monthly oval tube colony count tests, farm and dairy plant inspections, and tests of the finished product are conducted by the Sanitarian and the Laboratory Director. Local distributors heartily support our inspection program. They have found it most helpful in eliminating many of the problems which tend to lower quality.

The results of this program on the quality of the bottled milk as shown by the laboratory checks on the finished supply are most encouraging. The average standard plate counts per ml. are now well below 10,000 and usually below 5,000. Graph 3 shows the results of the plate counts on all the types of fluid milk products from each dairy distributing in the city during the year 1944. Logarithmic averages of the monthly plate counts were made.

The recently revised City Milk Ordinance provides that after June 15, 1945, all milk and cream sold in the City of Sheboygan must be pasteurized. The use of the high temperature short-time pasteurization method is now permitted. The experience of other laboratories where this method of pastuerization is in effect shows that the use of tests for pasteurizability will aid in the exclusion of thermophylic organisms from milk pasteurized by the flash method.

VITAMIN A VALUE IN BUTTER

The average vitamin A value of the creamery butter produced in the United States is more than 15,000 International Units per pound, according to a recent study by State experiment stations, in cooperation with the Bureau of Dairy Industry and the Office of Experiment Stations, U. S. Department of Agriculture.

The study was begun in 1941 at the request of the Food and Nutrition Board of the National Research Council, to determine the normal variations in the vitamin A values of butter as affected by the season and regional feeding practices, and also included determinations on the vitamin A found in butter on retail markets after varying periods of cold storage.

When people eat as much butter as they did just before the war (about 18 pounds annually per capita) butter furnishes about 740 International Units per capita daily, or about 15 percent of the daily allowance recommended for normal adults by the Food and Nutrition Board.

The average vitamin A value per quart of milk consumed in all its forms is 1,530 International Units, and when the average consumption rate is 1.052 quarts daily per capita, as it was in 1941, milk and milk products furnish about 1,600 International Units of vitamin A daily per capita, or nearly one-third of the recommended allowance.

The fourteen States, where surveys of creamery butter have been completed, produce 64 percent of the national output. As was expected, a distinct difference was found between butter produced under summer and winter feeding conditions. About 36 percent of the creamery butter was "winter butter" with an average potency of 11,200 International Units of vitamin A per pound, and 64 percent was "summer butter" with an average potency of nearly 18,000 International Units per pound.

Storage tests on butter by seven State laboratories indicate that both carotene and vitamin A in butter are very stable and that no significant losses occur during ordinary periods of commercial storage at the usual storage temperatures. Carotene is the substance which gives milk and butter its natural yellow color and it is converted into vitamin A in the human body.

Studies of the butter sold on retail markets in four States indicate that, although the proportionate amounts of summer and winter butter may vary from month to month, the consumer can expect to obtain butter most of the time which compares favorably in average vitamin A potency with the over-all average of 15,000 units per pound for all the butter produced.

The study gives a practical demonstration of the fact that the vitamin A potency of milk and butter depends upon the quantity of carotene in the cow's diet. The cow's principal sources of carotene, from which she manufactures vitamin A, are the fresh green pasture grasses and other good quality roughages. Because of the wide variations in the vitamin A potency of the milk and butter produced under different feeding methods and at different seasons, the conclusion is that much can be done to improve the average annual potency of dairy products by adopting better feeding systems in winter, and possibly also in summer.

JOURNAL OF MILK TECHNOLOGY

Official Publication of the

International Association of Milk Sanitarians

(Association Organized 1911)

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Membership and Dues: Active membership in the Association is $3.00 per year, and Associate membership is $2.00 per year, including respectively all issues of the JOURNAL OF MILK TECHNOLOGY. All correspondence concerning membership in the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS, including applications for membership, remittances for dues, failure to receive copies of the JOURNAL OF MILK TECHNOLOGY, and other such matters should be addressed to the Secretary of the Association, C. SIDNEY LEETE, STATE DEPARTMENT OF HEALTH, ALBANY, N. Y.

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Associations Which Have Designated the
JOURNAL OF MILK TECHNOLOGY
As Their Official Organ

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Association News

CALIFORNIA PLANNING TO STREAMLINE POST-WAR MILK LAWS

A Statewide Dairy Legislation Study Committee has been formed and is now engaged in a comprehensive study of existing laws and ordinances including enforcement procedures pertaining to the health and sanitary aspects of milk control in California.

Organization of the Statewide Committee is the result of a resolution adopted several months ago by the California Dairy Council instructing its veteran secretary, Sam H. Greene, to make all necessary arrangements for selection of a representative membership, a task well and speedily performed.

The Statewide Committee totals approximately one hundred members, and is divided into two sections, North and South. Organizations represented on the Committee include producers, distributors, health officers, inspectors, State Bureau of Dairy Control, Division of Dairy Industry College of Agriculture and State Department of Public Health. The actual work is being done by three sub-committees appointed from the membership of the large Committee. These sub-committees are as follows:

(1) Sub-Committee on Study of State Code;
(2) Sub-Committee on Study of City and County Ordinances, Northern;
(3) Sub-Committee on Study of City and County Ordinances, Southern.

In addition, we have other sub-committees appointed to study certain specific and technical problems.

The study is scheduled to be continued for at least a year or more and

a report on findings and recommendations to be submitted by the Committee before the end of 1946.

Although it is generally conceded that California has made an outstanding record in the field of milk sanitation under its present milk control program initiated about thirty years ago, it is also recognized that changing conditions have made obsolete many provisions and practices of the pioneering period, and that more uniformity is desired.

The study program has met with general approval of industry leaders and health and milk control officers throughout the state as a constructive approach to the problem of streamlining post-war milk laws. Uniformity in health and sanitary requirements, coordination in enforcement procedures, and standards of quality that will justify the utmost of public confidence in dairy products are the primary objectives.

H. C. E.

WISCONSIN MILK SANITARIANS ASSOCIATION

The value of the Wisconsin Milk Sanitarians Association to the profession is clearly indicated by the steady increase in the membership of the Association. Our membership at the present time is approximately 200. In order to be of *greater service, the continued growth of the organization is important.* The need of uniformity in procedures and regulations, and the need of keeping abreast with new developments is apparent to all Sanitarians. The members of the Wisconsin Milk Sanitarians Association should *take every opportunity to acquaint others* with the organization's program.

The Association's request for a permit to hold a meeting tentatively scheduled for May 24th at Madison was denied by the Committee on Conventions of the Office of Defense Transportation. It is the hope of the Sanitarians to hold a meeting as soon as conditions permit so that pertinent problems may be discussed. Among these may be considered:

(a) The problem of milk supply inspections for small communities.

(b) The relation of the Sanitarian and milk quality standards in out of state markets to Wisconsin quality standards.

(c) The potential effects of ensuing legislation or food standards on the activities of Milk Inspectors in Wisconsin.

(e) The development of a special educational program for Milk Sanitarians.

A meeting of the Executive Committee was held in Madison on May 11th. At this meeting it was decided to issue a series of manuscripts for the Wisconsin Assoriation members. This series will consist of papers about Wisconsin activities of interest to the Wisconsin Sanitarians, and will be issued quarterly. K. G. Weckel and E. Wallenfeldt of the University of Wisconsin were appointed editors. These publications should be of value to the members and should stimulate greater interest in the organization.

C. O. WIDDER, President.

PRESIDENTS OF THE INTERNATIONAL ASSOCIATION OF MILK SANITARIANS

C. J. Steffen	Wilwaukee, Wis.	1912–1913
C. J. Steffen	Milwaukee, Wis.	1913–1914
A. N. Henderson	Seattle, Wash.	1914–1915
Claude F. Bossie	Omaha, Neb.	1915–1916
Wm. H. Price	Detroit, Mich.	1916–1917
Alfred W. Lombard	Arlington, Mass.	1917–1918
James O. Jordan	Boston, Mass.	1918–1919
Ernest Kelly	Washington, D. C.	1919–1920
C. L. Roadhouse	Davis, Calif.	1920–1921
H. E. Bowman	Somerville, Mass.	1921–1922
George E. Bolling	Brockton, Mass.	1922–1923
J. B. Hollingsworth	Ottawa, Canada	1923–1924
Thomas J. Strauch	Richmond, Va.	1924–1925
G. C. Supplee	Bainbridge, N. Y.	1925–1926
W. A. Shoults	Winnipeg, Canada	1926–1927
Ira V. Hiscock	New Haven, Conn.	1927–1928
Howard R. Estes	Cleveland, Ohio	1928–1929
Ralph E. Irwin	Harrisburg, Pa.	1929–1930
A. R. B. Richmond	Toronto, Canada	1930–1931
William B. Palmer	Orange, N. J.	1931–1932
Horatio N. Parker	Jacksonville, Fla.	1932–1933
Paul F. Krueger	Chicago, Ill.	1933–1934
C. K. Johns	Ottawa, Ont.	1934–1935
George W. Grim	Ardmore, Pa.	1935–1936
John G. Hardenbergh	Chicago, Ill.	1936–1937
Alexander R. Tolland	Boston, Mass.	1937–1938
Victor M. Ehlers	Austin, Tex.	1938–1939
Paul B. Brooks	Albany, N. Y.	1939–1940
Leslie C. Frank	Washington, D. C.	1940–1941
Fred W. Fabian	East Lansing, Mich.	1941–1942
C. A. Abele	Chicago, Ill.	1942–1943
C. A. Abele	Chicago, Ill.	1943–1944
Russell R. Palmer	Detroit, Mich.	1944–1945

HORATIO N. PARKER RETIRES

Horatio N. Parker, president of the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS in 1932–1933, has retired from his position as city bacteriologist and chemist for the City of Jacksonville, Florida, since 1918, becoming effective October 15.

Dr. W. W. Rogers, city health officer, in presenting Mr. Parker's request for retirement, said: "Dr. Parker has been one of the foundation rocks of the city health department for a generation, and has been greatly instrumental in shaping its policies and improving its services to the status of its present operations. In his chosen field he has distinguished himself throughout the nation, and in the years of his greatest productiveness he had no superior in the practical function of a division of pure foods and laboratories. Dr. Parker has rendered over a period of 27 years outstanding service to this city" (Jacksonville, Fla.). Each of the commissioners added words of praise for Mr. Parker's work.

CONNECTICUT ASSOCIATION OF DAIRY AND MILK INSPECTORS

A short course in "Dairy and Food Housekeeping and Sanitation" was given by the Connecticut Association of Dairy and Milk Inspectors, in cooperation with the Department of Dairy Industry of the University of Connecticut at Storrs, Conn., on June 21, 1945. Over 135 were in attendance.

The opening remarks of welcome were made by W. B. Young, Acting Dean of Agriculture and Director of short courses of the University.

The morning program got under way with "Sanitation and Housekeeping" with Leonard R. Dowd, Associate Professor of Dairy Industry, heading a panel consisting of Frank Herron, Easton Smith and Harold Neuman. This discussion was educational, timely and it was well received.

The afternoon program was divided into two sections: Food and Dairy. The food program included E. B. Noonan who talked on "Mobile Laboratory Service"; Richard Eglinton discussed "Laboratory Control," and a motion picture with comments on Restaurant Sanitation was presented by Lieutenant C. M. Moss, U. S. Public Health Service of New York.

The Milk Program for the afternoon was in the form of a melodrama entitled "The Farmer's Dilemma" or "It Happens in the Best of Milk Houses." It was presented by the following cast in the order of their appearance:

Farmer Brown.....John Sermet
Conn. Milk Producers' Assn., Hartford, Conn.

The Tired Hired Man...H. Clifford Goslee
Supervisor of Milk Inspectors, State of Conn., Hartford, Conn.

The Clean-Em-Up Inspector.E. O. Anderson
President, Conn. Association of Dairy and Milk Inspectors and Associate Professor, Dairy Industry, Univ. of Conn., Storrs, Conn.

Cow Accessories Before the Fact:
E. A. Blakelock, Keiner-Williams Stamping Co., Boston, Mass.

Herbert Ewell, Pennsylvania Salt Co., Boston, Mass.

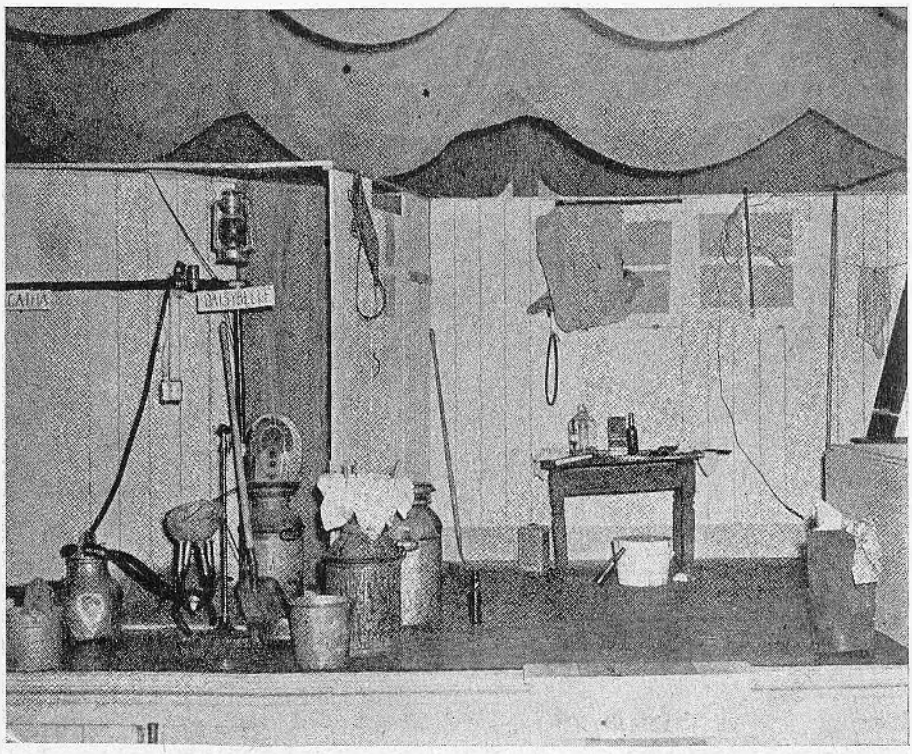
Harry R. Hamilton, The De Laval Separator Co., Glastonbury, Conn.

The Assistant Tired Hired Man..G. C. Graf
Assistant Extension Dairyman, Univ. of Conn., Storrs, Conn.

Act 1

The Farmer and His Tired Hired Man demonstrate the way they produce high count milk. Their use of old worn out equipment, their slipshod way of using a milking machine and their lack of proper methods of cleaning up can clearly be seen in photograph No. 1.

But Farmer Brown and his hired man seemed satisfied with their methods until the new milk inspector calls to check on the cause of their high counts. The inspector sells the farmer on the idea of changing his ways and suggests calling in outside assistance, men who are in a position to give good practical advice. An impromptu meeting was arranged in the milk house. Present were the Farmer and his hired man, the milk inspector and three fellows representing the milking machine industry, the chemical industry and the dairy equipment industry. A real "knock-down-drag-out" session followed. The reason for Improved Milking, proper equipment, proper knowledge and use of Soapless Cleansers and chlorine were discussed and that the use of all these things were necessary to produce low count milk. Farmer Brown begins to see the light and the scene closes as Farmer Brown says he is going to do some changing as the result of our discussion.



SCENE FROM ACT I

Farmer Brown's Milk House Before Cleaning Up

Act 2

As the curtain rises, a new hired man is just preparing Farmer Brown's last cow. He is washing the udder with hot water, he uses a strip cup and he professionally applies a new milker unit. He turns an egg timer and in less than three minutes he machine strips and removed the milker unit. Farmer Brown has started his herd on the Improved Milking Program. Picture 2.

The hired man takes his unit and other milking equipment into the milk house and does a wonderful job of washing all of his equipment. He can do a good job because Farmer Brown has not only cleaned up his milk house but he has installed:

1. A new two compartment wash sink.
2. A new hot water heater.
3. Has purchased good brushes for washing equipment.
4. Has supply of soapless cleanser and proper sterilizer and knows how to use them.
5. Has purchased a non-freeze solution rack.
6. Installed can and pail rack.
7. The hired man has been trained in proper methods of sanitation.

As the washing up is about completed, Farmer Brown and the Milk Inspector come into the milk house. They discuss the value of each piece of new equipment that has been installed. They stress the importance of proper milking methods, proper equipment to do the job and the proper use of chemical sterilization, which together with proper cooling, cannot help but result in the production of quality milk.

Again, the importance of the cooperation of the farmer, the milk inspector, the hired man and representatives of the Dairy Industry was stressed. Working together, they can solve any problem on the farm or at the dairy plant.

SCENE FROM ACT II

Farmer Brown's Milk House After Cleaning Up and Securing New Equipment

Cast from left to right: Harry Hamilton, De Laval Separator Co., Glastonbury, Conn.; E. O. Anderson, Professor of Dairy Industry, Storrs, Conn.; Clifford Goslee, Supervising Inspector, Hartford, Conn.; John Seremet, Conn. Milk Producers' Assoc., Hartford; E. A. Blakelock, Keiner-Williams Stamping Co., Boston; Herbert Ewell, Pennsylvania Salt Co., Boston. Insert: G. C. Graf, Assist. Dairy Extensionman, Storrs.

In Act 1, mistakes in milking and washing procedures were intentionally made. The audience were asked to write down these mistakes as they occurred. The response was splendid and they entered into the spirit of the occasion. They found plenty of mistakes.

A discussion period followed the melodrama and it was interesting to see how much of the material we gave them met with their approval. This was especially true of the washing of the milker unit and the recommendation for the use of lye in the solution rack.

In the evening, after a business meeting, one of the Association members, Herbert S. Ewell of Boston, Mass., and representing the Pennsylvania Salt Company, entertained us for a good full hour with his feats of magic, ending with one which literally brought down the house. He produced what seemed to be unlimited quantities of cigarettes from what seemed an empty box.

E. O. ANDERSON
Department of Dairy Industry
University of Connecticut

Correspondence

The following is taken from a letter which Mr. Leete received recently from Major A. J. Kranaskas, Acting Chief of Party, The Institute of Inter-American Affairs, Division of Health and Sanitation, Montevideo, Uruguay.

I have been receiving the *Journal* regularly and find it as interesting as it always has been.

There are several veterinarians in Montevideo who are engaged in milk sanitation work for the City and National Government, whom I am planning to ask to join the Association. What do you think of the idea? Personally, I am of the opinion that it would be well to have several Association members in Uruguay.

It is now fifteen months that I have been in this country, and during that time I have had a chance to study their milk sanitation program quite extensively. Some of these days, when I catch up on my work, I intend to write an article on milk sanitation in Uruguay, which may be of interest to members of our Association and other persons doing milk control work in the States.

No Convention This Year

NEW MILK TECHNOLOGY COURSE

The Department of Chemical Engineering for the Polytechnic Institute of Brooklyn announces the introduction, for the academic year 1945–46, of a new graduate course on the *Technology of Dairy Products*. This course, designed to cover the technological, sanitary, and manufacturing aspects of the production of milk and milk products, is to be given under the direction of Dr. Morris B. Jacobs, Senior Chemist of the Chemical Laboratories of the Department of Health of the City of New York. Dr. Jacobs is well-known as a contributor in the field and as the author of the treatise on the chemistry and technology of food and food products. In this course Dr. Jacobs will deal with the physical and chemical properties and composition of milk, and with its pasteurization, fortification homogenization, bottling, and marketing. Attention will be given to the manufacture of cream, butter, cheese, and ice cream and other frozen desserts, as well as to the evaporating, condensing, and drying of milk and milk products. Special emphasis will be given to the bacteriological and chemical control of these manufacturing steps. The course will be given at the graduate level for people with complete training in chemistry and chemical engineering. The course of lectures is scheduled for Wednesday, from 6:00 to 8:00 P.M. Registration will be carried on during the week of September 24, and classes will begin on Wednesday, October 3. Further details may be had from the Office of the Graduate School, Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn 2, New York.

Industrial Notes

Diversey Personnel Changes

H. A. Reiger, formerly a district manager for the Eastern Division of The Diversey Corporation, has been made division manager of that company's North Central Division. He will have his headquarters at Diversey's Minneapolis office, 1906 Foshay Tower.

R. C. Perry has been appointed district manager for the Eastern Division of The Diversey Corporation. He was formerly a senior field service representative in Diversey's Southwestern Division where he serviced the Nebraska area. Mr. Perry will make his headquarters at Syracuse, N. Y.

New Oakite Product

Oakite Products, Inc., have issued a new booklet describing their new product, Tri-San. This product, in one single operation, is claimed to deodorize, clean, and disinfect surfaces to which it is applied. It is particularly recommended for use in the food industry.

Pennsylvania Salt Markets New Product

Pensalco, an inhibited descaling agent, has recently been placed on the market by Pennsylvania Salt Manufacturing Company, Philadelphia, Pa.

Pensalco is a solvent for scale formed by hard water and alkalies on can washers and bottle washers. It dissolves the mineral constituents of milkstone leaving milk residues easily removable.

Packed in 12 and 13 gallon glass returnable carboys, Pensalco is efficient and economical to use. One carboy (12 gallons) prepares 72 gallons of the descaling solution.

Detailed instructions are available for both can washers and bottle washers.

This company has also recently published an attractive pamphlet, "The B-K Plan For Dairy Equipment," which gives pertinent information on the use of B-K chlorine-bearing bactericide for bacteria control on dairy farms.

Copies of this booklet can be secured by writing to the company.

SCHMITT PROMOTED BY CORN PRODUCTS

The promotion of Edward W. Schmitt to the position of Bulk Sales Manager is announced by Corn Products Sales Company. Previously he served as division Sales Manager for the confectionery, bottling, canning, and meat packing industries.

Mr. Schmitt joined the Sales Department of the Company in 1912 and since then has devoted his efforts entirely to sales and sales development work.

In his new capacity Mr. Schmitt will assume the responsibility for bulk sales development and the introduction of new industrial products perfected by the Company.

GEORGE E. BOLLING, 1875–1945

George Everett Bolling, president of the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS during 1922–1923, died on May 20, 1945, in his seventieth year, after an illness of a year and a half.

Mr. Bolling was born in Brockton, Massachusetts, on June 17, 1875. He graduated from the local public schools, and attended Brown University in 1893 to 1894, and then in special courses at the Massachusetts Institute of Technology, Harvard University, and the University of Pennsylvania. While awaiting opportunity to enter the West Point Military Academy, he was appointed assistant city chemist for Brockton, and two years later was made city chemist, holding this position for nearly fifty years.

He established the health and water department laboratory for Brockton in 1909. For several years he lectured at the Massachusetts Institute of Technology on "Public Health Laboratory Methods." In 1918 he served as a lieutenant, later as captain, in the Sanitary Corps, U. S. Army, as chief of laboratory work at Camp Fremont, Cal.

He collaborated with the U. S. Department of Agriculture in the analysis of distilled liquors. For 18 years he was Chairman of the Laboratory Methods Committee of the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS. For 13 years he was the chemist in charge of Brockton's sewage disposal plant, and for 22 years lectured in the nurses' training course at the Brockton City Hospital. In 1935 he was one of the serologists selected by the U. S. Public Health Service for collaborative work in evaluating serodiagnostic tests for syphilis. He authored the measure, which became a law, that removed appointment and tenure of office of milk inspectors from politics, placing them under the state civil service.

He was affiliated with the following organizations: American Chemical Society, Society of American Bacteriologists, American Public Health Association, INTERNATIONAL ASSOCIATION OF MILK SANITARIANS, and Massachusetts Milk Inspectors' Association.

New Members

ACTIVE

Bortree, Alfred L., Michigan State College, East Lansing, Mich.

Forster, George E., Asst. Chief, Div. of Laboratories, State Dept. of Public Health, 1800 W. Fillmore St., Chicago, Ill.

Male, Major L. H., Milk and Food Consultant, U. S. P. H. Service, District 4, 707 Pere Marquette Bldg., New Orleans 12, La.

Manera, Anthony Bartholomew, Inspector of Dairies, Health Department, 654 Mt. Pleasant Ave., Providence 8, R. I.

Wallace, William W., Assoc. Chemist, U. S. Food and Drug Administration, 531 New Custom House, Denver 2, Colo.

ASSOCIATE

Adams, George J., Sales Representative, Sealright Co., Inc., 10445 So. Talman Ave., Chicago 43, Ill.

Booth, Edward, Consultant in Dairy Organization and Technology, 420 St. Kilda Rd., Melbourne, S. C. 2, Australia.

Brann, O. M., Treasurer, Johnson Creamery Co., Bloomington, Ind.

Bunzol, Chas. J., Dairy Inspector, City Board of Health, 2419 N. Halstead St., Chicago, Ill.

Carroll, Daniel, Dairy Inspector, Chicago Board of Health, 913 No. Michigan St., Plymouth, Ind.

Hanawalt, Dr. Wm. L., Veterinarian in Charge of Milk Control, State Health Department, P. O. Box 1131, Louisville 1, Ky.

Horner, George M., Fieldman, Momence Milk Coop. Assn., Lake Village, Ind.

Ice, Bernard E., Field Representative, Babson Bros. Co., 815 Scott St., Wheaton, Ill.

Nelson, Edward M., Fieldman, Twin Ports Co-op. Dairy Assn., 1618 16th St., Superior, Wis.

Owen, Robert L., Procurement Manager, J. D. Roszell Co., 736 So. Washington St., Peoria, Ill.

Ratz, A. J., Salesman, Sealright Co., Inc., 7628 Phillips Ave., Chicago 49, Ill.

Schroeder, Paul H., Fieldman, First Iowa-Grant County Dairy Improvement Assn., 213 Clarence St., Dodgeville, Wis.

Selsor, James Q., Field Representative, The Diversey Corp., 1411 Maryland Ave., Sheboygan, Wis.

Slater, Stewart, 40-12 158th St., Flushing, L. I., N. Y.

Smiley, John A., Fieldman, Kankakee Pure Milk Co., 602 So. Greenwood Ave., Kankakee, Ill.

Stein, John J., Pasteurizer and Quality Control, Hovertown Farms Dairy, R. F. D. 1, Coplay, Penn.

Stiritz, B. A., Mgr., Kankakee Pure Milk Co., 396 So. Schuyler Ave., Kankakee, Ill.

Turgeon, J. P., District Manager, The Diversey Corp. (Canada), Ltd., 4340 Boulevard Pie IX, Montreal.

Weber, Hiram H., Employee, Kraft Cheese Co., 19-C East State St., Hartford, Wis.

White, John P., Field Service Engineer, The Diversey Corp., 2421 Palmer Ave., New Orleans 15, La.

Whitmore, Burton F., Gen'l Supt., J. D. Roszell Co., Peoria, Ill.

CHANGES IN ADDRESS

Bellin, T/Sgt. Walter P., from APO 709, San Francisco, Cal., to APO 75, c/o Postmaster, San Francisco.

Brunner, Lt. T. F., from Fort Omaha, Neb., to 1st Lt. T. F. Brunner, 01845685, SMDET, Fitzsimons GH, Denver, Colo.

Eklund, Edmund S., from Hampshire, Ill., to Maple Park, Ill. Rest of address the same.

Engendorff, Sgt. O. H., from Rapid City, So. Dakota, to Sgt. O. H. Engendorff, 36251083, Veterinary Service, Sq. M, C. A. A. B., Clovis, New Mexico.

Garrison, E. R., from Columbia, Mo., to c/o Golden State Co., 425 Battery St., San Francisco, Cal.

Guerin, Wm. J., from Chicago, Ill., to 6542 So. Fairfield Ave., Chicago, Ill.

Gust, Alex A., from Waukegan, Ill., to 624 Ridgland Ave., Waukegan, Ill.

Hannett, G. E., from Syracuse, N. Y., to R. D. 1, Clyde, N. Y.

Miller, J. Raymond, from 1007 So. Wright St., Bloomington, Ill., to 103 N. Robinson St., Bloomington, Ill.

Minkin, Joseph L., from New Orleans, La., to 9112 Palmetto St., New Orleans, La.

Morgan, Dr. Jas. W., from Chicago, Ill., to 476 Preston Ave., Elgin, Ill.

Shaw, Alex G., from State Dairy and Milk Inspector, Tampa, Fla., to Borden-Poinsettia Dairy Products Co., Tampa, Fla.

Stebnitz, Dr. V. C., from Skokie, Ill., to 6930 N. Clark St., Chicago 26, Ill.

Ward, Willard E., 14 Town Hall, Brookline, Mass., to 113 Griggs Rd., Brookline 46, Mass.

"Dr. Jones"—Says—*

One of those awful hot days recently I was up in the city and dropped into a restaurant for lunch. When I first went in I thought I'd got in the wrong door: got in the refrigerator by mistake. But what it was: this place was air-cooled and they were overdoing it. I must say it felt kind of good at first but I hadn't been there long before I began feeling chilly and when I went out on the street again, the sudden change of temperature—it felt hotter'n ever.

A fellow was telling me the other day: he was in a Pullman car somewhere out in the Middle West. It was 104 outside and something like 70 in the car: thirty odd degrees difference. He told the porter it was too cold and, instead of regulating the air-cooling business, he shut it off. Then it warmed up so it was worse'n if there hadn't been any air-cooling.

And, you know, that's one trouble with these innovations: they don't always innovate their ideas to go along with 'em. Air conditioning and all that, in its place it's fine. But they seem to forget, sometimes, that the condition of the people that use these places needs to be considered, too. If it's intelligently regulated to fit the existing conditions, it'll promote comfort and, maybe, health as well. It it's overdone it could defeat its purpose and do harm.

A strong and healthy person can stand extremes of temperature, if it don't last too long, without any serious damage. But the body has to adjust itself to changes—the heat-regulating mechanism and all. Exposure to high temperature—more blood goes to the surface capillaries, and there's other changes. When it's cold the blood concentrates in the internal organs, blood pressure rises and body fuel-consumption increases. So, going in and out repeatedly, from one extreme to the other, it puts a big strain on the body mechanism, to say nothing of increasing susceptibility to colds and so on.

If it's 90 outside, they tell me 12 degrees lower inside should be the limit—and other temperatures accordingly. Yes, from Florida to the northern Adirondacks in three or four days—that's swell. But we wouldn't want to be shuttling back and forth every few minutes.

PAUL B. BROOKS, M.D.

* From *Health News*, New York State Department of Health, Albany, July 23, 1945.

No Convention This Year

Inquiry by Secretary Leete to the War Convention Committee of the O.D.T. in Washington to determine whether or not we could hold our postponed meeting now that the war is over has brought the reply that the only conventions which will be authorized are those at which less than 150 out-of-town members would be in attendance. This ruling excludes the possibility of our scheduling a convention this year, and states that there was no possibility of this restriction being made less severe before the end of the year.